City of Banning

Advanced Metering Infrastructure (AMI) Project

Water and Energy Efficiency Grant Program
FY 2019
FOA No. BOR-DO-19-F004
Funding Group I

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TECHNICAL PROPOSAL

Executive Summary

Date: March 19, 2019
Applicant Name: City of Banning
City, County, State: Banning, Riverside County, California
Project Name: City of Banning Advanced Metering Infrastructure (AMI) Project

Project Summary. The City of Banning (population 30,824) requests $300,000 from the Bureau of Reclamation (BOR) to offset costs for a $2.9 million project to retrofit 10,500 water meters to "smart meters" by installing advanced metering infrastructure (AMI) that will provide wireless, two-way communication between the meter and utility personnel. In addition, hydropower generators will be installed to further enhance the City's infrastructure by powering telemetry (SCADA) equipment to monitor flows across pressure zones for quicker leak detection. The new AMI technology will allow the billing department and Pump Operators to automatically collect consumption, diagnostic, and status data from each water meter, transferring that data to a central database for billing, troubleshooting, and analyzing in a fraction of the time it currently takes. The AMI system will be comprised of state-of-the-art electronic/digital hardware and software to combine interval data measurements with remote communications. This system will enable measurement of detailed, time-based information and frequent collection of information allowing for quicker leak detection. Overall, the project will modernize the City's infrastructure, provide more accurate and detailed leak and billing data, improve communication networks with customers by providing real-time utility billing information customers can access online, and will save an estimated 686.799 acre-feet per year (AFY) of potable water. The conserved water will remain in local groundwater basins, which are shared with Beaumont Cherry Valley Water District, Banning Heights Mutual Water Company, Cabazon Water Company, and the Morongo Band of Mission Indians, and recharged by a dwindling State Water Project (SWP) water allocation. The proposed project aligns with FOA goals and the Department of Interior's priority to modernize American infrastructure, and represents the City's ultimate goal to increase efficiency and improve operations. The median household income (MHI) for the City is $39,700, well below 80% of the State's MHI of $57,652, a fact that classifies City as low-income.[1] The project will take 24 months to complete, and is not located on a federal facility.

The existing meters are an average of 15+ years old and require our FSRs to physically inspect each of the 10,500 meters onsite and visually perform a meter-read. Currently, the FSRs manually read each customer water meter every 30 days, which provides only a static read that gives the total water consumption since the previous read 30 days prior. There is no way to determine daily patterns of water use or quickly "see" leaks with the current system and data. A leaky faucet may persist, or a crack in a distribution system pipe may leak for months or years before identifying the problem. In Figure 1, below, a City employee observed a wet spot on the

[1] Based on U.S. Census Bureau data from the 2013-2017 American Community Survey 5-Year Estimates and the state income limits.

pavement that persisted for months. After investigation from the City, a cracked pipe that had been leaking for an estimated 10 years was identified. As part of the City's 2015 Urban Water Management Plan, we developed a forecast of water loss into 2040, and found that with our current water loss patterns and lack of modern infrastructure, water loss will grow from 733.157 AFY (2017) to 1,042 AFY by 2020 (just three short years) and 1,351 AFY by 2040 (City of Banning UWMP, p. 25). The new meters will modernize our current process, and provide more accurate and consistent reading. The AMI will enable two-way communication over a fixed network between the utility system and the metering endpoints. With such a powerful and robust system and hydro generators powering meters at pressure reducing stations, allowing for a comparison in metered consumption, leaks can be detected quicker. The result is quantifiable and sustained water savings that support broader water reliability benefits, including conservation of the region's groundwater storage. This result is less dependence on imported water from the SWP. AMI technology will also provide customers with access to real-time utility billing information.

Fig. 1 Ten-year-old Leak

The project is part of a larger city-wide overhaul to move to a "smart grid" system for both electric and water utilities. In April of 2017, the City moved forward with the last phase of the electric smart meter project.

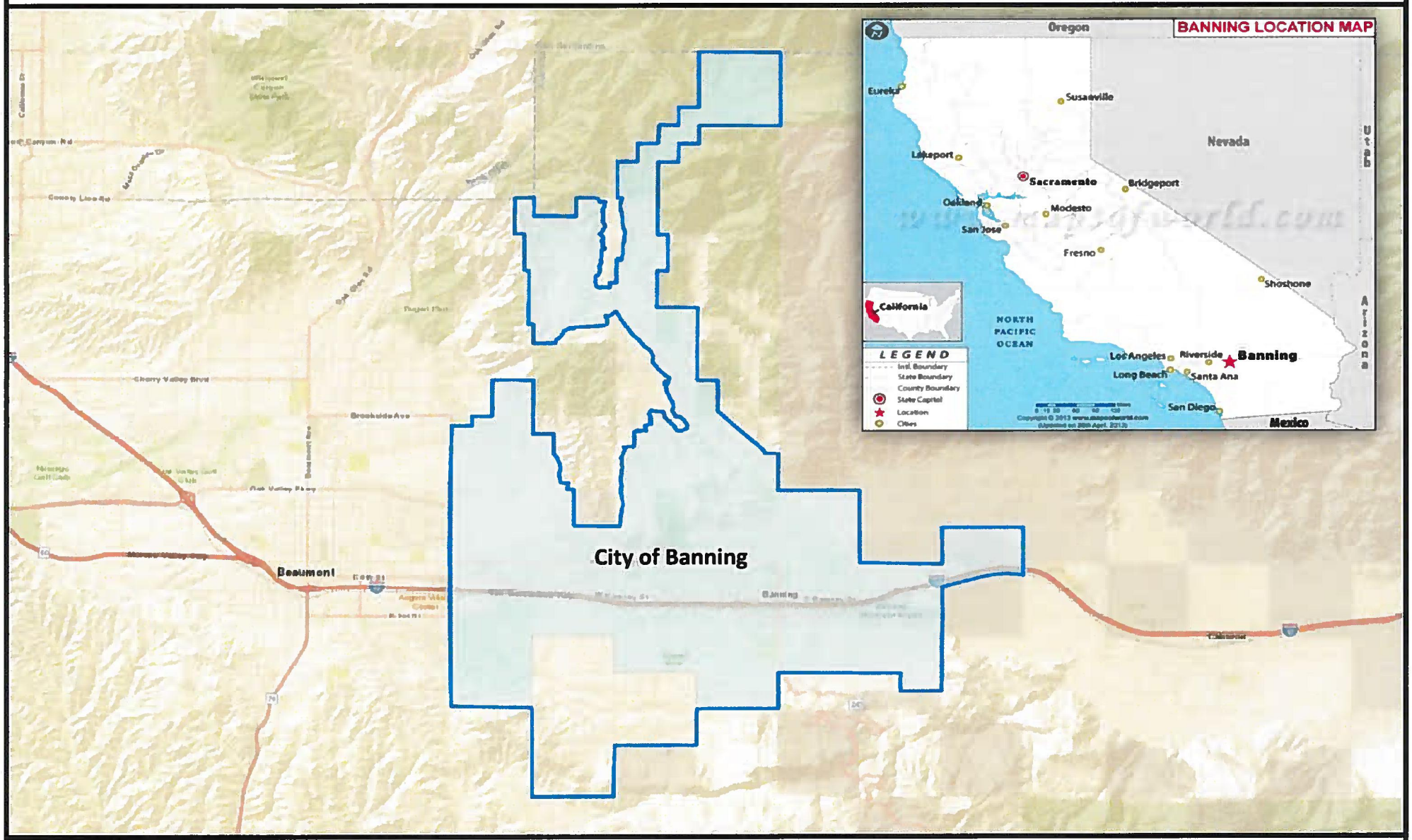
Background Data

<u>Location</u> (including map)

The City of Banning is in northern Riverside County in Southern California, approximately 25 miles east of downtown Riverside and 85 miles east from downtown Los Angeles. The City encompasses 23.2 square miles astride Interstate 10 in the San Gorgonio Pass and is bounded by the City of Beaumont to the west, the Morongo Band of Mission Indians to the east, the San Bernardino Mountains to the north, and the San Jacinto Mountains to the south.

As of 2017, the total existing population within the City's boundaries was estimated at 30,824 people. The City, through its Public Works Department and Water Division, provides municipal water to its service area, which includes the area within the City's boundary as well as some unincorporated areas of Riverside County. The City of Banning's Water Service Area comprises approximately 16,908 acres.

Project Location Map



City of Banning
Advanced Metering Infrastructure (AMI) Project

Source of Water Supply. Currently, 100 percent of the City's potable water system is supplied by groundwater from five basins: the Beaumont Basin, Banning Basin, Cabazon Storage Unit, Banning Bench Storage Unit, and Banning Water Canyon Basin. The basins are recharged from the SWP. The City of Banning and the Morongo Band of Mission Indians, among other entities, share the reserves in the Cabazon Storage Unit. The average annual water supply between 2012 and 2014 was 8,595 AFY, which equates to an average day demand (ADD) of 7.7 million of gallons per day (MGD). The average maximum month demand (MMD) for this same time period was 10.1 MGD, while the maximum day demand (MDD) was calculated to be approximately 13.3 MGD.

Additionally, the City purchases imported water from the San Gorgonio Pass Water Agency (SGPWA) to recharge the Beaumont Basin. The City recharged approximately 1,350 AF in 2017. SGPWA receives water from the State Water Project (SWP), a Reclamation Facility, via the California Aqueduct East Branch Extension pipeline to the Beaumont Basin. The predominant means of providing SWP supply to retail agencies is to recharge the Beaumont Basin, one of California's 22 adjudicated groundwater basins.[2]

Water Rights Involved. The Beaumont Basin is an adjudicated basin which quantifies pumping rights among various agencies, including the City of Banning, and provides for the use of available storage capacity. The water allocation from the Beaumont Basin is the responsibility of Beaumont Basin Watermaster, a five-member committee consisting of representatives from the City of Banning, the City of Beaumont, the Beaumont-Cherry Valley Water District, the Yucaipa Valley Water District, and South Mesa Water Company. The use of groundwater and available storage space in the Beaumont Basin is subject to the terms of a court adjudication referred to as the Beaumont Basin Judgment. The Beaumont Basin is capable of storing more than 200,000 AF of water.

Pursuant to the Beaumont Basin Judgment and an agreement with the Beaumont Basin Watermaster, the City of Banning has the right to store up to 80,000 AF of water in the Beaumont Basin for later use. The City is authorized to bank new yield (e.g., imported water, storm runoff, surplus spring flows, or reclaimed water) in the aquifer. New yield is defined as "proven increases in quantities greater than the historical level of contribution from certain recharge sources." This allows the withdrawal of the stored supply from the aquifer to meet future demand.

Groundwater rights in the Banning, Banning Bench, Banning Canyon, and Cabazon Basins have not been adjudicated and no groundwater management plan has been adopted by any agency with proper authority. Thus, these four basins are currently unregulated. Over half of the City's supply (62 percent) is from two sources, the Banning Water Canyon (38 percent) and the Beaumont Basin (24 percent). The Banning Basin and Banning Bench supply approximately 15 percent each. The Cabazon Basin is at the east of the City's service area boundary and serves approximately eight percent of the City's supply.

[2] Groundwater adjudication happens when water users turn to the courts to resolve a dispute about water in a basin for decisions on 'safe yield' and preventing overdraft.

Current Water Uses. The City of Banning categorizes its water users into the following five categories: Residential, Commercial, Industrial, Public, and Irrigation. The City also provides water to the Banning Heights Mutual Water Company and High Valleys Water District. Public water uses include fire protection and construction use.

The water categories by percentage of use are listed in Table 1 below.

TABLE 1
WATER CATEGORIES – PERCENTAGE OF USE

Residential	Commercial	Industrial	Public	Irrigation
57%	29%	1.5%	1%	12%

Residential. Banning's residential sector includes single family residences, condominiums, apartments, and mobile homes. Water use in this sector typically includes indoor uses (such as bathing, laundry, drinking, cooking, and sanitation) and outdoor uses, such as landscape irrigation, car washing, swimming pools, and hardscape cleaning. The residential sector is expected to expand with new specific plan developments, which are explained further in this section under "Current and Projected Water Demand." The only agriculture currently within the City of Banning is animal husbandry (production and care of domestic animals), and these uses are served under the residential sector.

Commercial. The City has a complex mix of commercial customers, ranging from family restaurants, insurance offices, gas stations, shopping centers, high-volume restaurants, golf courses, and other facilities serving the local population and visitors. The City's commercial sector is expected to grow to accommodate growth in the City's residential sector.

Industrial. The City's industrial sector has historically been divided between airport-industrial related uses and traditional industrial uses, ranging from storage to heavy manufacturing. Industrial development has been an important source of employment in the City.

Public. The City's public sector includes governmental institutions, such as City Hall, fire and police facilities, hospitals, railroads, schools, airport, courthouse, and interstate highways. This sector also includes cemeteries, which are non-governmental institutions. The public sector is expected to expand as the City's population grows.

Irrigation. Landscape demand is currently served by potable water, with the exception of the non-potable groundwater served to Sun Lakes Golf Course for irrigation use. Significant increases in landscape sector potable demand are not anticipated and future increases in landscape demand may be offset by future recycled water use.

Number of Water Users Served.
The City operates a single public water system which currently serves a population of 30,824 people through approximately 10,500 water service connections.

The demographic breakdown of the City of Banning is as follows: Hispanic (41.9 percent), White (38.8 percent), Black (9.6 percent), Asian (5.9 percent), American Indian and Native Alaskan (2.9 percent), and Other (0.7 percent). 23.4 percent of the population live below the poverty level. The California Climate Investments mapping tool (used for multiple grants to determine low-income and disadvantaged status), deems the City as a low-income community, shown at right.[3] An important notation to include is that the population of the Morongo Band of Mission Indians is 996. Since Banning shares water reserves, increased reliability for Banning's water supply also means increased reliability for the tribe.

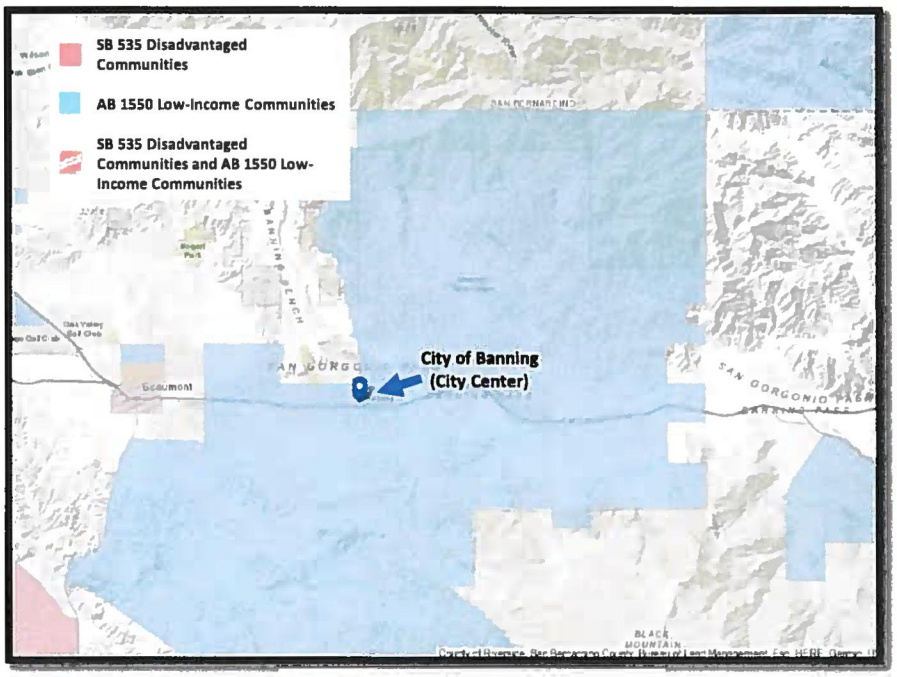


Fig. 2 AB 1550 Low Income Map

Current and Projected Water Demand. Based on development currently proposed within the City's water service area (30,824 people), the population is estimated to grow to between 37,000 and 60,000 people and approximately 8,285 new dwelling units are anticipated to be added to the City's service area by 2040. Currently, there are two significant developments planned within the City's water service area – the Atwell and Rancho San Gorgonio developments. Regardless of new developments, the population growth will require added residential water meters in the future. The proposed project will lay the groundwork for future connections to seamlessly integrate into a modern AMI system.

[3] The California Climate Investment's AB 1550 mapping tool uses multiple data to determine disadvantaged status. It was created to help identify these communities that should receive more help according to SB 535. The communities/maps are designated by the California Environmental Protection Agency (CalEPA) for the purpose of SB 535, showing high burdens of pollution and low-income. The map can be found at: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/lowincomemapfull.htm.

The Atwell Specific Plan (Atwell) is a master-planned community project that encompasses 1,543 acres and includes approximately 4,900 residential dwelling units, two elementary schools, two commercial sites, and community parks and trails. The project would be constructed in five phases over an estimated period of 30 years.

The Rancho San Gorgonio Specific Plan (Rancho San Gorgonio) is a master-planned community project that encompasses approximately 831 acres and includes up to 3,385 residential dwelling units, almost 49 acres of neighborhood and community parks, over 160 acres of paseos and open space, and approximately 81 acres of right-of-way and utility easements. The project is anticipated to be constructed in six phases over a period of 18 years.

Table 2 highlights the anticipated growth without and with the proposed developments.

TABLE 2
POPULATION - CURRENT AND PROJECTED

	2015	2020	2025	2030	2035	2040
Population within the City's Water Service Area (without proposed specific plan developments)	30,491	31,913	33,335	34,757	36,179	37,700
Population within the City's Water Service Area (with proposed specific plan developments)	30,491	35,730	40,969	46,207	51,446	56,685

Based on a review of the available data for the City, it was determined that the most accurate demand forecasting method is a combination of a population- and land-use-based demand forecasting method. Population-based demand forecasting utilized a calculated per-capita water use and was obtained from the City's 2015 UWMP. Land-use-based demand forecasting utilizes calculated water demand factors. The water demand factors estimate the amount of water usage per area for a certain land-use type and are typically expressed in gallons per day per acre (GPD/AC).

Future demands were estimated and grouped into three categories: 1) existing customers, 2) known developments, and 3) infill development. The forecasted water demands are summarized in Table 3. As shown in Table 3, the City's future water demands are expected to increase from approximately 5,302 AFY to 7,018 by the year 2025, and to 8,450 AFY by the year 2040. The majority of this increase in water demands within the planning horizon is attributed to new planned developments of Atwell and Rancho San Gorgonio.

TABLE 3 WATER CATEGORIES – PERCENTAGE OF USE				
Year	**Existing Demand (AFY)**	**Near-term (2025) Demand (AFY)**	**Long-term (2040) Demand (AFY)**	**Build-out Demand (AFY)**
Existing (including Potable Water Offset)	5,302	5,262	5,262	5,262
Near-term Known Developments	0	784	784	784
Long-term Known Developments	0	0	1,581	1,581
Build-out Known Developments	0	0	0	1,409
Infill	0	972	823	3,303
Total	5,302	7,018	8,450	12,339

Potential Shortfalls in Supply. The City indirectly receives its imported water from the SWP, which is dependent on dwindling snowpack and subject to the dire conditions of California drought. As allocations decline each year for receiving agencies, it is imperative we find alternative methods for conserving our water supply and ensuring our groundwater supplies are sustainable. Pulling water from the adjudicated Beaumont Basin means that we must conserve our local supply -- not only for our own use, but for the multiple agencies that share reserves from the Basin.

Water Delivery System. The City of Banning's potable water is primarily supplied from groundwater wells. The City overlies the Coachella Valley Groundwater Basin, which is underlain by several large sub-basins. The City overlies the San Gorgonio Pass (SGP) sub-basin, which is divided into water storage units. As previously mentioned, the City extracts groundwater from the Banning Storage Unit, Banning Bench Storage Unit, Cabazon Storage Unit, Beaumont Basin, and Banning Canyon Storage Unit. In addition to the 21 groundwater wells within the City boundary, the City also jointly owns and operates three potable water wells with Beaumont-Cherry Valley Water District.

The water delivery system, which was built between 1913 and present, consists of 165 miles of pipeline and includes 21 groundwater wells, eight storage reservoirs, two booster pumping stations, five pressure reducing valve stations, and six pressure zones. Of the 21 groundwater wells – with a total capacity of 14,950 gallons per minute (GPM) – two (wells M7 and M12) are currently non-potable wells, resulting in a total potable water capacity of 13,700 GPM. In the future, these non-potable wells may be converted for potable use.

All wastewater flows collected within the City's service area are currently treated at one facility, the Banning Wastewater Treatment Plant (WWTP). The plant is in the southeast portion of the City adjacent to Smith Creek and east of Hathaway Street. The City contracts with Suez Environmental Services for the operation and maintenance of the WWTP. The WWTP is designed

to treat wastewater to secondary standards and consists of the following processes: headworks, screening, grit removal, two primary clarifiers, two trickling filters, and two secondary clarifiers. The existing wastewater collection system consists of approximately 112 miles of sanitary sewer pipelines ranging in diameter from 4 inches to 30 inches, as well as 4 active wastewater lift stations. The collection system was originally constructed in the 1960's, with a majority of the collection system installed between 1980 and 2000.

The solids treatment at the Banning WWTP consists of a gravity thickener, two primary digesters, a secondary digester, sludge drying beds, and percolation ponds. Anaerobic digesters and sludge drying beds are used for sludge stabilization and dewatering. The plant currently discharges the effluent to percolation ponds. Solids are periodically removed from the drying beds and hauled off by a private contractor. Once off site, the sludge is disposed of by a reputable solids hauler at a designated landfill site.

The City currently serves one high volume customer (Sun Lakes Development Golf Course) with non-potable water from Well M7 and Well M12. Based on average production data for years 2012 through 2014, the average annual demand for Sun Lakes Development Golf Course is 850 AFY (or 0.8 MGD). Aside from this customer, the City does not have any other recycled water or non-potable demands. In addition, the City has constructed approximately 2.2 miles of 24-inch diameter pipeline and has begun constructing an additional 3.4 miles of pipeline to connect the existing recycled water pipes to the WWTP.

The City has plans to upgrade the existing WWTP treatment to meet tertiary standards and facilitate infrastructure to supply recycled water. The design of the upgraded WWTP will allow for expansion of the treatment capacity when it becomes necessary.

Hydropower and Energy Efficiency.

Hydropower. The City of Banning will install hydropower generators on five existing pressure reducing stations (PRVs) to power up Supervisory Control and Data Acquisition (SCADA) that will monitor pressures both upstream and downstream along with flow going into the pressure zone. This data will be reported back to the Production staff where they will collect metered consumption usage within the zone and compare it to the water delivered into the zone. The comparison will determine an approximate water loss for each pressure zone. See Appendix B for vendor materials for the proposed hydro generators.

Energy Efficiency. This project will conserve water by replacing outdated water meters with "smart meters" and improve energy efficiency with advanced metering infrastructure (AMI) by enabling two-way communication over a fixed network between the utility system and metering endpoints. In addition to smart meters, the City will deploy acoustic leak sensors by zone that will provide 24/7 monitoring of the water system to identify leaks. PRV stations will have meters powered by hydro generators that will compare water delivered versus water billed for each zone. This will provide an additional method to estimate water losses. Leak sensors will then be deployed to the zone with the most water loss to identify the exact location of the leaks. Once

leaks are identified and properly addressed with the percentage of water loss showing significant reductions, the leak sensors will then be relocated to the next zone to repeat the process. With this approach, the City will identify, locate, and repair all leaks over time.

The project will improve energy efficiency by reducing water loss - less energy will be expended by decreasing the need to import water into the basins utilized by the City of Banning. Energy will also be conserved by reducing the number of times groundwater is pumped and boosted into the water distribution system.

Past Working Relationship with the Reclamation. The City of Banning purchases imported water from the San Gorgonio Pass Water Agency (SGPWA) to recharge to the Beaumont Basin. SGPWA receives deliveries from the State Water Project (SWP), a U.S. Department of the Interior Bureau of Reclamation facility, through the East Branch of the California Aqueduct.

Technical Project Description

The proposed project will update 10,500 water meters in the City of Banning to "smart meters" and install Advanced Metering Infrastructure (AMI) to provide wireless, two-way communication between the meter and utility personnel. The City of Banning will install 10,500 Zenner Stealth radios, install 10,500 multijet and ultra sonic meters, and reconfigure the meters to capture hourly data with Zenner Stealth Advanced Metering Infrastructure (AMI) technology. The system will include advanced acoustic leak sensors. See Appendix C for vendor materials for the proposed AMI system.

The average age of existing meters is approximately 16 years old (See Figure 3 below). The City currently employs five (5) full-time Field Service Representatives (FSRs) that physically inspect and read each of the individual water meters by driving to the service address, getting out of their vehicle, and walking to the meter to take the read. The new "smart meters" will include acoustic leak detector sensors that will constantly record data and provide reports by zone to identify high or unusual flow patterns. By comparing with flow and pressure data obtained from the hydro generator powered sensors at pressure reducing stations, the City will be able to pinpoint potential leaks on both the distribution and residential sides of the meter. The current meters only provide a static read of the amount of water that was used since the last read, generally 30 days prior. There is no indication of daily use or patterns, or unusual spikes in water flow.

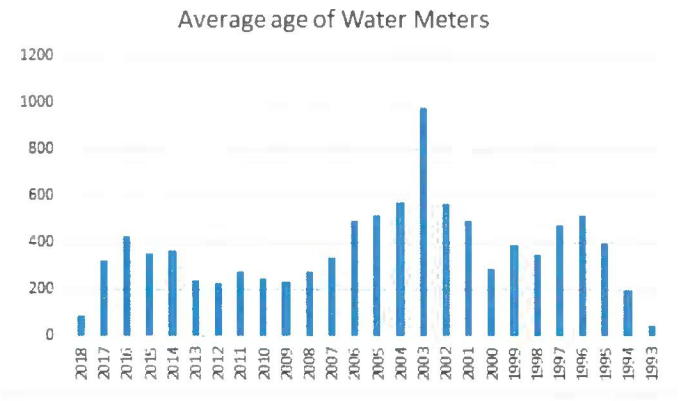


Fig. 3 Average Age of Water Meters

The AMI system will be comprised of state-of-the-art electronic/digital hardware and software to combine interval data measurements with remote communications. The new AMI system, paired with leak detection technology and cloud-based analytics that can be deployed by zone, will enable measurement of detailed, time-based information and frequent collection of information allowing for quicker leak detection. The project will modernize the City's infrastructure by providing more accurate and detailed leak and billing data, improve communication networks with customers by providing real-time utility billing information customers can access online, and will save an estimated 686.799 acre-feet per year (AFY) of potable water.

In preparation of the proposed project, City staff visited two nearby municipalities that upgraded their meters to "smart meter" (Pasadena and the Palmdale Water District in California) as proposed in this application. Staff received favorable reports of increased leak detection, little to no issues with the equipment, and gathered information about the most efficient way to install a large number of meters to an entire service area. Please see reports from these meetings in Appendix D. The City has installed 100 AMI water meters along with one collector as part of a pilot study to collect real time reads to ensure efficient installation and integration of the system. The pilot study will include software integration and testing from multiple locations across the City, and data collection.

In preparation of the AMI portion of the project, City staff will monitor and observe the pilot study for three to six months to verify that the hardware and software are compatible and functioning well.

The proposed project will begin within 90 days of the BOR grant award notification and will be completed within 24 months. The City will choose the selected vendors through a formal bid process, who will manage the purchase, delivery, integration and final testing of the AMI system and installation of the hydro generators, with oversight from the City's Project Manager, Mr. Luis Cardenas. Physical installation of the new "smart meters" and AMI system will be performed by City staff, who are certified water distribution system operators.

The proposed project includes the following tasks:

Task 1. Project Grant Administration
Banning staff will provide administrative oversight for the project. Activities will include reviewing and executing the grant agreement and contract, preparing for and attending meetings with the Bureau of Reclamation (BOR), maintaining all grant and project files, preparing and processing requests for reimbursements and fully completed form SF-425 federal financial reports semi-annually and with the final report, preparing updates for the City Council, ensuring grant compliance, completing and submitting semi-annual interim performance reports (to include accomplishments and milestones met and the status of the schedule and timeline) and a final performance report (to include a summary of the objectives met, benefits achieved, long-term resiliency from project, collaboration among partners, and photos), coordinating any audit requests or examination of records by BOR or independent auditors, and maintaining all records for at least three years after the project is closed out.

Deliverables include:

- Executed grant agreement
- Meeting agendas and minutes
- Requests for reimbursement
- Completed SF-425 reports
- Interim performance reports
- Final performance report
- Audit report (if applicable)

Task 2. Finalize Agreement with Vendor
Vendors will be selected through a formal bid process. They will be responsible for making periodic deliveries, troubleshooting faulty equipment and replacing, at no additional cost, any components that are found to be defective. The City has adequate staff to provide the labor for the meter replacements and installation of the AMI system. The team will hold a kick-off meeting with the selected vendors to review the schedule (and make refinements, if necessary), the cost estimate, and expectations for the 24-month project.

Deliverables include:

- Final agreement documents with Vendor
- Project schedule including key milestones
- Notes from Kick-Off Meeting
- Refined, final cost estimate

Task 3. Easement(s)/R.O.W.
No easements or R.O.W. are anticipated for the installation of new "smart meters " and the AMI and hydroelectric systems. For the AMI system, water meter boxes will remain at their existing locations. The hydroelectric systems will be installed at existing pressure reducing stations.

Task 4. Environmental Documentation
The City of Banning anticipates that the proposed project will qualify for a California Environmental Quality Act (CEQA) Categorical Exemption because the project will not result in individual or cumulatively significant environmental effects, and therefore falls within Section 43, Code of Federal Regulations, Part 46, Subsection 46.210(f): *Routine and continuing government business, including such things as supervision, administration, operations, maintenance, renovations, and replacement activities having limited context and intensity (e.g., limited size and magnitude or short-term effects).*

The City also anticipates that the project will be considered a National Environmental Policy Act (NEPA) Categorical Exclusion, according to the list of Categorical Exclusions located in the Code of Federal Regulations for the Department of Interior. The project meets the following Categorical Exclusion definitions: "minor construction activities associated with authorized projects

which...merely augment or supplement..." and "maintenance, rehabilitation, and replacement of existing facilities which may involve a minor change in size, location, and/or operation."

Environmental documentation will be filed after the grant is executed and the contract is awarded.

Deliverables include:

- Approved and adopted CEQA documentation (Categorical Exemption)
- Approved and adopted NEPA documentation (Categorical Exclusion, BOR to confirm)

Task 5. Permitting
No permits are expected for the installation of the AMI and Hydro systems.

Task 6. Public Outreach
City of Banning project staff will continue efforts to alert the 10,500 customers of the system upgrade for all three leak correlation, hydro, and AMI systems. The City will provide education regarding the logistics and benefits of installation and the new systems. Outreach began in March of 2017, with information posted to the City's website about the impending upgrade of electric and water smart meters and AMI system. Contact information for City staff was made available to answer any questions regarding the proposed work. Future outreach will include a video of a meter replacement on the Banning public news channel as well as the City's website, and may include door tags.

Deliverables include:

- Copies of customer outreach materials

Task 7. Install AMI Systems
City of Banning staff will install 10,500 Zenner Stealth radios and 10,500 multijet and ultra sonic meters of varying size (0.75-inch through 8-inch) and reconfigure the meters to capture hourly data with Zenner Stealth Advanced Metering Infrastructure (AMI) technology. The system will include advanced acoustic leak sensors (Sebalog N-3) on approximately one out of every 1,000 feet of metal pipe material if the pipe material is metal, and one out of every 500 feet if the pipe material is plastic. No digging will be necessary. For each meter, staff will mount the encoder receiver transmitter (ERT) on a lid lock unit that penetrates a new meter box lid which would include 2" hole, then remove the old meter and install the new "smart meters." Although labor intensive, the City is opting to complete automating meter reading and leak detection via AMI technology simultaneously, saving time, staff resources, and most importantly, water.

Staff anticipates that installation will be accomplished over the two-year period in two installments: Year 1 - 5,250 meters installed; and Year 2 – 5,250 meters. Two Water Service Workers will be dedicated to the task full-time, installing an average of 22 meters each per day until each year's installment is complete. A third Water Service Worker will assist with meter replacements as necessary to stay on schedule.

AMI automated installation will be integrated into the City's existing water management system, and will include hourly meter data monitoring, leak sensor detection, and IT support for any troubleshooting. The system will utilize an automated installation management process that will eliminate any information needing to be captured manually, by using handheld barcode scanner. A redundant backup process allowing all information to be preserved in the event of a breakdown will be included in the system. Computers/handhelds shall be used for efficient meter exchanges to track, collect, and report information relating to the field personnel.

Deliverables include:

- Installation schedule
- Meter installation inspection checklists
- Automated installation process
- Contractor invoices

Task 7.1. Test and Launch AMI System

The vendor will ensure that the new AMI system will be integrated with the City's billing system to allow customers to view periodic flow rates, total water consumed during a selected period, and total consumption over a billing cycle. The vendor will install a software system for the AMI system analytics and fully test the system upon completion of each phase of the installation. Preliminary software and integration testing will be accomplished with our test set of meters before grant award. A data file will be created for each meter providing an account number, meter reading route number, meter size, make and serial number, and meter location (GPS coordinates), access notes to the meter, and the name and phone number listed on the account. The system will need minimal manipulation during the grant-funded phases of installation.

The Zenner Stealth radios will be able to relay the extended meter alarms provided by new meters. These alarms will include:

- Empty Pipe;
- High Flow;
- Meter Low Battery;
- Meter Tampering;
- Reverse Flow; and
- Zero Consumption.

Deliverables include:

- IT Support
- Installation of account data
- Vendor invoices
- System handbooks

Task 7.2. Train Staff
The vendor will provide an extensive onsite training to City staff, to include installation, operation and maintenance of the meter units, overview and operation of the software management system and data collection capabilities, and training on developing and analyzing reports.

Deliverables include:

- Vendor invoices
- Training agenda and participant list
- Photographs of the installed meters
- Installation completion report

Task 7.3. Hydro Generators Installation
Installation of the Cla-Val Hydro Generators will be will be performed by Cla-Val personnel at five existing pressure reducing stations located inside vaults. Electrical wires will be installed to connect to a telemetry (SCADA) panel to be installed in the near future as part of a separate project the City is undertaking. The telemetry panel needs the hydro generator power because utility power is not readily available at these locations.

Deliverables include:

- Installation Schedule
- Vendor invoices

Schedule
Please see the anticipated project schedule, below.

Table 4-SCHEDULE

City of Banning AMI Implementation Schedule									
Task No.	Timeline Major Project Tasks	2019	2020				2021		
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
0	BOR Awards Announced August 2019								
1	Project Grant Administration								
2	Finalize Agreement with Vendor								
3	Easements – Not Applicable								
4	Environmental Documentation								
5	Permitting – Not Applicable								
6	Public Outreach								
7	Install AMI System								
7.1	Test and Launch AMI System								
7.2	Train Staff								
7.3	Hydro Generators Installation								
Project Start: October 1, 2019 — Project Completion: September 30, 2021 (24 months)									

Evaluation Criteria

Evaluation Criterion A: Quantifiable Water Savings (30 points)

Amount of Water Saved and Current Losses

The estimated amount of water expected to be conserved as a direct result of this project is 686.799 acre-feet per year (AFY).

Please see responses to questions, below, for details regarding quantification methodology, estimated water losses, and support for these conclusions.

Municipal Metering.

a. **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.**

The estimated annual water savings was calculated utilizing the City's annual AWWA water audit (attached in Appendix E) and Environmental Protection Agency (EPA) assumptions and data. Please see below.

The City quantified potable savings in the following manner: **First, the City determined annual, real water loss.** The City utilizes American Water Works Association (AWWA) software to perform annual water audits. Water audits evaluate the effectiveness of metering and meter reading systems, as well as billing, accounting, and loss control programs. The City's latest annual AWWA water audit shows an annual water loss of 733.157 AFY in 2017 – an average of 62.33 gallons per service connection per day of water loss. This number is determined by subtracting the amount of water authorized for consumption (5,898.021 AFY) from the amount of actual water supplied (6,631.179 AFY).

6,631.179 AFY – 5,898.021 AFY = 733.157 AFY TOTAL LOSS

The audit shows 151.289 AFY in unavoidable apparent losses. This is a number we cannot control and includes unauthorized consumption and system calculation errors. We subtract this number from actual water loss to find "real loss."

733.157 AFY – 151.289 AFY = 581.869 AFY REAL LOSS (current, ongoing loss)

This is the amount of water lost to water leaks on the utility side of the meter – leaks in the distribution system, overflows at the utility's storage tanks, leakage up to the service connection points, and leaks at the meter that do not register consumption. This water seeps back into the ground, and is water that the City has paid for, but is not reimbursed for. It is called nonrevenue

water. All these water loss/nonrevenue water causes can be curbed with the proposed meter upgrade to the system, thanks to the acoustic leak sensors.

Second, we estimated the amount of savings from the proposed project in two ways.

Methodology 1 (Distribution System Losses): We reviewed current Environmental Protection Agency (EPA) literature and studies that show net savings when updating traditional meter systems without leak detection sensors to smart meters. According to the EPA Water Audits and Water Loss Control for Public Water Systems report "Average water loss in systems is 16 percent – up to 75 percent of that is recoverable" (Thornton, J., Sturm, R., Kunkel, G., Water Loss Control Manual (2nd Edition), McGraw-Hill, 2008).

We used the above statement to determine water savings:

1) The proposed project is to upgrade 10,500 meters, which is our entire system, and install a new AMI system, along with acoustic leak sensors.
2) Based on the EPA's statement that up to 75% of system water loss is recoverable, we conservatively anticipate a 50% reduction in our real water loss number (50% of 581.869 AFY = 290.935 AFY in savings) due to quicker leak detection (system leaks that have been leaking for months or years). The new acoustic leak sensors will continuously gather data from the distribution system and will immediately show locations with likely leaks, even before they become visible at the surface, allowing staff to identify leaks in a matter of hours or days versus months or years. This will ultimately reduce water losses.
3) **Methodology 1 Total Estimated Water Savings: 290.935 AFY**

The proposed project will allow this water to remain in local groundwater basins. It will not need to be pumped to customers as leaks will be identified and repaired quickly, eliminating continuous flow to leaks and cracks in the system. Currently, on the distribution side of the meter, we can only respond to visible leaks and breaks; thus, only repairing leaks we can see after the fact. The proposed project will allow us to detect leaks – even leaks that never reach the surface – within a few hours to days rather than months or years. The City has determined that leveraging the SEBA Log acoustic leak sensors system would unlock opportunities for both operational savings and conservation.

Methodology 2 (Customer-Side Savings): On the customer side of the meter, we will be able to identify daily usage, water use spikes and high or continuous flows. Currently, we have no way to tell if a residential meter has had an unusual uptick in water flow or usage and we have no daily snapshot of use. The new system will allow us to see these upticks and red flag water patterns to address leaks quickly. The AMI system will recognize if there is an increase in consumption that might indicate a leak, leading to faster detection and repair. The EPA's WaterSense website states that the average household's leaks can account for 10,000 gallons of water wasted every year (residential side of the meter). Furthermore, 10% of homes have leaks that waste 90 gallons or more per day (or 32,850 gallons per year).

1) Banning plans to retrofit meters for 10,500 homes and install AMI technology simultaneously.
2) Using the above logic, we can assume that 90% of these 10,500 homes are leaking 10,000 gallons of potable water each year (90% of 10,500 is 9,450 X 10,000 gallons per year = 94.5 million gallons per year).
3) We can also assume that 10% of these homes are leaking 32,850 gallons per year (10% of 10,500 is 1,050 X 32,850 gallons per year = 34,492,500 gallons per year).
4) Together, this is 128,992,500 gallons per year, or 395.864 acre-feet per year. We believe that the new leak sensors and AMI technology will allow us to quickly identify leaks and notify customers so they can make repairs and eliminate water loss much quicker than would occur otherwise.
5) **Methodology 2 Total Estimated Water Savings: 395.864 AFY**

The two methodologies together account for water loss that can be prevented on both the distribution meter side AND the customer-side of the system, thus we found the project's estimated water savings to be 686.799 AFY.

290.935 AFY (Distribution Side) + 395.864 AFY (Customer Side) = 686.799 AFY

Total Estimated Water Savings from Project = 686.799 AFY

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

The current distribution system losses were determined through AWWA water audit software. California Senate Bill 1420 requires water purveyors to quantify distribution system losses for the most recent 12-month period available. The water loss quantification is based on the water system balance methodology developed by the AWWA. In 2015, the City compared results from AWWA methodology with their own water loss methods and calculations and found the water loss numbers in the AWWA report consistent with City staff calculations. We continue to use the AWWA methodology and software to determine water loss (581.869 AFY of current, ongoing, "real" loss in 2017).

Though not quantified, we believe there is potential for reductions in water use by individual users. The new AMI system will provide customers with detailed reports of their water usage in their monthly bills. They will be able to identify patterns of high usage and see exactly where their water is going. We anticipate behaviors such as over-watering landscapes and running taps will be curbed with this more accurate data for the customer.

c. **For installing individual water user meters, refer to studies in the region or in the applicant's service area that are relevant to water use patterns and the potential for reducing such use. In the absence of such studies, please explain in detail how expected water use reductions have been estimated and the basis for the estimations.**

"Metering America: AMR as a Conservation Tool" by David Wallenstein, the Associate Engineer for the East Bay Municipal Water Utility District (EBMUD) in Oakland, California, performed a customer survey within their 1.3 million customer service area, and found that that 60 percent of single-family respondents thought they used less than 50 gallons per day (GPD) per Household, but the actual average is 228 to 480 GPD per single-family household. Seventy-one percent of residents irrigated the same area daily, and 13 percent irrigated the same area twice daily. The study found that customer conservation was a key piece to their conservation puzzle, and that, when armed with more detailed data, customers changed their water-use patterns (Wallenstein, 2006). "Metering in California," by the Pacific Institute, cites, "Studies show that metering, when coupled with effective pricing structures, reduces water use by 15% to 20%" (Pacific Institute, 2014).

Please see below for additional studies of water use systems and water use reductions.

The following case studies reference systems using the same, or similar, advanced meter technology that the City of Banning will use for the proposed project to corroborate the anticipated benefits and reduction of water loss. Below are summaries of the case studies with longer excerpts provided in Appendix F.

1) Murfreesboro, Tennessee Case Study
   Study Excerpt: The City of Murfreesboro water & Sewer Department (MWSD) was looking to modernize its meter reading process to more efficiently manage the delivery and use of water to, and by, its customers. The AMI system resulted in a more efficient process, giving staff the ability complete preventative maintenance, detect leaks, reduce non-revenue water and provide customers with actionable data.

2) City of North Miami Beach, Florida Case Study
   Study Excerpt: The City of North Miami Beach relied on traditional walk-up, manual meter reading, and a leak detection service that visited quarterly to survey areas of its distribution system. Leveraging AMI technology, the City completed installation of 38,000 communication modules along with 11,000 acoustic leak sensors in 2015. The new system provides North Miami Beach with real-time data on customer usage and potential leaks throughout the system, and is best suited to the City's long-term strategy to expand services beyond metering to surveying their distribution system for leaks on a daily basis.

3) Lake County, Illinois Case Study
Study Excerpt: Lake County Public Works Department was manually reading meters every 60 days and had little insight into its leaks and water usage patterns across its distribution system. They started an automatic meter reading (AMR) system, but realized a solution that allowed customers a regular billing schedule without manual visits was needed. With a large geographic service area, they realized the need to reduce drive-time and miles driven for manual meter reads. After issuing an RFP and conducting a comprehensive interview process to evaluate technology options, AMI was the best solution, which included communication modules capturing hourly consumption data. Since completing the installation in 2015, the time to gather reads has been greatly improved and customer billing has been reduced from up to six days down to one day. Customers are also able to view their personal usage data through an online portal, allowing them to adjust their usage to fit their personal spending and conservation goals.

d. If installing distribution main meters will result in conserved water, please provide support for this determination (including, but not limited to leakage studies, previous leakage reduction projects, etc.). Please provide details underlying any assumptions being made in support of water savings estimates (e.g., how leakage will be reduced once identified with improved meter data).

The proposed project includes distribution main meter infrastructure that will reduce water leakages from: **1)** improved individual meter data via the AMI and acoustic leak detection correlators that will help pinpoint the location of leaks in the distribution system; and **2)** the AMI network which includes communication modules for capturing hourly consumption data in 15-minute intervals. This consumption data will be compared with data from distribution main meters to be installed at pressure reducing stations and powered by hydro generators. It is assumed that in the first weeks of installation, the City will identify existing leaks that are currently going unnoticed if there are large discrepancies between water delivered to a zone and metered consumption. The smart meter technology will identify these leaks and allow for leak repair. Please see justification in parts a, b, and c of this criterion for further details.

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

The City will install 10,500 Zenner Stealth meters and radios that include SEBAs advanced acoustic Leak Sensors. The Leak Sensors collect and analyze changes in pipe acoustics that indicate probable leaks in the distribution system environment to detect both new and pre-existing leaks automatically. Leak Sensor technology, coupled with the SEBA correlator algorithm will provide the utility with a highly accurate picture of the overall health of the water distribution system. The Zenner ERT module stores 40 days of 15-minute interval consumption information, which can be collected by the fixed network system to leverage real time data collection.

These the modules provide an easy migration to network operations via the AMI system. As part of the full two-way communications network, the module supports other capabilities the City can including: tamper and reverse flow flags, exception reporting, and firmware upgrades. The technology will provide the utility with a highly accurate picture of the overall health of the water distribution system.

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

Actual water savings will be verified in the City's annual AWWA water audit each year during the period of performance. We are using the same data points as our baseline for 2017 and will show the water savings at the end of each year with the annual report. On a monthly basis, we will compare consumption for the same month the year before meter conversion for customers who have the new "smart meters." Additionally, the Stealth meter software combined with the City's GIS technology will allow staff to develop digital images, maps, and reports for monthly reporting and a final report for the BOR.

Evaluation Criterion B—Water Supply Reliability (18 points)
Please provide sufficient explanation of the project benefits and their significance. These benefits may include, but are not limited to, the following:

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

Yes, the proposed project has wide local and regional support which promotes and encourages local and regional collaboration to achieve California's overarching goal to increase the reliability of the State's water supply and provide long-term solutions to the effects of climate change and population growth. Letters of support from the following entities are included in this application in Appendix A:

- Representative Raul Ruiz Congressman for the U.S. House of Representatives 36th District in California – member of the House Committee of Energy and Commerce for clean, sustainable practices for the environment;
- Supervisor Jeff Hewitt – Riverside County Board of Supervisors;
- Riverside County Flood Control and Water Conservation District;
- San Gorgonio Pass Water Agency; and
- Sun Lakes Home Owner Association

Representative Raul Ruiz: As the Congressman for the U.S. House of Representatives 36th District in California, Representative Ruiz serves the Coachella Valley and the cities of Banning, Beaumont, Blythe, Hemet, and San Jacinto. The proposed project aligns with the goals of the House Committee of Energy and Commerce for clean, sustainable practices for the environment

by modernizing infrastructure that will result in significant water savings by providing quick, efficient leak detection.

Supervisor Jeff Hewitt (Riverside County Board of Supervisors): Supervisor Hewitt is a supporter of municipalities improving sustainable practices that will minimize environmental impacts of its water infrastructure.

Riverside County Flood Control and Water Conservation District (District): The District's mission is, in part, to support regional water conservation measures. As such, the District is a member of the San Gorgonio Pass Regional Water Alliance (Alliance), along with the City of Banning and 11 other regional water providers and local governments (see Alliance section below). The District works closely with Alliance members to develop mutually beneficial solutions that include coordinating plans and infrastructure development that ultimately deliver clean, reliable and affordable water supplies for the citizens of the San Gorgonio Pass. Our proposed project will do just that – ensuring that the hundreds of acre-feet of water each year are not lost due to undetected leaks.

The San Gorgonio Pass Water Agency (SGPWA): SGPWA provides imported water to the City of Banning from the SWP to reduce local groundwater overdraft. The project is expected to save 686.799 AFY of potable water that can remain in the Beaumont Basin (one of California's 22 adjudicated basins), and other local basins, and will contribute to SGPWA goals of sustaining groundwater supplies. This is especially significant as imported water allocations from the SWP continue to decline.

Sun Lakes Home Owners Association: The Sun Lakes neighborhood includes 3,327 homes and condos and two 18-hole gold courses. The Association supports efforts to support modern infrastructure that will help their community abide by California's water restrictions, while making their neighborhood function at a more efficient level.

In addition to Banning's widespread support of local and regional water resource goals, the City also participates in several collaborative associations and programs to establish and encourage local and regional water savings, better water management, and long-term solutions to water sustainability, which include the following:

San Gorgonio Pass Water Alliance (Alliance): The Alliance was created on November 6, 2012 by action of the Riverside County Board of Supervisors to identify challenges in water supply and water quality in the region and to improve coordination, collaboration, and communication among local, state, and federal governments and water purveyors and other water resource stakeholders in the San Gorgonio Pass region. The Alliance **is a coordination of 13 regional water providers and local governments located in the San Gorgonio Pass region, including the City of Banning, dedicated** to achieving greater efficiency and effectiveness in delivering water supplies. The Alliance is charged with developing mutually beneficial solutions that include coordinating

plans and infrastructure development that ultimately deliver clean, reliable and affordable water supplies for the citizens of the San Gorgonio Pass.

Beaumont Management Zone (BMZ) Maximum Benefits Program: The City of Banning participates in this program, which is under the oversight of the Santa Ana Regional Water Quality Control Board (RWQCB) and is intended to ensure the long-term sustainability of water quality in the BMZ. Banning works closely with the Yucaipa Valley Water District, Beaumont-Cherry Valley Water District, and City of Beaumont who are also participants in the program.

Beaumont-Cherry Valley Water District: The City of Banning and Beaumont-Cherry Valley Water District jointly own and operate three groundwater wells in accordance with an agreement between the two parties, dated December 23, 2003. These wells have the capacity to supply 2,000 GPM each of potable water to the Cities of Banning and Beaumont annually. The City of Banning is entitled to 50% of the production capacity.

San Gorgonio Pass Sub-Basin Cooperative Agreement: The City of Banning, SGPWA, and Banning Heights Mutual Water Company signed a Memorandum of Agreement in April of 2017 to manage the sub-basin in accordance with the Sustainable Groundwater Management Act (SGMA). Other stakeholders include the High Valleys Water District and Morongo Band of Mission Indians.

The City has also initiated several water conservation programs to work with the public and educate water service customers on various approaches to conserve water. At City Hall, water conservation pamphlets are displayed year-round as well as at public city-wide events. Public Works Department staff visit school classrooms, make presentations on water conservation, and distribute brochures with water conservation information, emphasizing the value of water and water conservation.

- **Is there widespread support for the project?**

As mentioned above, there is local and regional support for the proposed project from agencies including Representative Raul Ruiz, Riverside County Board of Supervisor Jeff Hewitt, Riverside County Flood Control and Water Conservation District, and SGPWA. There is also public support, as demonstrated by the letter of support provided by the Sun Lakes Home Owners Associations (HOA). This HOA represent 3,327 homes which adhere to the strict California water restrictions to ensure that valuable water is not wasted. The letter provided supports the City's goal to move toward a system that will allow quick identification of leaks at homes and businesses and will supply accurate snapshots of daily data for water usage.

The City is also diligent in gathering public feedback for conservation projects like this one. The project was listed in the 2015 UWMP as a measure to modernize water delivery and reduce leaks and water loss. Since its first UWMP was developed in 1985, the City has actively encouraged community participation in its urban water management planning efforts by holding public

hearings and making draft UWMPs available for public review and comment prior to adoption. Public comments are included in the final version. A copy of the Final 2015 UWMP is available for public review at the City Clerk's office and is also available online at www.ci.banning.ca.us/2015uwmp.

- **What is the significance of the collaboration/support?**

Ultimately, the significance of the City's collaboration with and support from other agencies and inclusion in various water management programs is the dedication of the cities and agencies in Western Riverside County to work together to conserve and better manage valuable water resources for the future of California.

The City extracts groundwater from the Beaumont Storage Unit (Beaumont Basin) Banning Storage Unit, the Banning Bench Storage Unit, the Cabazon Storage Unit, and the Banning Canyon Storage Unit of the San Gorgonio Pass Sub-basin portion of the Coachella Valley Groundwater Basin. As stated above, the City purchases imported water from SGPWA to recharge the Beaumont Basin, which also supplies water to the City of Beaumont, Beaumont Cherry Valley Water District, South Mesa Water Company, and Yucaipa Valley Water District. SGPWA receives water from the SWP, a Reclamation Facility, via the East Branch Extension pipeline, thus the Beaumont Basin receives Reclamation water via the SWP.

The City of Banning must work closely with agencies and cities to properly manage water supplied by the Beaumont Basin to ensure there is ample water resources for all citizens of San Gorgonio Valley now and in the future as the State faces the effects of climate change and population growth. In addition, the City strives to implement projects that will save significant amounts of valuable water that affect all of California including imported water from the SWP supplies.

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

The proposed project will save 686.799 AF of water annually that will remain in the adjudicated Beaumont Basin and other local groundwater basins. The more water that is kept in the Basin to provide recharge and storage for future use, the less water the City will have to purchase from the SWP, enhancing the long-term reliability to SWP water resources. Continuous availability of SWP allocations will require complete development of the unfinished SWP, which currently is unable to meet maximum amount obligations during droughts.

In particular, the Wanger decisions regarding protection of the Delta smelt (endangered fish species), concerns about reliability of the Delta levees, and other concerns led the Department of Water Resources to issue a revision in June 2012 of The SWP Reliability Report 2009, dated August 2010, wherein the long-term reliability of SWP supplies was reduced to approximately 60 percent of maximum allocations (later reduced to 58 percent). Without the construction of

additional Sacramento-San Joaquin Delta facilities and certain water storage reservoirs, the water supply capability of the SWP will remain limited and SWP Contractors will have to share reduced quantities of available supplies, especially during droughts.

In addition, Banning will share best practices and results of the proposed project with the cities and agencies included in its numerous programs and agreements which will enable project replication in other cities and districts.

- **Will the project make water available to address a specific water reliability concern? Please address:**
    - **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.**

As stated above, the City of Banning purchases imported water from SGPWA, sourced from SWP water supplies. The proposed project benefits the same Delta region as the SWP. The SWP draws water from the Delta, where the Sacramento and San Joaquin Rivers meet. SWP water is then pumped through the North Bay Aqueduct and the East Branch among other paths. SWP then supplies water to Banning to recharge the Beaumont Basin. SWP supplies also originate from the Feather River watershed. The availability of these supplies is dependent on the amount of precipitation in the watershed, the amount of that precipitation that runs off into the Feather River, water use by others in the watershed and the amount of water in storage in the SWP's Lake Oroville at the beginning of the year. Variability in the location, timing, amount and form (rain or snow) of precipitation, as well as how wet or dry the previous year was, changes from year to year as shown in the amount of water that flows into Lake Oroville. According to the Department of Water Resources, one of the leading factors in determining SWP water allocations is snow water content. The statewide snow water content is currently 37 percent of average. Despite the above-normal precipitation received in March and April, warm temperatures increased runoff and snowmelt in the Northern Sierra, resulting in diminished snowpack for this time of year.[4]

As discussed in Section 1.8 and in DWR's 2015 State Water Project Delivery Capability Report (2015 DCR), climate change adds another layer of uncertainty in estimating the future availability of SWP source water. Current literature suggests that global warming may change precipitation patterns in California from the patterns that occurred historically. While different climate change models show differing effects, potential changes could include more precipitation falling in the form of rain rather than snow and earlier snowmelt, which would result in more runoff occurring in the winter rather than spread out over the winter and spring.

[4] https://mavensnotebook.com/2018/04/24/this-just-in-dwr-increases-water-supply-allocation-to-state-water-contractors-to-30/

Water conservation at the end source will benefit all of the water recipients and suppliers up the chain of delivery, because decreased water demand from the residents of Banning means a larger water supply for the rest of Delta and SWP water recipients.

- **Describe where the conserved water will go/how it will be used. Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)? Will it be left in the river system?**

The conserved water will remain in the local groundwater basins, allowing a more sustainable local supply and decreased dependence on imported water for recharge. The proposed project will directly address the adjudication of the Beaumont Basin by ensuring that 686.799 AFY of local water remains in the Basin, which is a finite resource shared among several agencies.

- **Describe how the project will address the water reliability concern?**

In addition to the existing restrictions on water supplies from the SWP, California is in its seventh consecutive year of severe drought. Beginning in 2012, the State experienced the driest three years on record. In response to another dry winter in 2014/2015, the Governor of California issued an executive order on April 1, 2015, mandating water restrictions on urban water use statewide, and demanding 25 percent reduction in water use. Drought has a tremendous impact on SWP water, as stated above, and also pushes more agencies in the region to utilize, and necessarily conserve, local groundwater. One basin is already adjudicated and is shared among multiple users. The proposed project will help conserve local water, leaving more in the basin to share and for storage AND to help reduce the need to draw on imported sources like the SWP.

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

There is tension over the Beaumont Basin, as described throughout the application, and litigation in the form of the basin's adjudication to prevent over-allocation. The project will ease the tension by reducing Banning's water needs and freeing up demand on the Basin. The project is also critical as California continues to experience drought conditions. By conserving more water, Banning will need less imported water from the SWP for groundwater recharge. And, the SWP is often a hot topic and subject of tension, which contributes to less draws.

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

Not applicable. The conserved water will simply remain in the City's groundwater basins.

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

As described earlier, and indicated in the application's letters of support, the City of Banning has many important relationships and collaborations at the local, regional, and state levels to enhance conservation of the regional water supply. The City also performed site visits to local agencies to evaluate the effectiveness of upgrading meters (interviews referenced in Appendix D), in addition to reviewing AMI case studies referenced in Appendix F.

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

Conserved water in the amount of 686.799 AFY will remain in the City's groundwater basins for increased sustainability of Banning's water supply and water supply of other agencies that share local groundwater reserves.

- **Will the project benefit Indian tribes?**

Yes, the Morongo Mission Band of Indians shares water from the shared Cabazon Basin. The Cabazon Basin (storage unit) is located on the eastern boundary of SGPWA's service area. The City of Banning, Mission Springs Water District, and the Morongo tribes rely on pumping from this basin to serve a portion of their respective water demands. The proposed project will allow 686.799 AFY of water to remain in local groundwater basins for shared use, including the Cabazon Basin.

- **Will the project benefit rural or economically disadvantaged communities?**

Yes. Based on U.S. Census Bureau data from the 2012-2016 American Community Survey 5-Year Estimates, and the California Climate Investments AB 1550 mapping tool, the City of Banning is considered low-income/disadvantaged. The City's MHI ($39,700) is less than 80% of the state's MHI of $57,652, identifying it as a disadvantaged community. The project will benefit the entire city (all water meter connections), which is a disadvantaged community.

- **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.**

Yes. Banning imports water to recharge groundwater in the Beaumont Basin, sourced from the SWP, which is derived, in part, from the California Bay Delta. The Bay Delta is home to at least four federally recognized endangered/threatened species, including the Delta Smelt endangered

fish species. The proposed project will help recharge local groundwater supplies, thereby alleviating the need to purchase so much imported water. By potentially reducing the amount of imported water needed, the proposed project protects and expands potential habitats of the Bay Delta.

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

Yes. The project will be a model for other Western Riverside County, local and regional water purveyors. The City will publish savings and findings of water conserved to offer additional concrete data for neighboring communities regarding the benefits of AMI technology. Providing this information will inevitably support the move from outdated meters to upgraded "smart meters, which will result in more water conserved in the local groundwater basins and in the form of less needed water needed from the SWP.

Evaluation Criterion C—Implementing Hydropower (18 points)

The City plans to utilize hydropower to power their SCADA equipment at five (5) pressure reducing stations to monitor flow and pressure to verify usage within pressure zones.

- **Describe the amount of energy capacity.**
- **Describe the amount of energy generated**
- **Describe any other benefits of the hydropower project.**

The Cla-Val hydro generators are capable of delivering up to 42 watts of non-continuous draw, with an expected continuous power generation of 14 watts each, for a total of 70 watts continuous. The hydropower project will allow for measurement of water into pressure zones so that water losses can be evaluated for each pressure zone when comparing water delivered versus water registered by customer meters. Currently, the five pressure reducing stations do not have access to utility power, therefore there is no telemetry equipment that can provide flowrate information in real time.

Evaluation Criterion D—Complementing On-Farm Irrigation Improvements (10 points)

Not Applicable. The only agriculture currently within the City of Banning is animal husbandry, and these uses are served under the residential sector. The City does not expect other agricultural activities to develop within its water service area.

Evaluation Criterion E—Department of the Interior Priorities (10 points)

The proposed project aligns with the following Department of the 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**
   b. **Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands**

Utilizing Science
The project mitigates the effects of climate change creates critical challenges for California water resources management.

The Safeguarding California Plan: 2018 Update is the State's roadmap for everything state agencies are doing and will do to protect communities, infrastructure, services, and the natural environment from climate change impacts. In the Water Sector Plan section, dozens of actions are listed as underway for California to prepare for climate change impacts on the water sector. These actions utilize science to identify best practices that span the different areas of the water sector including: (1) surface water and groundwater, (2) drinking and environmental water supplies, (3) wastewater, (4) flood flows and storm water, and (5) recycled water. The actions focus on safeguarding State- and locally-managed infrastructure and resources by supporting current actions and incentivizing local water managers to plan for future actions to address climate change impacts on local and regional water resources.

Several best practices are listed that are reflected in the proposed project. These include diversifying local supplies and increasing water use efficiency. Increasing regional self-reliance and diversification of local water supplies and maximizing water conservation and water use efficiency will enable Californians to better respond to changing economic and climatic conditions while ensuring a reliable water supply for the diversity of the State's water needs. These strategies must ultimately be implemented by local and regional water management agencies throughout the State. This project allows the City of Banning to be proactive in implementing its own strategy to assist with the greater California goal of water conservation while addressing climate change.

Fostering Relationships
Several partners and conservation agencies are lending their support to the City of Banning for this project and they include the SGPWA, the Riverside County Flood Control and Water Conservation District, and the San Gorgonio Pass Regional Water Alliance. All share a goal to conserve water and believe implementing a modernized infrastructure today, to achieve greater efficiency and effectiveness in delivering water supplies, is critical for the future of California. This type of project can save hundreds of thousands of gallons of water by quickly identifying where a leak is located so that steps can be taken to fix the issue.

2. **Utilizing our natural resources**
   a. **Ensure American Energy is available to meet our security and economic needs**

Over the last two decades, the water-energy nexus has gained attention due to local, regional, national, and global concerns regarding energy security, water scarcity, and the impacts of global climate change. For example, the historic 2012-2015 North American Drought impacted electricity generation capacity by restricting surface water withdrawals used for power plant cooling, as well as drastically reducing hydropower resource availability. Situations such as this highlight how water and energy systems are inextricably linked and the potential vulnerabilities this creates.

The energy needed for providing water can be a significant portion of all energy use, with a California Energy Commission report estimating that five percent of energy consumption in California can be attributed to the conveyance, distribution, and treatment of water. Advanced water metering reduces real water loss, thus reduces the need for energy to pump and clean water that will remain in local groundwater basins.

3. **Restoring trust with local communities**
   a. **Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;**

The City is a member of the San Gorgonio Pass Regional Water Alliance, which seeks to improve coordination, collaboration, and communication among local, state, and federal governments and water purveyors and other water resource stakeholders in the San Gorgonio Pass region to achieve greater efficiency and effectiveness in delivering water supplies. The project aligns with Alliance goals that, in effect, include being a better neighbor by improving dialogue and relationships with one another, and working toward conservation projects that benefit the entire region and entities from all over California that receive SWP water.

The Alliance includes the City of Banning, Banning Heights Mutual Water Company, the City of Beaumont, Beaumont Basin Watermaster, Beaumont Cherry Valley Water District, Cabazon Water District, City of Calimesa, County of Riverside, High Valleys Water District, Mission Springs Water District, Morongo Band of Mission Indians, San Gorgonio Pass Water Agency, South Mesa Mutual Water Company, and Yucaipa Valley Water District. Project results will be dispersed among Alliance members to increase communication and demonstrate best practice projects.

4. **Modernizing our infrastructure**
   a. **Support the White House Public/Private Partnership Initiative to modernize U.S. infrastructure;**
   b. **Prioritize DOI infrastructure needs to highlight:**
      1. **Construction of infrastructure**

As mentioned earlier, the proposed project directly aligns with the Department of Interior's priority to modernize American infrastructure. The existing meters are an average of 16 years old, and require staff to physically inspect each of the meters onsite and visually perform a meter-read, a long, time-consuming process that bears no periodic water use data. Additionally, leaks in the distribution system must reach the surface before they are noticed or flagged for repair, as in the example shared at the beginning of this application. The outdated meter infrastructure has allowed leaks to go unnoticed for years. The new meters will modernize the process, allowing for drive-by meter-reading, more accurate and consistent reading, and faster and more reliable identification of system leaks and issues. The smart meters also lay the groundwork for future systems which will provide City of Banning customers with access to real-time utility billing information.

Evaluation Criterion F—Implementation and Results (6 points)

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.

Provide the following information regarding project planning:

(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 City of Banning has two relevant planning documents that provide support for the proposed project and identify strategies for water conservation:

- The City of Banning 2017 AWWA Water Audit Water Loss Control Planning Guide. The tool analyzes available data and provides suggested water system enhancements based on the validity of data available to the water purveyor. At this time, improving meter data collection, through a project such as AMI, is the most effective investment for the City of Banning water system, as shown in "Long-Term Loss Control" on the included document.
- The City of Banning 2018 Integrated Master Plan lists the project on pages 6-35 and 287 as improvement projects that have been recommended to optimize the operation of the City's potable water system or provide reliability.

All relevant pages are included in Appendix G.

(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).

First, the project conforms to the three plans listed above, dating back to 2012: Banning 2012 Capital Improvement Plan, Banning 2015 Urban Water Management Plan, and Banning 2018 Integrated Master Plan.

Next, the project type is listed in the State of California Water Plan (2013 Update). The Water Plan is California's strategic plan for managing and developing water resources statewide for current and future generations. It provides a collaborative planning framework for elected officials, agencies, tribes, water and resource managers, businesses, academia, stakeholders, and the public to develop findings and recommendations and make informed decisions for California's water future. The plan is updated every five years, and the 2018 Update is currently underway.

The 2013 State of California Water Plan outlines smart metering as a top Best Management Practice (BMP), see Section 3: Urban Water Use Efficiency. Due to the large size of the Plan is not included in this application, but can be found here:
https://www.water.ca.gov/Programs/California-Water-Plan/Water-Plan-Updates

The 2018 State Water Plan Update, in preliminary draft form, lists "Modernize Water Management Systems" on page 1-6 and 1-7 and states "Water resource infrastructure is maintained, rehabilitated, or modernized to perform effectively. Such structures are more resistant to impacts from inter-annual hydrologic variability and other uncertainties." (Relevant pages are included in Appendix H.) The proposed project will modernize our water management system, as prioritized in the document.

Sub-criterion F.2— Performance Measures

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved).
The City will use a simple 'pre-post' design to quantify performance. Calendar year 2018 will serve as the preferred baseline. The City's Water Utility Department will collect and analyze data, and provide information for reports to the Project Manager, Mr. Luis Cardenas, to include in the Interim and Final Performance Reports. The following performance measures will be included:

Proposed Performance Measures

1) Water Better Managed. The proposed project will result in 100% of potable water better managed. The entire City's potable water distribution system will be integrated to the

new AMI technology, allowing for early leak detection. As a result, one hundred percent of the water delivered through this system will be better managed.

2) Real Water Conserved (in Acre-Feet per Year). The City will record the number of acoustic sensor alerts received throughout the 2-year project period, the number of leaks identified and fixed, and utilize the AWWA annual water audit to identify the total real water conserved over 2019 and each following year.

Evaluation Criterion G— Nexus to Reclamation Project Activities (4 Points)

- **Is the proposed project connected to Reclamation project activities? If so, how?**

Yes. The proposed project is connected to Reclamation project activities, because it benefits the State Water Project (SWP), a water facility project managed in tandem with the Bureau of Reclamation, as mandated in the 1986 Coordinated Operations Agreement between the United States of America and the Department of Water Resources for the State of California. SWP water is provided to the City of Banning via the San Gorgonio Pass Water Agency for groundwater recharge. The project will conserve 686.799 AFY of potable water, meaning the City can rely less on imported water for recharge and keep the water in the local basins, without the need to pump or treat for potable use. This will benefit all SWP water recipients, as it decreases the need to draw on this imported water source.

- **Please consider the following:**
  - **Does the applicant receive Reclamation project water?**

Yes, as stated above, the City receives SWP water via the San Gorgonio Pass Water Agency.

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

The project is not located on Reclamation lands, but involves the SWP, a facility jointly managed by Reclamation and the State of California.

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

No.

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

The proposed project will contribute water to a basin that receives Reclamation water for recharge.

- **Will the project benefit any tribe(s)?**

Yes, the project will benefit the Morongo Band of Mission Indians. The proposed project will allow 686.799 AFY of water to remain in the Cabazon groundwater basin, which is shared between the City of Banning and the Morongo tribe. The project will increase security of water sustainability for the tribe by reducing potable water waste and contributing to a healthier water basin.

Evaluation Criterion H— Additional Non-Federal Funding (4 points)

Non-Federal Funding ($2,645,052) / Total Project Cost ($3,033,052) = 90%

~End of Technical Proposal Narrative~

PROJECT BUDGET

Funding Plan and Letters of Commitment

How you will make your contribution to the cost-share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments)?

The total project cost is $2,945,052. The City will provide non-federal matching funds in the amount of $2,645,052, or 90% of the total cost. The City respectfully requests $300,000 in Reclamation funding to complete the proposed AMR project. The City's cost share is cash and comes from the City's Water Operations Fund for water projects, and is allocated for each year of the proposed project period. Reclamation funding will account for 10% of the total project cost.

Describe any donations or in-kind costs incurred before the anticipated Project start date that you seek to include as project costs.

No donations or in-kind costs incurred before the anticipated project start date will be included as project costs. While the testing phase is soon to begin, none of these costs will be used toward match or as part of the grant-funded activities.

Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards the required cost share unless otherwise allowed by statute.

No funding will be, or has been, requested or received from other Federal partners.

Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.

There are no pending funding requests for the proposed project.

Table B-1.—Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCES	AMOUNT
Non Federal Entities	
1. City of Banning	$2,645,052
Non Federal Subtotal	$2,645,052
Other Federal Entities	
Not Applicable	$0
Other Federal Subtotal	$0
REQUESTED RECLAMATION FUNDING	$300,000

Budget Proposal

TABLE B-2. PROPOSED BUDGET				
	Computation			
Budget Item Description	**$/Unit**	**Unit**	**Quantity**	**Total Cost**
Salaries and Wages				
Project Manager (Costs are outside the scope of the grant request)	$ -	NA	NA	$ -
Water Service Worker	$ 24.86	HR	7875	$ 195,773
Technical Project Administration (Blended Rate)	$ 29.60	HR	3800	$ 112,480
Fringe Benefits				
Water Service Worker	$ 18.55	HR	7875	$ 146,081
Project Management and Administration (Blended Rate)	$ 22.40	HR	3800	$ 85,120
Travel				
Not applicable				
Equipment (Over $5,000)				
Not applicable				
Supplies/Materials (Under $5,000)				
City Operations Truck	$ 20.29	HR	7875	$ 159,783.75
0.75" Multijet Meter	$ 72.71	EA	9652	$ 701,796.92
1" Multijet Meter	$ 96.49	EA	462	$ 44,578.38
1.5" Multijet Meter	$ 219.40	EA	93	$ 20,404.20
2" Multijet Meter	$ 269.00	EA	152	$ 40,888.00
3" Ultra Sonic Meter	$ 1,472.10	EA	20	$ 29,442.00
4" Ultra Sonic Meter	$ 1,994.80	EA	32	$ 63,833.60
6" Ultra Sonic Meter	$ 3,229.18	EA	20	$ 64,583.60
8" Ultra Sonic Meter	$ 3,836.33	EA	17	$ 65,217.61
10" electronic register replacement	$ 116.00	EA	1	$ 116.00
Production Well Digital Meter Registers	$ 1,250.00	EA	21	$ 26,250.00
Zenner Stealth 2 Reader Interface	$ 70.00	EA	10449	$ 731,430.00
Zenner Stealth MIU Repeater (MIUR)	$ 70.00	EA	40	$ 2,800.00
Zenner AMI Permaloggers	$ 570.00	EA	5	$ 2,850.00
Patroller II & Nautiz PDA barcode scanner	$ 8,202.50	EA	1	$ 8,202.50
AMI NovusCenter Software setup	$ 4,000.00	EA	1	$ 4,000.00

City of Banning Advanced Metering Infrastructure (AMI) Project

Banning, California

Billing Interface Development	$ 2,500.00	EA	1	$	2,500.00
Zenner Stealth Handheld Unit	$ 3,335.00	EA	5	$	16,675.00
Zenner Stealth Collector-GPRS Ready	$ 3,072.00	EA	4	$	12,288.00
Zenner Stealth Repeater A/C Powered	$ 950.00	EA	8	$	7,600.00
Zenner Stealth Repeater Battery Powered	$ 778.50	EA	4	$	3,114.00
AMI Communications Poles	$ 25.00	EA	56	$	1,400.00
Zenner Stealth Pit Install Kit	$ 2.02	EA	10449	$	21,106.98
Zenner Stealth Lid Lock W/Extension	$ 4.50	EA	10449	$	47,020.50
Zenner Stealth Indoor Install Kit	$ 7.50	EA	40	$	300.00
Travel Expenses (Zenner Staff)	$ 1,800.00	EA	5	$	9,000.00
Meter Lids w/ 2" Lid Lock Hole	$ 19.00	EA	10449	$	198,531.00
Seba Mounted GSM Box	$ 2,000.00	EA	2	$	4,000.00
Seba Repeater	$ 350.00	EA	4	$	1,400.00
Sebalog Leak Sensor	$ 1,100.00	EA	20	$	22,000.00
Cla-Val X143IP Hydro Generator	$ 4,267.00	EA	5	$	21,335.00
Cla-Val VC22 Controller	$ 3,266.00	EA	5	$	16,330.00
Cla-Val X117-D Valve Position Indicator	$ 2,433.00	EA	5	$	12,165.00
Cla-Val X145 Electronic Display	$ 941.00	EA	5	$	4,705.00
Cla-Val X144-D Flowmeter	$ 2,434.00	EA	5	$	12,170.00
Fees					
Stealth Command Software Base Fee	$ 1,200.00	EA	1	$	1,200.00
Stealth Command Software Per Meter	$ 0.85	EA	10449	$	8,881.65
Zenner Project Management Per Day	$ 700.00	EA	16	$	11,200.00
Stealth Vision Software & Training	$ 700.00	EA	3	$	2,100.00
Stealth Installation Training Per Day	$ 700.00	EA	1	$	700.00
Contractual					
Not applicable					
Environmental Compliance					
BOR Staff	$ 100.00	HR	10	$	1,000.00
City Staff	$ 38.64	HR	10	$	386.40
City Staff Fringe	$ 31.36	HR	10	$	313.60
Total Indirect Costs					
Not applicable					
TOTAL PROJECT COSTS				**$**	**2,945,052**
Total Reclamation Request (10% of Total Project Cost)				**$**	**300,000**
Total Recipient Contribution (90% of Total Project Cost)				**$**	**2,645,052**

Budget Narrative

Salaries and Wages $308,253

Personnel costs (salaries and wages) for the Water Service Worker and Technical Project Administration are listed as grant requested items, shown below. Project management and training are not included in the grant request for ease of reporting. However, they are described below for a full understanding of project management.

Program Manager (Not included in Grant Request)
Mr. Luis Cardenas, P.E., will manage the project. Mr. Cardenas is the City's Senior Civil Engineer. Mr. Cardenas will be responsible for day-to-day project management and operations and will serve at the BOR's primary contact. Mr. Cardenas will oversee the project schedule, budget, key milestones, and will be responsible for managing all project staff. Mr. Cardenas will oversee the vendor agreement for equipment and training, and oversee development of the interim and final performance reports.

Mr.Cardenas has 12 years of experience in the field, and has been with the City of Banning for 1.5 years. He has successfully managed multiple city projects, including Chromium VI Compliance, an Integrated Master Plan for Water, Wastewater, and Recycled Water, a 1.5-mile transmission main replacement project, sludge removal and digester dome repair project, and a potable reservoir cleaning and inspection project.

Water Meter Installation – Water Service Worker (Included in Grant Request) $195,773
Staff anticipates that installation will be accomplished over the two-year period in installments: Year 1 - 5,250 meters installed; and Year 2 – 5,250 meters. Two full-time workers will be dedicated to the task, installing an average of 22 meters each per day, nine hours per day, until each year's installment is complete. An additional Water Service Worker will be called upon if needed to stay on schedule. Based on prior experience with simple meter exchange, the City estimates it will take approximately one/quarter of an hour (0.75) to install each of the 10,500 meters. (0.75 hours X 10,500 meters = 7,875 hours)

The Water Service Worker will spend 7,875 hours total on the project at $24.86 per hour (base rate). (7,875 hours X $24.86 per hour. = $195,773)

Training (Not Included in Grant Request)
The selected vendor will provide training on the new AMI system to City staff including Field Service Representatives, Water Service Workers, finance and billing representatives, and water and wastewater department staff. Staff will be trained on installation, collecting data, uploading reports, analyzing reports, and integration of billing system data.

Technical Project Administration (Included in Grant Request) $112,480
This task is based on a blended rate among a low-, mid-, and high-level employees, and includes data entry, reporting, verification of work orders by the Superintendent, billing, warehouse administrative duties, information technology staff (IT), and reporting duties to ensure grant compliance during the three-year project period. The blended rate is $50 per hour at a fully burdened rate. At a base rate, with fringe separated, the rate is $29.60.

The City is requesting grant-funding for 3,800 hours of Technical Project Administration (approximately 1,900 hours per year).
(3,800 hours X 29.60 per hour = $112,480)

Total Salaries and Wages = $195,773 + $112,480 = $308,253

Fringe Benefits $231,201
The City's fringe benefit rate is 44.8 percent, and includes Public Employees Retirement System (PERS), Medicare, Social Security, State Unemployment Insurance, Workers Compensation, Benefit allowance, and an Education Incentive.

The fringe rate applied to the Water Service Worker base rate of $24.86 is $18.55 per hour.
(7,875 hours X $18.55 per hour = $146,081)

The fringe rate applied to the Technical Project Administration blended rate of $29.60 per hour is $22.40 per hour.
(3,800 hours X $22.40 per hour = $85,120)

Total Fringe Benefits = $146,081 + $85,120 = $231,201

Travel - Not Applicable

Equipment - Not Applicable

Supplies and Materials $2,403,898.69
Materials for the proposed AMI project include:

The Water Service Worker will use a City operations truck to travel to meter sites for installation. The truck hourly rate is $20.29 per California Department of Transportation standards.

The Worker will utilize the truck for 7,875 hours.
(7,875 hours X $20.29/hour = $159,783.75)

Materials:

9,652	0.75" Multi Jet Meters at $72.71/meter = $701,796.92
462	1" Multi Jet Meters at $96.49/meter = $44,578.38

93	1.5" Multi Jet Meters at $219.40/meter = $20,404.20
152	2" Multi Jet Meters at $269/meter = $40,888
20	3" Ultra Sonic Meter at $1,472.10 = $29,442
32	4" Ultra Sonic Meter at $1,994.80 = $63,833.60
20	6" Ultra Sonic Meter at $3,229.18 = $64,583.60
17	8" Ultra Sonic Meter at $3,836.33 = $65,217.61
1	10" electronic register replacement at $116 = $116
21	Production Well Digital Meter Registers at $1,250 = $26,250
10,449	Zenner Stealth 2 Reader Interface at $70 = $731,430
40	Zenner Stealth MIU Repeater (MIUR) at $70 = $2,800
5	Zenner AMI Permaloggers at $570 = $2,850
1	Patroller II & Nautiz PDA barcode scanner at $8,202.50 = $8,202.50
1	AMI Novuscenter Software setup at $4,000 = $4,000
1	Billing Interface Development at $2,500 = $2,500
5	Zenner Stealth Handheld Unit at $3,335 = $16,675
4	Zenner Stealth Collector-GPRS Ready at $3,072 = $12,288
8	Zenner Stealth Repeater A/C Powered at $950 = $7,600
4	Zenner Stealth Repeater Battery Powered at $778.50 = $3,114
56	AMI Communications Poles at $25 = $1,400
10,449	Zenner Stealth Pit Install Kit at $2.02 = $21,106.98
10,449	Zenner Stealth Lid Lock w/ Extension at $4.50 = $47,020.50
40	Zenner Stealth Indoor Install Kit at $7.50 = $300
5	Travel Expenses (Zenner Staff) at $1,800 = $9,000
10,449	Meter Lids w/ 2" Lid Lock Hole at $19 = $198,531
2	Seba Mounted GSM Box at $2,000 = $4,000
4	Seba Repeater at $350 = $1,400
20	Seba Leak Sensor at $1,100 = $22,000
5	Cla-Val X143IP Generator at $4,267 = $21,335
5	Cla-Val VC22 Controller at $3,266 = $16,330
5	Cla-Val X117-D Valve Position Indicator at $2,433 = $12,165
5	Cla-Val X145 Electronic Display at $941 = $4,705
5	Cal-Val X144-D Flowmeter at $2,434.00 = $12,170

Total Materials and Supplies = $2,379,817.04

Supply Fees:

1	Stealth Command Software Base Fee at $1,200 = $1,200
10,449	Stealth Command Software per Meter at $0.85 =$8,881.65
16	Zenner Project Management per day at $700 = $11,200
3	Stealth Vision Software & Training at $700 = $2,100
1	Stealth Installation Training per day at $700 = $700

Total Supply Fees = $24,081.65

Total Materials/Supplies + Fees = $2,403,898.69

The quote for materials and supplies has been provided by the City's Public Works Department and Zenner Stealth cost estimate from the vendor.

Contractual - Not Applicable

Environmental and Regulatory Compliance Costs $1,700

Twenty hours for Environmental Compliance have been allocated. It is believed that the project is a Categorical Exemption for CEQA and a Categorical Exclusion for NEPA. We have allocated 10 hours for City staff to evaluate and file paperwork for environmental compliance at $70/hour (fully burdened rate) and 10 hours for BOR staff to review documentation at $100/hour. The City received confirmation from the Lower Colorado Regional representative that this amount is sufficient for this type of review.

For BOR staff:
10 hours X $100/hour = $1,000

The base rate for City staff is $38.64.
(10 hours X $38.64 per hour = $386.40)

The fringe rate applied to the City staff rate of $70 per hour is $31.36 per hour.
(10 hours X $31.36 per hour = $313.60)

Total Environmental Costs = $1,700

Other Expenses - Not Applicable

Indirect Costs - Not Applicable

Total Costs: $2,945,052

Federal Request from Bureau of Reclamation:	$ 300,000
Total Non-Federal (LOCAL) Cost Share:	$2,645,052
Total Project Cost:	**$2,945,052**

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

The City has evaluated the project for both CEQA and NEPA compliance. It is believed that the project is a Categorical Exemption for CEQA and a Categorical Exclusion for NEPA. The CEQA Categorical Exemption reference is Section 15301. Existing Facilities, part (b). The project is a Class I project which consists of the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public and private structures, facilities, mechanical equipment, etc. The types of "existing facilities" is consistent with part (b) of Section 15301 which states "existing facilities of both investor and publicly-owned utilities used to provide electric power, natural gas, sewage, or other public utility services." For NEPA, we reviewed the list of Categorical Exclusions located in the Code of Federal Regulations for the Department of Interior and concluded that the project meets the following categorical exclusion definitions: "minor construction activities associated with authorized projects which...merely augment or supplement..." and "maintenance, rehabilitation, and replacement of existing facilities which may involve a minor change in size, location, and/or operation."

- **Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.**

No. The proposed AMI project will involve replacing existing meters in sites that have been previously-disturbed and are regularly maintained with newer models, and upgrade the City's network with Stealth AMI technology. No earth will be disturbed.

- **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?**

No, we are not aware of any Federal threatened/endangered species or critical habitat in the proposed project area. No species or habitat will be affected by any activities associated with the proposed project.

- **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.

- **When was the water delivery system constructed?**

The water delivery system was originally constructed in 1913, but additions have been constructed consistently since that time, with a large portion built in the 2000's.

- **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, the project will not result in any modification of or effects to individual features of an irrigation system.

- **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.**

The original 1913 pipeline is eligible for listing on the National Register of Historic Places. However, it is no longer in use and is abandoned in place. Furthermore, it will not be affected by this project.

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

No.

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

No. The proposed project will have a benefit to low income and minority populations by increasing water sustainability and modernizing infrastructure.

- **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.

REQUIRED PERMITS OR APPROVALS

No permits or approvals are expected to be required for the proposed project. Project components will be installed on existing facilities.

LETTERS OF SUPPORT

The City of Banning received letters of support, which are included in this application, from the following entities:

- Representative Raul Ruiz
- Riverside County Board of Supervisors 5th District Supervisor Jeff Hewitt
- San Gorgonio Pass Water Agency
- Riverside County Flood Control and Water Control District
- Sun Lakes Home Owners Association

OFFICIAL RESOLUTION

A resolution from the City Council of the City of Banning will be provided within 30 days of the application deadline. The Resolution is scheduled for Council on March 26, 2019.

The City of Banning will adopt this Resolution on March 26, 2019. An executed copy will be provided to the Bureau of Reclamation within 30 days of the grant deadline.

RESOLUTION 2019-XX

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF BANNING, CALIFORNIA, APPROVING THE APPLICATION FOR GRANT FUNDS FROM THE BUREAU OF RECLAMATION WATERSMART: WATER AND ENERGY EFFICIENCY GRANTS FOR FY 2019 PROGRAM FUNDING OPPORTUNITY NO. BOR-DO-19-F004

WHEREAS, the President of the United States and the United States Department of the Interior have provided funds for the WaterSMART Program; and

WHEREAS, the Bureau of Reclamation has been delegated the responsibility for the administration of this grant program, establishing necessary procedures; and

WHEREAS, said procedures established by the Bureau of Reclamation require a resolution certifying the approval of application(s) by the applicant's governing board before submission of said application(s); and

WHEREAS, the applicant, if selected, will enter into an agreement with the Bureau of Reclamation to carry out the development of the proposal.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of Banning a follows:

SECTION 1. The City Council approves the filing of an application for the WaterSMART: Water and Energy Efficiency Grants for Fiscal Year 2019 Program for the City of Banning; and

SECTION 2. The City Council appoints the City Manager, or his designee, to act as agent with legal authority to enter into the grant agreement; and

SECTION 3. The City Council certifies that the City Council of the City of Banning has reviewed and supports the proposed application; and

SECTION 4. The City Council certifies that the City of Banning has sufficient matching funds to provide the amount of funding/in-kind contributions specified in the funding plan included in the grant application; and

SECTION 5. The City Council certifies that the City of Banning will work with the Bureau of Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

SECTION 6. The City Clerk shall certify to the adoption of this resolution and shall cause a certified resolution to be filed in the book of original resolutions.

The City of Banning will adopt this Resolution on March 26, 2019. An executed copy will be provided to the Bureau of Reclamation within 30 days of the grant deadline.

PASSED, APPROVED AND ADOPTED this 26th day of March, 2019.

_____
Art Welch, Mayor
City of Banning

ATTEST:

_____
Daryl Betancur, Deputy City Clerk
City of Banning

APPROVED AS TO FORM AND LEGAL CONTENT:

_____
Kevin G. Ennis, City Attorney
Richards, Watson & Gershon

CERTIFICATION:

I, Daryl Betancur, Deputy City Clerk of the City of Banning, California, do hereby certify that the foregoing Resolution No. 2019-XX was duly adopted by the City Council of the City of Banning, California, at a regular meeting thereof held on the 26th day of March, 2019, by the following vote, to wit:

AYES:

NOES:

ABSTAIN:

ABSENT:

_____
Daryl Betancur, Deputy City Clerk
City of Banning, California

APPENDIX A: LETTERS OF SUPPORT

- Representative Raul Ruiz
- Riverside County Board of Supervisors 5th District Supervisor Jeff Hewitt
- Riverside County Flood Control and Water Control District
- San Gorgonio Pass Water Agency
- Sun Lakes Home Owners Association

RAUL RUIZ, M.D.
36TH DISTRICT, CALIFORNIA
COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON HEALTH
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
SUBCOMMITTEE ON ENVIRONMENT AND CLIMATE CHANGE

Congress of the United States
House of Representatives
Washington, DC 20515-0536

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WASHINGTON, DC 20515
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F: (202 225-1238

43875 WASHINGTON STREET, SUITE F
PALM DESERT, CA 92211
P: (760) 424-8888
F: (760) 424-8993

445 EAST FLORIDA AVENUE
HEMET, CA 92543
P: (951) 765-2304
F: (951) 765-3784

Website: http://ruiz.house.gov

March 12, 2019

Darren Olson, Grants Management Specialist
Bureau of Reclamation, U.S. Department of the Interior
Denver Federal Center
Bldg. 56, Room 1000
6th Avenue and Kipling Street
Denver, Colorado 80225

Subject: Grant Application for City of Banning, California

Dear Mr. Olson:

I write in strong support of the City of Banning and their application for grant funding from the Bureau of Reclamation's Water and Energy Efficiency grant program. This grant would allow the city to fund a modernization project that will help the city identify and address leaks that threaten the local water supply.

Every individual should have access to drinking water that is both clean and safe. That requires careful conservation of limited water resources, particular in the desert communities I represent. The City of Banning's modernization project will improve water metering infrastructure, allowing more accurate water readings, quicker identification of leaks, and an overall more effective process for conserving water.

The requested funds will also help the City of Banning improve sustainability and minimize the environmental impacts of its water infrastructure. I am encouraged by the City's recent conversion to advanced metering infrastructure: an important first step toward creating updated systems that provide real-time leak detection, potentially saving hundreds of acre-feet of water per year.

I believe that the City of Banning is a deserving candidate for your grant program. I urge you to give full and fair consideration to their application, consistent with all relevant program rules and regulations. If you have any additional questions, please feel free to contact my congressional office at 760-424-8888.

Sincerely,

Raul Ruiz, M.D.
Member of Congress

PRINTED ON RECYCLED PAPER

County of Riverside

SUPERVISOR JEFF HEWITT
FIFTH DISTRICT

February 19, 2019

Mr. Darren Olson
U.S. Department of the Interior
Bureau of Reclamation
Denver Federal Center
Bldg. 56, Room 1000
Denver, Colorado 80225

Subject: City of Banning Water Meter Infrastructure Grant Application

Dear Mr. Olson:

As the Fifth District Supervisor of Riverside County, I am writing this letter of support for the City of Banning who is submitting an application to the Bureau of Reclamation's WaterSMART: Water and Energy Efficiency Grant program. I proudly support water conservation projects that help to ensure the sustainability of one of our most precious natural resources.

The City of Banning is a member of the San Gorgonio Pass Regional Water Alliance, which was created in 2012 by action of the Riverside County Board of Supervisors. The Alliance was created to identify challenges in water supply and water quality in the region and to improve coordination, collaboration, and communication among local, state and federal governments. The City's project to convert outdated water meters to advanced meter infrastructure is a smart move to address system and residential water leaks through a faster leak detection method and real-time water usage data. These types of projects can save hundreds of thousands of gallons of water by quickly identifying the location of a leak so that the issue can be addressed before too much water is wasted.

Water is a crucial issue facing our district and our state. It is imperative that our Southern California cities upgrade outdated water systems to improve delivery and sustainability of this vital resource that is often taken for granted. For these reasons, I support the City's projects that will address water supply concerns and sustainability.

I hope that your agency looks upon the application favorably and provides the City of Banning the grant funding it needs to implement this project.

Sincerely,

Supervisor Jeff Hewitt
Fifth District Supervisor

COUNTY ADMINISTRATIVE CENTER • FIFTH FLOOR • 4080 LEMON STREET • P.O. BOX 1645 • RIVERSIDE, CA 92502-1645
TELEPHONE: (951) 955-1050 • FAX: (951) 955-9030 • EMAIL: DISTRICT5@RIVCO.ORG
MORENO VALLEY DISTRICT OFFICE • 14375 NASON STREET, SUITE 207 • MORENO VALLEY, CA 92555

JASON E. UHLEY
General Manager-Chief Engineer

1995 MARKET STREET
RIVERSIDE, CA 92501
951.955.1200
FAX 951.788.9965
www.rcflood.org

RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

March 12, 2019

Mr. Darren Olson
Bureau of Reclamation
Denver Federal Center
Building 56, Room 1000
6th Avenue and Kipling Street
Denver, CO 80225

Dear Mr. Olson:

Re: Letter of Support for Advanced Metering Infrastructure for Banning, California

The Riverside County Flood Control and Water Conservation District (District) is pleased to support the City of Banning and their application to the Bureau of Reclamation (BOR) to update the City's water meter infrastructure. Our mission is, in part, to support regional water conservation measures. As such, the District is a member of the San Gorgonio Pass Regional Water Alliance, along with the City of Banning and 11 other regional water providers and local governments.

The goals of the San Gorgonio Pass Regional Water Alliance are to improve coordination, collaboration and communication among local, state and federal governments, water purveyors and other water resource stakeholders in the San Gorgonio Pass region to achieve greater efficiency and effectiveness in delivering water supplies. We are charged with developing mutually beneficial solutions that include coordinating plans and infrastructure development that ultimately deliver clean, reliable and affordable water supplies for the citizens of the San Gorgonio Pass. The City of Banning's proposed project will do just that – ensuring that the hundreds of acre-feet of water each year are not lost due to undetected leaks.

We are proud to work alongside the City of Banning and other municipalities that move toward more efficient, reliable water infrastructure. I hope BOR will join me in support of this project.

Sincerely,

JASON E. UHLEY
General Manager-Chief Engineer

JU:bad
P8/224821

San Gorgonio Pass Water Agency

A California State Water Project Contractor
1210 Beaumont Avenue • Beaumont, CA 92223
Phone (951) 845-2577 • Fax (951) 845-0281

President:
Ronald Duncan

Vice President:
Leonard Stephenson

Treasurer:
Stephen Lehtonen

Directors:
Dr. Blair M Ball
David Castaldo
David Fenn
Michael Thompson

General Manager & Chief Engineer:
Jeff Davis, PE

Legal Counsel:
Jeffry Ferre

March 4, 2019

Darren Olson
Bureau of Reclamation
Denver Federal Center
Bldg. 56, Room 1000
Denver, Colorado 80225

RE: Banning, California Application for Funding – Advanced Metering Infrastructure

Dear Mr. Olson:

The San Gorgonio Pass Water Agency (SGPWA) is pleased to provide this letter of support for the City of Banning's advanced water metering infrastructure project to the Bureau of Reclamation funding under the WaterSMART: Water and Energy Efficiency Grant Program. SGPWA provides imported water to local water agencies, including the City of Banning, to reduce local groundwater overdraft. The City proposes to convert over 10,000 outdated water meters to advanced infrastructure meters that will modernize the entire city water system and allow for efficient leak detection. The project is expected to save hundreds of acre-feet per year of potable water that can remain in the Beaumont Basin (one of California's 22 adjudicated basins) and contribute to our goals of sustaining groundwater supplies. This is significant as imported water allocations from the State Water Project continue to decline.

Our Agency fully supports the City's commitment and forward-thinking to improve water infrastructure. We respectfully ask you to find favor in the City's application for smart water conservation infrastructure that will protect our water resources.

Sincerely,

Jeff Davis
General Manager

SUN LAKES
Country Club

February 27, 2019

Mr. Darren Olson
Bureau of Reclamation
Denver Federal Center
Bldg. 56, Room 1000
Denver, Colorado 80225

Subject: Advanced Metering Infrastructure for Banning, California

Dear Mr. Olson:

The Sun Lakes Home Owners Association (HOA) is pleased to support the City of Banning's application for grant-funding to update the city's water meters to new "smart" meters. The project will improve leak detection and save the City's water resources. Our neighborhood includes 3,327 homes and condos and two 18-hole golf courses. Our residents fully support this project that will move us toward a system that will quickly identify leaks and will provide real-time data for water usage. We adhere to the strict California water restrictions to ensure that our water is not wasted and appreciate all efforts to support modern infrastructure that will keep our homes and neighborhood more efficient.

On behalf of the thousands of Banning residents who are proud to call Sun Lakes "home," please accept this letter as our support of the City's project.

Sincerely,

Sandra Moyer

Sandra Moyer
President

850 S. Country Club Drive • Banning, California 92220 • (951) 845-2191 • Fax (951) 845-7814

APPENDIX B: Vendor Materials for Hydropower Generators

X143IP Intermediate Power Generator

Request for Quote

[X143IP]

The X143IP Intermediate Power Generator is a self-contained power generation system designed to be mounted on a Cla-Val Automatic Control Valve.

Advantages include:

- Uses the hydraulic energy of the system to generate power
- Retrofits to an existing Cla-Val Control Valve
- Can be specified on a new valve
- Ideal for isolated locations and confined spaces
- Generates up to 14 watts of power to operate onsite equipment without tying into the grid, including the following:
  - Electronic Control Valves
  - Communications Equipment
  - Data loggers that capture and store information

Engineering Data Sheet | Technical Manual | Application Overview

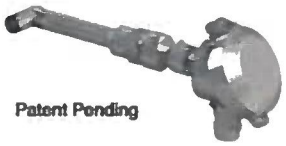
Electronic Super Valve:

An all-In-one solution for power, information and control

Discover the advantages of a Cla-Val electronic control valve with integral metering and power:

- As a package, the **CRD-33 Electronic Pilot Control, X144 e-FlowMeter and X143IP Power Generator** combine to create an ultra-efficient means to achieve remote control and provide access to flow data, without the need for an external power source
- All three IP-68 submersible components can be easily retrofitted to an existing Cla-Val Automatic Control Valve
- The CRD-33 Electronic Pressure Reducing Pilot Control is installed on a Cla-Val Automatic Control Valve to maintain accurate downstream pressure while allowing set points to be changed remotely
- The e-FlowMeter is accurate to within 2% of full scale and alleviates the need for an external meter with the associated installation costs
- The low power requirements of the X144 e-FlowMeter and the CRD-33 are reliably met using the X143IP Power Generator

The CRD-33 Electronic Pilot Control provides optimum remote control of a Cla-Val Pressure Reducing Valve, using an analog 4-20mA command signal from any SCADA-type control system.

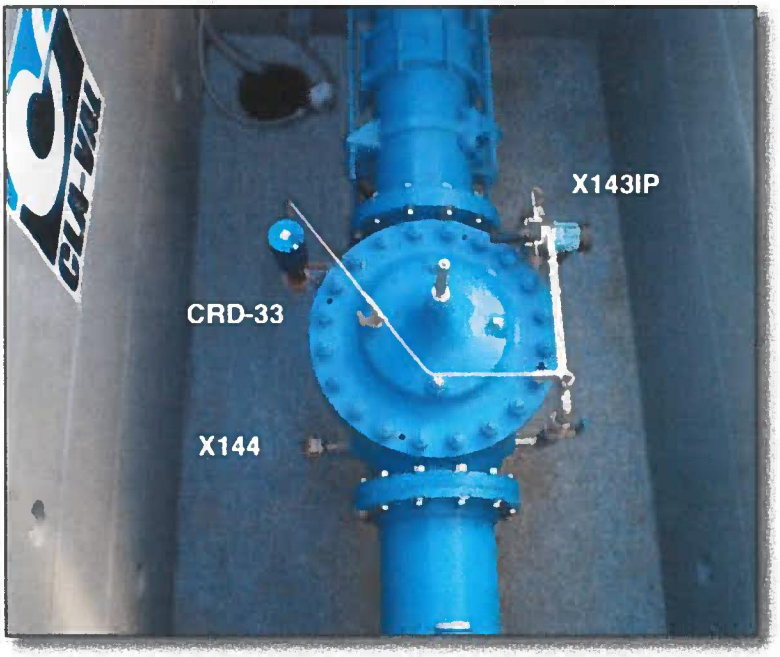


Patent Pending

The self-contained X144 e-FlowMeter can be installed in the inlet tappings on either side of a Cla-Val Automatic Control Valve to provide accurate flow measurement.

The compact X143IP is installed in the pilot system of a Cla-Val Automatic Control Valve and uses the hydraulic energy in the pipeline to produce enough power to operate the e-FlowMeter and the CRD-33 Pilot Control.

The Cla-Val Model 390 Series Electronic Pressure Reducing Valve equipped with the X144 e-FlowMeter and X143IP Power Generator is an ideal solution for water system operators looking for highly accurate flow data, precise control and a reliable means to operate without external power.



UtahState University · Imperial College London

laboratory and field proven

To learn more about this and other Cla-Val Electronic Products, log onto www.cla-val.com

CLA-VAL

MODEL **X143IP**

Intermediate Power Generator

Product Description

The X143IP Intermediate Power Generator is a self-contained, power generation system designed to be mounted on a Cla-Val Automatic Control Valve.

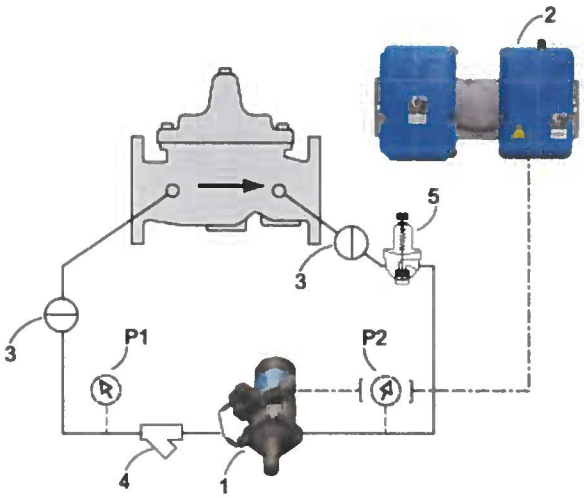
The X143IP uses the pressure drop across the valve to produce up to 14 watts of power to run electronic equipment located at the valve site.

Product Features

- Designed to be installed within the pilot system of a Cla-Val Automatic Control Valve
- Factory installed or field retrofittable to an existing valve
- Up to 14 watts continuous draw
- Up to 42 watts non-continuous draw
- 12 psi differential pressure minimum at 15 gpm
- 12 Volt Battery with 12 and/or 24 VDC Output
- Automatic shutdown of the X143IP when battery is fully charged helps to maximize both battery and generator life span
- Applications include powering electronic valve controls, data loggers, position controls and communications equipment

CE

patent pending



Typical Schematic Diagram

Supplied Equipment

1 Power Generator Unit
2 Electronics & Battery Housing
3 CK2 Isolation Valve
4 X43 "Y" Strainer

Optional Equipment

P X141 Pressure Gauge
5 CRD-L Pressure Reducing Valve

Note: Maximum inlet pressure is 150 psi.
Please consult factory if pressure is above 150 psi.

Power Generator Specifications

- 12V DC or 24V DC output
- 12 PSI minimum differential pressure required
- Up to 14 watts generator power output
- 3/4-inch female connection
- Upper recharging threshold: 13.5 VDC
- Lower recharging threshold: 12 VDC

1

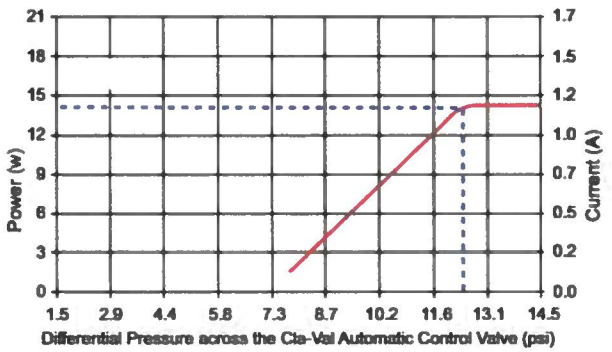
2

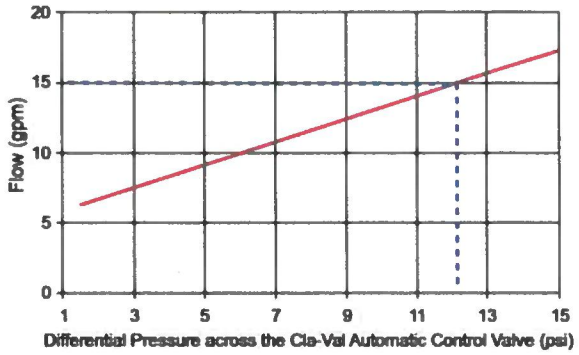
visit www.cla-val.com
to learn more about this and other
Electronic Products

Power Output

Voltage Output	Maximum Continuous (24h/24)	Maximum Non-Continuous
12 volts	1.2 A (14 W)	3.5 A (42 W)
24 volts	0.6 A (14 W)	1.7 A (42 W)

Power and Flow Charts





Typical Installation: Pressure Reducing Valve Station X143IP providing power to operate electronic valve controls, and the Cla-Val X144 e-FlowMeter

Easy retrofit: The X143IP Power Generator is installed as part of the pilot system of an existing Cla-Val Automatic Control valve to provide power without compromising valve performance and without tying into to the grid

CLA-VAL

1701 Placentia Avenue • Costa Mesa, CA 92627

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APPENDIX C: AMI Vendor Materials

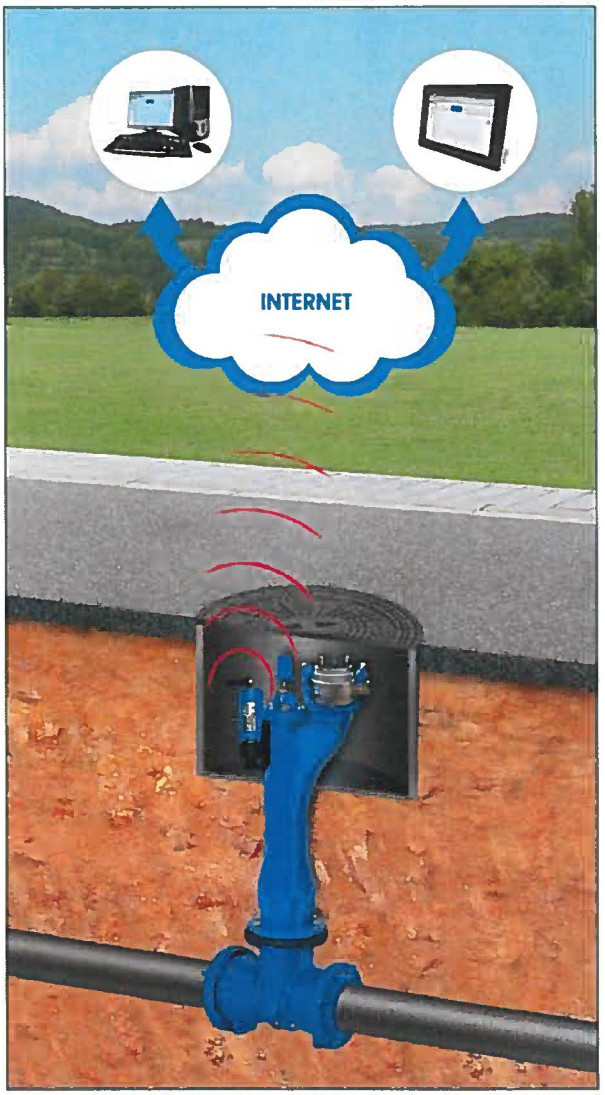
GSM TRANSMITTER 3 (GT-3)

sebaKMT
A member of Megger Group

Portable GSM Data Transmitter for Sebalog N-3 and Sebalog P-3

Special features

- Offers remote data transmission
- Fits even into small valve boxes
- Uses field replaceable batteries
- Is fully submersible
- Operates wireless
- Carries data from up to three devices



Description

Patrolling noise and pressure loggers is time consuming and costly. The GSM Transmitter 3 (GT-3) can save you this trouble. It is designed to transmit data collected by noise and pressure loggers from the site to your office. Using GSM/GPRS, on site patrolling is no longer necessary. Save time, money and monitor your network from the office with the GT-3.

Small and fully submersible, the GSM Transmitter 3 is specifically designed to fit into valve boxes and hydrant chambers.

Always ready to use - the GSM Transmitter 3 is equipped with two powerful field-replaceable batteries.

Up to three devices can be connected to the GSM Transmitter 3 - a benchmark in cost efficiency for GSM data transmission out of an underground chamber.

The fully wireless operation offers the best flexibility to place and mount the GT-3 inside a chamber.

Technical data

Dimensions (incl. antenna)	44 x 44 x 124mm (44 x 44 x 160mm)
Weight	225 g
Power supply	2 x AA 1.5 V Lithium
Operating time	1 year (depending upon use)
Operating temperature	-20 °C ... +60 °C
Data transmission	GPRS
Alarm targets	SMS, Email
Communication	Bi-directional radio
IP protection class	IP 68

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sales@sebakmt.com · **www.sebakmt.com**

sebaKMT
A member of Megger Group

ISO 9001:2008 We reserve the right to make technical changes. DS_GT-3_en_V01.pdf

Stealth Reader™ By ZENNER

ZENNER
All that counts.

www.zennerusa.com
info@zennerusa.com
+888.766.1253
+972.386.1814 (FAX)

Stealth Reader Software

A ZENNER PREFERRED PRODUCT

The Stealth Reader Software utilizes a distributed management architecture with management functions in the network devices, a management server and a management user interface at the operator's workstation. Management functions are integrated across the mesh network system while providing each entity with its own independent management component.

Stealth Reader provides tools for both the mesh communications network and the application data.

STEALTH READER BY ZENNER USA

Status tools identify, report and depict anomalies in the network.

These include problems like low battery, device tampering, loss of AC power, antenna issues, and gas or water conservation violations. Current status as well as historical status are available.

Stealth Reader also provides alarm acknowledgment, alarm claiming and remote alarm notification via text messages and email for proactive fault/alarm management.

STATUS/FAULT MONITORING

Network Visulization tools locate devices of interest and help users plan site related maintenance.

Visualization tools depict the flow of traffic through the mesh and help users understand the mesh robustness and capacity both generally and locally

NETWORK VISUALIZATION

CUSTOMIZATION

Customization for OEM applications can include branding, specialized views, reports, alerts and integration with OEM application software. Graphical reports and charts ease the understanding and analysis of large data collections. Reports are available for mesh behaviors such as report delivery and message latency as well as for application interests such as gas or water usage. As the Mesh network is adapted to a new application area, additional report types appropriate for that application are added.

SYSTEM REQUIREMENTS

Microsoft Windows XP or Later
1 GB of RAM
1.5 GB of Available Hard-Disk Space
Color Monitor with 16 GB Color Video Card
CD-ROM Drive

CONTENT INCLUDED

Software for Stealth Reader Management System Version 2.1.2
Instructional Manual

Stealth Reader By ZENNER

CONFIGURATION

Global configuration from the Stealth Reader operator interface provides for tuning both mesh behavior and application behavior. Configuration can set alarm thresholds, set data reporting intervals, set application schedules (water conservation), distribute and install new device firmware.

ZENNER USA | 15280 Addison Road, Suite 340, Addison, TX 75001 | TEL: +888 766 41253 | www.zennerusa.com

APPENDIX D: AMI Smart Meter Interviews

City of Banning
Site Visits and Interviews for "Smart Meters"

1. Did you have a selection process for your meters?
   Palmdale: Yes, compatibility with Itron, multijet.
   Pasadena:

2. What were the main factors that were considered when choosing the meter selected?
   Palmdale: Stuck meter, no moving parts, sand issues.
   Pasadena: Operations did not participate in the selection process.

3. What was the cost per meter?
   Palmdale: $108 for ¾" w/out ERT. ERT $100.
   Pasadena: $184 for ¾" with ERT.

4. Were meters installed in house or by a contractor?
   a. If in house, is special training and/or tools needed?
   b. Testing needed?

   Palmdale: Installs done by contractor. Smaller companies worked better. No training or tools required, pretty basic job.
   Pasadena: Installs initially done by a contractor and there were so many issues, it caused more work for the staff. Subsequently, installs were done in-house.

5. Any special integration required with the data collection/management system?
   Palmdale:
   Pasadena: Zenner worked closely with operations and IT to integrate data.

6. How many meters/laborer/day were installed?
   Palmdale: Approximately 8K meters installed by a 4/5-man crew over a 2-month period.
   Pasadena: 14 meters installed per 11-hour day, 6 days/week, per person.

7. Any major issues with installation?
   Palmdale: No issues.
   Pasadena: Major issues were with contractors.

8. Reaction from customers?
   Palmdale: There was some pushback regarding accuracy. Customer Care Reps (CCR) reviewed reads with customers.
   Pasadena: Different department. Did not talk to them.

9. How much outreach was done prior to installation?
   Palmdale: Lots of outreach. Transparency is a top priority.
   Pasadena: None, "knock & talk".

10. Any operational issues that we should consider now?

City of Banning
Site Visits and Interviews for "Smart Meters"

Palmdale:
Pasadena: Preparing paperwork for installers was time consuming. Installed by route, binder used.

11. Any accuracy issues?
    Palmdale: None with Itron/Zenner.
    Pasadena: None with Zenner or Badger.

12. Any issues covered under product warranties?
    Palmdale: One bad batch. Vendor provided replacement parts and labor.
    Pasadena:

13. Any organizational change issues with staff? (i.e. staff displacement, ongoing training, etc.)
    Palmdale: None.
    Pasadena: Staff decreased13-8 (due to retirements). No ongoing training needed.

14. Is AMI the long-term goal, or AMR only?
    Palmdale: AMR only.
    Pasadena: AMR only, unless power goes to AMI. AMI is very expensive.

15. What data is collected, and how much is shared with customers?
    Palmdale: Quite a bit is shared. Transparency is a top priority.
    Pasadena: Just reads, nothing shared.

16. What were some of the drivers for converting to AMR? (i.e., Financial, Customer Service, Conservation)
    Palmdale:
    Pasadena:

17. What was the QA/QC process for ensuring smart meter readings were accurate, based on historical consumption?
    Palmdale:
    Pasadena: With Zenner, spot check units to insure they are programmed correctly.

18. What is the range of the device?
    Palmdale: Over 2 miles, depending on terrain.
    Pasadena: Different department. Did not talk to them.

19. Are there exposed wires and if so, what can be done to keep them from being affected by gophers?
    Palmdale: Yes, less than ½%.

Pasadena: Metal flex conduit placed over wire. (Conduit installed by Zenner is $4 extra.)

20. Besides the latitude and longitude information needed for the device, what other information must be entered into the billing system to assure the device can be read (ERT, MXU, etc.)?
    Palmdale: None.
    Pasadena: None.

21. Remote turn on and turn off?
    Palmdale: No.
    Pasadena: No. Only using one port (read).

Additional Notes:

Palmdale –

- Octave meter – no moving parts, has 20%-25% increase in accuracy, less expensive than compound meters.
- Zenner fails at a rate of 1%-2% as a result of a programming issue that can be easily fixed.
- Uses a "true read" device to check meter accuracy.
- Great product support with Itron.
- Reads are done with handheld, not laptop. CCRs able to complete 2k reads in approximately 3.5 hours.
- Billing software used is True Point. It is great for work orders. CCRs use ipads.
- Richard is their GeoViewer programmer (in-house).
- Fiberglass stake vendor is AM Leonard.
- Department name changed to "Customer Care". They are very transparent and they educate their customers.
- Meter switch process took 10-12 years.
- ERT mounted on 12" fiberglass stakes with uniform placement inside box (upper left corner).
- Transmissions can be picked up with concrete boxes with no problems.
- 11x17 sheets of paper utilized for install process, with room to place tags (stickers) from meter and ERT.

Pasadena –

- Utilizes Zenner and Badger meters with no issues.
- Software used is ECIS (MVRS).
- Meters read using laptop.
- Vacuum truck sent out ahead of installers to clean mete boxes.
- ERT installed upright, 6" below lid, mounted on 12" fiberglass stakes.
- Meter boxes are Armorcast.
- FC 300 will be replaced with a tablet in the near future.

APPENDIX E:

AMERICAN WATER WORKS ASSOCIATION 2017 WATER AUDIT

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association
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? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Banning (CA3310006)
Reporting Year: 2017 | 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

Volume from own sources:	4	7,017.747	acre-ft/yr	2	Pcnt:	Value: 300.418	acre-ft/yr
Water imported:	n/a	0.000	acre-ft/yr				acre-ft/yr
Water exported:	3	86.150	acre-ft/yr				acre-ft/yr
WATER SUPPLIED:		**6,631.179**	acre-ft/yr				

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	5	5,880.477	acre-ft/yr			
Billed unmetered:	n/a	0.000	acre-ft/yr			
Unbilled metered:	n/a	0.000	acre-ft/yr			
Unbilled unmetered:	5	17.544	acre-ft/yr		17.544	acre-ft/yr
AUTHORIZED CONSUMPTION:		**5,898.021**	acre-ft/yr			

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption)

733.157 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		16.578	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	2	120.010	acre-ft/yr	2.00%		acre-ft/yr
Systematic data handling errors:		14.701	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **151.289** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **581.869** acre-ft/yr

WATER LOSSES: **733.157** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **750.702** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	8	165.8	miles
Number of active AND inactive service connections:	8	10,766	
Service connection density:		65	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	4	109.3	psi

COST DATA

Total annual cost of operating water system:	7	$13,521,881	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$2.21	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	7	$250.07	$/acre-ft

☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 53 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Billed metered

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

American Water Works Association.
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Water Audit Report for: City of Banning (CA3310006)
Reporting Year: 2017 | 1/2017 - 12/2017

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 53 out of 100 ***

System Attributes:

Apparent Losses:	151.289	acre-ft/yr
+ Real Losses:	581.869	acre-ft/yr
= **Water Losses:**	733.157	acre-ft/yr
? Unavoidable Annual Real Losses (UARL):	307.53	acre-ft/yr
Annual cost of Apparent Losses:	$145,642	
Annual cost of Real Losses:	$560,151	Valued at **Customer Retail Unit Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	11.3%	
	Non-revenue water as percent by cost of operating system:	5.3%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	12.55	gallons/connection/day
	Real Losses per service connection per day:	48.25	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.44	gallons/connection/day/psi

From Above, Real Losses = Current Annual Real Losses (CARL):	581.87	acre-feet/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.89	

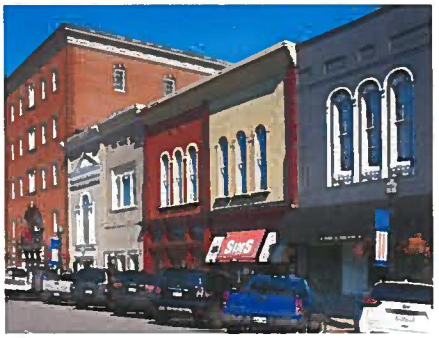
* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

APPENDIX F: AMI CASE STUDIES

- Murfreesboro, Tennessee Case Study
- City of North Miami Beach, Florida Case Study
- Lake County, Illinois Case Study

Murfreesboro Tennessee

The City of Murfreesboro Water & Sewer Department (MWSD) was looking to modernize its meter reading process to more efficiently manage the delivery and use of water to, and by, its customers.



OVERVIEW

With a goal of reducing their non-revenue water, MWSD sought a technology that would solve its problems today, while offering potential for future growth and flexibility. A key driver was partnering with a technology that was a reliable, tested solution from a company with a sound reputation and strong financial backing. Itron's Advanced Metering Infrastructure (AMI) solution with acoustic leak detection and analytics software stood out in the search process. The project began in August 2015, and finished ahead of schedule in May 2017.

SOLUTION

Itron's AMI solution with leak detection and analytics has increased operational efficiencies at MWSD and saved millions of gallons per year.

"The Itron AMI system has resulted in a more efficient process, giving our staff the ability to complete preventative maintenance, detect leaks, reduce non-revenue water and provide our customers with actionable data," said Darren Gore, director of MWSD.

CUSTOMER

City of Murfreesboro, Tennessee

SERVICE TERRITORY

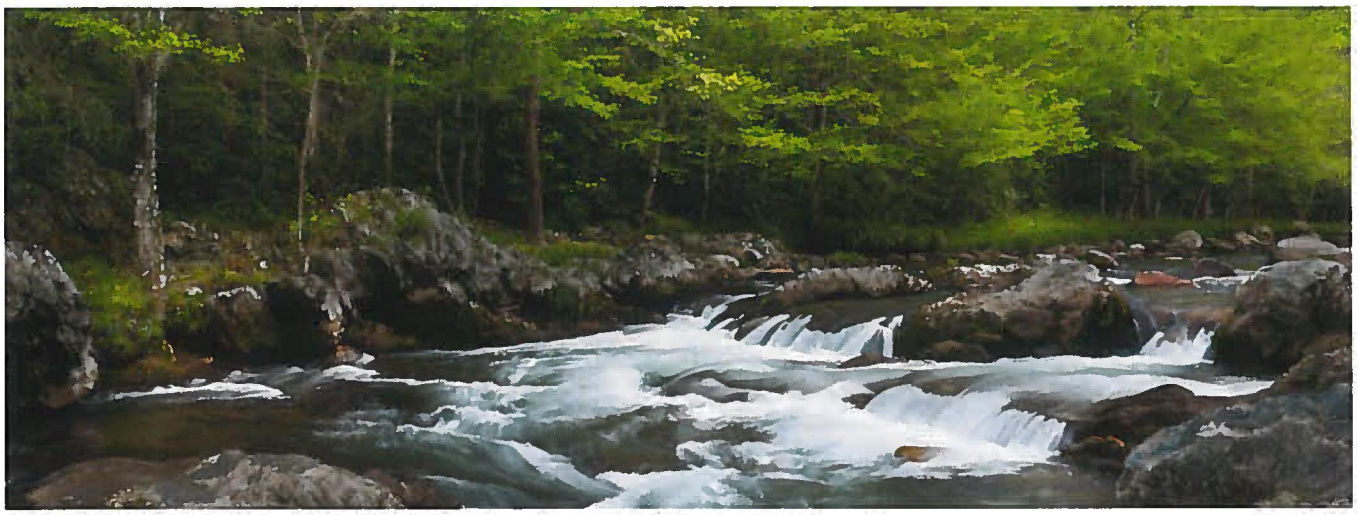
100,000 customers

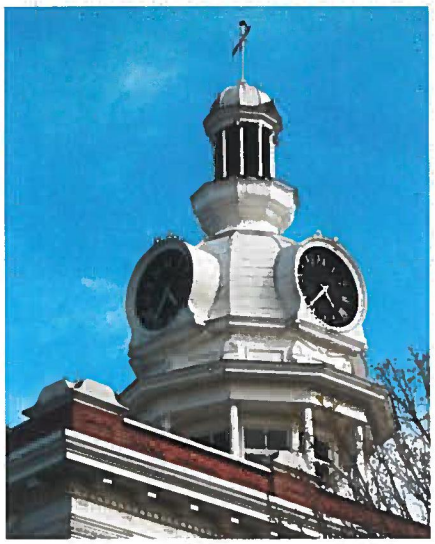
TECHNOLOGY

AMI and acoustic leak detection with analytics software

BENEFITS

- 64 leaks located
- 28 repaired
- **104 million gallons saved per year**
- 385 thousand gallons saved per day
- Estimated production cost saving per year of $105,000
- Improved customer service
- Greater operational efficiencies





SOLUTION *(continued)*

While monitoring the Acoustic Leak Sensors through the AMI network, a leak was detected and determined to be leaking at a rate of around 70gpm, "The Itron technology alerted us about the leak and allowed us to monitor the situation until we could schedule the repair at the most opportune time for our staff. The result minimized the impact on Murfreesboro citizens, as well as the local environment," said Randy McCullough, MWSD AMI field services manager.

In the seven months since the leak has been repaired, 21M gallons of water have already been saved with a savings of $41,000.00.

WHAT'S NEXT?

As the City of Murfreesboro continues to focus on detecting leaks, they have rolled out the Customer Web Portal to their customers, giving them access to real-time, actionable data. This application will help MWSD continue to raise the standard for customer service, and increases conservation efforts and operational efficiencies, while decreasing non-revenue water and ultimately sustaining their communities water resources.

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City of North Miami Beach, Florida

Leveraging Itron AMI to Identify & Repair 23 Leaks, Saving 27 Million Gallons of Water Annually

OVERVIEW

Until recently, the City of North Miami Beach relied on traditional walk-up, manual meter reading, and a leak detection service that visited quarterly to survey areas of its distribution system. Surveyors would visit two weeks per quarter, helping city staff systematically go from one end of the 550-mile pipeline system to the other in one-mile sections—it took one and a half years to get through the city's 25-square-mile service territory. While the city was able to maintain its system and identify leaks, the process was labor intensive and the city understood that automating meter reading and leak detection could be done simultaneously, saving precious time, staff resources, money—and most importantly, water.

SOLUTION

The City of North Miami Beach is leveraging Itron's Advanced Metering Infrastructure (AMI) solution, equipped with leak detection technology and cloud-based analytics, which now utilize the robust and secure Microsoft Azure platform. The project, completed in 2015, includes 38,000 communication modules along with 11,000 acoustic leak sensors. The new system is providing North Miami Beach with real-time data on customer usage and potential leaks throughout the system. Instead of potentially taking more than a year to identify leaks, the city now knows within three days if a leak occurs. In 2016, North Miami Beach's transition won *Water & Wastes Digest* magazine's Top Projects Award.

"After a competitive pilot, it was evident Itron's solution and vision best suited North Miami Beach's long-term strategy to expand services beyond meter reading," said Karim Rossy, chief engineer for the City of North Miami Beach. "Itron's AMI solution has the ability to not only bring back hourly reads, but also survey our distribution system for leaks on a daily basis."

CUSTOMER

City of North Miami Beach, FL

SERVICE TERRITORY

The City of North Miami Beach, Florida produces 21 million gallons of water per day, delivered to 38,000 endpoints across 25-square-miles of Northern Miami-Dade County

TECHNOLOGY

Itron AMI solution equipped with leak detection technology and analytics

BENEFITS

- 23 leaks identified and repaired, saving an estimated 27 million gallons and $38,000 annually
- Improved efficiency of meter reading and billing
- Enhanced safety of meter readers
- Increased quality of customer service by eliminating the need of estimated bills
- Customers may check own usage via secured website

"We chose Itron for this project because of the company's commitment to quality and extensive experience helping utilities with automated and advanced metering deployments."

— Ana M. Garcia, City Manager.

With Itron's AMI solution, North Miami Beach is able to enhance customer service, protect revenue, forecast consumption, analyze flow and support district metering by leveraging detailed consumption and meter alerts collected by Itron Analytics in the cloud. The utility's customers now have access to detailed consumption information through a secure customer web portal so they can better manage their usage, conserve water and save money.

"Our goal is to drive down costs for the utility and our customers, and reduce the amount of water we produce," said Ana M. Garcia, city manager for the City of North Miami Beach. "We chose Itron for this project because of the company's commitment to quality and extensive experience helping utilities with automated and advanced metering deployments."

BENEFITS

With 11,000 leak sensors installed, the city has already identified and repaired 23 leaks. These leaks will recover an estimated 27 million gallons of water per year, saving North Miami Beach $38,000 annually.

"One big benefit we are seeing from utilizing our new leak detection technology is the time savings, resulting from not having to do physical surveying," said Rossy.

With access to customer consumption data, North Miami Beach is now able to identify leaks they were previously unaware of. This has allowed proactive customer service outreach and customers are happy to be alerted to maintenance and other actions being taken to repair leaks and save them money in the long run.

"With the information we are receiving from the system, we have been able to proactively engage with our customers regarding abnormal usages before sending out a bill," Rossy said. "And our distribution crews have been able to find leaks before they come to the surface, saving close to 23 million gallons of water to date."

This installation has laid the groundwork for additional benefits—not only to the utility, but for customers as well—including:

- Automated leak detection, which will help drive costs down for both the utility and customer.
- Improved efficiency of meter reading and billing.
- Enhanced safety of meter readers.
- Increased quality of customer service by eliminating the need of estimated bills.
- Customers can check own usage via secured website.

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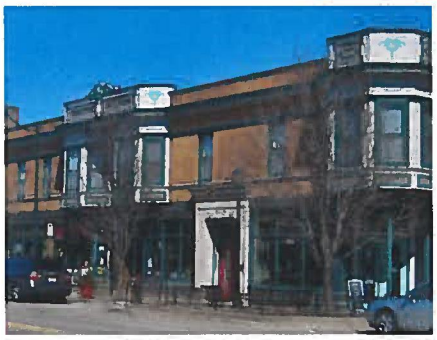
Lake County Illinois

Leveraging Itron AMI and Analytics to Save $250,000 Annually While Enhancing Customer Service & Water Conservation



OVERVIEW

Until recently, the Lake County Public Works Department was manually reading meters every 60 days and had little insight into its leaks and water usage patterns across its distribution system. The company had started a project to install an automated meter reading system, but knew that it needed a solution that would allow customers to be billed on a regular schedule without the need to manually visit each customer premise.

In addition to automating billing, due to its service territory spanning a large geographic region, the utility suspected that significant savings could be realized by automating meter reading activities, allowing meter readers to drastically reduce drive-time and miles driven.

The utility issued an RFP and comprehensive interview process to evaluate technology options, and determined that leveraging an Itron Advanced Metering Infrastructure (AMI) system would not only allow the utility to streamline its billing process, but also unlock opportunities for enhanced customer service, operational savings and conservation.

SOLUTION

In addition to providing the AMI network, which included communication modules capturing hourly consumption data, the utility has leveraged Itron hosting and analytics to derive even more value from the system.

Since completing installation in 2015, the utility has improved the time it takes to gather reads and bill customers for water service from up to six days down to one. Additionally, having true usage data gathered on an hourly basis has allowed the customer service department to have more valuable interactions with customers. Customers can also view their personal usage data through an online portal, allowing them to adjust their usage to fit their personal spending and conservation goals.

CUSTOMER

Lake County, Illinois

SERVICE TERRITORY

The Lake County Illinois Public Works Department owns and operates two public water supply distribution systems across a large service territory.

TECHNOLOGY

Hosted Itron AMI solution equipped with analytics

SOLUTION *(continued)*

"Prior to having analytics we could tell that ongoing consumption meant the customer likely had a leak, but we did not have the data to back it up so some customers would simply not believe us," said Kathleen Dalessandro, chief account specialist at Lake County Public Works. "We are now proactively reaching out to alert our customers to possible leaks so they can take action, saving them money and conserving water."

Compared to the way the utility operated 10 years ago, with three meter technicians and a supervisor, this transition has allowed them to adjust staffing, through retirements and natural attrition, to one meter technician and a supervisor. The utility had also been hiring a contractor to help do a lot of driving and walking to collect meter readings for billing, a cost they are now able to eliminate. The utility now has a reliable, predictable way to collect usage information automatically without having to send out meter technicians.

The same is true in the billing department. The utility has become more resourceful and proactive, moving from four fulltime billing specialists and a supervisor to a single supervisor, one fulltime billing specialist and part-time billing specialist. In addition to spending the utility's dollars more wisely, the work of department staff is more rewarding due to the fact that they now have more positive interactions with customers, and help them save money and conserve.

"Installing this system was a win for us as well as our customers," added Dalessandro. "This is a project that our County Board supported and they highlight this project as a sustainability initiative."

WHAT'S NEXT

Since beginning to use analytics for leak detection and customer service, utility personnel continue to realize new ways to leverage system data to improve operations and service. Utility customers are now able to leverage the Customer Portal to view personal usage data and take action without needing to contact the utility. The utility has begun customer outreach campaigns to inform customers about ways to conserve, and they are seeing more and more customers interested in conservation every day.

"We are hearing more and more customers looking for ways to conserve and with new towns working to get water allocations, we all need to make sure we are using our water wisely," added Dalessandro. "It is refreshing to have this abundance of data available to make more informed decisions and improve our service to customers."

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APPENDIX G: PLANNING DOCUMENTS

- City of Banning 2017 AWWA Water Audit Water Loss Control Planning Guide
- City of Banning 2018 Integrated Master Plan

AWWA Free Water Audit Software:
Determining Water Loss Standing

WAS v5.0

American Water Works Association
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Water Audit Report for: City of Banning (CA3310006)
Reporting Year: 2017 | 1/2017 - 12/2017
Data Validity Score: 53

Water Loss Control Planning Guide

Functional Focus Area	Water Audit Data Validity Level / Score				
	Level I (0-25)	**Level II** (26-50)	**Level III** (51-70)	**Level IV** (71-90)	**Level V** (91-100)
Audit Data Collection	Launch auditing and loss control team; address production metering deficiencies	Analyze business process for customer metering and billing functions and water supply operations. Identify data gaps.	Establish/revise policies and procedures for data collection	Refine data collection practices and establish as routine business process	Annual water audit is a reliable gauge of year-to-year water efficiency standing
Short-term loss control	Research information on leak detection programs. Begin flowcharting analysis of customer billing system	Conduct loss assessment investigations on a sample portion of the system: customer meter testing, leak survey, unauthorized consumption, etc.	Establish ongoing mechanisms for customer meter accuracy testing, active leakage control and infrastructure monitoring	Refine, enhance or expand ongoing programs based upon economic justification	Stay abreast of improvements in metering, meter reading, billing, leakage management and infrastructure rehabilitation
Long-term loss control		Begin to assess long-term needs requiring large expenditure: customer meter replacement, water main replacement program, new customer billing system or Automatic Meter Reading (AMR) system.	Begin to assemble economic business case for long-term needs based upon improved data becoming available through the water audit process.	Conduct detailed planning, budgeting and launch of comprehensive improvements for metering, billing or infrastructure management	Continue incremental improvements in short-term and long-term loss control interventions
Target-setting			Establish long-term apparent and real loss reduction goals (+10 year horizon)	Establish mid-range (5 year horizon) apparent and real loss reduction goals	Evaluate and refine loss control goals on a yearly basis
Benchmarking			Preliminary Comparisons - can begin to rely upon the Infrastructure Leakage Index (ILI) for performance comparisons for real losses (see below table)	Performance Benchmarking - ILI is meaningful in comparing real loss standing	Identify Best Practices/ Best in class - the ILI is very reliable as a real loss performance indicator for best in class service

For validity scores of 50 or below, the shaded blocks should not be focus areas until better data validity is achieved.

6.2.8 Pipeline Replacement Analysis

As presented in 6.1.2.2, the City's GIS currently has approximately 165 miles of potable water pipelines that were installed between 1914 and 2012. Based on the GIS, 19 percent of the pipelines had missing information on either pipeline material and/or year of installation. As a full asset-management analysis is beyond the scope of this IMP, a cursory level pipeline replacement analysis was conducted along with planning level cost estimates using a number of general planning assumptions. Since a large amount of the pipeline material was also unknown, the estimated average useful life was assumed to be 80 years. To estimate the pipeline age for those pipes with unknown installation dates, the following method was used by City staff:

- The approved date field, if populated, in the GIS was used as an approximation for the installation date.
- Remaining pipelines without an installation date or approved date were assigned an installation date based on field observations and the age of surrounding pipelines.

Based on these assumptions, approximately 31.6 miles of pipelines would require replacement by year 2025 and an additional 37.5 miles of pipelines would require replacement between year 2026 and 2040. Details on this calculation are included in Appendix G. This estimate does not include the pipelines that remained with unknown diameter after using the two methods above, which equated to 19.3 percent (xx miles) of the total pipelines. To account for the remaining unknown diameters, City staff used an adjustment factor to estimate the cost. To assist with identifying and replacing pipelines that are at the end of their useful life, the following projects have been recommended:

- Pipeline Rehabilitation Asset Study (PWO-1): This project is recommended to better understand the characteristics of the City's existing pipelines and refine the pipeline replacement program.
- Pipeline Replacement Program (PWRR-1): This project is recommended to maintain the existing distribution system and replace pipelines that have already reached or are nearing the end of their useful life. This is estimated to be a total of approximately 40 (39.1 calculated) miles of pipeline.

6.2.9 Other Improvements

Other miscellaneous improvement projects have been recommended to optimize the operation of the City's potable water system or provide reliability. The projects listed are included in the City's existing CIP. The other improvements include:

- Water Canyon Pipe Phase 2 (PWP-13)
- Altitude Valves (PWV-1)
- Water Line Replacements (PWRR-2 through PWRR-4)
- Well Enclosures (PWRR-20)
- Well Rehabilitation (PWRR-21)
- Security Cameras at Water Yard (PWO-2)
- Replace SCADA Computer Hardware/Software (PWO-3)
- Work Truck (PWO-4)
- Automatic Meter Reading (AMR) (PWO-5)
- Advanced Metering Infrastructure (AMI) (PWO-6)
- Computer Information System/ERP (PWO-7)

Table 9.10 Potable Water Capital Improvement Plan Summary

	Project	Proposed Size/Diameter	CIP Cost Estimate	City Cost	Developer Cost	CIP Phasing									
						Near-Term								Long-Term	Build out
						2018	2019	2020	2021	2022	2023	2024	2025	2026-2040	2041 & beyond
Wells		**Quantity (gpm)**													
PWW-1	**Proposed Main Zone Well C-8**	1,400	$ 3,422,000	$ -	$ 3,422,000	$ 342,000	$ 1,711,000	$ 1,369,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWW-2	Convert Well M-7 to Supply the Upper Main Pressure Zone	500	$ 191,000	$ -	$ 191,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 191,000	$ -	$ -
PWW-3	**Convert Well M-12 to Supply the Upper Main Pressure Zone**	1,100	$ 191,000	$ -	$ 191,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 191,000	$ -
PWW-4	Proposed Upper Main Well C-9	1,800	$ 4,252,000	$ -	$ 4,252,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,252,000	$ -
PWW-5	**Proposed Upper Main Well C-10**	1,800	$ 4,251,000	$ -	$ 4,251,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,251,000
PWW-6	Proposed Foothill West Well C-11	1,800	$ 4,251,000	$ -	$ 4,251,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,251,000
PWW-7	**Proposed Upper Main Well C-12**	1,800	$ 4,251,000	$ -	$ 4,251,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,251,000
Valves															
PWV-1	Altitude Valves (City's Existing CIP)	n/a	$ 250,000	$ 250,000	$ -	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWV-2	**New Pressure Reducing Valve for Rancho San Gorgonio**	n/a	$ 341,000	$ -	$ 341,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 341,000	$ -	$ -
PWV-3	Foothill West to Upper Main Zone Pressure Reducing Station	n/a	$ 681,000	$ -	$ 681,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 681,000	$ -	$ -
PWV-4	**C2 PRVs 1 & 2**	n/a	$ 681,000	$ -	$ 681,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 681,000	$ -	$ -
PWRZ-1	New Pressure Reducing Valves for Re-Zoning	n/a	$ 3,424,000	$ 3,424,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,424,000	$ -
Repair and Rehabilitation Projects			$ 357,746,000	$ 357,746,000	$ -	$ 1,467,000	$ 1,330,000	$ 1,242,000	$ 1,231,000	$ 1,316,000	$ 1,354,000	$ 1,703,000	$ 748,000	$ 93,094,000	$ 254,261,000
Pipelines		**Quantity (mi)**													
PWRR-1	**Pipeline Age Replacement Program**	133	$ 346,826,000	$ 346,826,000	$ -	$ -	$ -	$ -	$ 100,000	$ 800,000	$ 100,000	$ 800,000	$ 100,000	$ 90,665,000	$ 254,261,000
PWRR-2	Water Line Replacement Locations #2 (City's Existing CIP)	n/a	$ 650,000	$ 650,000	$ -	$ 650,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWRR-3	**Water Line Replacement Locations #3 (City's Existing CIP)**	n/a	$ 650,000	$ 650,000	$ -	$ -	$ 650,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWRR-4	Water Line Repalcement: Jacinto View/Chevy (City's Existing CIP)	n/a	$ 580,000	$ 580,000	$ -	$ -	$ 30,000	$ 550,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Storage															
PWRR-5	**San Gorgonio Reservoir Site R&R**	n/a	$ 767,000	$ 767,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 375,000	$ 375,000	$ 17,000	$ -
PWRR-6	Southwest Reservoir Site R&R	n/a	$ 41,000	$ 41,000	$ -	$ -	$ -	$ 28,000	$ -	$ -	$ -	$ -	$ -	$ 13,000	$ -
PWRR-7	**Mountain Reservoir Site R&R**	n/a	$ 788,000	$ 788,000	$ -	$ -	$ 161,000	$ 161,000	$ 214,000	$ -	$ -	$ -	$ -	$ 252,000	$ -
PWRR-8	High Valley Reservoir Site R&R	n/a	$ 839,000	$ 839,000	$ -	$ 181,000	$ 181,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 477,000	$ -
PWRR-9	**Sunset Reservoir Site R&R**	n/a	$ 642,000	$ 642,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 582,000	$ -	$ -	$ 60,000	$ -
Valves															
PWRR-10	**Foothill East PRV R&R**	n/a	$ 28,000	$ 28,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 28,000	$ -
PWRR-11	Hargrave & John PRV R&R	n/a	$ 71,000	$ 71,000	$ -	$ -	$ 35,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 36,000	$ -
Wells															
PWRR-12	**Well 1 Site R&R**	n/a	$ 879,000	$ 879,000	$ -	$ 133,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 746,000	$ -
PWRR-13	Well 3 Site R&R	n/a	$ 30,000	$ 30,000	$ -	$ -	$ -	$ -	$ 17,000	$ -	$ -	$ -	$ -	$ 13,000	$ -
PWRR-14	**Well C-2 Site R&R**	n/a	$ 776,000	$ 776,000	$ -	$ -	$ -	$ -	$ 627,000	$ -	$ -	$ -	$ -	$ 149,000	$ -
PWRR-15	Well C-5 Site R&R	n/a	$ 477,000	$ 477,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 386,000	$ -	$ -	$ 91,000	$ -
PWRR-16	**Well C-6 Site R&R**	n/a	$ 26,000	$ 26,000	$ -	$ -	$ -	$ -	$ -	$ 23,000	$ -	$ -	$ -	$ 3,000	$ -
PWRR-17	Well M-3 Site R&R	n/a	$ 235,000	$ 235,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 13,000	$ -	$ -	$ 222,000	$ -
PWRR-18	**Well M-11 Site R&R**	n/a	$ 66,000	$ 66,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25,000	$ -	$ 41,000	$ -
PWRR-19	Well M-12 Site R&R	n/a	$ 41,000	$ 41,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 41,000	$ -
PWRR-20	**Well Enclosures (City's Existing CIP)**	n/a	$ 400,000	$ 400,000	$ -	$ 80,000	$ -	$ 80,000	$ -	$ 80,000	$ -	$ 80,000	$ -	$ 80,000	$ -
PWRR-21	Well Rehabilitation (City's Existing CIP)	n/a	$ 750,000	$ 750,000	$ -	$ 150,000	$ -	$ 150,000	$ -	$ 150,000	$ -	$ 150,000	$ -	$ 150,000	$ -
Multi-Site Projects															
PWRR-22	**Multi-Site Projects (Emergency Power & Safety Retrofits)**	n/a	$ 2,184,000	$ 2,184,000	$ -	$ 273,000	$ 273,000	$ 273,000	$ 273,000	$ 273,000	$ 273,000	$ 273,000	$ 273,000	$ -	$ -
Other Projects			$ 38,716,000	$ 38,716,000	$ -	$ 2,299,000	$ 3,180,000	$ 2,290,000	$ 5,790,000	$ 25,000,000	$ -	$ -	$ 157,000	$ -	$ -
PWO-1	Pipeline Rehabilitation Asset Study	n/a	$ 216,000	$ 216,000	$ -	$ 216,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWO-2	**Security Cameras at Water Yard (City's Existing CIP)**	n/a	$ 33,000	$ 33,000	$ -	$ 33,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWO-3	Replace SCADA Computer Hardware/Software (City's Existing CIP)	n/a	$ 750,000	$ 750,000	$ -	$ 250,000	$ 250,000	$ 250,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWO-4	**Work Truck (City's Existing CIP)**	n/a	$ 80,000	$ 80,000	$ -	$ -	$ -	$ 40,000	$ 40,000	$ -	$ -	$ -	$ -	$ -	$ -
PWO-5	Automatic Meter Reading (AMR) (City's Existing CIP)	n/a	$ 3,800,000	$ 3,800,000	$ -	$ 1,800,000	$ 2,000,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWO-6	**Advanced Metering Infrastructure (AMI) (City's Existing CIP)**	n/a	$ 750,000	$ 750,000	$ -	$ -	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PWO-7	Computer Information System/ERP (City's Existing CIP)	n/a	$ 1,500,000	$ 1,500,000	$ -	$ -	$ -	$ 750,000	$ 750,000	$ -	$ -	$ -	$ -	$ -	$ -
PWO-8	**Chromium 6 Treatment Pilot Study, Design, and Construction (City's Existing CIP)**	n/a	$ 31,430,000	$ 31,430,000	$ -	$ -	$ 180,000	$ 2,250,000	$ 5,000,000	$ 25,000,000	$ -	$ -	$ -	$ -	$ -
PWO-9	Water Master Plan Update (City's Existing CIP)	n/a	$ 157,000	$ 157,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 157,000	$ -	$ -
CIP Total			$ 570,222,000	$ 434,522,000	$ 135,789,000	$ 5,367,000	$ 8,347,000	$ 10,685,000	$ 28,115,000	$ 43,431,000	$ 5,447,000	$ 3,215,000	$ 4,063,000	$ 137,850,000	$ 323,791,000
Annual Cost			N/A	N/A	N/A	$ 5,367,000	$ 8,347,000	$ 10,685,000	$ 28,115,000	$ 43,431,000	$ 5,447,000	$ 3,215,000	$ 4,063,000	$ 9,190,000	N/A

APPENDIX H: STATE WATER PLAN 2018 DRAFT PAGES

2. Improve Regulatory Framework to Reconcile Environmental Needs and Human Activities.
3. Provide Resources, Knowledge, Skills, and Tools Water Managers Need for Data-Driven Decision-Making.
4. Modernize and Rehabilitate Water Resource Management Systems.
5. Provide Sufficient and Sustainable Funding.

Improve Alignment — Shared intent is identified and governments are aligned behind regionally appropriate investments. State government supports alignment and empowers local and regional water management. State government ensures that regional entities have the incentives, knowledge, tools, authority, and guidance to develop, implement, and enforce water resource management practices for sustainability by:

- Assisting regional entities with building capacity to strengthen governance; establishing collaborative management of resources; and providing regional government agencies the necessary data, tools, models, and processes to conduct regional water sustainability assessments.
- Providing technical and facilitation assistance to regions for sustainably managing water resources at the proper scale, and identifying the types of investments and actions needed to realize those desired changes.
- Ensuring assistance to under-represented and economically disadvantaged communities and Tribes. These communities are fully embedded in regional water sustainability planning. Traditional/Tribal ecological knowledge (TEK) is considered in watershed planning processes.
- Recognizing local knowledge and empowering local agencies to manage their water resource sustainably.

Improve Regulation — More cost-effective and successful delivery of intended benefits and services are occurring. Restored ecosystems, enhanced water reliability, and reduced flood risk result from regulations being tied to planning and long-term system management. Consistent with "Streamline and Consolidate Permitting," from Action 8 of the Governor's Water Action Plan, a dialogue among federal, Tribal, State, and local agencies results in reconciliation and alignment of various regulatory frameworks and statutes. Regulatory incentives, discretion, and alternative compliance pathways are used to accomplish intended outcomes. Reducing uncertainty in this way provides more incentive for investment in built infrastructure (grey) and natural infrastructure (green), with the latter supporting vital ecosystem services.

Provide Knowledge and Data — More productive policy conversations and shared understanding are occurring. Local, regional, and State governments use a consistent and comprehensive method for assessing sustainability and tracking the effectiveness of policy and investment. Information and data gaps are significantly reduced, thus increasing desired outcomes and return on investments. State government is equipped to provide stewardship of public funding and consistently reports return on investment.

Modernize Water Management Systems — All Californians enjoy the benefits of increases in water supply reliability, more abundant and sustainable nature resources, and improved health and safety

when ecosystems and infrastructure are functioning and sustainable. This is accomplished by assessing and prioritizing restoration and rehabilitation needs, and then investing in a manner consistent with priorities. Water resource infrastructure is maintained, rehabilitated, or modernized to perform effectively. Such structures are more resistant to impacts from inter-annual hydrologic variability and other uncertainties.

Provide Funding — Sufficient and stable funding sustains public benefits from past investments by maintaining and modernizing infrastructure. Sufficient funding for data, planning, regulation, governance, and technologies helps achieve the desired outcomes of future water policy and investment. It includes public cost-share for rehabilitation, modernization, and operations and maintenance of water resource management systems.

Implementing actions based on these priorities sets the stage for Californians to enjoy a more sustainable water future through 2050 and beyond.

Leveraging Accomplishments and Delivering on Commitments

Building on accomplishments and delivering on commitments is a fundamental planning strategy of Update 2018. Building on collaborative accomplishments is the most direct strategy for helping to ensure consistency, efficiency, and ultimately effectiveness of water policy and investment. Adhering to, and delivering on, commitments, such as the recommendations in Update 2013 or sustaining engagement with local and regional partners, is the most direct strategy for maintaining trust and building on investments in time and relationships. It also minimizes stranded investment resulting from abrupt changes in direction, or abandonment of existing partnerships and governance structures. Delivering on commitments is the best way to earn and sustain the trust necessary for fruitful partnerships — the foundation of integrated water management.

Update 2018 is the twelfth in a series of California Water Plans prepared since 1957. Update 2018 builds on Update 2013, which was encyclopedic in its coverage of water management in California. At more than 3,500 pages, Update 2013 covered a variety of information, from detailed descriptions of current and potential regional and statewide water conditions, to a detailed "Roadmap For Action" that identified potential actions to support 17 objectives. Update 2013 also included detailed reports on each of California's hydrologic regions and overlay areas. Those "state of the region" reports focused on watersheds, groundwater aquifers, ecosystems, floods, climate, demographics, land use, water supplies and uses, and governance. Update 2013 provided an integrated water management toolbox in the form of more than 30 resource management strategies. Discussed were strategies to reduce water demand, increase water supply, improve water quality, practice resource stewardship, improve flood management, and recognize people's relationship to water.

The comprehensive, detailed nature of Update 2013 informs Update 2018's more concise call for collaborative, integrated action. Specifically, Update 2018 frames the State of California's need for:

- More inclusive, integrated, and aligned water planning processes to prioritize and fund long-term, sustainable State/public investment in water resource management.