Automated Meter Reading Project

United States Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant Application Fiscal Year 2020

Funding Level 2

Submitted: October 3rd, 2019

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Mandatory Federal Forms

The following forms were submitted electronically with the grant application.

- SF-424 Application for Federal Assistance
- SF-424C Budget Information for Construction Projects
- SF-424D Assurances for Construction Projects
- SF-LLL Disclosure of Lobbying Activities

Technical Proposal

Executive Summary

Date:

October 3, 2019

Applicant Name:

Public Works and Natural Resources, City of Longmont, Boulder County, Colorado

Executive Summary

The City of Longmont (the City) is applying for the U.S. Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant opportunity for $800,000 funding for the Automated Meter Reading (AMR) project. The AMR project, as described in City's Capital Improvement Plan (CIP), meets the industry standard of an advanced metering infrastructure (AMI) project for a water utility. The City initially began the process of transitioning to AMR meters in 2012. The grant application is to assist in the final transition of residential and large analog meters to AMR. Once the transition is complete, the AMR meters will be connected to a fixed base collector system and customer portal. The fixed base collector system and customer portal are separate projects not included in the scope of this grant application. The development of both projects is on a similar timeline as the AMR project and the two final milestones for the AMR project is its integration into the collector system and customer portal. The completion of this AMR project will create a continuous flow of data that will notify staff of customer leaks, backflow events, meter tampering and no flow events, and inform and educate customers on their detailed water usage and opportunities for savings. The full transition and integration of the AMR project will enable improved leak detection and customer education, resulting in an estimated savings of 321.99 million gallons or 988.1 acre-feet of water per year. The AMR project's quantifiable water savings and improved management of the water system is in direct support of the WaterSMART funding opportunity's goals of increasing water conservation, efficiency and reliability.

Tasks

1) Notification of Grant Award, *second quarter 2020*
2) Signed Funding Agreement, *third quarter 2020*
3) AMR Individual Meter Replacements
    a. Milestone 1: Engage contractor for meter installation assistance, *early 2020*
    b. Milestone 2: Replace 3,673 5/8" meters with Neptune E-code R900i AMR water meters, *end of 2021*
    c. Milestone 3: Replace 3,956 5/8" meters with Neptune E-code R900i AMR water meters, *end of 2022*
    d. Milestone 4: Replace 711 large meters (1" – 6") with Neptune E-code R900i AMR water meters, *third quarter 2023*
    e. Milestone 5: Connect AMR meter data to the customer portal, *fourth quarter 2022*
    a. Milestone 6: Complete AMR connections to the fixed base collector system[1], *third quarter 2023*
4) Semi-Annual Grant Reporting, *semi-annually 2021 – 2023*
5) Final Grant Report, *end of 2023*

Length of Time and Estimated Project Completion Date:

January 2021 – September 2023, 32 months

Is the Proposed Project Located in a Federal Facility?

No

Background Data

Source of Water Supply

The City of Longmont's drinking water is surface water that comes from streams, lakes and reservoirs that are fed by snowmelt and rainfall. The sources of Longmont's drinking water are:

1. The St. Vrain Creek watershed, which includes North and South St. Vrain Creeks, and St. Vrain Creek. The North St. Vrain Creek watershed primarily includes portions of Rocky Mountain National Park. Ralph Price Reservoir is used to store water from North St. Vrain Creek. The South St. Vrain Creek watershed extends into the Indian Peaks Wilderness. The North and South forks combine to form St. Vrain Creek near the town of Lyons. For Longmont, the Highland Ditch is used to convey water from the St. Vrain Creek to the Nelson Flanders Water Treatment Plant for treatment. In 2018, 49% of Longmont's water came from North St. Vrain Creek and St. Vrain Creek. Water from St. Vrain Creek, below the Town of Lyons, is conveyed by the Palmerton Ditch to Longmont's Wade Gaddis Water Treatment Plant (a peaking plant for Longmont). This water source was not used during 2018.

[1] The City's propagation study expects at least 99% AMR connection to the collector system.

2. The Colorado and Fraser Rivers in Grand County. These sources are delivered to Longmont via the Colorado-Big Thompson (C-BT) project, operated by the Northern Colorado Water Conservancy District (Northern Water). Longmont takes delivery of both C-BT Project water, as well as Windy Gap Diversion Project water through the C-BT system. Water from reservoirs in Grand County flows through the Adams Tunnel and is delivered to Longmont through Carter Lake, then delivered to Longmont via the St. Vrain Supply Canal and Southern Water Supply Pipeline. In 2018, 51% of Longmont's water came from these C-BT water sources. These water sources were treated at the City's Nelson Flanders water treatment plant. The Wade Gaddis water treatment plant was not operated in 2018.

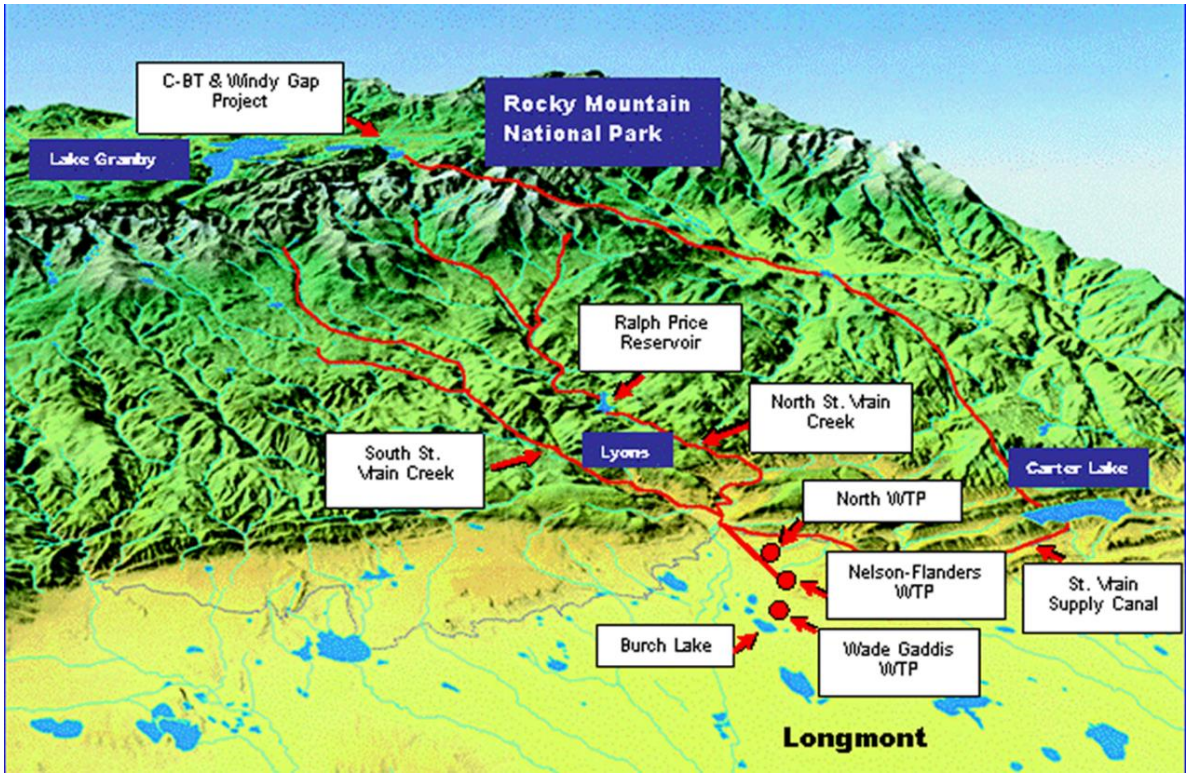


Figure 1: 2012 Map of the City of Longmont's Water Supply

Water Rights

Longmont's inventory of water rights has grown through the construction of projects, purchase of water rights and through water acquired via the 1964 Raw Water Requirement Policy. Examples of construction include the North and South St. Vrain Creek Pipelines, McCall Lake, Ralph Price Reservoir and the Windy Gap Project. Purchases include shares in the Longmont Supply and Palmerton Ditches, Bluebird, Pear and Sandbeach Reservoirs, C-BT Project units, and a majority interest in Union Reservoir in 1986.

Longmont's Raw Water Requirement Policy specifies that new development transfer all historic irrigation water rights used on that land to the City and specifies that a minimum of three acre-feet per acre be provided. Of this amount, at least one acre-foot must be from storage water

rights. Non-historic water rights and cash in lieu of historic water rights are accepted by Longmont. The cost of cash in lieu of water rights is based on the cost per acre-foot for C-BT water as modified from time to time by the Longmont Water Board. Typically, funds from cash in lieu of water rights have been used to purchase C-BT units or other water rights such as Union Reservoir shares. Since its adoption in 1964, the Raw Water Requirement Policy has provided Longmont with a significant portfolio of water rights.

Water Use and Water Delivery System

At the end of 2018, the City of Longmont served water to a population of 98,242. Within the City of Longmont, the City provides both potable and raw water for residential, municipal, commercial, mixed-use and irrigation. Raw water is specifically used for irrigation taps for City parks, schools and a few homeowner associations (HOAs). Every year, Longmont tracks the total number of active connections and reports it to the Colorado Water Conservation Board (CWCB) through the CWCB's Water Efficiency Reporting Portal (Table 1).

Table 1: Active 2018 Customer Connections in Longmont, Colorado

Customer Category	**Number of Active Connections**
Residential, Single Family	24,985
Residential, Multi-Family	1,101
City Water	371
Irrigation	315
Commercial	1,429
Mixed Use	22

Current and Projected Water Demand

In 2012, the City of Longmont completed a Future Water Demand Evaluation that provided a comprehensive study of current and future water demands. In 2019, the City of Longmont updated the Future Water Demand Evaluation report. This 2019 update allowed for the inclusion of historical water usage data from 2001 to 2017. This report highlighted that average annual treated water demand was 23,992 acre-feet/year with a forecasted five-year water demand of 22,001 acre-feet/year. Including the water demand variability factors, the five-year forecast is adjusted to 32,532 acre-feet per year, as highlighted in Table 24 from the Water Demand Evaluation Report (Table 2)

Table 2: Treated water current water usage and forecast, Future Water Demand Evaluation Report, 2019 Update

Table 24 Treated Water Reference Forecast + Variability						
	2012 WDE w/ 2008 data		2001 - 2017 Average		Forward 5-Yr Ave Trend Line to 2022	
	mgd	ac-ft / yr	mgd	ac-ft / yr	mgd	ac-ft / yr
Total Metered Demand (Subset of Table 17)		22,731		20,386		17,954
Reference Forecast for Total Treated Water Demand (Table 17)		24,595		22,071		19,414
Reference Forecast for Total Raw Water Demand		27,086		23,992		22,001
		+		+		+
Mid Level Variability Water Demand Adjustments (Table 22)		5,637		10,542		10,530
		=		=		=
Adjusted Forecast For Total Raw Water Demand		**32,723**		**34,534**		**32,532**

Potential Shortfalls in Water Supply

To meet the projected raw water demand for the City of Longmont, the City has approved firming existing supply by purchasing 8,000 acre-feet of storage with the Windy Gap Firming Project with Northern Water. The predicted water supply was determined using a reference forecast and a series of variable assumptions, including climate variability and future water conservation, as highlighted in Table 22 from the Water Demand Evaluation Report (Table 3).

Table 3: Variable Assumption for Raw Water Demand, Future Water Demand Evaluation Report, 2019 Update

Table 22 - Summary of Variable Assumptions for Adjusted Total Water Demand Forecast (Annual Average)							
1a. Redevelopment (non-residential)	-0.004	(4)	1.3	1,415	1.3	1,415
1b. Redevelopment (residential)			0.1	124	0.1	124
2. Partially Developed or Occupied	0.4	447		0		0
3a. New Development (non-residential)	-0.3	(291)	1.0	1,067	1.0	1,067
3b. New Development (residential)			0.2	180	0.2	180
4. High Water Industrial Users (5% of parcels)	1.1	1,200	1.1	1,200	1.1	1,200
5. Primary Employment conversion to Mixed Use	0.0	0	0.1	146	0.1	146
6. Additional Water Loss	0.0	0	0.5	562	0.4	449
7. Adjust to Average Trend	0.4	449		0		0
8a. Climate Variability	1.8	1,968	1.6	1,766	1.4	1,553
8b. City Raw Water Irrigation			-0.1	(112)	-0.1	(112)
9. Dry Year Adjustment	1.3	1,445	2.3	2,584	2.0	2,247
10. Future Water Conservation	-1.6	(1,750)	-0.8	(928)	0.0	0
11a. Factor of Safety / Contingency (5%)	1.1	1,230	0.9	1,011	0.7	786
11.b Airport Redevelopment				150		150
12. Distribution system water loss from variability assumptions	0.0	0	0.0	0	0.0	0
Subtotal Treated Water Demand Variabilities		**4,724**		**9,163**		**9,205**
13. Climate variability impact on Raw Water Supply		541		489		433
14. Climate varibility impact on raw water irrigation demand by city		136		136		136
15. Raw Water Supply and Treatment Plant losses for Variability factors		236		641		644
16. Colorado River Compact Call				0		0
17. Add 8b back in for raw water supply				112		112
Subtotal Raw Water Demand Variability		**913**	0.0	**1,379**	0.0	**1,326**
Total Water Demand Variability to be applied to Reference Forecast		**5,637**		**10,542**		**10,530**

If future water conservation goals are not met, then the water supplies for the City of Longmont will be approximately 2,250 acre-feet short during a seven-year-long drought (using the variability assumption of water conservation saving of 928 acre-feet for Longmont's planning horizon). Continuing the City's water conservation efforts is critical to avoiding potential short-falls in water supply.

The impact of climate change and climate variability was approximated at an eight percent impact on treated water demand, with a possible range between six to ten percent. This variability was calculated using the different climate variability scenarios for the Front Range of Colorado from the 2012 Joint Front Range Climate Change Vulnerability Study (Woodbury, Baldo, Yates, & Kaatz, 2012). If climate extremes follow the hot and dry model and cause a ten percent increase in treated water demand, this could lead to a future shortage in water supply. Although, Longmont's inclusion of a five percent factor of safety/contingency factor in the analysis could offset this increase in demand.

As the community grows, the City will continue to evaluate how to avoid water supply shortages and provide water to the community through water conservation and identifying new sources of water supply. This project is an important component of how the City can continue to minimize potential shortfalls in Longmont's water supply.

Past Working Relationships with Reclamation

The City of Longmont has not directly worked with the Bureau of Reclamation. The City has worked with Northern Water on numerous projects, including the C-BT and the Windy Gap Diversion Project. The City of Longmont is a participant in the Colorado River Recovery Program and South Platte River Recovery Program that has basin-wide benefits and is supported by Reclamation.

Project Location

The AMR project is taking place within the City of Longmont which is located primarily within Boulder County and partially within Weld County, Colorado within Reclamation's Great Plains region. The AMR project is divided into three different meter installation phases through neighborhoods within the City of Longmont (Figure 2).

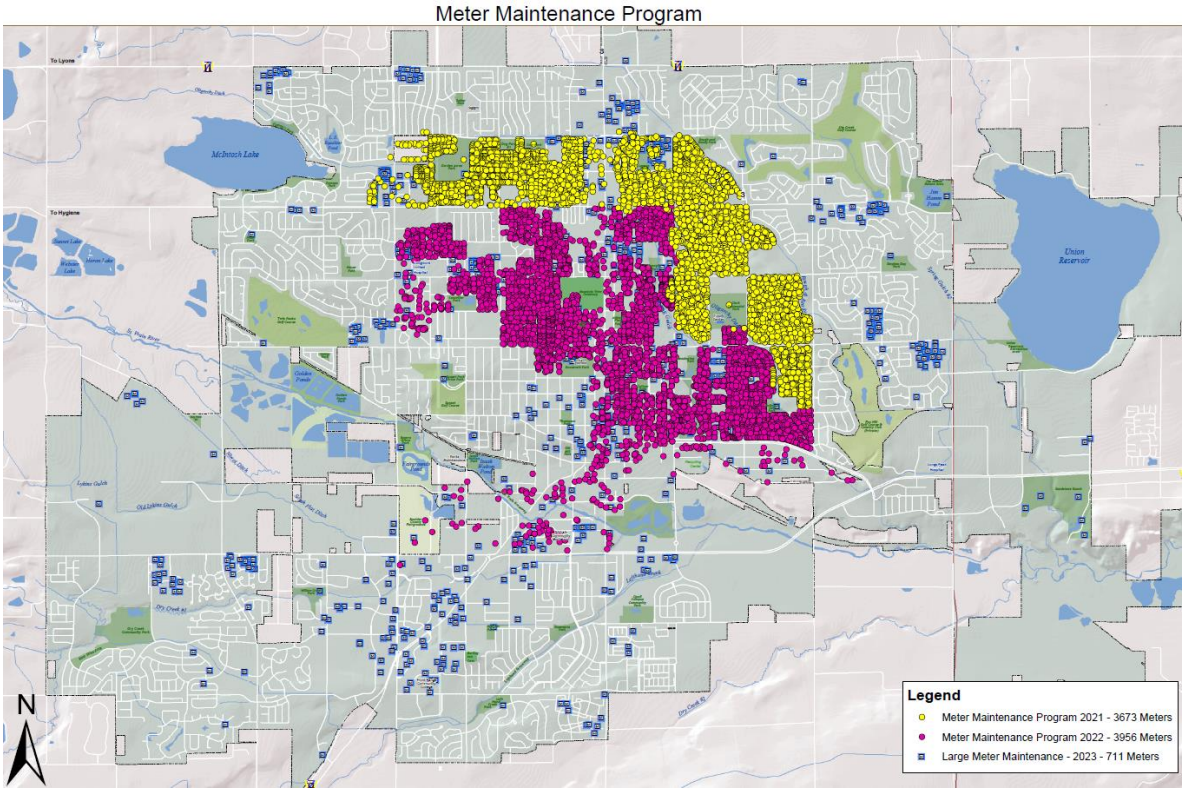


Figure 2: The AMR project implementation map

Project Description

The City of Longmont began the process of transitioning to an AMR system in 2012. This grant application is to support the completion of the transition of residential and large meters to AMR. Previous phases excluded from this funding request include the initial AMR meter standardization and fixed base collector pilot project. Also excluded from this funding request

are two concurrent projects: the installation of the fixed base collector system, and an upgraded customer portal. The AMR project will integrate with both of these components to deliver the project's key objectives. The fixed base collector system installation is expected to be completed by the end of 2022 or mid-2023. This was excluded from the grant application because the City has already begun the execution of this project. The customer portal project is expected to be completed by the end of 2022. This was excluded from this grant application because the City's water utility is partnering with the City's electric utility to create a combined comprehensive utility portal. The overall customer portal project scope is much larger than just the transition to AMR. These projects are included in the project description and as part of the AMR project objectives, because an important milestone in the project is the integration of the AMR meters into both the fixed base collector system and the customer portal.

Implementation – Meter Replacement

Beginning in 2021, staff will begin the final phase of meter installations to enable the completion of system build-out by September of 2023. At the end of 2022, the City will have changed out all residential meters to radio read technology and will connect these meters to the customer portal. At the end of 2023, 711 large meters will be changed to the radio read technology. Throughout the transition to AMR meters, meters will connect to the fixed base collector system.

Tasks

2) Notification of Grant Award, *second quarter 2020*
3) Signed Funding Agreement, *third quarter 2020*
4) AMR Individual Meter Replacements
    a. Milestone 1: Engage contractor for meter installation assistance, *early 2020*
    b. Milestone 2: Replace 3,673 5/8" meters with Neptune E-code R900i AMR water meters, *end of 2021*
    c. Milestone 3: Replace 3,956 5/8" meters with Neptune E-code R900i AMR water meters, *end of 2022*
    d. Milestone 4: Replace 711 large meters (1" – 6") with Neptune E-code R900i AMR water meters, *third quarter 2023*
    e. Milestone 5: Connect AMR meter data to the customer portal, *fourth quarter 2022*
    f. Milestone 6: Complete all AMR connections to the fixed base collector system[2], *third quarter 2023*
5) Semi-Annual Grant Reporting, *semi-annually 2021 – 2023*
6) Final Grant Report, *end of 2023*

Evaluation Criteria

Evaluation Criterion A – Quantifiable Water Savings

Describe the support/documentation of estimated water savings

[2] The City's propagation study expects at least 99% AMR connection to the collector system.

Municipal Metering Questions: An applicant must provide a detailed description of the method used to estimate savings, including references to documented savings from similar previously implemented projects.

How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.

Once all residential and large meters have transitioned to AMR and integrated into the customer portal, this project is estimated to save approximately 321.99 million gallons of water per year or approximately 988 acre-feet. AMI will achieve these savings through advanced leak detection and enhanced customer education through the customer portal (Hanes, 2013).

There are additional opportunities for water savings through integration with the City's existing SCADA system. Several case studies presented at the 2018 AWWA Water Conference highlighted opportunities for water loss control through implementation of district metering using a combination of SCADA and AMR data. As these studies are currently in development, the City decided to be conservative and not include these estimated savings in this grant application.

Leak Detection

The City of Longmont completed the AWWA M36 Water Audit for 2018 data. This audit identified that in 2018 total real losses for the City equaled 311.70 million gallons/year or 30.2 gallons/connection/day. This AMR project is upgrading the 24,985 residential connections and 711 large meters. For residential meters, the real loss is 275.41 million gallons/year. This is approximately 11.6% of total residential use. For large meters, the real loss is 7.84 million gallons/year. For the 711 large meters, that is approximately 2% of large use. In total, the real loss is 283.25 million gallons per year.

According to the EPA, about 75% of real loss is recoverable (Unites States Environmental Protection Agency, 2013). At a maximum, 212.44 million gallons/year is recoverable. The AMR system will reduce leaks through the ability to record data into 96 intervals of 15-minute data, allowing the utility or the customer through a customer portal to quickly identify leaks (Hanes, 2013). The City decided to estimate that the AMR system would reduce real loss by 50%, as per recommendation by Peter Mayer of Water Demand Management and co-author of the Water Research Foundation's 2016 "Residential End Uses of Water, Version 2". Assuming a 50% reduction in residential real loss, this would lead to 141.62 million gallons/year.

Table 4: Summary of water savings calculations from improved AMI leak detection

Water Savings from Leak Detection		
AWWA M36 Real Loss	311.70	MG/year
AWWA M36 Real Loss	30.2	gal/conn/day
Total Residential Connections	24,985	conn
Total Large Meters	711	conn
Total Residential Real Loss	275.41	MG/year
Total Large Meters Real Loss	7.84	MG/year
Total Real Loss	283.25	MG/year
50% of Recoverable Loss from AMI	141.62	MG/year

Customer Education

Once all meters have been transitioned to AMR, the City will increase education, usage information, and engagement with the customer through a customer portal. A study by IBM in Dubuque, Iowa found that customer education during a pilot study led to 6.6% water savings (IBM Research, 2011). Based on 2018 usage in Longmont this would lead to 180.37 million gallons/year of water savings.

Table 5: Summary of water savings calculations from improved customer education

Water Savings from Customer Education		
Total 2018 Residential Consumption	2,366.54	MG/year
Total 2018 Large Meter Consumption	366.32	MG/year
Total Consumption	2,732.86	MG/year
Percent Savings from Customer Education	6.6%	percent
Estimated Savings from Customer Education	180.37	MG/year

Total Water Savings

Water Savings from Leak Detection + Water Savings from Customer Education = 141.62 MG/year + 180.37 MG/year = 321.99 MG/year or 988 acre-feet

Total Water Savings ÷ (2018 Residential Water Usage + 2018 Large Meter Usage) = 321. 99 MG/year ÷ (2,366.54 MG/year + 366.82 MG/year) = 11.78% projected residential and large user savings

How have current distribution system losses and/or the potential for reductions in water use by individual users been determined?

Current system losses and losses per connection as highlighted in the section above were determined using the AWWA M36 Water Audit for 2018. Potential for reductions for water use by individual users was defined in the previous sub-sections.

What types (manufacturer and model) of devices will be installed and what quantity of each?

- All meters are Neptune E-Code R900i AMR water meters of varying sizes
  - 7,629 5/8" meters
  - 507 1" meters
  - 147 1.5" meters
  - 47 2" meters
  - 4 3" meters
  - 1 6" meter
  - 3 meters within 1" – 6"

How will actual water savings be verified upon completion of the project?

The AWWA M36 Water Audit provides a baseline for overall system real loss before the completion of the AMR project. Once the project is completed and before the customer portal is launched, the City will use a data management system and SCADA to determine current leakage rates and estimate overall water loss. After the project's launch, the City will continue to use the data management system and SCADA to analyze the impact of customer education and increased knowledge of residential leaks. The City will also use the data to explore if there are opportunities for increased water systems throughout the entire system. Lastly, the City is planning to continue to use the AWWA M36 Water Audit to evaluate and improve the entire water distribution system.

Evaluation Criterion B – Water Reliability

Will the project address a specific water reliability concern? Please address the following:

Yes, this project will increase water reliability by increasing our ability to reduce leaks and promote water conservation practices.

Explain and provide detail of the specific issue(s) in the area that is impacting water reliability, such as shortages due to drought, increased demand, or reduced deliveries. Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)?

As mentioned in the Background, Potential Shortfalls in Water Supply section of this grant application, the City of Longmont's Water Demand Evaluation Report identified multiple different sources of variability that can impact water reliability ((Table 3).

Table 3). Climate variability affects both the raw water supply and treated water demand. Deere & Ault Consultants, Inc in 2010 identified that climate variability would lower annual yield by two percent (Deere & Ault Consultants, Inc, 2011). Treated water demand has an even higher variability of eight percent because of higher evapotranspiration rates from higher temperatures and changes in precipitation rates. Even if there is an increase in precipitation, hotter temperatures will increase evapotranspiration leading to an increase in demand. The City also expects impacts to water reliability from droughts, in the past eighteen years, two larger droughts have occurred in 2006 and 2012 causing an increase in total treated water demand. The City is prepared to implement watering restrictions during prolonged drought periods.

The City is expecting to continue to grow and has factored in both new development and redevelopment into water supply variability. The City's interest in bringing more industry and opportunities for economic growth can lead to sudden increases in water demand. This project will directly address water reliability for population growth and changing industries. The AMR system allows us to further study water usage practices by residents, businesses and industries. By better understanding water usage, the City can develop policies that strategically target higher water users for conservation interventions and develop rate structures that further encourage water savings. The City can better understand and predict water usage of future development projects and use that data to determine the economic and environmental cost-benefit of bringing high industrial water users to the region. The integration of the AMR system into a customer portal will allow the City to better communicate the causes of high bills with City customers and quickly identify leaks, allowing the City and customer to respond to larger leaks within a few days instead of up to 45 days later when the next monthly bill is delivered. This project will allow the City to conserve water and be better prepared to address heightened competition for finite water supplies from population growth and climate variability.

Describe how the project will address the water reliability concern? In your response, please address where the conserved water will go and how it will be used, including

whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.

The project will address the water reliability concern by conserving water for other uses, including increased demand from expected population growth. By increasing water conservation, the City is better prepared to continue to provide all necessary water during prolonged periods of drought. Lastly, conserving water through this project will allow more water to be left in the river system and continue to move downstream.

Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.

The conserved water will allow an incremental decrease in the overall demand, allowing the City to capture and store this water for periods of prolonged drought. The City will not need to install additional infrastructure to realize the benefits of this conserved water.

Indicate the quantity of conserved water that will be used for the intended purpose.

Approximately 321.99 million gallons of water per year or 988 acre-feet of conserved water from the AMR project will be used to increase water reliability.

Will the project make water available to achieve multiple benefits or to benefit multiple water users? Consider the following:

Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)?

The City of Longmont serves multiple sectors: residential, commercial (including agriculture), and municipal. This project is transitioning residential single family meters and a portion of commercial and multi-family meters, but the water conservation benefits will benefit all customers within the City by providing increased reliability and water supply for all. Additionally, increasing the water kept instream through conservation will benefit the environment and recreational users who fish and kayak in the St. Vrain Creek.

> **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 describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.**
>
> The project has the ability to conserve water and increase water kept instream which will benefit Coloradan riparian habitat and species. Locally, this project will contribute to a decrease in demand on the St. Vrain Creek which will benefit the four minnow species that are a federally recognized candidate and Colorado state species of concern. This project will also support Northern Water's environmental stewardship projects on the C-BT Project and Windy Gap Diversion Project. By reducing Longmont's water consumption, the City can reduce demand from the C-BT project and support Northern

Water's efforts to keep water instream and protect endangered fish on the Upper Colorado, including the Colorado pikeminnow, razorback sucker, bonytail and humback chub.

Increasing Longmont's water conservation and water left instream will help contribute to both Northern Water's and St. Vrain and Left Hand Water Conservancy's districts goal of improving and restoring streams and riparian habitats.

Will the project benefit a larger initiative to address water reliability?

Yes, this project will contribute to water conservation efforts which are a key component of the City's overall goals to meet the treated water demand identified in the City of Longmont Water Demand Evaluation Report.

Will the project benefit Indian tribes?

The AMR project will not directly benefit Indian tribes.

Will the project benefit rural or economically disadvantaged communities?

The AMR project will benefit economically disadvantaged communities in Longmont. By better understanding water usage, the City can better target water conservation programs and rebates that can help save water and money for economically disadvantaged communities. The increased ability for leak detection and alerting customers of high water usage will allow customers to act quicker and avoid debilitating high water bills.

The demographics of the census blocks where residential AMR upgrades will be made during this grant project are primarily in regions where the average household income ranges from $0 - $60,000 (below the area median income) and the diversity index (for data that was available) ranges from 58-83 (Figure 3 and Figure 4). Large meter upgrades are dispersed throughout the City.

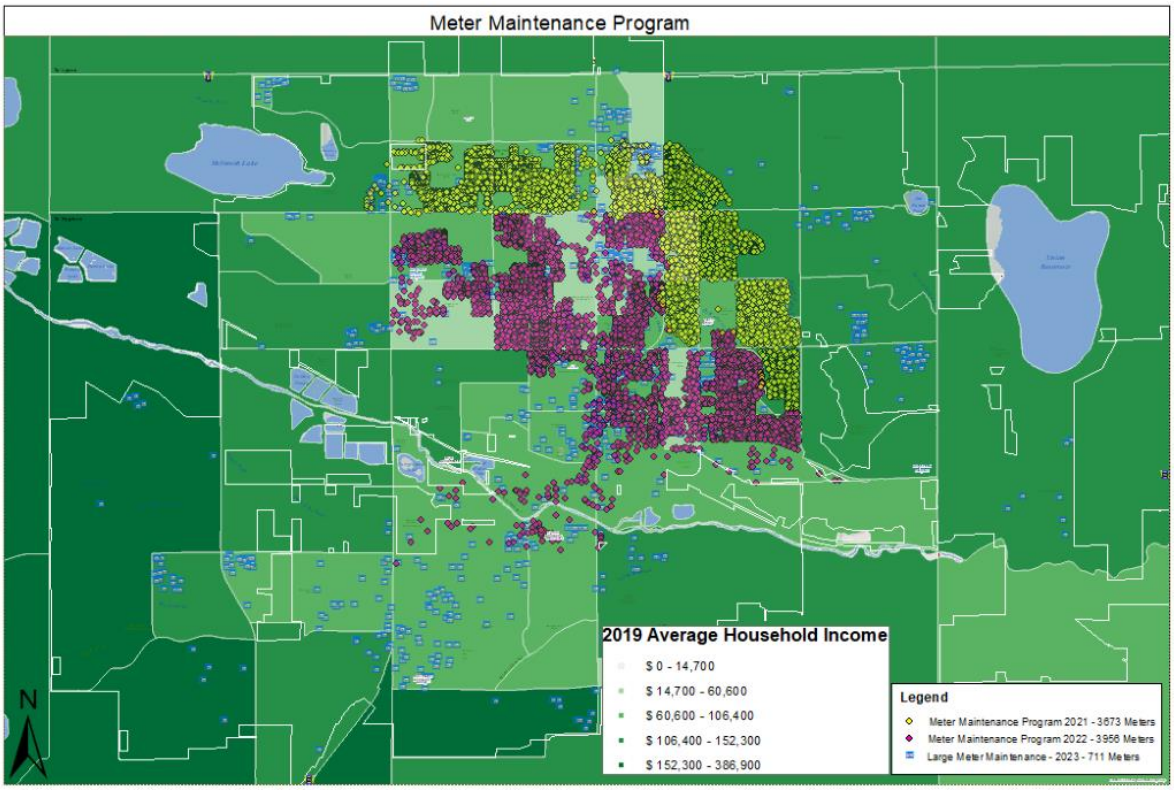


Figure 3: AMR Grant project and average household income by census block (ESRI and U.S. Census Bureau, 2019)

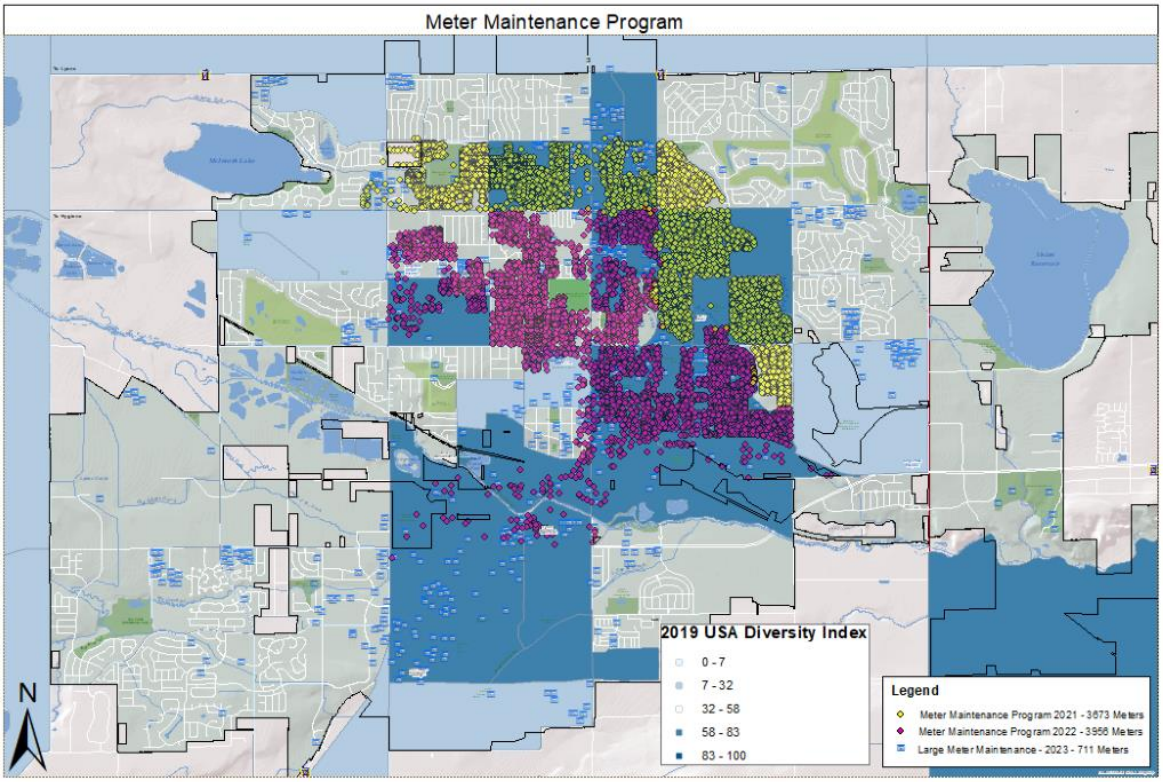


Figure 4: AMR Grant project and diversity index of census blocks (ESRI and U.S. Census Bureau, 2019)

Describe how the project will help to achieve these multiple benefits. In your response, please address where the conserved water will go and where it will be used, including whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.

The project will benefit multiple sectors, including economically disadvantaged communities and riparian species, by conserving water that will increase water reliability, increase conservation opportunities for customers and leave more water in the river systems.

Does the project promote and encourage collaboration among parties in a way that helps increase the reliability of the water supply?

The AMR project encourages increased collaboration between the City of Longmont and the customer. Currently, analog meters do not provide details on the causes of high water bills and have led to misunderstandings and lack of trust from the water customer. The launching of the customer portal to provide more direct information from the AMR system to the customer will allow for even higher levels of communication and education on high water usage and leaks. This increased collaboration will improve trust and opportunities for water conservation, leading to an increased reliability in the water supply.

The project also provides the opportunity to work with the City's two water conservancy districts, Northern Water and St. Vrain and Left Hand Water Conservancy District, and the Colorado state board CWCB to share lessons learned in this process. This may provide the ability to increase the reliability of water supply across a broader region than just the City of Longmont by reaching other communities served by these regional entities.

Is there widespread support for the project?

There is widespread support for this project, as indicated in the letters of support from the City of Longmont's Water Board and Sustainability Advisory Board, from Northern Water Conservancy District and St. Vrain and Left Hand Water Conservancy District, and from CWCB (Appendix B).

What is the significance of the collaboration/support?

The significance of increased collaboration with City customers means that the City can increase not only the reliability of the water system but improve customer trust in City government and understanding of water conservation opportunities. The support from the City's Water Board and Sustainability Advisory Board is significant because it indicates that this project is in support of the City's water conservation and sustainability goals detailed in the Water Efficiency Master Plan and Sustainability Plan. The support from the two Conservancy Districts indicates that these projects will not only support the water reliability of the City of Longmont's water but will provide benefits to organizations that serve larger regions across Colorado. Lastly, the support from CWCB indicates that this project is in supporting not only local but state conservation goals.

Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

There are multiple ways that this project enhances water conservation improvements for water users. First, water users will be notified of leaks and how to address and fix water leaks significantly faster than the previous analog system. The customer portal will also be a more direct method of incentivizing and providing education on how customers can conserve water. Lastly, the AMR system will provide significantly more data on water users' consumptive practices which the City can use to design programs that more effectively promote or incentivize water conservation.

Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?

The project's water conservation objectives and increased information on water usage will help prevent water-related crises around decreased water availability and can help reduce water usage conflict with the customer over high bills and usage. Currently, the St. Vrain Creek is a highly over-appropriated basin. Typically, during the summer, water rights that are junior to 1870 are out of priority and over the winter period water rights junior to 1900 are out of priority. Any efforts to conserve water in the basin will help benefit all junior water rights in the basin and decrease tension and litigation in the region.

Describe the roles of any partners in the process. Please attach any relevant supporting documents.

There are currently no other partners in the AMR project. The City is working internally to develop a customer portal that provides the customer with both water and electricity usage. The City is open to sharing the results of the process with partners.

Will the project address water supply reliability in other ways not described above?

No, the above questions address all water supply reliability concerns.

Evaluation Criterion C – Implementing Hydropower

N/A. This evaluation criterion does not apply to this project, this project is not implementing hydropower.

Evaluation Criterion D - Complementing On-Farm Irrigation Improvements

N/A. This evaluation criterion does not apply to this project, this project is not adding on-farm irrigation improvements.

Evaluation Criterion E - Department of Interior Priorities

1. ***Creating a conservation stewardship legacy second only to Teddy Roosevelt***
    a. Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment

    AMR allows the City to gather data and run analyses of water usage in Longmont. This increase in access to data, opportunity to engage the customer, and identify leaks allows the City to identify the best practices to conserve and protect water resources.

2. ***Utilizing our natural resources***

The subsections in this category do not apply to this grant application. The City's water system is primarily gravity fed and there will not be significant energy savings from pumping.

3. ***Restoring trust with local communities***
    b. Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.

    The connection of the AMR system to a customer portal will enable the City to provide more in-depth information on water usage and expand lines of communication and trust between the municipality and customers. The ability to provide more in-depth details on high water usage and "real-time" water usage, allows customers to better understand and react to higher water usage before a

monthly bill. This will enhance the trust between the local community and the City as a water provider.

Additionally, grant support of this local effort helps to highlight the Bureau and the Department's alignment with community conservation efforts and overall stewardship of natural resources.

4. Striking a regulatory balance

The subsections in this category do not apply to this grant application.

5. Modernizing our infrastructure

a. Support the White House Public/Private Partnership Initiative to modernize U.S. infrastructure

Upgrading from analog to AMR is an important part of modernizing U.S. infrastructure and using data to enhance how Longmont conserves and uses water resources.

Evaluation Criterion F – Implementation and Results

Subcriterion F.1— Project Planning

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place? Please self-certify or provide copies of these plans where appropriate to verify that such a plan is in place.

The City of Longmont's Water Efficiency Master Plan (WEMP), which was an update to the 2008 Water Conservation Plan, was finalized in September of 2017 and approved by the CWCB in May of 2018. The WEMP can be viewed here https://www.longmontcolorado.gov/home/showdocument?id=23548.

1. **Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Drought Contingency Plan or other planning efforts done to determine the priority of this project in relation to other potential projects.**

   The transition to AMR is a project specified in the City of Longmont CIP. This transition is supported by the CWCB approved WEMP as a way to improve metering and prevent water loss. Implementation of the WEMP is supported by the City's Sustainability Plan passed in 2016 and achieving water conservation is an important part of the City's Water Demand Evaluation Report.

2. **Describe how the project conforms to and meets the goals of any applicable planning efforts and identify any aspect of the project that implements a feature of an existing water plan(s).**

The City's water conservation goal, as stated in the WEMP, is to reduce customer and City raw water demands by approximately ten percent within the planning horizon (approximately 2048). This is an expected reduction of 1,141 MG or 3,500 acre-feet. This goal was originally established in the 2004 Raw Water Master Plan. The estimated 321.99 MG per year savings from this project is an important component to achieving that goal.

The City's Water Demand Evaluation Report factors in both minimal increases in water loss and increases in water conservation to estimate future demand. As the City's system ages, more quickly identifying leaks is an important part of minimizing water loss. As stated in the previous paragraph, this project will support water conservation efforts, thereby keeping the City on track to meet future water demand goals.

Subcriterion F.2— Performance Measures

The AMR project will be replacing existing analog meters to AMR meters. These are specifically individual water meters. District meters are already part of the City's SCADA network and are not part of this upgrade. However, there are opportunities to use the fully deployed AMR system combined with existing SCADA data to improve distribution system leak detection and reduction.

Water Conservation Performance Measures

Water Savings Opportunities	Water Savings Performance Measures
Overall Water Conservation	1. Average annual water consumption per meter by meter size will be compared before and after the transition to AMR. Average winter water usage will be used to compare indoor usage and average summer water usage will be combined with yearly weather data to compare outdoor usage.
Leak Reduction	1. Leak reduction will be estimated by calculating the real loss in the system through the AWWA M36 Water Audit or a similar calculation method. 2. Compare estimate leak duration before (from high bill reports) and after (from leak flags) the installation of AMR meters.
Water Conservation from Customer Education	1. By the end of 2022, the AMR meters installed will be integrated into an upgraded City customer portal. AMR data for some meters will have been collected since 2020 and before the customer portal launch in 2022. Using these meters, the City can compare average consumption

	before and after the implementation of the customer portal and increased education on water conservation.
Exploration of Full System Water Conservation (*tentative savings opportunity*)	1. The AMR system and SCADA network could offer opportunities for combined water savings in distribution leak detection. This method will be explored, if it is possible, then the identification and estimate quantifications of water leaks in main lines will be compared before and after the implementation of this system (*tentative performance measure*).

Project Implementation Performance Measures (divided by meter size):

1. Number of analog meters replaced with AMR meters
2. Number of new AMR meters installed with new construction
3. Number of new AMR meters installed on unmetered connections (expected very low number, possibly zero)

The water conservation and project implementation performance measures will be reported in the City's final report to Reclamation upon completion of the project.

Subcriterion F.3— Readiness to Proceed

Describe the implementation plan of 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.

Major Tasks

1. Notification of Grant Award, *second quarter 2020*
2. Signed Funding Agreement, *third quarter 2020*
3. AMR Individual Meter Replacements
    a. Milestone 1: Engage contractor for meter installation assistance, *early 2020*
    b. Milestone 2: Replace 3,673 5/8" meters with Neptune E-code R900i AMR water meters, *end of 2021*
    c. Milestone 3: Replace 3,956 5/8" meters with Neptune E-code R900i AMR water meters, *end of 2022*
    d. Milestone 4: Replace 711 large meters (1" – 6") with Neptune E-code R900i AMR water meters, *third quarter 2023*
    e. Milestone 5: Connect AMR meter data to the customer portal, *fourth quarter 2022*
    a. Milestone 6: Complete AMR connections to the fixed base collector system[3], *third quarter 2023*
4. Semi-Annual Grant Reporting, *semi-annually 2021 – 2023*

[3] The City's propagation study expects at least 99% AMR connection to the collector system.

5. Final Grant Report, *end of 2023*

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

There are no permits needed to replace meters.

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

A propagation study was performed prior to the scope of the project application (initial study, Appendix A). The City expects the propagation study to be continued to be re-evaluated throughout the project.

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

To implement this project requires budget approval from City Council for each year and approval from City Council of the grant agreement.

Describe how the environmental compliance estimate was developed. Has the compliance cost been discussed with the local Reclamation office?

To determine the environmental compliance estimate, the City talked with Pat McCusker of the Eastern Colorado Area Reclamation office. He stated that this project will most likely fall under environmental categorical exclusion as it is replacing meters in existing meter pits or indoor location. From this, the local office will most likely only need to review the application and briefly visit the site, totaling between $1,000 and $2,000. To be safe, the City used the estimation of $2,000 for the environmental compliance estimate.

Evaluation Criterion G— Nexus to Reclamation Project Activities

Is the proposed project connected to Reclamation project activities? If so, how? Please consider the following:

Does the applicant receive Reclamation project water?

Yes, the City of Longmont receives water from the C-BT Project. In 2018, 51% of the City's water supply was from C-BT water. The City also participates and contributes to the development of the Windy Gap Project.

Is the project on Reclamation project lands or involving Reclamation facilities?

The project is not on Reclamation project lands and does involve Reclamation facilities.

Is the project in the same basin as a Reclamation project or activity?

The project is in the St. Vrain region of the Great Plains Reclamation region. The project receives water from the C-BT Project in the Upper Colorado Reclamation region.

Will the proposed work contribute water to a basin where a Reclamation project is located?

Yes, the project will conserve water in the City of Longmont which will reduce our demand from the C-BT project and Windy Gap Project.

Will the project benefit any tribe(s)?

No, the project will not directly benefit any tribes.

Evaluation Criterion H – Additional Non-Federal Funding

State Percentage = Non-Federal Funding/Total Project Cost = $1,842,605.18 ÷ $2,642,605.18 = **69.73%**

Project Budget

Funding Plan and Letters of Commitment

Describe how the non-Federal share of project costs will be obtained. Reclamation will use this information in making a determination of financial capability.
Monetary Contributions by Applicant

The City of Longmont has included the completion of the AMR project in ongoing financial plans. The costs for labor, equipment, and contracted services will be appropriated each year through the City's annual budget process. The City's Water Operating Fund, which is an enterprise fund, will contribute 75% of the total cost. The remaining 25% will be contributed by the Sewer Operating Fund (also an enterprise fund). Due to restrictions in the TABOR amendment to the Colorado State Constitution, the City is prohibited from making multi-year financial commitments, so the City's contributions must be appropriated in the year in which they will be expended.

Cost-share by Applicant

The total cost-share for the project from the City of Longmont is $1,842,605.18.

Third-Party In-Kind Costs

There are no third-party in-kind costs.

Letters of Commitment

There is no other project funding from other sources besides the City, therefore there are no letters of commitment.

Cash Requested or Received from other non-Federal Entities

There is no cash requested or received from other non-federal entities.

Pending Funding Requests (I.e. grants or loans)

There are no pending funding requests (i.e. grants or loans) for this project.

Project Costs Prior to Award

There are no costs in the budget that will be incurred prior to the award.

Budget Proposal

Table 6 – Total Project Cost Summary

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	$ 800,000.00
Costs to be paid by the applicant	$ 1,842,605.18
Value of third party contributions	$ 0
TOTAL PROJECT COST	**$2,642,605.18**

Table 7 – Budget Proposal

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	TOTAL COST
	$/Unit	Quantity		
Salaries and Wages				
Water System Operations Supervisor	$39.43	500	hours	$19,715.00
Water Utility Technician	$27.17	1,066.50	hours for large meters	$28,976.81
Administration	$1.95	8,340	meter change work order	$16,263.00
Fringe Benefits				
FTE - Holiday	4.23%	$64,954.81	total labor cost	$2,747.59
FTE – Sick Leave	4.62%	$64,954.81	total labor cost	$3,000.91
FTE - Medicare	1.45%	$64,954.81	total labor cost	$941.84
FTE - Vacation	7.31%	$64,954.81	total labor cost	$4,748.20

FTE – Workers Compensation	1.81%	$64,954.81	total labor cost	$1,175.68
FTE - Retirement	12.53%	$64,954.81	total labor cost	$8,138.84
FTE – Health Benefits	15.32%	$64,954.81	total labor cost	$9,951.08
FTE – Life Insurance Benefits	0.07%	$64,954.81	total labor cost	$45.47
Equipment				
5/8” Neptune E-code R900i AMR water meters (outside set)	$225.80	2,091	units	$472,147.80
5/8” Neptune E-code R900i AMR water meters (inside set)	$172.50	5,538	units	$955,305.00
Large Meters	$533.42	711	units	$379,261.62
Contractual/Construction				
5/8” Meter Changeout (outside set)	$28.00	2,091	units	$58,548.00
5/8” Meter Changeout (inside set)	$100.00	5,538	units	$553,800.00
Third-Party Contributions				
N/A	N/A	N/A	N/A	$ 0
Other				
Environmental Compliance	$2,000	1	service cost	$2,000
Contingency Cost	5%	Enter total here	percent	$125,838.34
Total Direct Costs				
Indirect Costs				
Type of rate	percentage	$base		$0
Total Estimated Project Costs				$2,642,605.18

Budget Narrative

Salaries and Wages

Large meters (1” and above) will be installed by City employees. Each meter will require approximately 1.5 hours to install, so the 711 large meters should result in approximately 1,066.5 hours of direct labor by Water Utility Technicians. In addition, each meter changeout is processed by administrative staff, taking three to five minutes on average. Five minutes times 8,340 meters results in a direct administrative cost of $16,263. The process is managed by the System Operations Supervisor, who will spend approximately 500 hours on project management, quality control, inventory management, customer service and general administration, incurring a total cost of $19,715.00.

Fringe Benefits

All labor used on this project will be provided by full-time benefitted City employees. A comprehensive list of fringe benefits for full-time employees is provided above, including sick, vacation and holiday time, retirement, life insurance and health benefits, and Medicare and workers' compensation. The City provides a defined benefit plan, so it does not participate in Social Security. The percentage rates given above are an average across the entire employee population and do not constitute any personally identifiable information for the specific employees that may be involved in this project.

Travel

There is no expected travel for the AMR project.

Equipment

All water meters in the City of Longmont will be upgraded to AMR-compatible meters. Residential meters will be Neptune’s 5/8” x ¾" E-code R900i AMR meters. 5,538 of these will be constructed of materials appropriate to indoor installation and will cost $172.50 per unit. The remaining 2,091 will be installed in meter pits, and therefore constructed of more durable materials at a cost of $225.80 per unit. Finally, there are 711 meters ranging in size from one inch to ten inches which have a weighted average cost of $533.42 per meter (depending on the size of the meter, and whether a turbine or compound meter is most appropriate). The total cost of all meters to be installed to complete the AMR project is estimated to be $1,806,716.20.

Contractual

The City will be contracting out the changeout for the 7,629 residential 5/8” meter replacements. The cost of changeout is separated into the cost of changing outside and inside meters. The cost to change the 2,091 outside meters is $28 per change out, totaling $472,147.80. The cost to change the 5,538 inside meters is $100 per change out, totaling $553,800.00. Total expected contractual work is $1,025,947.80.

Third-Party In-Kind Contributions

There are no third-party in-kind contributions for the AMR project.

Environmental and Regulatory Compliance Costs

This project is expected to fall under an environmental categorical exclusion. The estimated costs for completing and confirming this project's categorical exclusion by the Eastern Colorado Area Reclamation Office is $2,000.

Other Expenses

A contingency cost of 5% of the total cost of the project is included to factor in any unforeseen costs.

Indirect Costs

There are not expected indirect costs for this project

Required Permits or Approvals

There are no required permits or approvals for this project. All project activities are within the scope of the City of Longmont's routine maintenance.

Environmental and Cultural Resources Compliance

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 AMR project is not expected to impact the surrounding environment as it is upgrading existing systems. The scope of this project only includes replacing meters, connecting to a fixed base collector system and customer portal. The only possible earth-disturbing work that could occur is if an inside meter needs to be relocated into an outside meter pit. If this occurs, this is not expected to have significant impacts on the local environment.

This project is expected to receive an environmental categorical exclusion. This was determined after speaking with Pat McCluster of the Eastern Colorado Area Office.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

There are four candidate minnow species along the St. Vrain Creek that runs through the City of Longmont that could be eligible to be listed as a Federal threatened or endangered species. This project only has the opportunity to benefit and protect this minnow species by decreasing water demand on the St. Vrain Creek. There will be no construction on the St. Vrain Creek.

This project could also benefit species outside the project area, as conserving water can help increase water kept instream and benefit Northern Water's efforts to protect endangered fish,

such as the Colorado pikeminnow, razorback sucker, bonytail and humback chub, in the Upper Colorado River.

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.

No, there are no wetlands or other surface waters inside the project boundaries that fall under CWA jurisdiction as "Waters of the United States".

When was the water delivery system constructed?

The City of Longmont's water delivery system has been under continuous construction since the first raw water pipeline was constructed in 1882.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.

No, this AMI project is focused on residential single-family and multi-family housing and commercial buildings. The project is not modifying individual features of irrigation systems.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.

There are nine individual properties listed on the National Register of Historic Places in Longmont, these properties will have had their meters upgraded to AMR before the scope of the grant application begins. Therefore, there are no individual properties that will be upgraded during the scope of the grant application that are listed on the National Register of Historic Places.

There are three national historic districts in Longmont (Figure 5).

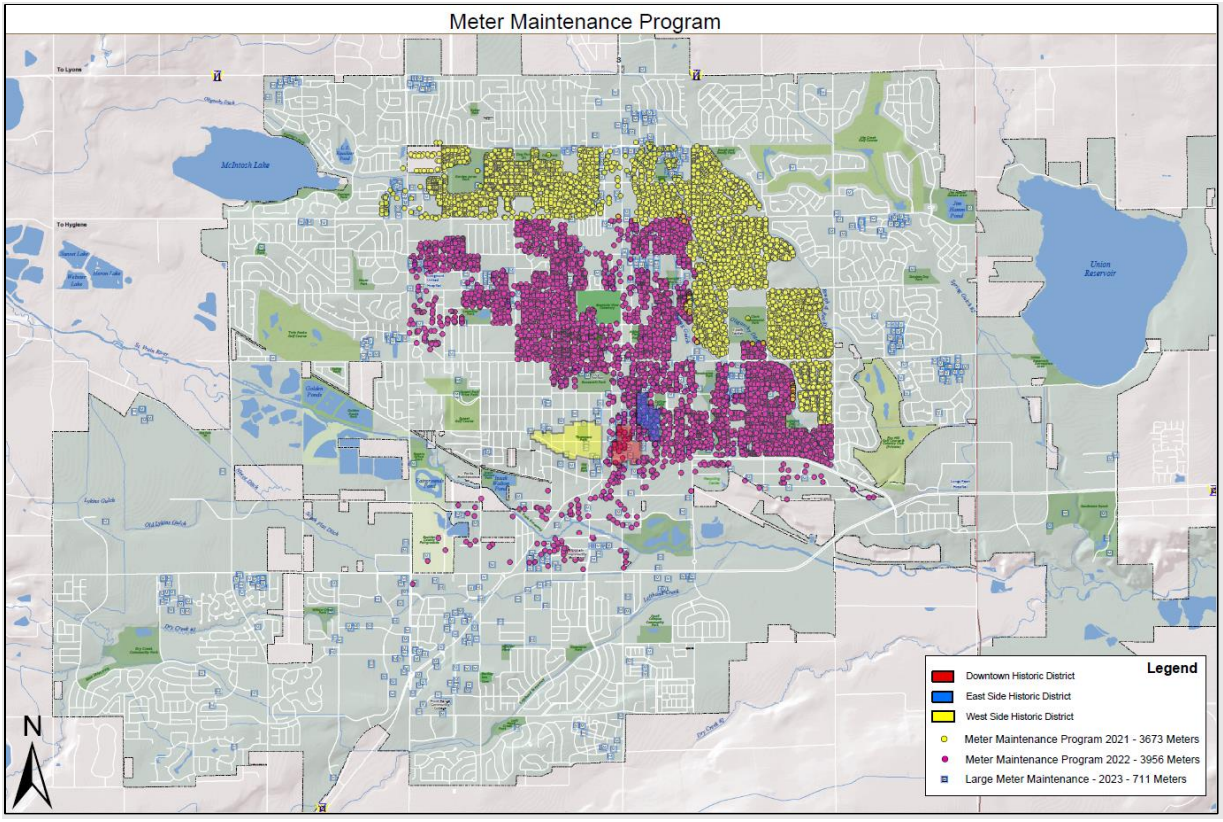


Figure 5: City of Longmont historic districts and overlap with the AMR project

Most of the eastside neighborhood and the westside neighborhoods have been surveyed, but not all. There is also the potential that areas adjacent to the historic neighborhoods could be added to the existing districts. The projected activities are also not expected to disturb properties as it only requires replacing meters in existing meter pits or inside structures.

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

No, there are no known archeological sites in the AMR project area.

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

No, the project does not have disproportionately high and adverse effects on low income or minority populations. The project has the opportunity to develop more accurate data and improve how the City serves low income and minority communities.

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

No, the project will not limit access to and ceremonial use of Indian sacred sites or impact tribal lands.

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, the project should not contribute to the introduction, continued existence or spread of noxious weeds or non-native invasive species.

References

Deere & Ault Consultants, Inc. (2011). *Water Demand Devaluation - Raw Water Supply Modeling Task Memorandum.*

ESRI and U.S. Census Bureau. (2019, June 21). 2019 USA Average Household Income.

ESRI and U.S. Census Bureau. (2019, June 21). 2019 USA Diversity Index.

Hanes, D. (2013, June 01). Every drop counts: How water utilities are putting water efficiency first. *JournalAWWA.* doi:https://doi.org/10.5942/jawwa.2013.105.0077

IBM Research. (2011). *Smart Water Pilot Study Report.* City of Dubuque. Retrieved from https://www.cityofdubuque.org/DocumentCenter/View/3116/City-of-Dubuque-and-IBM-Smart-Water-Pilot-Study-R?bidId=

Unites States Environmental Protection Agency. (2013, July). *Water Audits and Water Loss Control for Public Water Systems.* Retrieved from EPA 816-F-13-002: https://www.epa.gov/sites/production/files/2015-04/documents/epa816f13002.pdf

Woodbury, M., Baldo, M., Yates, D., & Kaatz, L. (2012). *Joint Front Range Climate Change Vulnerability Study.* Denver: Water Research Foundation. Retrieved from https://climatewise.org/images/stories/pdfs/Publications/ClimateWise/Joint_Front_Range_Climate_Vulnerability_Study.pdf

Unique Entity Identifier and System for Award Management

The City of Longmont's Unique Entity Identifier for the System for Award Management is 123SOBMBS.

Appendix A

Propagation Study

NEPTUNE
TECHNOLOGY GROUP INC.

Take Control.

ARB® FixedBase™ R900

Propagation Analysis

Longmont, CO

January 22, 2015

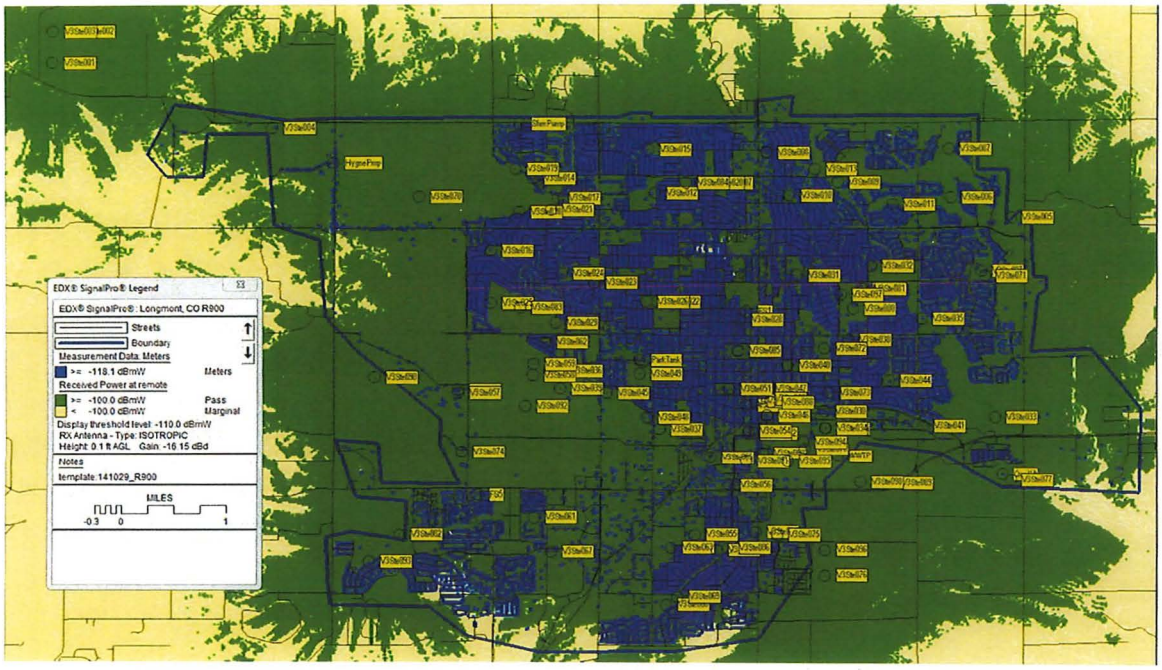
Scope:

- 27,075 meters in the service area
  - Geocoding: 27,075 (100.0%) matched
- Service boundary is approximately 30 sq. miles
- External MIU used for evaluation.
  - R900v3/R900i Pit MIU with external antenna
- Assets provided for Gateways.

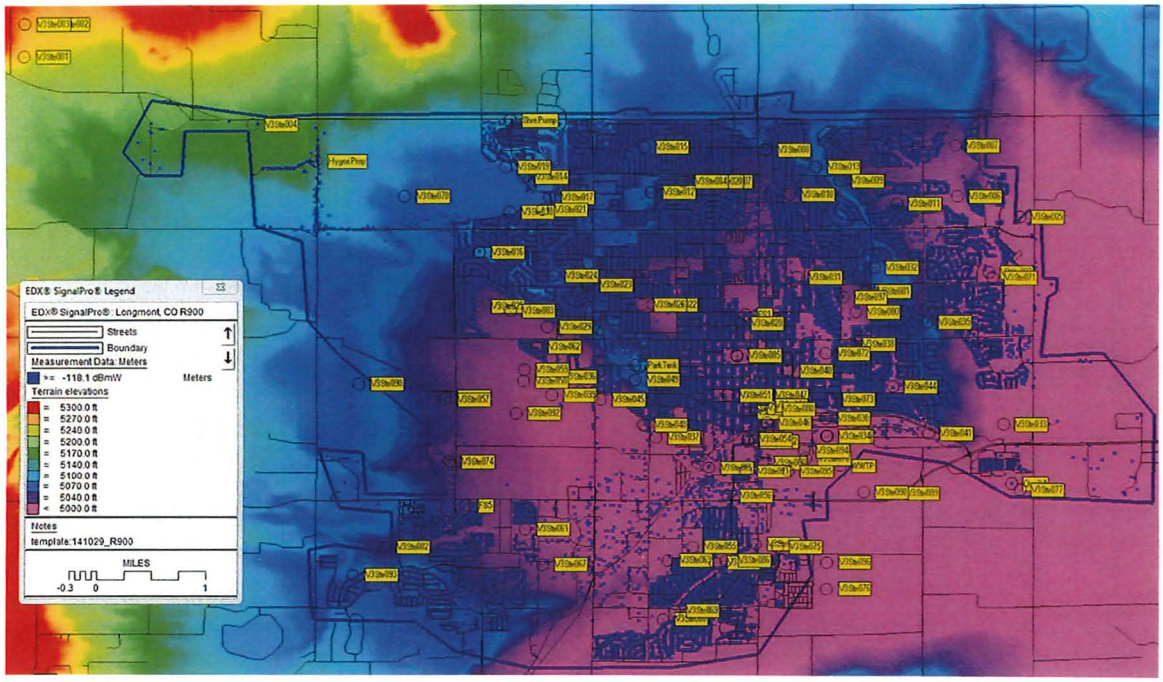
NEPTUNE TECHNOLOGY GROUP INC.

ARB® UTILITY MANAGEMENT SYSTEMS™

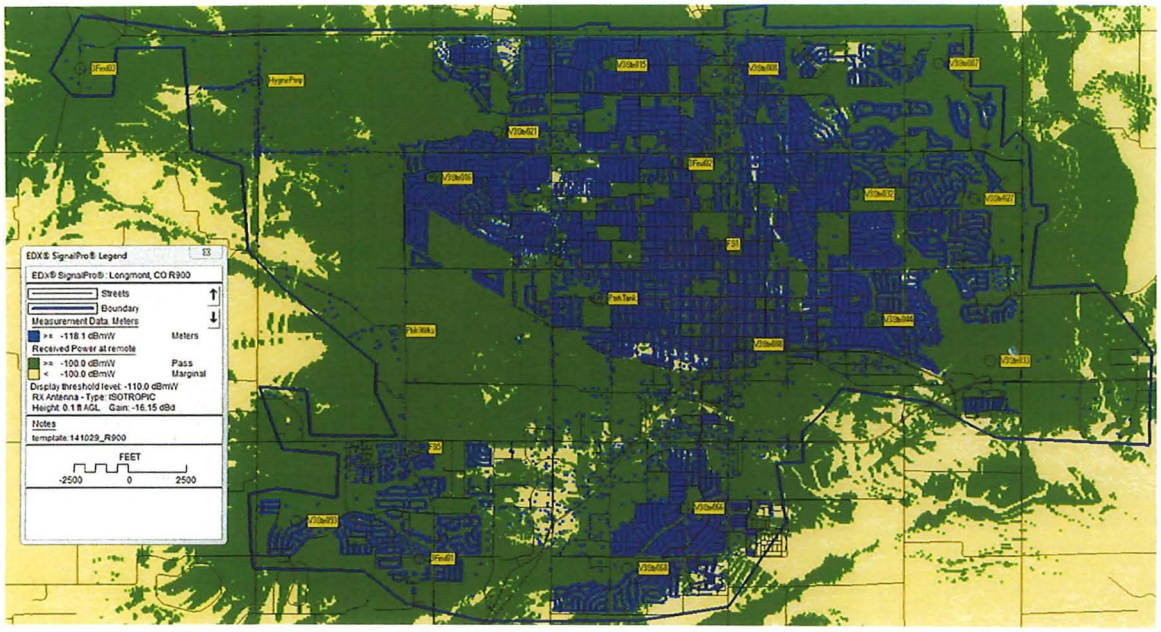
Map 1: Provided Assets



Elevation Map *(National Elevation Dataset available, courtesy of the U.S. Geological Survey)*



Map 2: >90% predicted coverage

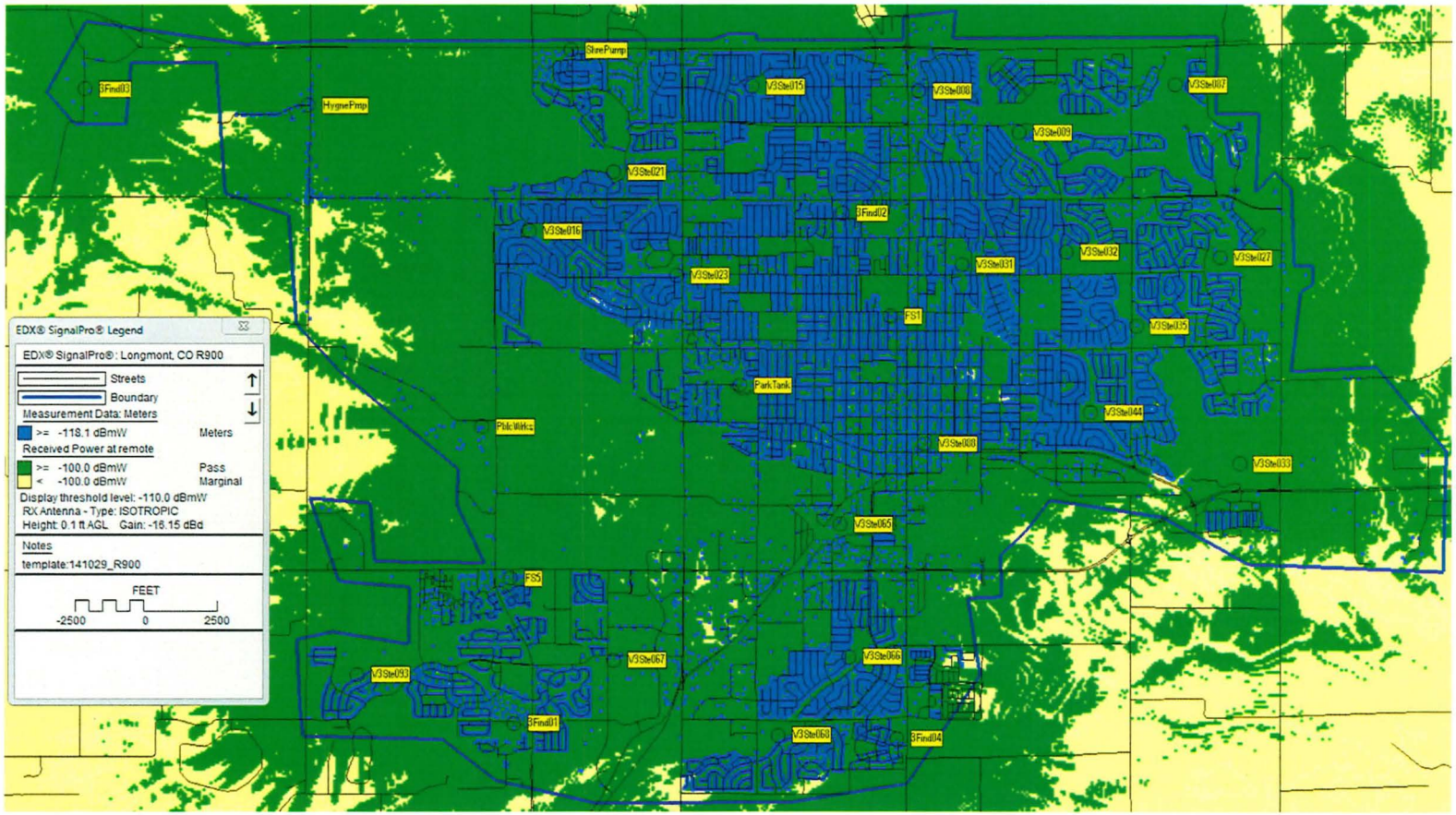


Results:

- 29 Gateways Required
  - Map 1: 120 Gateways – provided assets
  - Map 2: 21 Gateways – 94% services in predicted coverage
  - Map 3: 29 Gateways – 99% services in predicted coverage

- R900 V3/V4 Gateway requirements/conditions:
  - **Power requirement:** 120V AC or SOLAR options **Backhaul:** Cellular Modem, Ethernet
  - 10ft minimum vertical separation from other 900MHz system antennas on structure.
  - Top mounted antennas may require FAA approval near airports or heights >200ft.
  - 3ft-4ft standoff required for side mounting antenna on towers.
  - Revised propagation analysis required for Gateway location or height changes.
  - Spare gateway recommended for system maintenance.
  - Complies with Part 15 of the FCC Rules: May not cause harmful interference, and must accept any interference received, including interference that may cause undesired operation.
  - Propagation Study based on typical noise level below -120dBm, otherwise additional gateways could be required.
  - R900v3 MIU used for study, unless otherwise specified. Older version MIUs should be replaced with R900v3 MIU (External Wall or Pit w/External Antenna) . Pit MIUs require though lid antenna.
  - MIUs mounted inside structures are not recommended for Fixed Network solutions. RF signal is affected differently by building materials used within structures and it is difficult to account for all types of construction. If the Scope states inside MIU used for study, an average loss value is applied to the model. In situations, where inside MIUs do not perform as necessary, an external wall MIU or additional Gateways may be required
  - R900 propagation is in development and actual performance cannot be confirmed until system evaluations are complete. Propagation performance is based on 90% daily read success.
  - R900v4 enhanced propagation is preliminary, equipment specifications and system performance still required to validate propagation. Gateway V4 and R900v4 MIU (External Wall or Pit w/External Antenna) required, any older units will require replacement. The use of this Gateway propagation analysis should be done with this understanding and there is no guarantee of product or performance. Additional gateways could be required.

Map 3: >99% predicted coverage



Appendix B

Letters of Support

The following letters of support are from:

- The City of Longmont Water Board
- The City of Longmont Sustainability Advisory Board
- Northern Colorado Water Conservancy District
- St. Vrain and Left Hand Conservancy District
- Colorado Water Conservation Board

WATER BOARD
LONGMONTCOLORADO.GOV

September 16th, 2019

Ms. Janeen Koza
Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 581
6th Avenue and Kipling Street
Denver, CO 80225

Dear Ms. Koza,

As the Chair of the City of Longmont Water Board, I am pleased to represent the Board in its support of the City's application to the WaterSMART Water and Energy Efficiency Grant application for the fiscal year 2020 in support of the Automated Meter Reading (AMR) and Customer Portal project. This project will help conserve water by installing more accurate meters, improve leak detection and response rate, and increase customer education. This upgraded system is an important part of providing a reliable water delivery system that supports our water conservation goals as stated in the City's Water Efficiency Master Plan and supported by the City's Sustainability Plan.

Throughout its history, the City of Longmont has provided safe, reliable potable water to all its customers. The AMR program began in 2013 to transition City meters from analog to digital with radiofrequency capability to improve accuracies and ability to track water use. This grant will support the final transition to AMR and the launch of the Customer Portal by the end of 2022. With this grant, the City will continue to take steps towards achieving our local and Colorado state water conservation and sustainability goals.

The City of Longmont Water Board is excited to support the City's efforts towards creating a reliable and resilient community through the WaterSMART grant application.

Sincerely,

Todd Williams
Chair of the Water Board

SUSTAINABILITY ADVISORY BOARD
LONGMONTCOLORADO.GOV

September 16, 2019

Ms. Janeen Koza
Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 581
6th Avenue and Kipling Street
Denver, CO 80225

Dear Ms. Koza,

As the Chair of the City of Longmont Sustainability Advisory Board (SAB), I am pleased to represent the SAB in its support of the City of Longmont's application to the WaterSMART Water and Energy Efficiency Grant application for the Advanced Metering Infrastructure (AMI) Project. This project will help conserve water by installing more accurate meters, improve leak detection and response rate, and increase customer education. This upgraded system is an important part of providing a reliable water delivery system that supports our water conservation goals as stated in the City's Water Efficiency Master Plan and supported by the City's Sustainability Plan.

Throughout its history, the City of Longmont has provided safe, reliable potable water to all its customers. The AMI transition began in 2013 to transition City meters from analog to digital with radiofrequency capability to improve accuracies and ability to track water use. This grant will support the final transition to AMI. With this grant, the City will continue to take steps towards achieving our local and Colorado state water conservation and sustainability goals.

The SAB is excited to support the City's efforts towards creating a reliable and resilient community through the WaterSMART grant application.

Sincerely,

Kate Collardson
Chair Pro-Tem of the Sustainability Advisory Board

Northern Water
Northern Colorado Water Conservancy District
220 Water Avenue • Berthoud, Colorado 80513
800-369-7246 • www.northernwater.org

September 18, 2019

Ms. Janeen Koza
Bureau of Reclamation
Denver Federal Center
Building 67, Room 581
6th Avenue and Kipling Street
Denver, CO 80225

Dear Ms. Koza:

As the Water Efficiency Program Manager of the Northern Colorado Water Conservancy District (Northern Water), I am pleased to support the City of Longmont's (City) application to the WaterSMART Water and Energy Efficiency Grant application for the fiscal year 2020 in support of the Advanced Metering Infrastructure (AMI) project. Northern Water is a public agency that was created to build, operate, and maintain the U.S. Bureau of Reclamation's Colorado-Big Thompson (C-BT) Project. The City is a recipient of C-BT water, and this project is supporting our mission to provide water resources management, project operations, and conservation services by helping to conserve water by installing more accurate meters, improving leak detection and response rate, and increasing customer education. This upgraded system is an important part of providing a reliable water delivery system that supports the City's and Northern Water's conservation goals.

Throughout its history, the City has provided safe, reliable potable water to all its customers. In 2013 the AMI project began to transition the City's meters from analog to digital with radio-frequency capability to improve accuracies and ability to track water use. This grant will support the final transition to AMI and the launch of a customer portal by the end of 2022. With this grant, the City will continue to make progress toward achieving its water conservation and sustainability goals.

I am excited to support the City's efforts toward creating a reliable and resilient community through the WaterSMART grant application.

Sincerely,

Frank Kinder
Water Efficiency Program Manager

ST. VRAIN AND LEFT HAND WATER CONSERVANCY DISTRICT

9595 Nelson Road, Suite 203 • Longmont, CO 80501 • 303-772-4060 • www.svlhwcd.org

September 26, 2019

Ms. Janeen Koza
Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 581
6th Avenue and Kipling Street
Denver, CO 80225

Dear Ms. Koza,

As the Executive Director of the St. Vrain and Left Hand Water Conservancy District (District), I am pleased to support of the City of Longmont's (City) application to the WaterSMART Water and Energy Efficiency Grant application for the fiscal year 2020 in support of the Advanced Metering Infrastructure (AMI) project.

The District was formed in 1971 to preserve and protect the water resources in the Saint Vrain Creek and Left Hand Creek Watershed. This project will help meet those goals by installing more accurate meters, improving leak detection and response rate, and increasing customer education to conserve water in the City. This upgraded system is an important part of providing a reliable water delivery system that supports our and the City's conservation goals.

Throughout its history, the City of Longmont has provided safe, reliable potable water to all its customers. The AMI project began in 2013 to transition City meters from analog to digital with radiofrequency capability to improve accuracies and ability to track water use. This grant will support the final transition to AMI. With this grant, the City will continue to take steps towards achieving water conservation and sustainability goals that support the District's efforts to develop, manage and protect water resources in the Longmont area.

We are excited to support the City's efforts towards creating a reliable and resilient community through the WaterSMART grant application.

Sincerely,

Sean T. Cronin
Executive Director

COLORADO
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

September 23, 2019
Ms. Janeen Koza
Bureau of Reclamation
Denver Federal Center
Bldg. 67, Rm. 581
6th Avenue and Kipling Street
Denver, CO 80225

Dear Ms. Koza,

As the State Water Conservation Specialist for the Colorado Water Conservation Board (CWCB), I am pleased to support of the City of Longmont's (City) application to the WaterSMART Water and Energy Efficiency Grant application for the fiscal year 2020 in support of the Advanced Metering Infrastructure (AMI) project. CWCB serves as Colorado's most comprehensive water information resource and provides technical assistance and funding to support the development and implementation of water efficiency plans in Colorado. This project will help meet the City's goals of increased water efficiency by installing more accurate meters, improving leak detection and response rate, and increasing customer education to conserve water in the City of Longmont. Additionally, the proposed AMI Project is consistent with the Colorado Water Plan's measurable objectives and is an example of a project that will help the state of Colorado achieve the goal of a 400,000-acre foot demand reduction by 2050. This upgraded system is an important part of providing a reliable water delivery system that supports the State's and the City's conservation goals.

Throughout its history, the City of Longmont has provided safe, reliable potable water to all its customers. The AMI project began in 2013 to transition City meters from analog to digital with radiofrequency capability to improve accuracies and ability to track water use. This grant will support the final transition to AMI. With this grant, the City will continue to take steps towards achieving water conservation and sustainability goals that support increasing water conservation in the state of Colorado.

I am excited to support the City's efforts towards creating a reliable and resilient community through the WaterSMART grant application.

Sincerely,

Kevin D. Reidy

State Water Conservation Specialist
Colorado Water Conservation Board

Official Resolution

The official resolution for this grant application is being sent to Longmont City Council on October 22nd. The resolution will be submitted to Reclamation by November 2nd and within the 30-day deadline stated in the funding request. Below is the draft resolution that is being sent to City Council.

RESOLUTION R-2019-

A RESOLUTION OF THE LONGMONT CITY COUNCIL AUTHORIZING AN APPLICATION FOR WATERSMART GRANT FUNDING

WHEREAS the United States Bureau of Reclamation is offering grant opportunities through WaterSMART Water and Energy Efficiency Grant Program for fiscal year 2020; and

WHEREAS the City of Longmont's (City) Automated Meter Reading project will assist with leakage reduction, improve customer education, and increase data availability and analysis of customer usage, resulting in the Water Efficiency Master Plan and supported by the Sustainability Plan; and

WHEREAS the City submitted an application for the WaterSMART Grant Program on October 3, 2019; and

WHEREAS the Bureau of Reclamation requires that the City of Longmont submit a resolution adopted by the City's governing body in support of the application submitted for the WaterSMART Water and Energy Efficiency Grant program.

NOW THEREFORE, THE COUNCIL OF THE CITY OF LONGMONT, COLORADO RESOLVES:

Section 1

The City Council has reviewed and supports the City's application submitted for the WaterSMART Water and Energy Efficiency Grant program.

Section 2

The City has budgeted matching funds to meet the terms and obligation of any grant awarded. The City's financial obligations under any grant awarded are contingent upon

appropriation, budgeting, and availability of specific funds to discharge those obligations. Nothing in this resolution or any grant awarded constitutes a debt, a direct or indirect multiple fiscal year financial obligation, a pledge of the City's credit, or a payment by guarantee by the City.

Section 3

The City Manager or designee is authorized to execute all documents necessary to enter into an agreement for the WaterSMART Grant Program should the City's application for that program be granted by the United State Bureau of Reclamation.

Section 4

The City will work with the United States Bureau of Reclamation to meet established deadlines for entering into a grant agreement for the WaterSMART Grant Program.

Section 5

The Council repeals all resolutions or parts of resolutions in conflict with this resolution but only to the extent of such inconsistency.

Passed and adopted this _____ day of _____, 2019.

_____

MAYOR

ATTEST:

_____

CITY CLERK

APPROVED AS TO FORM

_____ _____

CITY ATTORNEY DATE

_____ _____

PROOFREAD DATE

APPROVED AS TO FORM AND SUBSTANCE:

_____ _____

ORIGINATING DEPARTMENT DATE

CA File: