# Mandan Advanced Metering Infrastructure (AMI) System Update Project – Phase 2

City of Mandan, North Dakota

Project Proposal for Bureau of Reclamation Funding Announcement

## Funding Opportunity Title

WaterSMART Small-Scale Water Efficiency Projects

## Funding Opportunity Number

No. R24AS00059

## Applicant:

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## Unique Entity Identifier

Organizational DUNS: 022227719
UEI: FB4EB5BGBJK6

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The mandatory federal forms (SF424 family) were included prior to the title page of this proposal.

## 1.1 Executive Summary

**Date**: July 8, 2024
**Applicant Name**: City of Mandan
**City:** Mandan
**County**: Morton County
**State**: North Dakota
**Applicant Category:** Category A

The City of Mandan (City), located in central North Dakota, has an aging Automated Metering Infrastructure (AMI) system in need of infrastructure upgrades to better track the City's water usage. There are 3,820 Invensys bronze water meters that are currently being operated in the City of Mandan's water meter network that need upgrades due to the following reasons identified by public works staff:

- Improved Measuring Accuracy: The existing bronze meters are beginning to present inaccurate water usage readings.
- Leak Detection/Data Analytics: The existing bronze meters do not have capabilities to alert staff and consumers of water leaks, preventing the City from making informed decisions about water management.

For the Mandan AMI System Update Project – Phase 2, the City will be replacing a portion of these aging meters. Upgrading to new meter technology improves the overall AMI functionality: improving control over water loss and theft and providing more efficient identification of and response to water leaks and usage spikes. It will also provide their customers with access to real-time water usage data on an online portal, allowing for enhanced customer water accounting and conservation. Ultimately, this project will help the City conserve and better manage its water supplies and more efficiently provide water services to customers. The City hopes to partner with the Bureau of Reclamation (BOR) through the WaterSMART Grants: Small-Scale Water Efficiency Projects by applying for federal financial aid for the purchasing of water meters for Phase 2 of the Mandan AMI System Update Project. The anticipated start and completion dates for this project are April 1, 2026 and December 15, 2026, respectively. This project is not located on a Federal facility.

## 1.2 Project Location

The project is in the City of Mandan (City), located in Morton County, North Dakota. The City is located along the I-94 corridor, approximately 154 miles east of the North Dakota – Montana border, 61 miles north of the North Dakota - South Dakota border, and 151 miles south of the North Dakota – Canada border. The coordinates for the project are 46°49'31.50" N (latitude) and 100°53'30.37" W (longitude). A location map for the City of Mandan showing the City's water distribution system is provided as **Figure 1**.

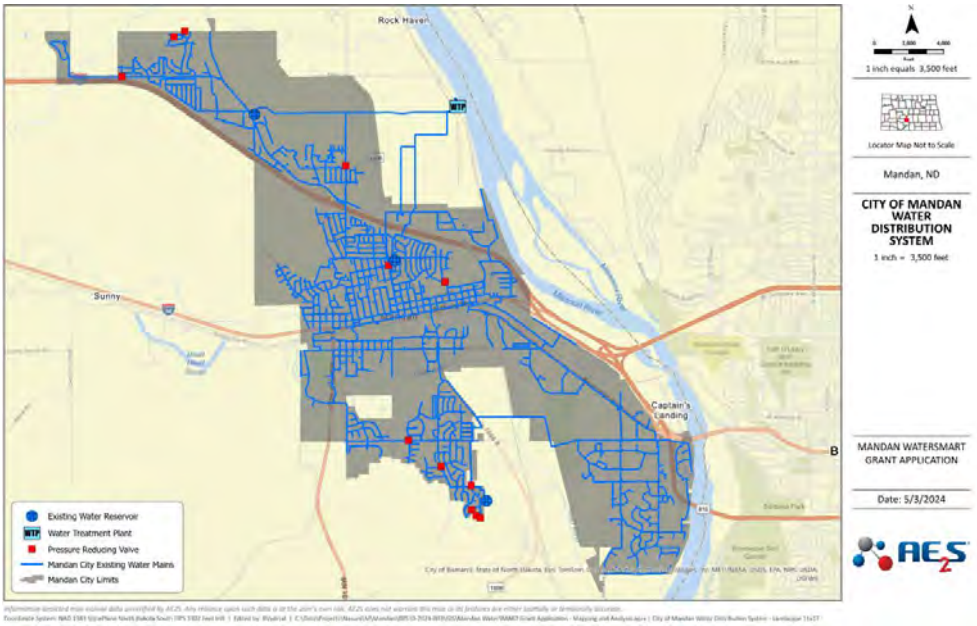



**Figure 1. City of Mandan Location Map Showing Their Water Distribution System**

## 1.3 Technical Project Description

The 2020 census reports the City provides water service to 24,206[i] residents across a service area encompassing approximately 8,800 acres. In recent years, the City noticed increasing fluctuations and discrepancies between water production and customer water meter data. Additionally, the City has reached or is rapidly approaching the estimated useful life on the majority of the City's employed water meters. The City is embarking on Phase 2 of an Advanced Metering Infrastructure (AMI) System Update Project to ensure the City continually provides reliable and accurate water delivery services. The City currently has Invensys SR-II meters employed throughout the city, They are planning to purchase and replace these with Sensus iPERL meters.

The Mandan Advanced Metering Infrastructure (AMI) Update Project – Phase 2, includes purchasing and installing 390 upgraded water meters, and the City is requesting aid for the purchasing of those water meters. Replacing the bronze water meters that are nearing their end of useful life will bring the City's water metering network back to a fully functioning AMI system with enhanced capabilities to communicate live water usage data throughout the city. Upon

project completion, the City and its customers will have access to water meter readings in real-time, eliminating manual meter readings and improving control over water loss and theft, efficiency of the identification and response to water leaks and usage spikes, and customer awareness of individual water use. The City expects to experience environmental, economic, and social benefits through enhanced and more efficient water delivery and monitoring efforts. The project will commence in April 2026 once funding becomes available and completed in December 2026.

### 1.3.1 Background Data

Water from the Missouri River is the City's supply source. The Mandan Water Treatment Plant (MWTP) was established in 1911 along the banks of the Missouri River. From 1928 to 2000, the WTP underwent several expansion and upgrade projects to meet the growing municipal and industrial demands due to population growth and developing coal and oil industries. Additionally, in 1992, the Mandan City Commission approved the City to sell water to the Missouri West Rural Water System (MWRWS) beginning in 1993. The most recent major improvement was a new raw water intake completed in 2023. The new intake gravity feeds Missouri River water to the MWTP. Given the large amount of money spent on the new intake, it is critical that the City of Mandan monitors this water to ensure optimized water use, highlighting the importance of this project. The Mandan WTP has 132.3 miles of water mains and serves an area of 13.7 sq. mi. The MWTP treats and supplies its own water and does not use a wholesale provider or piggyback off another treatment plant. MWTP currently bills its customers a base charge plus a usage rate. **Table 1** and **Table 2** detail the charges and rates for different customer classes of MWTP.

[i] United States Census Bureau. Mandan city, North Dakota - Census Bureau Profile

***Table 1 –*** *Mandan Water Treatment Plant Customer Base Charges Per Meter Hookups*

| Customer Class | Base Charge Per Meter Hookup |
|---|---|
| Single Family Dwelling | $36.80 |
| Mobile Home | $36.80 |
| Duplex Unit | $73.60 |
| Other Multifamily Units | $110.40 |
| Commercial and Industrial | $73.60 |
| Commercial/Apartment Complexes | $110.40 |
| Montana-Dakota Utilities Co | $782.59 |

***Table 2 –*** *Mandan Water Treatment Plant Customer Usage Rates*

| Customer Class | Usage Rate |
|---|---|
| Mandan Water Customer | $3.00 / HCF* |
| MWRWS Customers | $1.96 / 1,000 gallons |
| Montana-Dakota Utilities Co | $2.81 / HCF |

*Hundred cubic feet (HCF)

The City of Mandan is located in the Missouri River Basin, a region historically stricken with catastrophic flooding and periods of drought. The changing climate dynamic of the area is making the City increasingly aware of the need to create and secure an element of climate resiliency within their WTP. This project will improve water management and resource control for MWTP and its customers, ensuring more efficient and reliable water availability and delivery during times of drought.

With the City's distribution system infrastructure approaching end of useful life, the City recently identified some inefficiencies in its water monitoring and delivery processes. The City has prioritized enhancing their water meters as an initial step to improving their water system infrastructure and delivery processes.

#### *1.3.1.1 Project Description*

In 2026, the City intends to conduct Phase 2 of their AMI Systems Update Project, which includes replacing 390 water meters. This project will be the first step in updating the City's existing AMI system. The City is planning to purchase Sensus iPERL meters. This infrastructure allows for real-time data acquisition and viewing through online portals visible to both the utility and the customers. Upgrading outdated meters nearing the end of useful life will improve metering accuracies, provide customers access to real-time water usage data, and aid further reduction of non-revenue water (NRW) by tracking water losses, theft, and usage spikes. **Table 3** lists the project plan for 2026.

***Table 3** – Mandan AMI System Update Project Plan for 2024*

| Phase No. | Year | Description of Improvements |
|---|---|---|
| Phase 2 | 2026 | - Apply for a CATEX File Through the USEPA<br>- Procure Water Meters<br>- Install 390 Water Meter Replacements |

#### *1.3.1.2 Water System Composition*

The City's water distribution system is comprised of approximately 132 miles of water main piping and approximately 7,761 curbstop valves ranging in pipe diameter, pipe material, and install date. The system also has 12 pressure reducing valves and 3 water reservoirs (2-, 3-, and 4-million gallons, respectively) used to maintain storage levels, distribution system pressures, and supply fire protection and peak demands. The City has 7,761 customer water meters located throughout the City. The MWTP distribution system can produce up to 12 million gallons per day (MGD); however, on average, the plant produces 2.8 MGD and 7 MGD on peak days.

In 2014, the City conducted a partial meter replacement project. Phase I of the Mandan AMI System Update Project is slated to commence in April of 2025, and replace 615 meters. Leaving 3,205 meters needing upgrades. The meters employed by the City that are Invensys meters. These meters have limited readings per minute and no ability to provide real-time data compared to the proposed Sensus iPERL meters. The Invensys bronze meters rely on mechanical

components that are designed to measure cumulative water usage over longer periods rather than providing high-resolution, instantaneous flow rates. The mechanical parts have certain response times and inertia, which makes them less suitable for capturing rapid changes in water flow necessary for per-minute readings. The public works department has noticed that the mechanical system is not reacting quickly enough to small, transient flow changes. The only way the City can currently identify a large leak with the aged meters at residents' home is when resident contest a high utility bill. The upgraded meters will have the same capabilities as the meters throughout the city that were updated in the 2014 and 2025 meter replacement projects. This project will bring more customers live data and improve the City/customer interface.

#### *1.3.1.3 Water Use*

Mandan's annual water production totals, annual billed water totals, and annual NRW totals from 2017 to 2024 are provided in **Table 4**. Also included in **Table 4** is Mandan's annual NRW percentages for each of the eight-years assessed. Finally, the eight-year averages for each respective column are included at the bottom of the table.

***Table 4*** *– Total Annual Water Purchased, Water Billed, and Non-Revenue Water for Mandan from years 2017 to 2023*

| Year | Total Water Produced (AC FT) | Total Water Billed (AC FT) | Non Revenue Water (AC FT) | Non Revenue Water Percentage |
|---|---|---|---|---|
| **2017** | 3,424 | 3,104 | 320 | 9.4 |
| **2018** | 3,223 | 2,963 | 259 | 8.0 |
| **2019** | 2,970 | 2,647 | 323 | 10.9 |
| **2020** | 3,607 | 3,290 | 317 | 8.8 |
| **2021** | 3,817 | 3,471 | 347 | 9.1 |
| **2022** | 3,414 | 3,106 | 308 | 9.0 |
| **2023** | 3,265 | 2,961 | 305 | 9.3 |
| **2024** | 3,389 | 2,984 | 405 | 12.0 |
| **Average** | **3,389** | **3,066** | **323** | **10.0** |

The City's average NRW amount from 2017 to 2024 was 10.0 AC-FT/YR (this value is used in calculations going forward). It is also evident from **Table 4** that the amount of NRW has been steadily around 10% of produced water for the past 8 years, indicating that there are currently consistent errors or leaks occurring throughout the Mandan distribution system. Additionally, we can see that last year (2024) shows the highest NRW percentage seen over the past 8 years, demonstrating worsening system issues and highlighting the importance of this project. It is also

important to note that over the past year (2024), Mandan experienced four water main breaks that contributed to their exceptionally high NRW amount and percentage displayed in **Table 4**.

According to the City's customer billing records, approximately 75.8% of water is billed to residential customer accounts. The remaining 24.2% of water is billed to commercial and other accounts. Using the eight-year average total water billed amount of 3,066 AC-FT/YR, the following were calculated:

- Typical Annual Residential Use
  - 2,324 AC-FT/YR (75.8% of billed usage)
- Typical Annual Commercial and Other
  - 742 AC-FT/YR (24.2% of billed usage)

Of the City's total 7,761 meters, 6,710 are residential customer accounts. It is estimated that each residential customer account utilizes 0.3 AC-FT (typical annual residential usage divided by residential accounts) of water per year.

### 1.3.2 Problems and Project Need

This section outlines the need for the project, including the following four sections: distribution system losses, residential losses, aging meter endpoints, and affordability challenges.

#### *1.3.2.1 Distribution System Losses*

Over the past 8 years, 10% or **323 AC-FT/YR** (as shown in **Table 4** ) of produced water is being lost on average. These losses are occurring somewhere between the MWTP meters and the customer meters through either: (1) apparent losses, such as unauthorized consumption and customer meter inaccuracies or (2) real losses through infrastructure system failures or leaks. The City consistently monitors NRW and actively strives to keep this number low.

#### *1.3.2.2 Residential Losses*

A study conducted by the Environmental Protection Agency (EPA) states average water losses through residential homes (i.e. leaky appliances, plumbing issues, etc.) is 13.7% of total water use. Based on this, it is estimated that each of Mandan's single-family residences lose 0.04 AC-FT/YR (13.7%x 0.3 AC-FT/YR) through plumbing leaks, recognizing that some may lose more and others less. Based on this calculation, the total estimated average residential losses Mandan experiences is **268 AC-FT/YR** (0.04 AC-FT/YR x 6,710 single-family residential meters).

The total estimated water loss (distribution system and residential) is **591 AC-FT/YR** (323 AC-FT/YR + 268 AC-FT/YR), or roughly **527,645 gallons per day**. With improved meter reading accuracy through updated water meters, these losses can be isolated and mitigated.

#### *1.3.2.3 Aging Meter Endpoints*

The City's water meters are reaching the end of useful life and are anticipated to begin dying. For this reason, the project is a priority of the City's to ensure water services and billings are provided in efficient, accurate, and uninterrupted manners.

## 1.4 Evaluation Criteria

The answers to the evaluation criteria are provided in blue.

### E.1.4.1 Evaluation Criterion A---Project Benefits

- Describe the expected benefits and outcomes of implementing the proposed project
  - Explain the anticipated water management benefits of the water supply delivery system and water customers.
    - Will the project result in more efficient management of the water supply?

    This project will replace aging water metering infrastructure throughout the City, helping update and replace the current AMI system. This project is anticipated to lower and stabilize the City's water loses from both distribution system and residential losses. On average, from 2017 to 2024, the City had a NRW percentage of 10%, which equates to 323 AC-FT/YR or 385 HCF per day in distribution system losses. The City bills water to their City of Mandan customers at $3.00 per HCF; therefore, the City loses approximately $1,155.00 per day in NRW ($421,575.00 per year). Note, this water usage rate varies for MWRWS and Montana-Dakota Utilities Co customers (refer to **Table 2**).

    It is anticipated that Mandan will reduce water losses through implementation of this project. The money saved from operating an upgraded AMI system could be used towards other critical water infrastructure improvements and to alleviate the burden of significant water rate increases, ensuring the City continues to provide affordable and equitable water service.
    - Where any of the conserved water as a result of the project will go and how it will be used?

    The conserved water resulting from curbing water losses through this project will simply be additional water supply available to Mandan's customers; thereby, improving their water security and resiliency.
  - Explain the significance of the anticipated water management benefits of the water delivery system and water customers. Consider the following:
    - Are customers not currently getting their full water rights at certain times of year?

      Customers are currently getting their full water rights.
    - Does this project have the potential to prevent lawsuits or water calls?

This project will update the City's AMI system, replacing dead and dying meters, allowing both the City and its customers to see real-time water usage with the new water meters, leading to fewer water billing disputes and water calls.

- What are the consequences of not making the improvement?
  If this project is not completed, the large volume of water loss due to aging meters will continue as more existing meters are expected to die. This would hinder the City's ability to read meters and appropriately bill customers, directly causing the City's NRW amount to increase.
- Are customer water restrictions currently required?
  There are currently no water restrictions and no water restrictions are forecasted. Nevertheless, 2021 was an exceptionally dry year where much of the state experienced drought, leading some municipalities in the state to employ restrictions on outdoor lawn watering.
- Other significant concerns that support the need for the project.
  This project will reduce the labor and miles driven to track down leaks, in turn, reducing carbon emissions, fuel costs, and wear on the City's pavement system. It will also free time currently spent by City staff identifying leaks shown on water bills, as opposed to an online alert system, to focus on other needs of the water system.

- Describe the broader benefits that are expected to occur as a result of the project. Consider the following:
  - Will the project improve broader water supply reliability at sub-basin or basin scale?
    - Will the proposed project increase collaboration and information sharing among water managers in the region? Please explain.
      This project will provide the City and its customers access to real-time water usage data. Since the City not only supplies water to city residents but also MWRWS and Montana-Dakota Utilities Co, this project will aid in better water management and budgeting for these providers as well. Additionally, Mandan's water is sourced from the Missouri River, which is an essential water source for many other communities. The improved management of Mandan's authorized discharge will better safeguard water supplies for downstream users.

      On a separate note, this data could be shared across the state, basin, and region for incorporation in various state and regional studies and benchmarking efforts.

- Is the project in an area that is experiencing, or recently experienced, drought or water scarcity? Will the project help address drought conditions at the sub-basin or basin scale? Please explain.

  North Dakota experienced one of its worst droughts of the last century in 2021. By updating the City's current AMI metering system, the current NRW losses will be curbed, conserving that lost water volume for essential uses during times of water shortage and drought. This conservation will lead to more efficiently utilized available water resources and lessen the impacts of water shortages during drought. Additionally, the advanced utility metering could be used to inform water use restriction enforcement efforts, if needed, during future water shortages or droughts.

- Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please explain.

  Not applicable.

- Will the proposed project positively impact/benefit various sectors and economies within the applicable geographic area (e.g., impacts to agriculture, environment, recreation, and tourism)? Please explain.
  Utilizing AMI will reduce the amount of water that is lost throughout the City's water distribution system. Anticipated environmental benefits of curbing water losses include reductions in both the chemicals used for water treatment and production and the energy consumption for water treatment and pumping. Another environmental benefit of an updated AMI system is that the customers will have access to their real-time usage data, allowing them to practice conservation efforts, saving water and money.

  One anticipated economic impact of this project is money savings on city recreation as the City parks will also be able to see real-time data, allowing isolation and repair of problem areas. Finally, utilizing the AMI system's data to inform future rate modeling and water utility fund budgeting, would for more accurate resource planning and allow the City to delay the need for water rate increases, providing economic benefits to their customers and the City in its entirety.
- Will the project complement work being done in coordination with NRCS in the area (e.g., the area with a direct connection to the districts water supply)? Please explain.
  Not applicable.

### E.1.4.2. Evaluation Criterion B---Planning Efforts Supporting the Project

- Describe to what extent the proposed project is supported by the identified plan.
    - Is the project identified specifically by name and location in the planning effort?
      This project is not identified by name in any specific planning effort. However, Phase I of this project is currently awarded funding through BOR's WaterSMART Grants: Small-Scale Water Efficiency Projects.
    - Is this type of project identified in the planning effort?
      North Dakota established a "Water Development Plan" in 2023, which outlines the state's water development goals and priorities through 2025. One of the highlighted goals is to improve the resiliency and reliability of water supplies to North Dakota citizens for their health and prosperity as well as that of the state's economy. Additionally, it was highlighted throughout this plan that general water and water supply projects are considered a priority, specifying projects that improve upon or replace water distribution infrastructure under this priority category.
    - Explain whether the proposed project implement a goal, objective, or address a need or problem identified in the existing planning effort?
      The Mandan AMI System Update Project – Phase 2 will upgrade water meters for the City, enabling improved water delivery through more transparent and reliable water accounting and billing, alongside a more resilient distribution system through decreased NRW volumes. This project aligns with the aforementioned goals of the State of North Dakota.
- Explain how the proposed project has been determined as a priority in the existing planning effort as opposed to other potential projects/measures.
  Through ongoing planning efforts and identifying that the City's water metering infrastructure is reaching the end useful life, the City has determined that updating and replacing the aging infrastructure is a top priority. In 2014, the City completed a meter upgrade project that covered part of their service area, followed by Phase I of this project coming up in 2025. However, 3,205 meters throughout their distribution system still require replacement. Failure to address these remaining meters through Phase 2 of this project will lead to data loss, less transparent customer billing, and an increase in water calls and NRW. This project aims to build upon the previously planned and conducted system improvements projects in 2014 and 2025 implemented by the City and the BOR.

### E.1.4.3. Evaluation Criterion C---Project Implementation and Results

- 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 Mandan AMI System Update Project – Phase 2 will be started in April of 2026 (anticipated to start as soon as grant award becomes available) and be completed in

December of 2026. The proposed project schedule is outlined below in **Table 5**, noting that the city will need to apply for a CATEX file prior to the kickoff of the project in April. The City intends to contract Core & Main to complete the installation of the water meter infrastructure for this Project.

***Table 5 – Proposed Project Schedule***

| Approximate Date | Major Tasks |
|---|---|
| February | Apply for CATEX File |
| April – June | Procure Water Meters |
| July | Install 200 Water Meters |
| August | Install 200 Water Meters |
| December | Install 215 Water Meters |

If the City of Mandan is successful in receiving grant funding, the City will work cooperatively with the BOR to meet specific milestones and adhere to schedule requirements set forth by the BOR.

- Proposals with a budget and budget narrative that provide a reasonable explanation of project costs will be prioritized under this criterion.
  See the Budget Narrative section below.
- Describe any permits and agency approvals that will be required, along with the process and timeframe for obtaining such permits or approvals.
  Because the water meters will be installed in homes and businesses, no permits will be required for this project. Customers will be notified prior to installation of the water meters.
- Identify and describe any engineering or design work performed specifically in support of the proposed project. What level of engineering design is the project currently? If additional design is required, describe the planned process and timeline for completing the design.
  No engineering or design work is anticipated for this project.
- Describe any new policies or administrative actions required to implement the project.
  Public outreach efforts are planned prior to project implementation to inform customers of the water meter installation and the updated real-time water usage viewing capabilities that will be offered.
- Describe the timeline for gaining access to the land or water source where the project is located. Have any required easements been obtained?
  Not applicable.

- Does the applicant have access to the land or water source where the project is located? Has the applicant obtained any easements that are required for the project? If the applicant does not yet have permission to access the project location, describe the process and timeframe for obtaining such permission.
  No environmental and cultural resource compliance is anticipated for this project; however, an application will be submitted in February of 2026 to obtain a CATEX file through the EPA prior to the start of the project to prove all environmental and cultural resource compliance is being met.
- Identify whether the applicant has contacted the local Reclamation office to discuss the potential environmental and cultural resource compliance requirements for the project and the associated costs. Has a line item been included in the budget for costs associated with compliance? If a contractor will need to complete some of the compliance activities, separate line items should be included in the budget for Reclamation's costs and the contractor's costs.
  Not applicable.

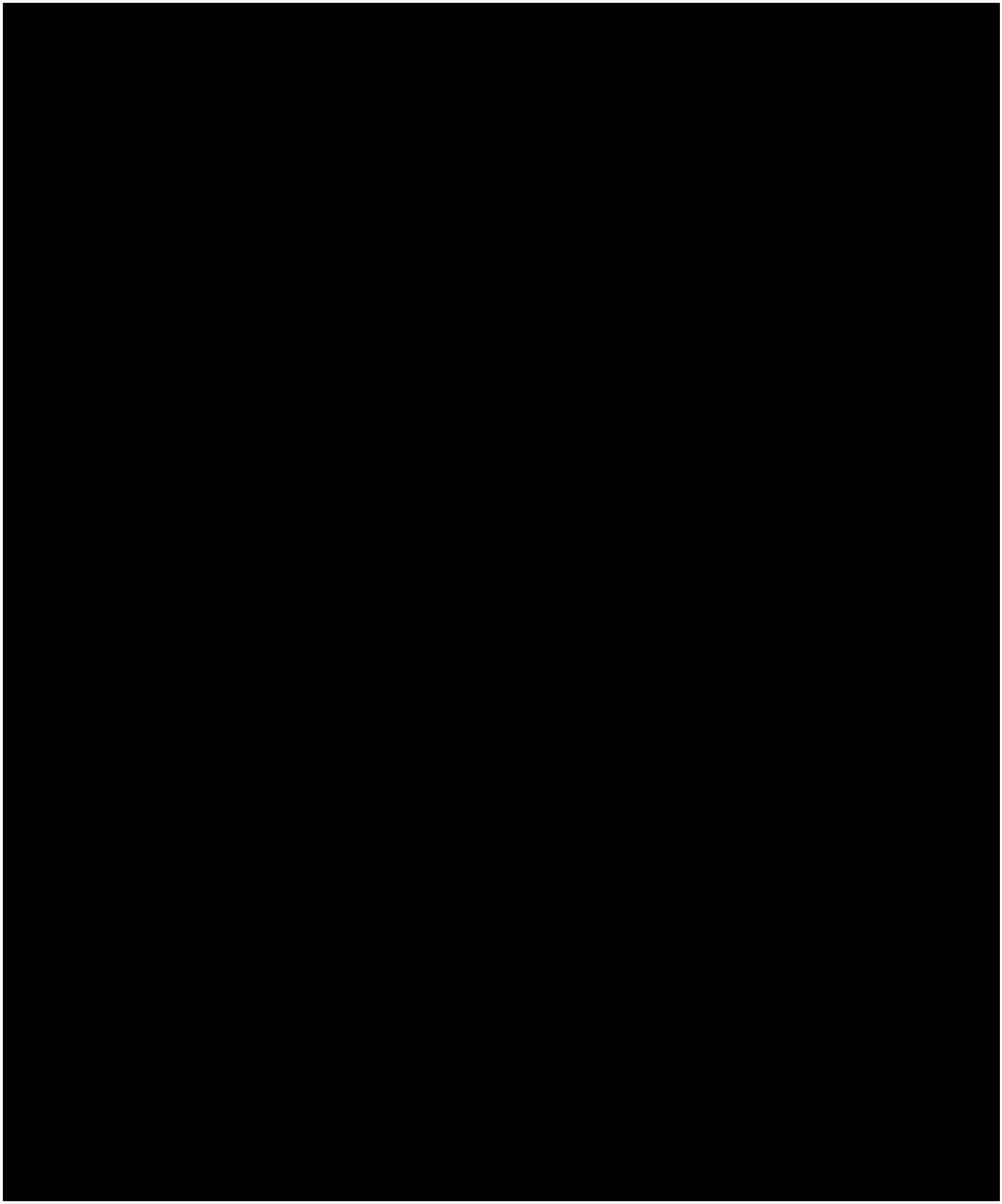
### E.1.4.4. Evaluation Criterion D---Nexus to Reclamation

- Is the proposed project connected to a reclamation project or activity?
  Yes, this project is connected to the upcoming Mandan AMI Update Project – Phase I, that will take place in 2025 with funding through the Bureau of Reclamation and the WaterSMART Grants: Small-Scale Water Efficiency Projects.
- If so, how? Please consider the following:
  - Does the applicant have a water service, repayment, or operations and maintenance contract with Reclamation?
    No.
  - Does the applicant receive Reclamation project water?
    No.
  - Is the project on Reclamation project lands or involving Reclamation facilities?
    No.
  - Is the project in the same basin as a Reclamation project or activity?
    There is an ongoing project connected to the Bureau of Reclamation going on in the State of North Dakota that would potentially provide water supply from the Missouri River to serve central and eastern North Dakota. According to the Bureau of Reclamation website, the Bureau of Reclamation signed a record decision on January 15, 2021, selecting the preferred alternative proposed for the Eastern North Dakota Alternate Water Supply (ENDAWS) Project. The selected alternative includes construction of infrastructure to provide up to 165 cubic-feet-per-second of water from the McClusky Canal. Water will be delivered through a buried pipeline along a northern route and connect with the main transmission pipeline

of the state-led Red River Valley Water Supply Project (RRVWSP). Both ENDAWS and the RRVWSP are located in North Dakota (Bureau of Reclamation Region 5).

- Will the proposed work benefit a Reclamation project area or activity?
  Yes. There is an upcoming Reclamation funded project in Mandan that will take place in 2025.
- Will the proposed work contribute water to a basin where a Reclamation project is located?
  No.

[redacted]



## 1.5 Overlap of Duplication of Effort Statement

The only overlap that potentially exists between this project and other projects is when the City is forced to replace water meters or SmartPoints as they go dead, requiring immediate replacement.

This grant application, submitted for consideration under this program, does not in any way duplicate a proposal or project that has been or will be submitted for funding consideration to any other potential funding source. The City would like to continue to apply for future WaterSMART grant opportunities, as applicable and available, to continuously improve their water system.

# 2.0 PROJECT BUDGET

The proposed project budget is described in the forthcoming sections.

## 2.1 Funding Plan and Letters of Commitment

The funding plan for this project is to utilize money from the City of Mandan Water Utility Fund to fund the City's cost-share portion of the project. These funds are available and already programmed in the City's budget, so no time constraints exist on the available funds. The total estimated project costs (including federal and local cost shares) for this project are $249,701.00. The City is requesting $125,000 (50% of total project costs) in federal cost-share from the Bureau of Reclamation under this grant, with the remaining amount to be funded by the City of Mandan through their Water Utility Fund.

Included in the notice of funding opportunity were the following parameters, which are answered in blue. Please identify the sources of the non-Federal cost-share contribution for the project, including:

- Any monetary contributions by the applicant towards the cost-share requirement and source of funds (e.g., reserve account, tax revenue, and/or assessments)
  The City of Mandan will use budgeted funds from the City's Water Utility Fund to pay for the non-federal share of the Project costs.
- Any costs that will be contributed by the applicant
  The City of Mandan is planning to contract Core & Main to install the water meters. The fees and costs associated with these activities are outlined in the budget proposal and budget narrative.
- Any third-party in-kind costs (i.e., goods and services provided by a third party)
  Not applicable.
- Any cash requested or received from other non-Federal entities
  Not applicable.
- Any pending funding requests (i.e. grants or loans) that have not yet been approved and explain how the project will be affected if such funding is denied
  Not applicable.

No project costs are anticipated prior to award. A summary of the total project costs is provided in **Table 6**. It should be noted that the City of Mandan is registered (and maintains an active registration) in the System for Award Management (SAM). The City is also registered with and willing to process payments through the Department of Treasury Automate Standard Application for Payments (ASAP) system with the Bureau of Reclamation.

*Table 6 – Total Project Costs*

| Source | Amount | Percentage |
|---|---|---|
| Costs to be reimbursed with the requested Federal funding | $ 125,000.00 | 50% |
| Costs to be paid by applicant | $ 124,701.00 | 50% |
| Value of third-party contributions | $ 0.00 | 0% |
| **TOTAL PROJECT COST** | **$** 249,701.00 | **100%** |

## 2.2 Budget Proposal

The budget proposal for this project is provided below in **Table7**.

*Table 7 – Budget Proposal*

| Budget Item Description | Computation | | QTY Type | Total Cost |
|---|---|---|---|---|
| | $ / Unit | QTY | | |
| ***Salaries and Wages*** | | | | |
| | | | | |
| ***Fringe Benefits*** | | | | |
| | | | | |
| ***Travel*** | | | | |
| | | | | |
| ***Equipment*** | | | | |
| | | | | |
| ***Supplies and Materials*** | | | | |
| 3/4 iPERL 1G 25' 3W PE SM | $ 263.76 | 394 | EA | $ 103,921.44 |
| 510M SmartPoint | $ 190.00 | 394 | EA | $ 74,860.00 |
| ***Contractual/Construction*** | | | | |
| Installation of Meters | $ 100.00 | 394 | EA | $ 39,400.00 |
| Installation of SmartPoints | $ 80.00 | 394 | EA | $ 31,520.00 |
| ***Other*** | | | | |
| | | | | |
| **TOTAL DIRECT COSTS** | | | | **$** 249,701.00 |
| ***Indirect Costs*** | | | | |
| | | | | |
| **TOTAL INDIRECT COSTS** | | | | **$ 0.00** |

## 2.3 Budget Narrative

The following categories were included in the notice of funding opportunity and provide the budget narrative for this project.

### 2.3.1 Salaries and Wages

The City's plan is to contract Core & Main to install the iPERL meters. The associated costs for these contracted services are discussed in **2.3.6 Contractual**. There are no salaries and wages associated with this project.

### 2.3.2 Fringe Benefits

The City's plan is to contract Core & Main to install the iPERL meters and Xylem SmartPoints. The associated costs for these contracted services are discussed in **2.3.6 Contractual**. There are no salaries and wages associated with this project.

### 2.3.3 Travel

Travel is not eligible and will not be requested for reimbursement.

### 2.3.4 Equipment

Because the City plans to retain the meter supplier to conduct the installations, no City equipment is anticipated; therefore, no reimbursement is requested.

### 2.3.5 Materials and Supplies

Reimbursement is being requested for the procurement and installation of 394 iPERL meters and 510M SmartPoints. The costs for materials and supplies are provided in a quote from a nation-wide and local supplier, Core & Main, and is included as **Appendix A**. Also included in Appendix A are the data sheets for the respective infrastructure planned to be installed.

If the City is selected for grant funding, the City would like to consider procuring the materials and supplies as soon as they are notified of the grant award (if allowed by the Bureau of Reclamation). Through discussions with various suppliers, the materials and supplies outlined in this grant application have long lead times due to post-pandemic labor and material shortages, foreign conflicts, growing inflation, supply chain issues, etc. Early procurement of the materials and supplies will help the City maintain the schedule outlined in the Project Implementation Plan and ensure accuracy of the supplied quote from Core & Main.

### 2.3.6 Contractual

The City's plan is to contract Core & Main to install the iPERL meters. According to the quote from Core & Main provided in **Appendix A**, Core & Main charges an installation fee of $100.00 per water meter unit and $80.00 per SmartPoint installed. These installation fees are included in the budgeted costs (**Table 7**) for this project, and reimbursement is being requested.

### 2.3.7 Third-Party In-Kind Contributions

No third-party in-kind contributions are anticipated; therefore, no reimbursement is requested.

### 2.3.8 Environmental and Compliance Costs

No environmental and compliance costs are anticipated; therefore, no reimbursement for this is requested.

### 2.3.9 Indirect Costs

No indirect costs are anticipated; therefore, no reimbursement is requested.

# 3.0 ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

The following questions were provided in the notice of funding opportunity (NOFO), and answers to the questions are provided in blue.

- Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.
  The impact to the surrounding environment will be negligible during the installation of the water meter replacements given they will be installed inside customer residences and businesses. The City and contracted Core & Main staff will take all necessary precautions and steps to minimize negative effects towards soil, air, water, or animal habitat during installation of the water meters.
- 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?
  Within Morton County (county where Mandan is located), there are 6 federally listed threatened or endangered species: black-footed ferret, northern long-eared bat, pallid sturgeon (historic habitat), piping plover, red knot (possible habitat), and whooping crane. Additionally, the monarch butterfly is a candidate species that migrates through Morton County, and the least tern is a species present in Morton County that was recently delisted. Although there are threatened or endangered species listed in the project area, none will be affected with the installation of the water meters because they will be installed within City residences and businesses.
- Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as “Waters of the United States?” If so, please describe and estimate any impacts the proposed project may have.

Yes, but the project will not impact any 'Waters of the United States' because the installation of the water meters will be installed inside City residences and businesses.

- When was the water delivery system constructed?
  The Mandan Water Treatment Plant (MWTP) was originally constructed in 1911. There were multiple projects to upgrade and expand the Mandan distribution system between 1911 and 2000. The delivery system incorporates roughly 132 miles of pipe.
- Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.
  No.
- Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.
  No.
- Are there any known archeological sites in the proposed project area?
  There are no known archaeological sites in the proposed project area.
- Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?
  The project will have positive impacts on low income and minority populations because every property owner with a water meter will have access to an online portal that allows them to view their water usage in real-time. Having this information will allow customers to be more cognizant of their water use and allow them to catch water spikes caused by leaks or plumbing fixtures left on inadvertently.
- Will the proposed project limit access to and ceremonial use of, Indian sacred sites or result in other impacts on tribal lands?
  No.
- Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?
  No.

# 4.0 REQUIRED PERMITS OR APPROVALS

No permits are required for this project. Property owners will be notified in advance prior to installation of the water meters.

# 5.0 LETTERS OF FUNDING COMMITMENT

The non-federal share for this project will be funded through the City of Mandan Water Utility Fund. Therefore, no letters of funding commitment were included.

# 6.0 LETTERS OF PROJECT SUPPORT

The project has the support of City staff. The project was presented to Mandan's City Council at the December 17, 2024 Council meeting and has the support of the Council. The project has also been presented at a subcommittee level and has support of the subcommittee. The Official Resolution will be signed and adopted by the City Council at their next Council meeting.

# 7.0 Overlap of Effort Statement, Conflict of Interest Disclosure, and SF-LLL: Disclosure of Lobbying Activities

This project does not overlap or duplicate any other future or ongoing funding ventures within the City at the time of this grant application.

There are no conflicts of interest or lobbying activities to disclose.

# 8.0 Uniform Audit Reporting Statement

The City does not have the 2024 audit available at the time of application submission but will provide one to the Bureau of Reclamation upon request.

# 9.0 OFFICIAL RESOLUTION

The Mandan City Council meets the first Monday of every month. At the time of preparing this application, the next scheduled City Council meeting will be in February of 2025.

The Official Resolution will be adopted at the February City Council meeting and submitted to the Bureau of Reclamation following official adoption of the resolution after the January 14, 2025 deadline.

# APPENDIX A – MATERIALS AND SUPPLIES – DATA SHEETS AND COST PROPOSALS

# SR II® WATER METERS

Invensys Metering Systems

## DISPLACEMENT TYPE MAGNETIC DRIVE COLD WATER METERS
5/8" (DN 15mm), 3/4" (DN 20mm) and 1" (DN 25mm)

## DESCRIPTION

**APPLICATIONS:** Measurement of cold water where flow is in one direction only; in residential, commercial and industrial services.

**CONFORMANCE TO STANDARDS:** Invensys SR II Water Meters comply with ANSI/AWWA Standard C700-latest revision. Each meter is tested to insure compliance.

**CONSTRUCTION:** Invensys SR II Water Meters consist of three basic components: maincase; measuring chamber; and sealed register. Maincases are of bronze with externally-threaded spuds. Registers are housed in a bronze bonnet, a bonnet of synthetic polymer is available as an option. Measuring chambers are of Rocksyn® a corrosion-resistant, tailored thermoplastic material formulated for long-term performance and especially suitable for aggressive water conditions. Maincase bottom plates are available in bronze or, if frost protection is desired, in cast iron or synthetic polymer①.

**REGISTER:** Hermetically sealed; proven magnetic drive design eliminates dirt and moisture contamination, tampering and lens fogging problems. Standard register includes a straight-reading, odometer-type totalization display; a 360° test circle with center sweep hand; and a low flow (leak) detector. Gears are self-lubricating, molded plastic for long life and minimum friction.

No change gears are required for accuracy calibration. Encoder-type remote reading systems are available for all SR II Water Meters. (See other side of sheet for additional information.)

**TAMPER RESISTANT FEATURE:** A unique locking system prevents customer removal of the register to obtain free water. A special tool, available only to water utilities, is required to remove the register bonnet.

**MAGNETIC DRIVE:** The SR II features a hydrodynamically cushioned design that eliminates premature wear of components. The meter utilizes a patented positive, reliable drive coupling. The high-strength magnets used will eliminate "drive slip" in normal use and also provide adequate strength to drive remote register units.

**OPERATION:** Water flows through the meter's strainer and into the measuring chamber where it drives the piston. The hydrodynamically balanced piston oscillates around a central hub, guided by the division plate.

A drive magnet transmits the motion of the piston to a driven magnet located within the hermetically sealed register. The driven magnet is connected to the register gear train. It reduces the piston oscillations into volume totalization units displayed on the register dial face.

**MAINTENANCE:** Invensys SR II Water Meters are engineered to provide long-term value and virtually maintenance-free operation. Simplicity of design and precise machining of components allows interchangeability of parts of like-size meters, reduced parts inventory requirements, and ease of maintenance. The register can be removed without relieving the water pressure or removing the maincase from the installation.

As an alternative to utility repair, Invensys offers maintenance programs to provide factory reconditioning of the maincase and replacement components at low fixed prices. See bulletin PD-299.

**CONNECTIONS:** Tailpieces/Unions for installing the meters on a variety of pipe types and sizes are available.

**GUARANTEE:** Invensys SR II Water Meters are backed by "The Invensys Guarantee." Ask your Invensys representative for details or see Bulletin G-500.

## SPECIFICATIONS

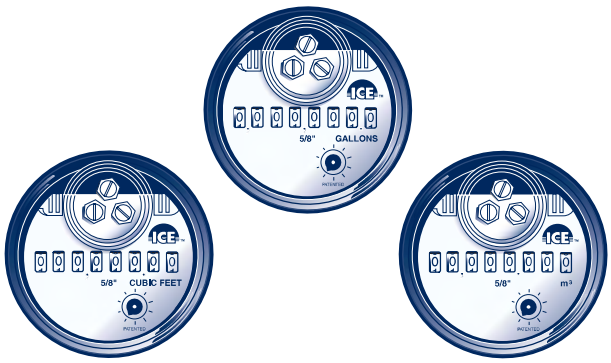
5/8" (DN 15mm) SR II®

3/4" (DN 20mm) SR II®

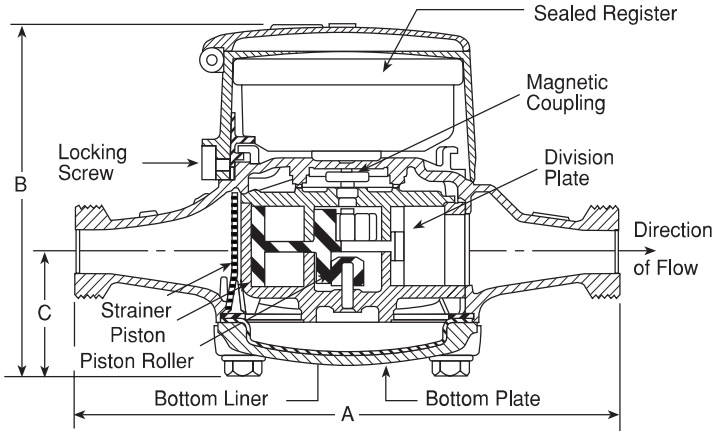
1" (DN 25mm) SR II®

| | |
|---|---|
| **SERVICE** | Measurement of cold water with flow in one direction only. |
| **NORMAL OPERATING FLOW RANGE②** | 5/8" (DN 15mm) size: 1 to 20 gal/min. (0.25 to 4.5 $m^3h$)<br>3/4" (DN 20mm) size: 2 to 30 gal/min. (0.45 to 7.0 $m^3h$)<br>1" (DN 25mm) size: 3 to 50 gal/min. (0.7 to 11.0 $m^3h$) |
| **ACCURACY** | 100% ± 1.5% of actual thruput |
| **LOW FLOW REGISTRATION** | 5/8" size: 95% at 1/4 gal/min. (0.06 $m^3h$)<br>3/4" size: 95% at 1/2 gal/min. (0.10 $m^3h$)<br>1" size: 95% at 3/4 gal/min (0.15 $m^3h$) |
| **MAXIMUM PRESSURE LOSS** | 5/8" size: 7.0 psi at 20 gal/min. (0.5 bar at 4.5 $m^3h$)<br>3/4" size: 9.0 psi at 30 gal/min. (0.6 bar at 7.0 $m^3h$)<br>1" size: 7.3 psi at 50 gal/min. (0.5 bar at 11.0 $m^3h$) |
| **MAXIMUM OPERATING PRESSURE** | 150 psi (10.0 bar) |
| **MEASUREMENT ELEMENT** | Oscillating piston |
| **REGISTER** | Straight reading, hermetically sealed, magnetic drive.<br>Remote reading unit optional. |
| **REGISTRATION** | 10 gallons, 1 cubic foot, or 0.01 $m^3$/ or 0.1 $m^3$/sweep hand revolution.<br>10,000,000 gallons, 1,000,000 cubic feet or 100,000 $m^3$ capacity.<br>6 odometer wheels. |
| **METER CONNECTIONS③** | 5/8" (DN 15mm) size: 3/4" (26.44mm) threads<br>5/8" x 3/4" (DN 15mm x 33mm) size: 1" (33.25) threads<br>3/4" (DN 20mm) size: 1" (33.25 threads)<br>3/4" x 1" (DN 20mm x 42mm) size: 1-1/4" (41.91mm) threads<br>1" (DN 25mm) size: 1-1/4" (41.91mm) threads<br>(All threads are straight pipe, external type, conforming to ANSI B1.20.1 or ISO R228, if specified.) |
| **MATERIALS** | Maincase—Bronze<br>Register box—Bronze (standard), synthetic polymer (optional)<br>Measuring chamber—Rocksyn®<br>Bottom plate—Bronze, cast iron or synthetic polymer①<br>Magnets—Plasticized material<br>Casing bolts—Stainless steel<br>Strainer—Synthetic polymer |

① Synthetic polymer maincase bottom plate available on 5/8" meter only.
② Maximum rates listed are for intermittent flow only. Maximum continuous flow rates as specified by AWWA are: 5/8" (DN 15mm)—10 gal/min (2.3 $m^3h$), 3/4" (DN 20mm)—15 gal/min (3.4 $m^3h$) 1" (DN 25mm)—25 gal/min (5.7 $m^3h$)
③ Unless otherwise noted, 5/8" size and 5/8" x 3/4" characteristics are identical. (5/8" x 3/4" designates 5/8" with 3/4" connection thread.) Also unless otherwise noted 3/4" size and 3/4" x 1" size characteristics are identical. (3/4" x 1" designates 3/4" with 1" connection thread.)
Metric designation is the normal bore x the outside diameter.




**5/8" (DN 15mm) Dials Shown**




## Dimensions and Net Weights

| Meter Size | A | B | C | Width | Net Weight① |
|---|---|---|---|---|---|
| 5/8" (DN 15mm) | 7-1/2" (190mm) | 5.0" (127mm) | 1-3/4" (44mm) | 3-7/8" (98mm) | 4.3 lb. (1.97 kg) |
| 5/8" x 3/4" (DN 15mm x 33mm) | 7-1/2" (190mm) | 5.0" (127mm) | 1-3/4" (44mm) | 3-7/8" (98mm) | 4.4 lb. (2.00 kg) |
| 3/4" (DN 20mm) | 9" (229mm) | 5-1/2" (140mm) | 2-3/16" (56mm) | 4-1/2" (114mm) | 6.4 lb. (2.90 kg) |
| 3/4" x 1" (DN 20mm x 42mm) | 9" (229mm) | 5-1/2 (140mm) | 2-3/16" (56mm) | 4-1/2" (114mm) | 6.6 lb. (2.99 kg) |
| 3/4" short (DN 20mm) | 7-1/2" (190mm) | 5-1/2" (140mm) | 2-3/16" (56mm) | 4-1/2" (114mm) | 6.2 lb. (2.81 kg) |
| 1" (DN 25mm) | 10-3/4" (273mm) | 6-9/16" (167mm) | 2-7/16" (62mm) | 6-1/2" (165mm) | 11.9 lb. (5.4 kg) |

① With Rocksyn® measuring chamber.

## **Remote Reading Systems**—For use with all sizes of Invensys Water Meters

All Invensys AMR systems work with the same absolute encoder Electronic Communications Registers (ECR), enabling the utility to mix and match or easily move from one system to another without changing registers for each.

**The TouchRead® Automated Meter Reading and Billing System**—is a multi-purpose encoder remote system suitable for indoor and/or outdoor use. The ECR Register uses a wired connection between the meter and an outside remote for inside set meters—or a pitlid mounted module, enabling underground meters to be read automatically without opening the meter box or vault. All wired connections and terminals of the TouchRead PitLid (TR/PL) modules and registers are fully sealed at the factory using a special process to ensure protection from water infiltration. The connection terminals of ECR/WP registers are also factory sealed.

Meters equipped for TouchRead System reading can be read with a visual reading device, stand alone AutoGun, and/or reading gun with an AutoRead HandHeld Device. For more information on TouchRead System equipment refer to bulletins AMR-TR, AMR-401, AMR-403, AMR-312 and EXSUMHH.

**PhonRead® AMR**—is a reliable telephone based call-in system that does not require batteries for operation. It also does note require equipment to be installed at telephone company facilities. PhonRead Meter Interface Units (MIU) automatically call "in" to the utility office for transferring meter reading data from the meter site to a PC. PhonRead is a transparent AMR system that does not interfere with customers' telephone service. For more information refer to bulletins AMR-PR and AMR-302.

**RadioRead® AMR**—uses superior Direct Sequence Spread Spectrum modulation to provide reliable, safe and virtually interference free radio-based transmission of reading data from underground or inside-set meters that are equipped with Meter Transceiver Units (MXU). A choice of meter reading options is available. A radio frequency hand-held device (RF-HHD) can be used by a meter reader on foot. The RF-HHD can also be used to collect readings from TouchRead equipped meters, or for manual meter reading entries. A more powerful Vehicle Transceiver Unit (VXU) can be used in any car or truck to read meters while on the move. (A dedicated meter reading vehicle is not required.) For more information refer to bulletins AMR-RR, AMR-301 and AMR-303, and AMR-401.

**MultiRead® Port Expanders**—can provide the capability to connect multiple ECR equipped meters to a single PhonRead MIU or RadioRead MXU to save the utility time and money for installations such as apartment complexes and shopping centers. Refer to bulletin AMR-305, AMR-306 and AMR-308.

invensys
Metering Systems

**Invensys Metering Systems**
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**450 N. Gallatin Avenue**
**Uniontown, PA 15401**

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**Toll Free: 1-800-888-2403**

**Web site: www.invensys.com**
**select *North American Water***
**Email: h2oinfo@invensys.com**

AUTHORIZED INVENSYS DISTRIBUTOR

# iPERL Smart Water Meter

## Electromagnetic Flow Measurement System

Sensus iPERL® smart water meters are designed to capture both lost water and lost revenue. The innovative magnetic technology delivers unmatched low flow registration and minimal pressure loss. With no moving parts, iPERL maintains its accuracy over a 20 year lifetime and is equipped with smart water alarms – delivering the intelligence you need to quickly resolve issues in the field.

### Industry Leading Performance

The patented measurement technology of the iPERL water meter provides continuous and enhanced accuracy ranges at both low and high flows and perpetual accuracy over the life of the product. The iPERL meter has a 20-year accuracy warranty and a 20-year battery life guarantee. Over this 20-year lifespan, your iPERL will measure just as accurately as the day it was installed.

### Construction

The iPERL meter body is available in two versions. The first version has a flow tube that is comprised entirely of composite polymer. The second version is comprised of lead-free bronze alloy with a composite polymer core. Both versions use the same thermal polymer shell with the same electronic register inside.

### Electronic Register

The 9-digit hermetically-sealed electronic register with LCD display was designed to eliminate dirt, water, and moisture contamination in pit settings. The large, easy-to-read display includes AMI/AMR digits, direction of flow, units of measure, and empty pipe detection. The AMI/AMR digits and units of measure are fully programmable. The register also provides user configurable data logging.

### Solid State Electromagnetic Technology

By avoiding the use of a mechanical measuring element inside the flow tube, metering performance is linear over the entire flow range – ensuring no reduction in accuracy at any flow rate over the life of the meter. The iPERL meter uses our patented remanent magnetic field technology – requiring far less energy and delivering superior accuracy.

### Tamperproof

The integrated construction of the iPERL water meter prevents removal of the register to obtain free water. The magnetic tamper and low field alarms will both indicate any attempt to tamper with the magnetic field of the iPERL meter. The meter communication alarm indicates a possible cut cable.

### Alarms

Quick resolution of field issues is made possible with smart water alarms including leak detection, reverse flow, empty pipe, magnetic tamper and low battery. When integrated with our FlexNet® communication network, remotely gathering and transmitting data has never been more reliable or profitable.

## FEATURES

- 5/8", 5/8" x 3/4", 3/4" and 1" sizes available in potable and reclaim versions
- 3/4" and 1" available in residential fire service (UL 327b)
- Starts registering flow as low as 0.03 gpm (0.007 m³/hr)
- Can be installed horizontally, vertically or diagonally
- Compatible with current Sensus AMI/AMR systems

## BENEFITS

- Maximize investment with iPERL's electromagnetic technology, which delivers a 20-year accuracy warranty, with no required maintenance, and no loss in accuracy over 20 years
- Smart alarms detect issues such as leaks, reverse flow, empty pipe, etc.
- Improve low flow accuracy to drive additional revenue

# iPERL Smart Water Meter

## Electromagnetic Flow Measurement System

### Smart Alarms

iPERL meters have many configurable smart alarms designed to protect your utility's investment, enhance customer service, and monitor/optimize distribution systems. These alarms include:

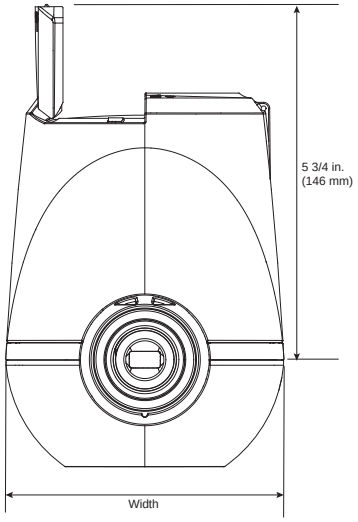
- Empty Pipe
  Detects the absence of water in the flow tube and sends an alert. Allows you to identify main breaks downstream and water shortages for quicker resolution to ensure water availability. This alarm can also indicate the water meter has been removed from service, or notify you of potential tamper.
- Tampering
  Detect magnetic interference to reduce apparent water losses and protect against unauthorized activities.
- Customer Leak
  Detect continual consumption of water over a period of time to indicate downstream leaks. This protects your utility, infrastructure and customers through alarm notifications that can reduce water loss and leak adjustment costs.
- Low Battery
  Replace your meters before they stop recording consumption through alerts indicating battery capacity to the meter or valve is running low.
- Reverse Flow
  Keep untreated water from re-entering your distribution system and deter tampering attempts through an alarm triggered when reverse flow is detected at the meter.

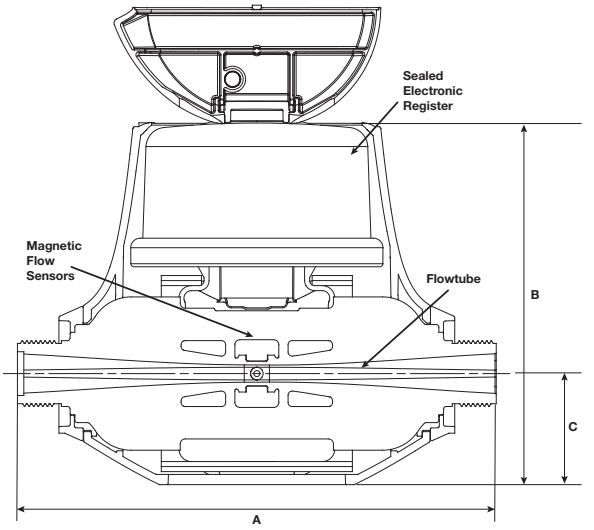
### SPECIFICATIONS

| | | | | |
|---|---|---|---|---|
| Service | Measurement of potable and reclaim water, and Residential Fire Service (UL 327b). 0-100% humidity. Fully submersible. IP68+ rated. | | | |
| Temperature Ranges | Water operating:<br>Ambient air operating:<br>Storage air: | 33 °F (0.55 °C) to 80 °F (26.7 °C)<br>-22 °F (-30 °C) to 140 °F (60 °C)<br>-30 °F (-34.4 °C) to 158 °F (70 °C) | | |
| Starting Flow | 5/8" (DN 15 mm) size: 0.03 gpm (0.007 m3/h) | 5/8" x 3/4" (DN 15x20 mm) size: 0.03 gpm (0.007 m3/h) | 3/4" (DN 20 mm) size: 0.03 gpm (0.007 m3/h) | 1" (DN 25 mm) size: 0.11 gpm (0.025 m3/h) |
| Low Flow Range (±3%) | 5/8" (DN 15 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr) | 5/8" x 3/4" (DN 15 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr) | 3/4" (DN 20 mm) size: >0.10 gpm (0.025 m3/hr) to <0.18 gpm (0.041 m3/hr) | 1" (DN 25 mm) size: >0.3 gpm (0.068 m3/hr) to <0.4 gpm (0.09 m3/hr) |
| Normal Water Operating Flow Range (±1.5%) | 5/8" (DN 15 mm) size: 0.18 to 25 gpm (0.04 to 5.7 m3/hr) | 5/8" x 3/4" (DN 15x20 mm) size: 0.18 to 35 gpm (0.04 to 8.0 m3/hr) | 3/4" (DN 20 mm) size: 0.18 to 35 gpm (0.04 to 8.0 m3/hr) | 1" (DN 25 mm) size: 0.4 to 55 gpm (0.09 to 12.5 m3/hr) |
| Maximum Operating Pressure | 5/8'', 5/8" x 3/4", and 3/4'' size: 200 psi (13.8 bar)<br>1'' size: 175 psi (12.1 bar) | | | |
| Measurement Technology | Solid state electromagnetic flow | | | |
| Register | Hermetically sealed, 9-digit programmable electronic register | | | |
| Capacity | 10,000,000 gallons, 1,000,000 cubic feet or 100,000 m3 capacity | | | |
| Register Resolution | .01 gallons/imperial gallons, .001 cubic foot, or .0001 m3 | | | |
| Conformance to Standards | Meets the requirements of NSF 61, Annex G and NSF 372.<br>Exceeds the most current revision of AWWA Standard C-715. | | | |
| Materials | External housing – Thermal polymer<br>Flowtube – Composite polymer or a bronze alloy flowtube with a composite polymer internal core | | Electrode – Silver/silver chloride<br>Register cover – Hermetically sealed glass | |

# iPERL Smart Water Meter

## Electromagnetic Flow Measurement System



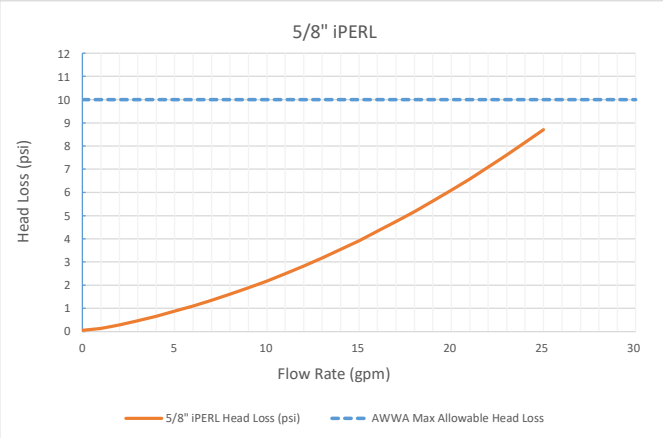

### DIMENSIONS AND NET WEIGHTS

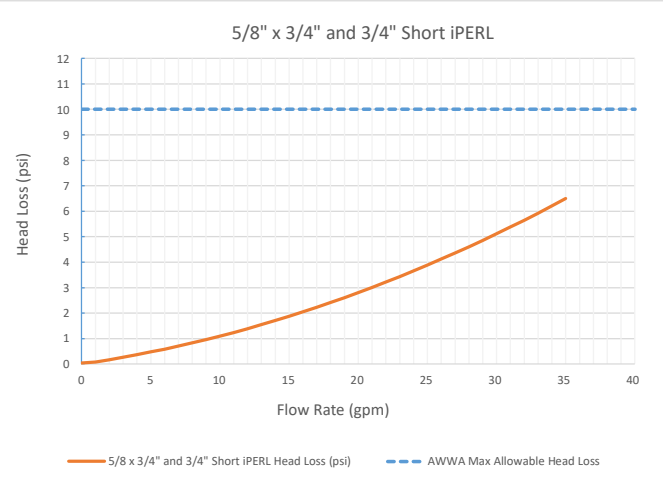
| Meter Size | A | B | C | Spud Ends | NPSM Thread Size | Width | Net Weight |
|---|---|---|---|---|---|---|---|
| 5/8″ (DN 15 mm) | 7-1/2″ (190 mm) | 6-1/10″ (155mm) | 1-3/4″ (44 mm) | 5/8″ (15 mm) | 3/4″ (20 mm) | 4-1/2″ (114 mm) | 3.1 lb. (1.4 kg) |
| 5/8″ x 3/4″ (DN 15mm x 20 mm) | 7-1/2″ (190 mm) | 6-1/10″ (155mm) | 1-3/4″ (44 mm) | 3/4″ (20 mm) | 1″ (25 mm) | 4-1/2″ (114 mm) | 3.1 lb. (1.4 kg) |
| 3/4″Short (DN 20 mm) | 7-1/2″ (190 mm) | 6-1/10″ (155 mm) | 1-3/4″ (44 mm) | 3/4″ (20 mm) | 1″ (25 mm) | 4-1/2″ (114 mm) | 3.1 lb. (1.4 kg) |
| 3/4″ (DN 20 mm) | 9″ (229 mm) | 6-1/10″ (155 mm) | 1-3/4″ (44 mm) | 3/4″ (20 mm) | 1″ (25 mm) | 4-1/2″ (114 mm) | 3.2 lb. (1.45 kg) |
| 1″ (DN 25 mm) | 10-3/4″ (273 mm) | 6-1/10″ (155 mm) | 1-3/4″ (44 mm) | 1″ (25 mm) | 1-1/4″ (32 mm) | 4-1/2″ (114 mm) | 3.3 lb. (1.5 kg) |

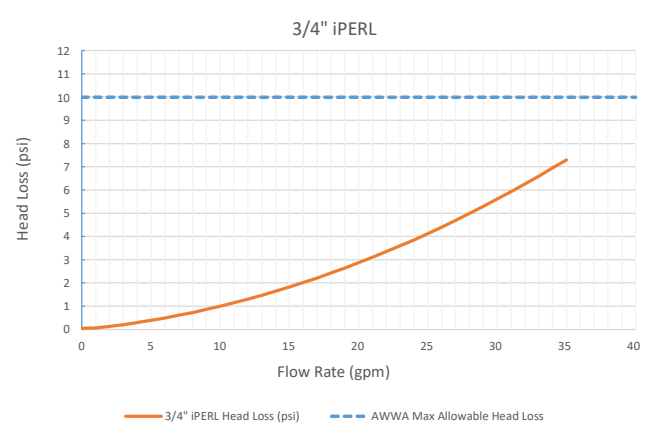
# iPERL Smart Water Meter

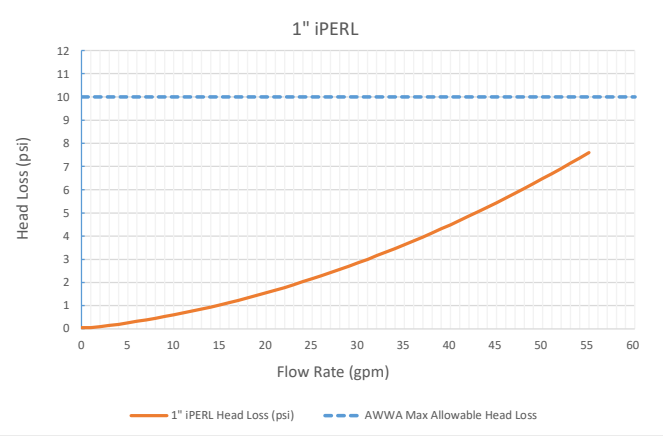
## Electromagnetic Flow Measurement System

### Head Loss Curves




Xylem.com | Sensus.com

**SENSUS** | 637 Davis Drive | Morrisville, NC 27560 | 800.638.3748

# Bid Proposal for Mandan metering 2024 pricing

**All Bidders**
**Job Location:** Mandan, ND
**Engineer:** N/A
**Bid Date:** 12/31/2021
**Core & Main** 3221376

**Core & Main**
407 72nd ST SE
Minot, ND 58701
**Phone:** 7018526878
**Fax:** 7018526817

| Seq# | Qty | Description | Units | Price | Ext Price |
|---|---|---|---|---|---|
| 30 | 1 | 5/8 IPERL METER | EA | 190.00 | 190.00 |
| 40 | 2 | 5/8X1/2 BRZ MTR CPLG NO LEAD | EA | 16.58 | 33.16 |
| 50 | 2 | 5/8X1/8 RUBBER METER WASHER | EA | 0.16 | 0.32 |
| | | | | **5/8 IPERL** | **223.48** |
| | | | **Average price per** | **EA** | **223.48** |
| 70 | 1 | 3/4S IPERL 1000G 3-TRM SCRW SM | EA | 190.00 | 190.00 |
| 80 | 2 | AYM 74620 3/4 METER CPLG- NL | EA | 23.72 | 47.44 |
| 90 | 2 | 3/4X1/8 THK RUBBER MTR WASHER | EA | 0.16 | 0.32 |
| | | | | **3/4S TOTAL** | **237.76** |
| | | | **Average price per** | **EA** | **237.76** |
| 110 | 1 | 3/4 IPERL 1G 25' 3W PE SM | EA | 216.00 | 216.00 |
| 120 | 2 | AYM 74620 3/4 METER CPLG- NL | EA | 23.72 | 47.44 |
| 130 | 2 | 3/4X1/8 THK RUBBER MTR WASHER | EA | 0.16 | 0.32 |
| | | | | **3/4 IPERL TOTAL** | **263.76** |
| | | | **Average price per** | **EA** | **263.76** |
| 150 | 1 | 1 IPERL 1000G 3-TERM SCREW | EA | 291.00 | 291.00 |
| 160 | 2 | AYM 74620 1" METER CPLG NL | EA | 29.70 | 59.40 |
| 170 | 2 | 18-G4 1 RUBBER METER GASKET | EA | 0.51 | 1.02 |
| | | | | **1" IPERL TOTAL** | **351.42** |
| | | | **Average price per** | **EA** | **351.42** |
| 190 | 1 | 1-1/2" SENSUS C2 OMNI METER | EA | 1,648.00 | 1,648.00 |
| 200 | 2 | 18-G6 1-1/2 FLG RUBBER GASKET | EA | 4.14 | 8.28 |
| 210 | 1 | 1-1/2" BRS OVAL MTR FLG SET NL | EA | 177.21 | 177.21 |
| | | | | **1-1/2" C2 TOTAL** | **1,833.49** |
| | | | **Average price per** | **EA** | **1,833.49** |
| 230 | 1 | 2" SENSUS C2 OMNI METER | EA | 1,905.00 | 1,905.00 |
| 240 | 2 | 18-G7 2 FLANGE METER GASKET | EA | 5.14 | 10.28 |
| 250 | 1 | 2" BRASS OVAL METER FLG SET NO | EA | 227.00 | 227.00 |
| | | | | **2" C2 TOTAL** | **2,142.28** |
| | | | **Average price per** | **EA** | **2,142.29** |
| 270 | 1 | OMNI 3" C2 MTR-1000GAL METER | EA | 2,234.00 | 2,234.00 |
| 280 | 1 | 3" COMPANION FLG SET | SET | 621.70 | 621.70 |
| | | | | **3" C2 TOTAL** | **2,855.70** |
| | | | **Average price per** | **EA** | **2,855.70** |
| 300 | 1 | 4" SENSUS C2 OMNI METER | EA | 4,162.00 | 4,162.00 |
| 310 | 1 | 4" COMPANION FLG SET | SET | 906.72 | 906.72 |

CORE & MAIN

# Bid Proposal for Mandan metering 2024 pricing

Bid #: 3221376

| Seq# | Qty | Description | Units | Price | Ext Price |
|---|---|---|---|---|---|
| | | | | 4" C2 TOTAL | 5,068.72 |
| | | | Average price per | EA | 5,068.72 |
| 330 | 1 | OMNI 6" C2 MTR 1000GAL METER | EA | 7,188.00 | 7,188.00 |
| 340 | 1 | 6" COMPANION FLG SET | SET | 1,585.45 | 1,585.45 |
| | | | | 6" C2 TOTAL | 8,773.45 |
| | | | Average price per | EA | 8,773.46 |
| 360 | | **FLEXNET RADIOS** | | | |
| 370 | 1 | 510M S/POINT M2 WIRED SP HR&LD | EA | 190.00 | 190.00 |
| 390 | | **SCHEDULING & INSTALL** | | | |
| 400 | | **ALL IN THE SAME TIME PERIOD** | | | |
| 410 | 1 | METER INSTALL | EA | 100.00 | 100.00 |
| 420 | | **IF NEEDED** | | | |
| 430 | 1 | AYM 74620 1" METER CPLG NL | EA | 29.70 | 29.70 |
| 440 | 1 | 74604B 1 ANG MTR VLV FIPTXMN | EA | 159.50 | 159.50 |
| 450 | 1 | 72092 3/4 BRS MIP INS ADPT | EA | 9.95 | 9.95 |
| 460 | 1 | HSS16 DIXON HOSE CLAMP | EA | 0.59 | 0.59 |

**UNLESS OTHERWISE SPECIFIED HEREIN, PRICES QUOTED ARE VALID IF ACCEPTED BY CUSTOMER AND PRODUCTS ARE RELEASED BY CUSTOMER FOR MANUFACTURE WITHIN THIRTY (30) CALENDAR DAYS FROM THE DATE OF THIS QUOTATION. CORE & MAIN LP RESERVES THE RIGHT TO INCREASE PRICES TO ADDRESS FACTORS, INCLUDING BUT NOT LIMITED TO, GOVERNMENT REGULATIONS, TARIFFS, TRANSPORTATION, FUEL AND RAW MATERIAL COSTS. DELIVERY WILL COMMENCE BASED UPON MANUFACTURER LEAD TIMES. ANY MATERIAL DELIVERIES DELAYED BEYOND MANUFACTURER LEAD TIMES MAY BE SUBJECT TO PRICE INCREASES AND/OR APPLICABLE STORAGE FEES. THIS BID PROPOSAL IS CONTINGENT UPON BUYER'S ACCEPTANCE OF SELLER'S TERMS AND CONDITIONS OF SALE, AS MODIFIED FROM TIME TO TIME, WHICH CAN BE FOUND AT:** https://coreandmain.com/TandC/

# APPENDIX B – OFFICIAL RESOLUTION

*The Official Resolution will be adopted at the Month day City Council meeting and submitted to the Bureau of Reclamation at sha-dro-fafoa@usbr.gov within the 30-day allotted time window following the July 9, 2024 application deadline.*