

Project Name:
Town of Cave Creek

**Advanced Metering Infrastructure
Water Conservation Management Plan**

Prepared For:

**U.S. Department of the Interior - Bureau of Reclamation
WaterSMART Grants:
Water and Energy Efficiency Grant for Fiscal Year 2023
Funding Opportunity Number: R23AS00008
Category A / Funding Group I**



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1 Technical Proposal

1.1 Executive Summary

Date: July 25, 2022

Applicant: Town of Cave Creek

City, County, State: Cave Creek, Maricopa County, Arizona

Project: Advanced Metering Infrastructure (AMI) Water Conservation Management Plan

Category Applicant: A

Funding Group: Group 1

Grant Funding Request: \$500,000

Non-Federal Matching Funds: \$587,402

Total Project Costs: \$1,087,402

Est. Completion Date: January 2025

Est. Duration from contract award date: Approximately 24 months

Federal Facility Denotation: The Project is not located on a federal facility

Estimated Annual Water Savings: 48,246,802 gallons or 148.06 acre-feet

Project Partner: None

1.2 Project Summary

A one-paragraph project summary that provides the location of the project, a brief description of the work that will be carried out, any partners involved, expected benefits, and how those benefits relate to the water management issues you plan to address

The Town is in an arid and desert climate. Staff are committed to aggressively pursuing water-use efficiency by embracing proven methods and technologies to achieve that goal. To that end, the Town of Cave Creek proposes to implement the Advance Metering Infrastructure (AMI) Water Conservation Management Plan that will result in reduced leak duration and increased water conservation. The Project is expected to result in **annual water savings of 48,246,802 gallons or 148.06 acre-feet and annual energy savings of 614,582.3 kilowatt hours (kWh), along with associated reductions in greenhouse gas (GHG) emissions of 436.8 metric tons of carbon dioxide equivalent.**

The Project calls for the implementation of the AMI, including the installation of new Neptune 360 AMI-compatible meters, Neptune 360 AMI communications network hardware and towers, upgrade to the new meter data management software system (Neptune 360), firmware upgrades to any existing AMI-capable meters, and connection to the new cloud-based network.

Currently, there are just over 2,800 water meters in the Cave Creek Water System, of which 550 will be transferred to another water provider by the end of 2022. 2,350 remaining meters are over 20 years old and nearing the end of their useful lives. Also, many of the radio units

used to transmit the usage data are also at the end of their useful lives. Currently staff spend a considerable amount of time each month performing manual reads on meters or verifying meter data, since many of the meters are also under-reporting water usage by customers. As the current Automated Meter Reading (AMR) meters continue to age, the Town will be under-billing customers for their water usage. This will have a negative impact on water system accounting and reporting.

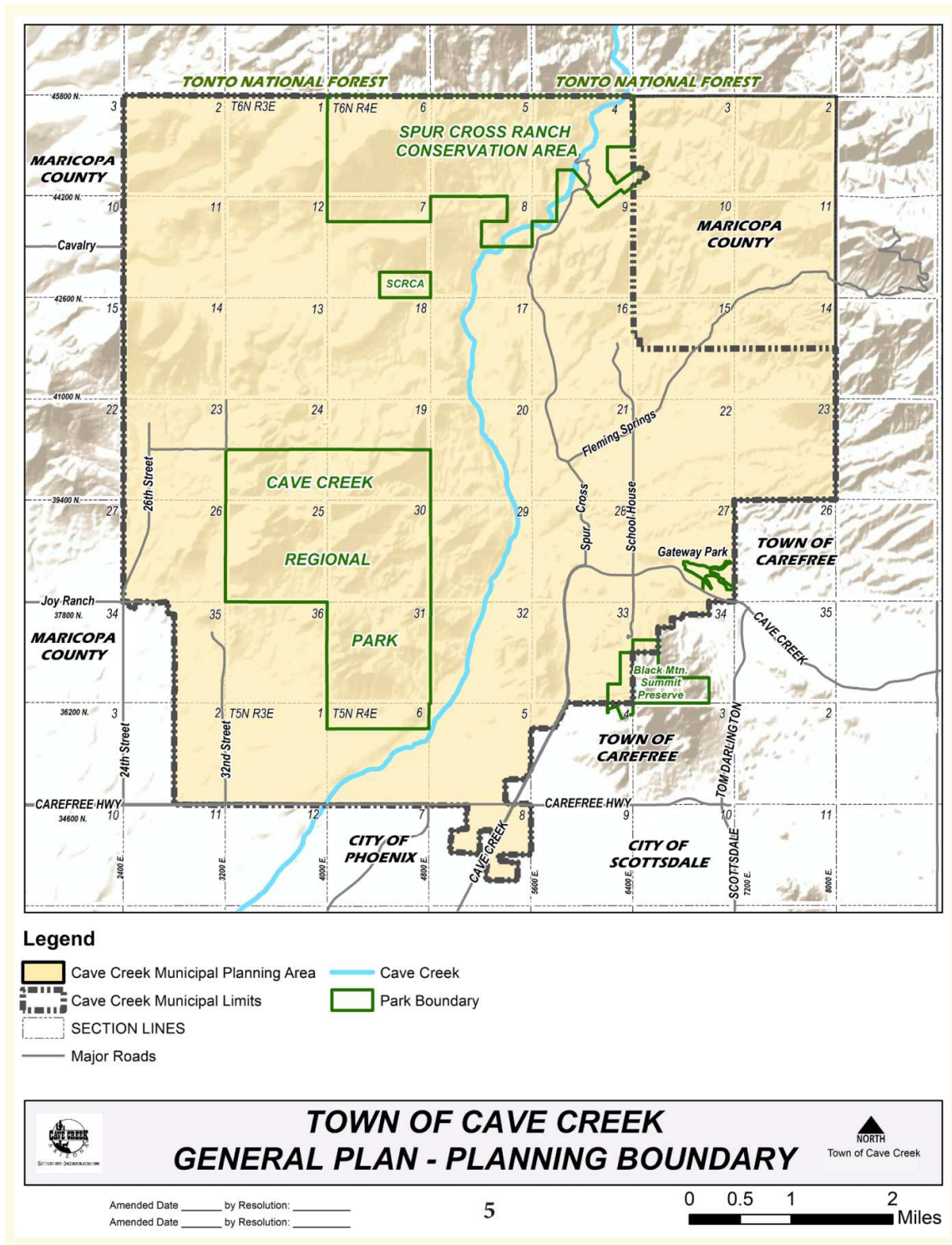
The Advance Metering Infrastructure (AMI) Water Conservation Management Plan will changeout 2,350 individual meters to AMI technology, which will allow each meter to connect to servers that are accessed over the internet (typically referred to “The Cloud”) in real time. Meter usage data will be uploaded directly to “The Cloud” and downloaded to the Town’s current and preexisting utility billing and management software (Caselle) at any time or frequency. High water usage reports can be set to alert staff to individually metered high usage as it is occurring. These high usage incidents can then be investigated and/or the customer contacted immediately preventing ongoing water loss that would normally occur until the meter is read monthly.

The Project will pursue best management practices to facilitate a reduction in end-user water consumption through early leak detection technology and reporting. More specifically, AMI data will be utilized to promptly detect potential customer leaks and alert customers, raise awareness of water conservation, provide customers with tailored water-saving advice, and assist customers develop their own strategies to save water.

1.3 Project Location

The Town of Cave Creek is in the Sonoran Desert in northern Maricopa County. It is approximately 33 miles north of downtown Phoenix. The town is bordered to the east by the Town of Carefree, to the west by unincorporated Desert Hills, to the north by Tonto National Forest and Elephant Mountain (elevation of 3,926 feet), and to the south by Black Mountain (elevation 3,398 feet) and the Town of Carefree. The area includes both urban and rural development. The municipal water providers that border the Town of Cave Creek include the Carefree Water Company, City of Phoenix, City of Scottsdale, and the Desert Hills Water Company which is also operated and maintained by the Town of Cave Creek. See the Project Location Map on the next page. The project latitude is 33°49’N and longitude is 111°57’W. Outdated AMR system meters throughout the Town of Cave Creek service area will be replaced with new AMI technology.

Project Location Map



1.4 Technical Project Description

Provide a more comprehensive description of the technical aspects of your project, including the work to be accomplished and the approach to complete the work. This description should provide detailed information about the project including materials and equipment and the work to be conducted to complete the project.

The Following connects 2,350 existing customers to a new AMI Fixed Network Data Collection or Cellular:

1. AMI Hardware and Meters:

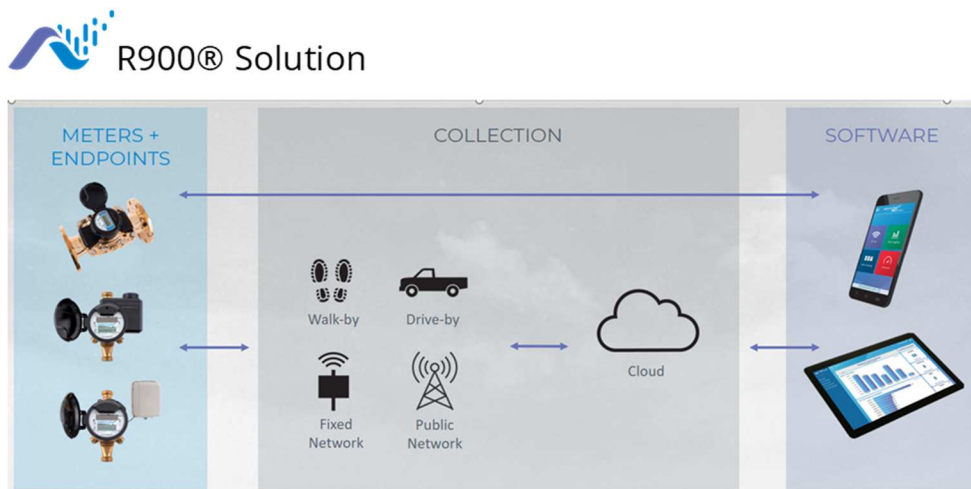
- Procurement, installation, and configuration of Neptune R900 System: five (5) Gateway Fixed Network Data Collectors on (AMI Tower Stations) located on town owned facilities, fixed units with access to consumption data and leak alerts
- Site electrical upgrades associated with the installation of new AMI Tower Stations
- Procurement and configuration of Neptune R900 System: MRX920 V4 Mobile Data Collector and Software, Mobile collector with access to consumption data, alerts of leaks, and utilized for meter programming
- Procurement, installation, and configuration of 2,000 new Neptune T-10 Meters with ProCoder R900i Endpoints, new meters with AMI technology allowing access to enhanced consumption data and leak alerts though Fixed Network
- Procurement, installation, and configuration of 350 new Neptune T-10 Meters with R900 Cellular Endpoints (Powered by the First Net Cellular Network) for locations out-of-range of the Gateway Fixed Network Data Collectors, new meters with AMI Cellular technology allowing access to meter data without a Fixed Network connection

2. AMI Software:

- Procurement, installation, and configuration of Neptune 360 Data Management Platform, cloud-based software to view metering data and analytics
- Installation and configuration of the Neptune 360 Mobile App, designed for in-the-field programming of Neptune registers using a phone or tablet
- Any Firmware upgrades needed to enable AMI communications

3. Detailed Technical Information:

Neptune's R900 System is an Advanced Metering Infrastructure (AMI) network foundation comprised of meters, data collectors, endpoints, and connectivity working together seamlessly to receive and transmit water consumption information and provide continuous monitoring and alerts for Non-Revenue Water, leaks, backflow, and other critical events to ensure that operations are running efficiently and effectively.



Challenges in topography and low meter density of the service area can potentially pose challenges for any one type of network. The key benefit to Neptune's system architecture is that it accepts data from multiple types of networks and seamlessly presents the data in one application.

Using multiple technologies achieves the highest read success rate. Neptune can deploy both fixed network and cellular endpoints to create the most cost effective, flexible, and scalable AMI network. This unique ability to select and combine the endpoint and network technology best suited to the utility achieves their specific goals without sacrificing coverage or increasing network cost.

The R900 endpoint communicates data using innovative radio frequency technology in reading mobile or fixed network modes eliminating the need for separate reading systems, site visits, and endpoint reprogramming or re-configuration. The R900 endpoint greatly improves access to meter readings and proactively identifies and resolves customer inquiries by providing detailed consumption information, as well as alerts for leaks or backflow. Mobile and fixed network messages are interwoven and continuously transmitted allowing users to maintain backup mobile reading capability with the same endpoints without the need for any reprogramming.

1.5 Evaluation Criteria

1.5.1 Evaluation Criterion A – Quantifiable Water Savings

The Project is considered a municipal metering project according to the WaterSMART Notice of Funding Opportunity.

Describe the amount of estimated water savings. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please include a specific quantifiable water savings estimate; do not include a range of potential water savings.

Based on the January 2022 report titled, “Increasing consumer benefits & engagement in AMI-based conservation programs” which was prepared for the American Water Works Association by The Behavioralist, found that a credible water savings associated with AMI-based metering technology can be as much as 10%. **Attachment 2**

In 2021, the Town’s Lost & Unaccounted for Water (L&U) was 52,810,672 gallons or 162.07 acre-feet at 10.95%. **Based on this projection, 10% is 48,246,802 gallons or 148.06 acre-feet.** This is the estimated potential water savings based on early leak/break detection paired with enhanced customer notifications and quick repairs. More detailed information regarding the rationale behind water savings estimates is included below.

Describe current losses: Please explain where the water that will be conserved is currently going and how it is being used.

Water loss is a particularly important issue in Arizona, where approximately 97 percent of Arizonans are served by public water supplies. The Town of Cave Creek has a higher-than-average Lost and Unaccounted for Water (L&U) at 11.09% on a 3-year average, and a Gallons Per Capita Per Day (GPCD) of 241. All large water providers within the State of Arizona that is located within an Active Management Area (AMA) shall not have an L&U that exceeds 10%. Since both the annual and 3-year average L&U exceed 10%, the Town of Cave Creek is non-compliant and is required to submit a remedial action plan to achieve compliance.

The Town is continuing to identify and correct our L&U sources to improve our water system, including investing in new AMI equipment that allows staff to be more efficient in detecting leaks and changing out deficient meters in the system to improve metering accuracy.

Water lost to leaks, breaks, and excessive irrigation seep into the ground. The Town of Cave Creek meets 100% of its potable water demands with surface water from the Central Arizona Project (CAP). Losses do not measurably make their way back into the water system, nor do they contribute to alternative water supplies.

Describe the support/documentation of estimated water savings:

The Project will enable the wireless transmission of water use data from all newly installed AMI-enabled smart meters to the Town of Cave Creek's Neptune 360 data system on a near real-time basis. The Town will benefit from the Neptune's 360 data management platform by gaining the ability to utilize frequent and on-demand reports fed from the ProCoder R900i registers. These reports will provide the Town with up-to-date information on water use anomalies and point to opportunities to provide early customer notification to reduce their water waste. Whereas consumption data is currently collected and made available only during monthly meter reads, AMI will automate data collection, making data available real-time.

Rather than traditional drive-by water meter reads, AMI automates the delivery of real-time data to the Town via configurable alarms, alerts, reports, and email notifications, enabling early detection of leaks and abnormally high-water consumption, thus reducing lag times to address and correct water waste.

When deployed as a "Fixed" or "Cellular" network, AMI can provide hourly consumption interval data, time synchronized at the host meter reading software. The host software provides individual account consumption interval data displayed in graphical as well as tabular format and is readily accessible. The Neptune R900 System provides priority alarm notification of potential leak and/or reverse flow events with user configurable email or text messages for notification to utility personnel. When operating as a fixed network, the System shall provide the capability for a demand read initiated from the host software application.

Water savings from the Project will be achieved by replacing 2,350 existing AMR meters with updated AMI technology and infrastructure. Real-time consumption data from the newly installed AMI meters will be available to town staff which will provide customers early high-consumption notifications. For example, notification can be sent as soon as an account's consumption levels approach a higher-rate tier to encourage additional conservation-minded behavior.

A review of AMI case studies was conducted with a focus on those that addressed leak detection and improved L&U water. Recent studies link the use of AMI, the availability of real-time water consumption data, and the behavioral impacts derived from comparative water consumption analytics to quantifiable water savings. Rather than the traditional delayed data feedback loop that relies upon infrequent physical collection of meter reads, AMI technology will automate meter reads and deliver to the town real-time data. Early detection of leaks and abnormally high-water consumption reduces lag times to address and correct water waste when compared to occasional meter-reads and bills that are sent to customers infrequently. Currently, customers receive consumption data monthly via their utility bills.

The Project includes the installation of AMI network infrastructure and meters to 2,350 customers. As detailed in the assumptions table and supported by additional documentation below, estimated water savings will reduce L&U water by 10% or 148.06 acre-feet.

Project Assumptions	
Total # of water meters being replaced and will AMI Technology	2,350
Estimated number of new AMR meters as a % of total meters read by Fixed Network Technology	85%
Estimated number of new AMR meters as a % of total meters read by Cellular Technology	15%
Total estimated water supplied to project area (Cave Creek used 1,318.6 acre-feet of water in calendar year 2021)	1,318.6 AF
Percent water savings derived from expeditious repair of customer-side leaks, breaks, water waste due to AMI real-time consumption reporting (Cave Creek used estimate of 48,246,802 gallons or 148.06 acre-feet = 10% savings)	10%

Note: Water savings are assumed to occur at an equal rate for each meter that connects to the AMI system.

Results from the Western Municipal Water District (Western) in Riverside County, California “Simplifying Operations and Empowering Customers with AMI solutions from Neptune” as presented in **Attachment 3**, was used to determine the Project’s water savings assumptions, and supported the water savings analysis of the Project. As of October 2020, Western installed 13,600 AMI Neptune meters into their system. By mid-2021, an additional 7,000 meters were changed out, with close to 85% of their system upgraded to AMI technology enabled through fixed network data collection. Reading turnaround time dramatically improved, with significant overall year over year gains in efficiency. Prior to AMI technology Western’s L&U water was at 12%, now it’s no more than 3.5%. Western now has the ability to make information actionable immediately, finding leaks remotely and even heading off high bill complaints. According to the Director of Finance Kevin Mascaro, “An informed customer is an empowered customer. They can take better control of their water usage using the real-time information that Western can now provide.”

How will actual water savings be verified upon project completion?

Actual water savings may be verified by comparing historical water consumption data from the towns exiting accounts with activated AMI connections to water usage after project implementation. Post-project consumption data should include a full one-year period after project completion to allow a meaningful comparison against the pre-project consumption data set.

1.5.2 Evaluation Criterion B—Renewable Energy

Subcriterion No. B.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

Sub-Criterion No. B.1 is not relevant to the proposed project.

Subcriterion No. B.2: Increasing Energy Efficiency in Water Management

Describe any energy efficiencies that are expected to result from the implementation of the water conservation or water efficiency project (e.g., reduced pumping).

Energy savings estimates associated with reduced water use originate from the point of diversion. The Project is anticipated to result in quantifiable energy savings of 614,582.3 kWh/AF. The embedded energy in the water distributed by the Town of Cave Creek includes energy to convey, treat and distribute water. The town's water supply is renewable surface water from CAP. The Central Arizona Project is Arizona's single largest resource for renewable water supplies. The town has a 16-inch raw water pipeline that extends over 12 miles from the CAP canal north to the Town's water treatment plant. The approximately 600-foot increase in elevation from the CAP canal to the water treatment plant is overcome through a series of four in-line booster stations.

Net energy intensity data was gathered from respectively from CAP's "Fact Sheet Cap Power" data publication and the Town of Cave Creek Arizona Public Services (APS) utility bills to calculate quantifiable energy savings. CAP used approximately 2 MWh or 2,000,000,000 kWh to deliver 1,323,452 acre-feet of raw water in calendar year 2021. **Attachments 4 & 5.** The Town of Cave Creek used 5,395,461 kWh to deliver 2,044 acre-feet of treated potable water in calendar year 2021. **Attachment 6**

A value for kWh/AF was established by combining the net energy intensities multiplied by estimated water savings from the Project to determine avoidance of embedded energy resulting from reduced reliance on water imports, as shown in the table below.

Embedded Energy Avoidance Resulting From Water Saving Estimates	
Provider	Net Energy Intensity
Central Arizona Project (CAP- Raw Water Delivery)	1,511.2 kWh/AF
Town of Cave Creek (Treated and Distribution Costs)	2,639.7 kWh/AF
Total Saved per AF:	4,150.9 kWh/AF
TOTAL Energy Savings (4,150.9 kWh/AF x 148.06 AF):	614,582.3 kWh

How will the energy efficiency improvement combat/offset the impacts of climate change, including an expected reduction in greenhouse gas emissions? Will the project result in reduced vehicle miles driven, in turn reducing greenhouse gas emissions? Does the calculation include any energy required to treat the water, if applicable?

By installing the AMI fixed infrastructure and cellular meters to connect the system, the town staff will no longer drive to the 2,350 meters locations each month to collect water usage data. During calendar year 2021, one vehicle was used to capture meter reads, resulting in 1,800 miles and 90 gallons of fuel. The Town of Cave Creek estimates the Project will reduce an equivalent of one vehicle’s annual mileage, resulting in the avoidance of 0.8 metric tons (MT) of carbon dioxide equivalent (CO2e) per year.

The EPA’s GHG Equivalencies Calculator was utilized to calculate the amount of carbon dioxide emitted per gallon of motor gasoline burned, information can be found here: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

Reducing water use reduces the associated energy demand required to transport, treat, and convey the water (embedded energy). The EPA’s GHG Equivalencies Calculator was used to calculate the amount of carbon dioxide emitted per kilowatt hour associated with embedded energy in imported water. Based on the calculator, the reduction in vehicle miles and water consumed is expected to translate to the avoidance of GHG emissions of 436.8 MT CO2e.

EPA GHG Equivalencies Calculator GHG Emissions Avoided		
Source	Savings	MT CO2e Calculator Value
Embedded energy in water	614,582.3 kWh year	436
Reduced vehicle miles and gallons of fuel	90 gallons per year	0.8
TOTAL MT CO2e:		436.8

Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).

This project is not a renewable energy project; however, this project will achieve measurable reductions in water consumption.

1.5.3 Evaluation Criterion C—Sustainability Benefits

Enhancing drought resiliency. Provide information regarding how the project will enhance drought resilience by benefitting the water supply and ecosystem.

Given the southwest’s ongoing struggles with drought conditions, many have developed an awareness that water is a valuable and sometimes scarce resource. The town relies fully on

renewable surface water to meet its potable water demand. Ultimately, this project will increase the water available to CAP and the Colorado River. Increasing available surface water will benefit overall ecosystem health. The Project will preserve water supplied to the natural environment and to species reliant on water from these sources. The Lower Colorado River supports several hundred species of wildlife. Water is diverted from the Colorado River primarily at Lake Havasu near Parker into central and southern Arizona. Diversions made to southern Arizona decrease flows that would otherwise support the Lower Colorado River ecosystem. The 2004 Lower Colorado River Multi-Species Conservation Program covers at least 27 species, most of which are state or federally listed as endangered, threatened, or sensitive species (lcrmscp.gov). The plan estimates that flow reductions could reach 1,574,000 AFY by 2051, resulting in lower water levels and higher concentrations of contaminants from agricultural runoff. Water in sufficient quantity and quality is fundamental to the health of the Colorado River and to the survival of those covered species and all elements of the wider ecosystem. By reducing the Town's needed supply of CAP water through advanced metering, the Project will increase the quantity of water that remains in the Colorado River, thereby supporting the health of the river and restoring and enhancing habitat for species dependent upon it.

Locally, the Sonoran Desert is home to jaguar, pygmy owl, Gila chub, Sonoran tiger salamander, southwestern willow flycatcher, and other species on the Endangered Species Act list. Stormwater pollution can harm or wildlife and can destroy desert habitats. This Project reduces water loss from breaks, leaks, and over-irrigation that would otherwise run off into storm drains, picking up and transporting pollutants (sediment, oil, fuels, trash, debris, and fertilizers) along the way.

Addressing a specific water and/or energy sustainability concern(s). Will the project address a specific sustainability concern?

Arizona and the western United States are again experiencing extensive drought conditions. The Available CAP Supply is based on Arizona's basic apportionment of 2.8 million acre-feet, less equal and higher priority consumptive uses, less any 2007 Guidelines reductions and agreement regarding lower basin drought contingency plan obligation contributions, as required by the Shortage Condition determined by the August 2022, 24-Month Study projection of the Lake Mead water surface elevation on January 1, 2023. The June 2022, 24-Month Study, projected the most probable end of calendar year Effective Elevation for Lake Mead to be 1,045.95 feet, or a Tier 2a Shortage Condition. However, modeling shows that a Tier 1, Tier 2a, or Tier 2b Shortage Condition is possible. Under a Tier 2a or Tier 2b Shortage Condition, the decreased available CAP Supply eliminates all water available to the CAP Excess priority pool, reduces water available to the CAP Non-Indian Agriculture pool, and may also reduce water available to the CAP Indian and Municipal and Industrial priority pools.

The Town of Cave Creek purchases 100% of its raw water from CAP. The town relies heavily on the Colorado River, combined with projected population growth in the service area and

the region's susceptibility to drought adds continued pressure on supply reliability. The Project is expected to lead to a reduction in water demands by an estimated 148.06 AFY. Through the Project, the Town of Cave Creek will be able to reduce its purchases of water from CAP, thereby reducing demands on the already depleted water supply from the Colorado River.

As stated before, embedded energy avoidance because of decreased demand for water will promote greater resource sustainability. Reduced energy use will reduce strain on the power grid. As discussed previously, AMI technology will eliminate the need to drive to each meter to collect monthly data, reducing fossil fuel consumption, also contributing to sustainability. Access to real-time consumption data will promote better water management, promote water-efficient behaviors, and enable faster repair of leaks and breaks.

Other project benefits. These benefits may include, but are not limited to, the following:

(1) Combating the Climate Crisis: E.O. 14008: Tackling the Climate Crisis at Home and Abroad, focuses on increasing resilience to climate change and supporting climate-resilient development. Describe how the project will address climate change, including the following:

How the project will address the impacts of climate change and help combat the climate crisis. How will the project strengthen water supply sustainability to increase resilience to climate change? How will the project establish and utilize a renewable energy source? Will the project result in lower greenhouse gas emissions?

Refer above to section Subcriterion No. B.2: Increasing Energy Efficiency in Water Management for an overview of how the Project will result in lower GHG emissions.

(2) Disadvantaged or Underserved Communities: Please describe how the project supports these Executive Orders, including: Does the proposed project directly serve and/or benefit a disadvantaged or historically underserved community?

According to the US Census (2021) Poverty Status Viewer (ACS19) for Census Tract 304.02, 12.5% (+/- 5.2) of Cave Creek area is classified as the "persons in poverty". On a regional scale, more water will be made available to other parts of the state and western region, including tribes, rural communities, and economically disadvantaged communities through a reduction in the amount of water the town purchases from CAP.

(3) Tribal Benefits: Please address the following, if applicable: Does the proposed project directly serve and/or benefit a Tribe? Will the project increase water supply sustainability for an Indian Tribe? Will the project provide renewable energy for an Indian Tribe? Does the proposed project directly support tribal resilience to climate change and drought impacts or provide other tribal benefits such as improved public health and safety through water quality improvements, new water supplies, or economic growth opportunities?

This Project reduces the burden on CAP and the Colorado River, thus helping to ensure the

supply of potable water for the tribes' while economic wellbeing remains stable.

(4) Other Benefits: Will the project address water and/or energy sustainability in other ways not described above? For example:

a. Will the project assist States and water users in complying with interstate compacts?

This Project supports the State of Arizona's commitment to live within its annual 2.8 million acre-feet apportionment of Colorado River water. However, with tensions high among the Lower Colorado River parties California, Arizona and Nevada recently signed an agreement known as the 500+Plan to take significantly less water out of Lake Mead. The goal is to conserve an additional 500,000 acre-feet or more per year beyond the Lower Basin Drought Contingency Plan reductions to benefit Lake Mead. This comes only months after the federal government already announcing it is holding back a large quantity of water in Lake Powell to reduce risks of the reservoir dropping to a point where Glen Canyon Dam would no longer generate electricity.

This Project will contribute to the stability of the Colorado River water supplies and aligns with recent State and Federal requirements by reducing demand for water.

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

Every gallon of water and watt of energy saved relieves pressure on already strained supplies. The Project is estimated to reduce water use by 148.06 acre-feet a year. It is also estimated to reduce energy use by 614,582.3 kWh and avoid 436.8 MT CO₂e annually. The conserved water and energy will remain available in the system for the benefit of multiple sectors, including residential, commercial, agricultural, industrial, and recreational. It will also provide additional resources for habitats and sensitive systems that may rely on available water supplies.

c. Will the project benefit from a larger initiative to address sustainability? Will the project help to prevent a water-related crisis or conflict? Is there frequent tension or litigation over water in the basin?

Water throughout the region that receive supplies from CAP and the Colorado River Basin face constant tension as demands for water from increasingly strained sources continue to grow. With 67% of Arizona under extreme drought conditions and the Colorado River having declared its first ever water shortage, area tensions are increasing. The Project helps decrease demands for water from these sources.

1.5.4 Evaluation Criterion D—Complementing On-Farm Irrigation Improvements

If the proposed project will complement an on-farm improvement eligible for NRCS

assistance, please address the following: Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.

The Town of Cave Creek service area does not have a significant agricultural sector or agricultural customer class. As such this evaluation criterium is not relevant.

1.5.5 Evaluation Criterion E—Planning and Implementation

Subcriterion E.1— Project Planning

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place? Does the project address an adaptation strategy identified in a completed WaterSMART Basin Study?

The Town of Cave Creek has a Council approved Drought Contingency Plan in place. The town is currently in the process of updating the plan to include Water Shortage Conservation.

Additionally, essential concepts report on in the Colorado River Basin Water Supply and Demand Study is “Municipal and Industrial Water Conservation”, which is described in Appendix F9 as “to further reduce the overall M&I water demand in areas currently relying on water supply from the Colorado River System”. The study further defines example BMPs as “meter retrofits”. This AMI project falls within this type of concept.

TABLE F9-3
 Municipal and Industrial Water Conservation Assumptions

	Level 1	Level 2	Level 3
Residential Indoor			
Indoor gpcd	60	50	40
Adoption rates	50%	60%	70%
Example types of BMPs: Public education programs, conservation-oriented plumbing and building codes, residential water surveys, high-efficiency showerheads and faucets, ultra low-flow toilets, efficient clothes washers, meter retrofits.			
Commercial, Institutional, and Industrial			
Target reduction in demand	15%	25%	30%
Adoption rates	50%	60%	70%
Example types of BMPs: Public education programs, conservation-oriented plumbing and building codes, green building codes, CII surveys and audits, high-efficiency faucets and fixtures, ultra low-flow toilets, high efficiency clothes washers, dishwasher high-efficiency pre-rinse spray valves, meter retrofits, efficiency in industrial processes and cooling .			
Outdoor Landscaping			
Target reduction in demand	15%	25%	35%
Adoption rates	50%	60%	70%
Example types of BMPs: Public education programs, conservation-oriented pricing, large landscape water surveys and audits, evapotranspiration-based irrigation controllers, large landscape separate metering, irrigation efficiency improvements, conversion of turf to lower water use landscaping.			
Water Loss			
Target water loss	7%	7%	7%
Adoption rates	50%	60%	70%
Example types of BMPs: Utility water loss control, supply system audits and leak detection programs.			

Information on the study can be found here:

<https://www.usbr.gov/lc/region/programs/crbstudy/finalreport/studyreport.html>

Subcriterion E.2— Readiness to Proceed

Identify and provide a summary description of the major tasks necessary to complete the project.

The Town of Cave Creek is the singular entity implementing the Project, which is located entirely within the Town of Cave Creek’s service area and is ready to proceed according to the schedule provided in this proposal. The town employs a talented staff who have been an integral part of the planning process for AMI implementation. Town Council supports the AMI initiative, as evidenced by the town adopted Resolution R2022-11, a Resolution authorizing the application to the U.S. Department of the Interior’s WaterSMART Program for a grant to fund the replacement of existing individual user water meters with AMI, as presented in **Attachment 11**.

The Town of Cave Creek has already started installing AMI-capable meters in anticipation of this long-awaited AMI upgrade project using cooperative purchase agreements. However, the Town will go through a competitive process to ensure competitive selection of vendors occurs when more than one qualified firm can provide the product or service and will issue contracts in accordance with requirements outlined in the agency’s policies and regulations.

The town will complete all required environmental and cultural resources reviews and anticipates acquiring any applicable permits connected with the Project. It is anticipated that the AMI work scope would qualify as a NEPA Categorical Exclusion.

Anticipated Project Schedule	
Task	Date
Project Administration	January 2023 – January 2025
Contracting	January 2023 – February 2023
Construction/Implementation	February 2023 – January 2025
Efficiency Evaluation of AMI Newly Installed Meters (At the end of the first year)	May of 2024 – January 2025

Note: Accrual of eligible expenses could begin after grant agreement execution

1.5.6 Evaluation Criterion F—Collaboration

Is there widespread support for the project?

The Town of Cave Creek will be implementing the Project without project partners, support for the project has been expressed by Town Council as well as those entities providing letters of support **Attachment 10** of this grant application.

1.5.7 Evaluation Criterion G—Addition to Non-Federal Funding

State the percentage of non-Federal funding provided using the following calculation:

$$\frac{\$587,402(\text{Non – Federal Funding})}{\$1,087,402(\text{Total Project Cost})} = 46 \% \text{ Cost Share}$$

The percentage of non-Federal funding is 54%, which meets the required 50% match.

1.5.8 Evaluation Criterion H—Nexus to Reclamation

Describe the nexus between the proposed project and a Reclamation project or Reclamation activity. Please consider the following: Does the applicant have a water service, repayment, or O&M contract with Reclamation? If the applicant is not a Reclamation contractor, does the applicant receive Reclamation water through a Reclamation contractor or by any other contractual means? Will the proposed work benefit a Reclamation project area or activity? Is the applicant a tribe?

The Project will conserve water that will ultimately reduce demand on CAP, thereby benefiting numerous reclamation projects. The town doesn't currently receive reclamation water and there are no tribal lands located within its service area.

Additionally, the town has recently secured recharge permits with CAP and Phoenix that will allow the Town in the future to recharge unused portions of CAP allocation. Storing a portion of the Town's CAP supplies will allow the Town to generate long-term storage credits. Having these credits will allow the Town to reduce our reliance on CAP water deliveries in the future, reducing our demand on CAP supplies.

2 Project Budget

2.1 Funding Plan

The Town of Cave Creek will provide the non-Reclamation share of the Project costs through its Grant Fund budget. The cost breakdown is shown in the table below. No additional funding commitments have been pursued for the scope of this project at this time.

FUNDING SOURCE	% OF PROJECT	FUNDING AMOUNT
Non-Federal Entities		
Town of Cave Creek		
<i>Non-Federal Subtotal:</i>	54%	\$587,402
Other Federal Entities		
N/A	0%	
<i>Other Federal Subtotal:</i>	0%	
Requested Reclamation Funding:	46%	\$500,000
TOTAL PROJECT FUNDING:	100%	\$1,087,402

2.2 Budget Proposal

The proposed budget breakdown by funding source for the Project is provided in this table.

	AMOUNT
Costs to be reimbursed with the requested Federal	\$500,000
Costs to be paid by the applicant	\$587,402
Value of third-party contributions	\$0
TOTAL PROJECT COST:	\$1,087,402

The proposed budget for the Project is provided in this table.

AMI Water Conservation Management Plan Budget Summary			
Figures in this summary table are calculated from entries made in subsequent categories, only blank white cells require data entry.			
Budget Object Category	Total Cost	Federal Estimated Amount	Non-Federal Estimated Amount
a. Personnel	\$16,892		
b. Fringe Benefits	\$6,926		
c. Travel	\$0		
d. Equipment	\$128,050		
e. Supplies	\$833,310		
f. Contractual	\$102,225		
g. Construction	\$0		
h. Other Direct Costs	\$0		
i. Total Direct Costs	\$1,087,402		
j. Indirect Charges	\$0		
Total Costs:	\$1,087,402	\$500,000	\$587,402
Cost Share Percentage:		46%	54%

2.3 Budget Details and Narrative

Position Title	Hours	Hourly Rate	Total Cost	Rate Basis	Comments
			\$8,364		
			\$8,528		
Total:			\$16,892		

Narrative: The Utility Assistant will be assigned as the project manager for the meter replacement program. They will organize the initial cost estimates and negotiate through final contracts with vendors. They will be responsible for coordinating the project timelines between vendors, staff, and end users. They will track, review and report costs to budget variances monthly to the Utility Director. They will approve all invoices before payment and review with Finance all grant reporting of expenses and ensure timely submission to the WaterSMART grantor throughout the two-year project. Calculated at an average of 4 Hours per Week X 52 Weeks = 208 Hours per year.

b. Fringe Benefits				
Position Title	Percentage	Project Wages	Total Cost	Comments
Utility Assistant & Compliance Coordinator Y1	41%	\$8,364	\$3,429	ASRS Pension 5%, Medical, Dental, Vision 24%, HSA 8%, Social Security 2%, Work Comp 1%, Unemployment 1%
Utility Assistant & Compliance Coordinator Y2	41%	\$8,528	\$3,496	ASRS Pension 5%, Medical, Dental, Vision 24%, HSA 8%, Social Security 2%, Work Comp 1%, Unemployment 1%
Total:			\$6,926	

Narrative: Calculations for fringe benefits are presented in the table below using the actual wages of the Utility Assistant position. The projected 2.5% COLA increase in wages did not materially affect the benefit percentage between year 1 and year 2. The Town Pension costs are calculated using an actuarial cost-based method and funded within six months after the end of that year.

Fringe Benefits	Monthly	%
HSA	546	7.8%
Pension	371	5.3%
LTD	6	0.1%
Health Ins	1,674	24.0%
SS	178	2.6%
Medicare	42	0.6%
Unemployment	1	0.0%
Work Comp	8	0.1%
	\$ 2,824	
	%	41%
		40.52%

c. Travel

Narrative: The Project is not requesting funds for travel.

d. Equipment					
Equipment Item	Quantity	Unit Cost	Total Cost	Basis of Cost	Purpose
MRX920 V4 MOBILE DATA COLLECTOR	1	\$8,050	\$8,050	Vendor quote	Equipment and installation for data collection points
GATEWAY FIXED NETWORK DATA COLLECTORS	5	\$17,500	\$87,500	Vendor quote	Fixed units for Data Collection
GATEWAY WARRANTY	1	\$15,000	\$15,000	Vendor quote	Five-year warranty on Hardware
GATEWAY INSTALLATION	5	\$3,500	\$17,500	Vendor quote	Hardware Installation
Total:			\$128,050		

Narrative: The equipment for the project consists of the permanent on the ground data collection units, the installation of the units, and associated warranties. The units will be installed in strategic locations to maximize data collection. All the equipment are individual units with a cost greater than the capitalization level for the Town of \$5,000 and a useful life of greater than one year. The vendor quote is based on a Cooperative Purchase Agreement with the City of Goodyear to use Core and Main which is Neptune’s preferred vendor. See City of Goodyear Contract Number CON-21-5694, Section 7, Paragraph 7.14 on page 17, Cooperative Statement and Contract Extension. **Attachment 7** See Core and Main bid proposal. **Attachment 8**

e. Supplies					
Supply Item	Quantity	Unit Cost	Total Cost	Basis of Cost	Purpose
2.5-5K ENDPOINT NEPTUNE 360 AMI	2000	\$5	\$10,800	vendor quote	AMI capable water meter software
NEPTUNE 360 ONE TIME SET UP FEE	1	\$3,000	\$3,000	vendor quote	Meter Set up programming
2.5-5K ENDPOINT NEPTUNE 360 AMI Cellular	350	\$19	\$6,510	vendor quote	AMI Cellular capable water meter software
3/4 INCH T-10 METER /w ProCoder R900i registers	1000	\$310	\$310,000	vendor quote	Hardware Metering Devices
1 INCH T-10 METER /w ProCoder R900i registers	1000	\$335	\$335,000	vendor quote	Hardware Metering Devices
3/4 INCH T-10 METER AND CELLULAR END POINT	175	\$440	\$77,000	vendor quote	Hardware Metering Devices
1 INCH T-10 METER AND CELLULAR ENDPOINT	175	\$520	\$91,000	vendor quote	Hardware Metering Devices
Total:			\$833,310		

Narrative: The supplies for the project are for the individual metering devices, the related metering software and programming set up of the meters. The vendor quote is based on a Cooperative Purchase Agreement with the City of Goodyear to use Core and Main which is Neptune’s preferred vendor. See City of Goodyear Contract Number CON-21-5694, Sec 7, Paragraph 7.14 on page 17, Cooperative Statement and Contract Extension. **Attachment 7**
 See Core and Main bid proposal. **Attachment 8**

f. Contractual				
Contractor Name	Purpose and Contracting Method	Total Cost	Description	Basis of cost
METERING SERVICES INC	Meter removal and new meter installation	\$102,225	Contracted Services	per meter contracted pricing from local vendor
Total:		\$102,225		

Narrative: The estimated \$102,225 cost of the contracted portion of the project is for the removal and installation of new AMI-capable meters and endpoints. The project effects 100% or 2350 meters within the Town of Cave Creek. The contracted services are scheduled to be provided by Metering Services Inc. The procurement method is a cooperative agreement between the City of Tempe and Metering Services Inc. The detail for the contracted price is outlined below and includes an anticipated 5% price increase when the contract renews in November 2022. See City of Tempe Contract Award Notice WUD21-015-01 with Metering Services Inc., Page 3 Number 9.

Attachment 9

Contracted Service - Metering Services Inc.	Meters			
Removal and installation of new 3/4 Inch meter	1175	41.00	*	48,175
Removal and installation of new 1 Inch meter	1175	46.00	*	54,050
<i>*Includes a 5% anticipated increase in cost</i>				\$102,225

g. Construction

Narrative: The Project is not requesting funds for construction.

h. Other Direct Cost

Narrative: The Project is not requesting funds for other direct costs

i. Total Direct Cost

Narrative: The total direct project costs are \$1,087,402.

j. Indirect Charges

Narrative: The Project is not requesting funds for indirect charges.

Third-Party In-Kind Contributions

The Project is not requesting third-party in-kind contributions.

Environmental and Regulatory Compliance Costs

The Project is not requesting funds for environmental and regulatory compliance costs.

Total Costs

The total cost of the proposed project is \$1,087,402. Funding sources for the Project are the Town of Cave Creek and the requested funds from USBR. The Town of Cave Creek is requesting **\$500,000.00** from USBR to fund the Project. **This request represents 46% of the total project cost.** No other Federal funding has been requested or received for the Project.

3 Environmental and Cultural Resource Considerations

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 impacts to the environment, including earth disturbing work, is anticipated when construction begins on the AMI infrastructure of upgrading to AMI enabled meters. The Project consist of installing Fixed Network Data Collection on existing town owned properties and replacing outdated meter technology with enhanced smart meter functionality.

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?

Per the U.S. Fish & Wildlife Service (USFWS) there are currently 74 listed endangered species located in the State of Arizona. However, given the small-scale and temporary nature of work activities associated with the Project, listed species, or designated critical habitat is not expected to be adversely affected.

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.

Per the U.S. Environmental Protection Agency and the U.S. Army Corps of Engineers & Revised “Water of the United States” and the U.S. Environmental Protection Agency WATERS GeoViewer there are no Listed Impaired Waters or Assessed Waters that fall within the project area. Link to the WATERS Geoview can be found here: <https://www.epa.gov/waterdata/waters-geoviewer>

There are several washes inside the town’s boundary; however, none would be impacted by the project. All work will occur within sites which have previously been disturbed.

When was the water delivery system constructed?

The Cave Creek Water Company was started as a private water system in 1954. The Town acquired the Cave Creek Water Company in 2007 to serve as a public water utility. The potable water system has developed over time and continues to expand to meet the requirements as new development continues.

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.

The Project will not modify or affect individual features of an irrigation system. The Project is centered around upgrades to water meters and will not involve irrigation systems.

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

The Project will not modify or affect any buildings, structures, or features. Therefore, cultural resources will not be affected because of program implementation.

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

The Project will not result in significant ground-disturbing activity that would pose a significant threat to archaeological sites. There are no known archeological sites in the proposed AMI network infrastructure installation sites (only pre-existing town owned facilities).

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

The Project will occur throughout the town's service area which includes low-income and minority populations, with no disproportionate impacts or benefits from program implementation anticipated to those populations. AMI offers real-time information on water consumption which may be of benefit to lower-income customers due to an anticipated increase in early leak detections and towns prompt response for notification, thus lower water bills.

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

It is not anticipated that this project will limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

The Project will not include any habitat alteration components. The program would not contribute to the introduction, continue the existence of, or spread noxious weeds or non-native invasive species in the project area.

4 Required Permits or Approvals

The Project is in the Town's jurisdiction and will not require extensive permitting work. Funding is not being requested for permitting and environmental tasks and no costs are included for such activities in the budget.

5 Letters of Project Support

The Town of Cave Creek has received letters of support for the Project from the following, which can be found in **Attachment 10**

- Town of Cave Creek Mayor Ernie Bunch
- Community Member William Mattingly

6 Official Resolution

A resolution was introduced at the Town of Cave Creek's July 18, 2022, Regular Council meeting to authorize the Town Manager/Chief Financial Officer to apply for this WaterSMART grant. Resolution NO. R2022-11 is in **Attachment 11** which provides the following:

- Identification of the official with legal authority to enter into an agreement
- Council support of the application
- Verification of applicant's ability to provide the funding match
- Verification of applicant's willingness to work with Reclamation to meet established deadlines for entering into a cooperative agreement

The matching funds of \$587,402 are appropriated within the Grant Fund. The total appropriation for the Grant fund in FY2022-23 is \$6,246,800. This non-customary large appropriation is in anticipation of a onetime grant award from Congressional Discretionary Spending per Arizona Senator Mark Kelly's Office for the Town's City of Phoenix Interconnect project which total cost is estimated to be \$9.5 Million. The Phoenix Interconnect will be a 100% contracted project.

7 Single Audit Reporting Statement

The Town of Cave Creek did not expend more than \$750,000 USD in Federal award funds and was not required to submit a Single Audit report for the most recently closed fiscal year 2021.

8 Conflict of Interest Disclosure

The Town of Cave Creek currently has no actual or potential conflicts of interest and will notify the program immediately in writing of any conflict of interest that arises during the life of this Federal award.

9 Overlap or Duplication of Efforts Statement

This application by Town of Cave Creek for Federal funding under the USBR WaterSMART program does not in any way duplicate any proposal or project that has been or will be submitted for funding consideration to any other potential federal or non-federal funding source. There is no overlap between the proposed project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel.

10 Automated System Application Payment (ASAP) Registration

The Town of Cave Creek has already contacted ASAP to start the process and will register upon invite notification with application acceptance. The town will maintain an active ASAP account during the period of any federal assistance agreement.

11 System for Award Management (SAM) Registration

The Town of Cave Creek is registered in the SAM and will always maintain an active SAM registration with current information during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency. The Town's unique entity identifier is J5ZTTVHEZJ43.

12 Certification Regarding Lobbying

The Certification of Lobbying activities is provided within the Grants.gov application forms.