Public Utilities

# Advanced Metering Infrastructure Project

**WaterSMART: Water and Energy Efficiency Grant**
**Fiscal Year 2018**

**Technical Proposal**
**(BOR-DO-18-F006)**

**Prepared for:**
**United States Bureau of Reclamation**


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# Technical Proposal

## Executive Summary

**Date:** May 8, 2018

**Applicant Name:** City of San Diego Public Utilities
City of San Diego
County of San Diego
California

**Project Name:** Advanced Metering Infrastructure Project

**Project summary:**

The City of San Diego (City) is applying to the WaterSMART: Water and Energy Efficiency Grant Program for $1,000,000 for the Advanced Metering Infrastructure Project (Project). The City is currently implementing the Advanced Metering Infrastructure (AMI) System to replace manual meter reading operation with automated systems capable of collecting more accurate meter consumption data on a near-real time basis. The initial implementation project installed a citywide fixed network system and AMI devices on approximately 11,000 meters. The current proposed citywide deployment project will install AMI endpoints on the remaining 270,000 meters. The Project shall promote the objective of the WaterSMART Program by producing quantifiable and sustainable water savings and improved water management. The installation of meters will be able to detect and quantify water leakage, mitigate water loss and therefore, will result in water savings. Through the System, AMI data identifies and alerts Department staff and customers of unusual consumption patterns, including early detection of customer water leaks. The Public Utilities Department (PUD) hopes to enhance its efforts to promote water conservation and efficient use of water, supported with verifiable results of the desired water savings through this new meter system. The project is estimated to yield potentially, considerable amount of reductions in outdoor water-use. In addition, it is projected to increase conservation awareness by all customer groups as well as reduce imported water supply from the State Water Project and Colorado River Aqueduct. Specifically, AMI will have the following benefits:

1) The system will allow the customer and the PUD staff to detect customer water leaks in a timely manner. Customers will receive notifications from PUD when the AMI system indicates a leak condition; leaks can be fixed before significant losses occur;

2) The potential for real time monitoring will allow the PUD to detect unauthorized water consumption and provide a record of the incident, resulting in increased effectiveness of enforcement of outdoor water conservation programs.

A robust AMI system is estimated to achieve a 10% reduction in per capita water consumption, based on polling other agencies and consultant experience. This 10% savings will occur on usage

prior to the implementation of mandatory conservation standards enacted by the Governor in April 2015.

**Average Annual Water Supply**: 252,320 A.F. (projected demand for 20 years)

**Estimated Amount of water saved after project completion: 1,616,868**A.F. (20 years )

**Estimated Amount of water better managed after project completion**: 4,541,765 A.F.

**Length of time and estimated project completion date:** 28 months (September 1, 2018 – December 31, 2020) for Installation.

**Project located in Federal facility:**
The City of San Diego provides water service to and has several meters on Navy property.

## Background Data

### Source of water supply

The City of San Diego currently provides water to its customers primarily from two water sources: (1) by collecting, on average, approximately 10 - 15% of its water needs through local supplies, and (2) by purchasing approximately 85 - 90% of its water from the San Diego County Water Authority (CWA) a wholesale water agency that provided 420,271 AF of imported water to its member agencies in the County in Fiscal Year 2017. CWA currently purchases the majority of its imported water from The Metropolitan Water District of Southern California (MWD) which is comprised of 26 public water agencies. MWD obtains its water from the Colorado River through the United States Bureau of Reclamation and from northern California, via the State Water Project (SWP), through the California Department of Water Resources (DWR).

### Water Rights

The Colorado River was MWD's original source of water after MWD's establishment in 1928. MWD has a legal entitlement to receive water from the Colorado River under a permanent service contract with the Secretary of the Interior, resulting from an agreement dated August 18, 1931, among Palo Verde Irrigation District, Imperial Irrigation District, Coachella Valley County Water District, MWD, the City of Los Angeles, the City of San Diego and the County of San Diego. These agreements establish respective water rights priorities among users.

MWD holds the fourth priority right of 550,000 AFY and a fifth priority right of 662,000 AFY (after priority rights to 3,850,000 AF held by Palo Verde Irrigation District, Yuma Project in California, Imperial Irrigation District and the All-American Canal, and Palo Verde Irrigation District). MWD's fourth priority right is within California's basic annual apportionment of 4.4 million AF.

**Current Water Uses**

- Single Family Residential.
- SFR refers to individual dwelling units served by a separate meter.
- Multi-Family.
- MFR encompasses multi-family dwellings such as apartment or condominium complexes, in which two or more dwelling units share the same meter.
- Commercial and Industrial (CI).
- CI user classes are comprised of a diverse group of customers. These customers typically have lower peaking factors than residential customers due to their relatively consistent usage trend.
- Irrigation. IRR customers use water primarily to irrigate personal or business landscaping.
- Temporary Construction -TC refers to meters that are placed on fire hydrants during construction in order to provide water to the construction site until the installation of a permanent meter. Irrigation and Temporary Construction customers typically have high peak demands characterized by relatively large amounts of water used in short periods of time when compared to average usage. Peak usage is more costly to deliver than constant usage.

**Number of Water Users Served**

The water system extends over 404 square miles serving nearly 1.4 million residents with flows on the order of 200 million gallons per day.

**Current and Projected Water Demand**

As of December 31, 2015, the City's average daily water use, including Del Mar and Cal-American deliveries, was approximately 155 mgd, with peak day demands as high as 195 mgd. These amounts are significantly lower than the recent past due to the unprecedented amount of conservation achieved by the citizens of San Diego brought on by the extended drought.

The table below sets forth water demand projections as currently projected in the City's 2015 Urban Water Management Plan. Although the City continues to promote water conservation, the demand for water within the City's service area is projected to increase. The City anticipates meeting a portion of such increased demand through the development of groundwater resources and the expanded use of recycled and Pure Water Program water, with the balance of purchases of imported water from the CWA to remain relatively flat.

TABLE 1
PROJECTED WATER DEMAND
Fiscal Years 2020 through 2035
(AFY)

| 2020 | 2025 | 2030 | 2035 |
|---|---|---|---|
| 209,890 | 248,756 | 271,085 | 279,550 |

Source: 2015 Urban Water Management Plan, Public Utilities Department, City of San Diego.

**Potential Shortfalls in Water Supply**

The ability of the Water System to operate effectively can be affected by the water supply available to the City, which is situated in an arid and semi-desert environment. Water supply may decrease significantly, whether by operation of mandatory supply restrictions, prohibitively high water costs or otherwise. Suppliers of water to the City, including the CWA and MWD, have planned and managed reserve supplies to account for normal occurrences of drought conditions. The City does not anticipate a shortfall in supply to meet demands and is well positioned to meet the estimated demands projected in Table 1.

**Water Delivery System**

The Water System consists of approximately 3,300 miles of transmission and distribution pipelines, including transmission lines up to 84 inches in diameter and distribution lines as small as four inches in diameter. Transmission lines are pipelines with larger diameters that convey raw water to the water treatment plants and convey treated water from the water treatment plants to the treated water storage facilities. Distribution lines are pipelines with smaller diameters that directly service the retail users connected to a meter. The Department also maintains and operates 49 water pump stations that deliver treated water from the water treatment plants to approximately 280,000 metered service connections in over 130 different pressure zones. The Department also treats and delivers the water provided by CWA for the City of Del Mar. In addition, the Department maintains several emergency connections to and from neighboring water agencies, including the Santa Fe Irrigation District, the Poway Municipal Water District, Cal-American, the Sweetwater Authority and the Otay Water District. Additionally, recycled water in the City includes two reclamation plants, pump stations, and over 80 miles of purple pipe, which delivers an annual average of over 10 MGD for irrigation, manufacturing, and other non-potable and non-drinking purposes

**Number of connections and/or number of water users served**

The Water System consists of nine raw water storage reservoirs, three water treatment plants, 31 treated water storage facilities, and over 3,300 miles of water transmission and distribution lines. Water is transported through 49 water-pumping stations and approximately 280,000 metered service connections.

**Reservoir Storage Rights**

The City has storage capacity rights agreements for the Lake Hodges Reservoir, San Vicente Reservoir, and the El Capitan Reservoir between other various water districts and the CWA.

**Water Treatment Plants**

The Department maintains and operates three water treatment plants with a combined rated capacity of 378 mgd through which potable water is supplied.

Alvarado Water Treatment Plant (AWTP)
The AWTP was originally constructed in 1951. Several hydraulic improvements constructed in the mid-1970's and additional upgrades completed recently increased the plant's rated capacity from 120 mgd to 200 mgd.

Miramar Water Treatment Plant (MWTP)
The MWTP was originally constructed in 1962 and has a current rated capacity of 144 mgd. The MWTP provides drinking water to an estimated 500,000 people in the general area north of the San Diego River.

Otay Water Treatment Plant (OWTP)
The current OWTP was constructed in 1989 and has a current rated capacity of 34.2 mgd. The OWTP serves the general area along the Mexico border and the southeastern portions of central San Diego. The following table summarizes the capacity and demands of the three Water Treatment Plants.

**TABLE 2**
**CAPACITY AND DEMAND OF WATER SYSTEM WATER TREATMENT PLANTS**
**(In Million Gallons Daily (mgd))**
**As of June 30, 2017**

| Water Treatment Plant | Original Design Capacity | Current Rated Capacity | Future Rated Capacity(1) | Current Average Demand(3) | Current Peak/Max Demand (3) |
|---|---|---|---|---|---|
| Alvarado | 66 | 200 | 200 | 69.76 | 95.00 |
| Miramar | 100 | 144 | 215 | 59.85 | 99.79 |
| Otay | 40 | 34 | 40 | 15.17 | 27.85 |
| Total | 206 | 378 | 455 | 144.78 | 222.64(2) |

(1) The Otay and Miramar plants require additional improvements, and/or further studies, followed by approval by the State Water Resources Control Board's Division of Drinking Water (DDW) to reach their Future Rated Capacity.
(2) Current demand data calculated from July 1, 2016 to June 30, 2017.
(3) Total is not intended to reflect the aggregate peak/maximum demand supported by all of the water treatment plants, because the plants do not all reach the peak/maximum demand simultaneously.

Source: City of San Diego FY17 Water Annual Report

**Treated Water Storage Facilities.**

The Department maintains and operates 31 treated water storage facilities, including steel tanks, standpipes, concrete tanks, and rectangular concrete reservoirs. These facilities have capacities varying from less than 1 million gallons to 35 million gallons and in the aggregate hold a daily total of approximately 250 million gallons.

**Past Working Relationships with Reclamation**

The Bureau of Reclamation and the City of San Diego (City) have worked cooperatively on over 31 projects since 1998 under the Title XVI Water Reclamation and Reuse Program. Funding for authorized Title XVI projects within the San Diego Area has amounted to over $52 million during this time. The City continues to work with the Bureau of Reclamation on projects which have been completed in preparation for the Pure Water San Diego Program and the North City Project.

The majority of projects funded through the Title XVI Program have been for the delivery of recycled water to customers for irrigation and industrial use from the North City WRP and South Bay WRP. This cooperative relationship has assisted the City in meeting water demands while reducing the dependence on imported water. The Title XVI Program has provided funds in the construction of recycled water pipelines to deliver recycled water to customers for irrigation, manufacturing, and other non-drinking, or non-potable uses.

In addition, cooperative agreements with the Bureau of Reclamation have assisted the City in actively pursuing the development of local water sources for beneficial purposes through groundwater exploration. The City has worked to determine the water supply production of potential groundwater basins including the Santee, El Monte Basin, Mission Valley and San Diego Formation.

Authorized projects related to the Pure Water Program and the North City Project which has been awarded Title XVI funding are as follows:

**Recycled Water Study Project**

The Recycled Water Study identified opportunities to increase recycling and reclamation of wastewater for potable and non-potable uses. The study examined potential costs of implementing such opportunities, and to what extent such recycling and reclamation could feasibly offload wastewater flows to the Point Loma Wastewater Treatment Plant (PLWWTP). Additional goals included identification and evaluation of recycling alternatives that would result in maximizing recycling of the City's wastewater to the fullest extent practicable, and evaluating opportunities to increase recycled water reuse at satellite facilities or a regional recycled water agency using wastewater generated by the Participating Agencies of the Metro Joint Powers Authority (Metro JPA). The study investigated opportunities for Reservoir Augmentation and

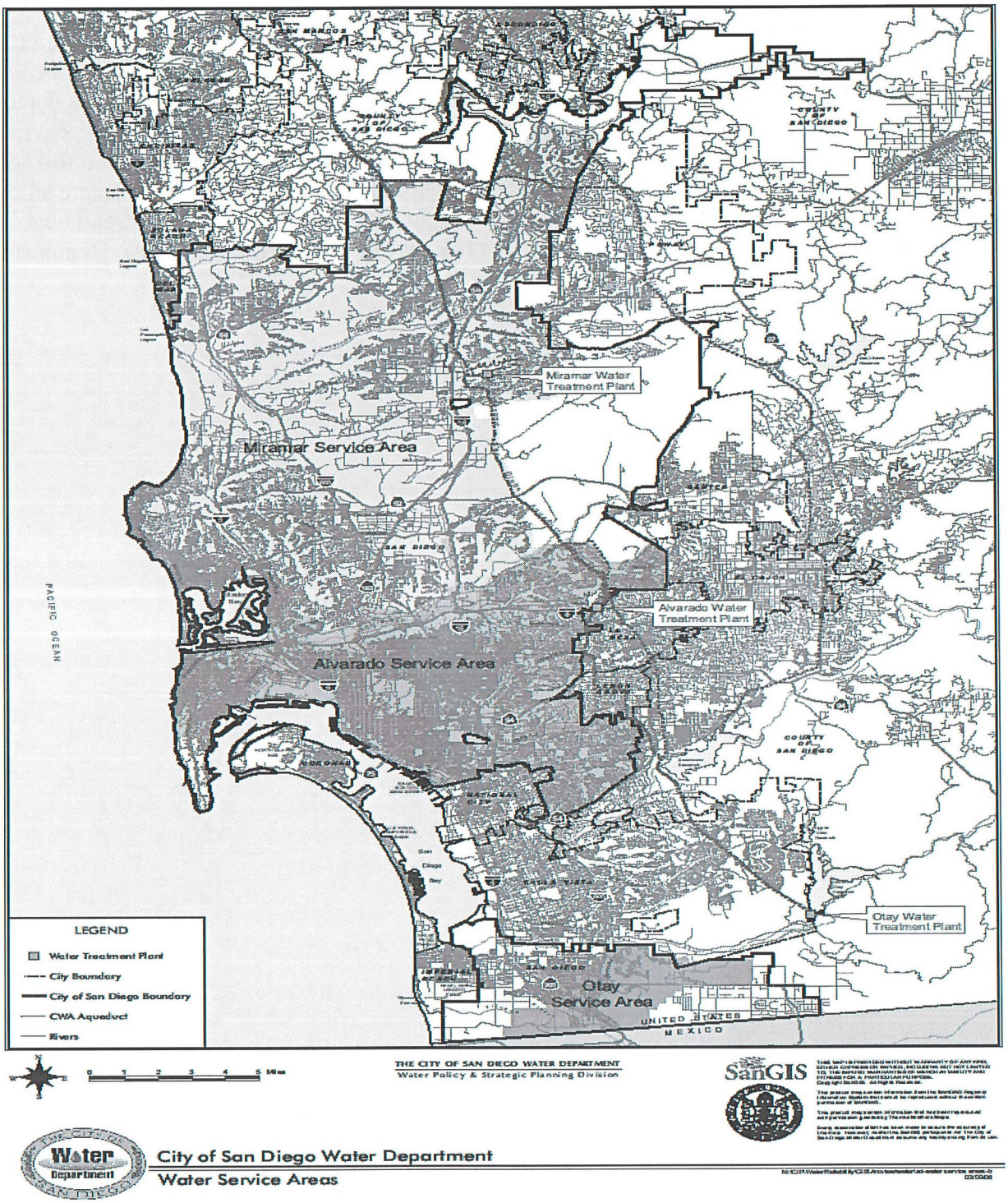
was awarded $593,912 in Title XVI funds. The Study may be obtained at http://www.sandiego.gov/water/pdf/purewater/2012/recycledfinaldraft120510.pdf.

**Indirect Potable Reuse/Reservoir Augmentation Demonstration Project**

The City developed the Potable Reuse/Reservoir Augmentation Demonstration Project and worked cooperatively with the Bureau of Reclamation in the design, planning, and construction of the crucial Phase Two of the Demonstration Project. Phase Two consisted of a demonstration scale advanced water purification facility to provide the technical, water quality, environmental, regulatory, funding, and public outreach requirements necessary to implement a full scale project. The current phase (Phase Three) uses tertiary treated wastewater to create an estimated 12,000 acre-feet per year of purified water for potable reuse for the City of San Diego. The City was awarded $3,109,360 in Title XVI funding for the Indirect Potable Reuse Demonstration Project.

## Water System Service Area Map

The map that follows shows the boundaries of the service area of the City of San Diego Water System.



## Technical Project Description

***This description shall have sufficient detail to permit a comprehensive evaluation of the proposal.***

During the City's initial implementation, the AMI system was installed on approximately 11,000 meters. The initial implementation provided a complete fully functioning fixed network radio-based AMI System which includes the following:

- 100W+ Endpoints and installation
- Network Collectors and repeaters with installation including power supply
- Network Application consisting of both Collection Engine and a DataMart
- Field Deployment Manager (FDM)
- FC300 handheld computers
- Water register replacement installation
- Professional Services, which includes:
  - Services required to deploy, test and commission the System
  - Necessary data interfaces
  - Training of City representatives
  - Hosted Services
  - GPRS backhaul services
  - Operations and Maintenance training
  - The System provide two-way communication and time-synchronized data logging from Endpoints within the City of San Diego's service territory.

For this project, the City will be deploying AMI endpoints to the remaining 270,000 (approx.) meters throughout the City. These endpoints will be able to communicate with the fixed networks system established in the initial implementation.

**Estimated project schedule**

| | |
|---|---|
| Issue Request for Proposal: | July 2017 |
| Contract Approval: | July 2018 |
| Notice to Proceed (NTP) Issuance: | August 2018 |
| Construction Start: | September 2018 |
| Installation Completion: | December 2020 |

## Evaluation Criteria

## Evaluation Criterion A: Quantifiable Water Savings (30 Points)

***1. What is the estimated amount of water expected to be conserved (in acre-feet per year ) as a direct result of this project?***

Based upon investigations of other water utilities that have implemented AMI technology, it is evident that there are significant benefits from this type of implementation. If San Diego sees an estimated 10% reduction for meters in scope for this project, water savings could be 504,641 acre feet throughout the 20 year life span of AMI devices.

***2. Where is the water that will be conserved currently going?***

The City's extensive raw water system includes nine reservoirs, which capture local runoff from rainfall and store purchased imported water that is sent to the City's three water treatment plants for treatment and distribution. The AMI Project will result in an estimated 10% reduction in consumption therefore the amount of water demanded from CWA/MWD will ultimately decrease as the demand will decrease. Any amount conserved will remain at its source, in the State Water Project and the Colorado River, for environmental and other uses.

**Eligible Project Type: Municipal Metering**

**Provide sufficient detail supporting how the estimated waste saving was determined, including all supporting calculations. Note: Projects that do not provide sufficient supporting detail/calculations may not receive credit under this section.**

***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 AMI project is estimated to achieve a 10% reduction in per capita water consumption, based on polling other agencies and consultant experience. A 10% reduction in water usage would equate to an estimated water saving of 25,232 AF annually (See below Table 1 and Attachments A-C). This 10% saving will occur on usage prior to the implementation of mandatory conservation standards enacted by the Governor in April 2015.

Table 1
**Water Savings Acre Feet (20 years project life)**

| WATER SAVINGS: A.F. | TOTAL |
|---|---|
| **Water Demand A.F.** | 5,046,405 |
| **10% estimated savings due to AMI** | 504,641 |
| **Average Annual Savings A.F.** | 25,232 |
| **Project Life** | 20 years |

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

Based upon polling other agencies and consultant experience, a robust AMI system is estimated to achieve a 10% reduction in per capita water consumption. When investigating other water utilities that have implemented AMI technology, it is evident that there are significant benefits from this type of implementation. One major California water utility conducted an outreach effort to customers providing AMI data. These customers used an average of 14% less water, according to a 2011 study by the Water Research Foundation.

AMI will benefit customers by providing them a tool to manage their water use and assist in their efforts to conserve water. It is able to find leaks earlier rather than when the leak is even greater which will be much more expensive to repair. In addition, this will allow water meters to be read electronically, rather than through direct visual inspection by field staff, thereby, reducing meter reading costs and ensuring reliability of meter reads. As customers reduce water consumption, there will also be a corresponding reduction in wastewater and discharge as well as operation and maintenance costs. AMI shall also be able to reduce non-revenue water loss, the water that was produced but never turned into revenue.

As water conservation increasingly becomes more important, AMI technology will allow the Public Utilities Department to provide tools to empower its customers to make better decision about their water use. AMI is proving to be an effective tool for educating consumers about their water consumption and the impact such conservation would have in reducing expenses.

***c. For installing individual water user meters installation, 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.***

Expected water use reductions and supporting documentation is discussed above in section a. The 2015 SDUWMP provided tables with categorical breakdowns of water use by customer type. Water use totals were compared between 2010 and 2015, see table below:

**Table 4-1 Historical Potable Water Use for City's Water Service Area**

| Sector | Type of Use | Treatment Level | 2010 | | 2015 | |
|---|---|---|---|---|---|---|
| | | | Meters | Use (AF) | Meters | Use (AF) |
| Single-Family Residential | Indoor and outdoor uses | Drinking Water | 219,555 | 67,267 | 224,162 | 60,573 |
| Multifamily Residential | Indoor and outdoor uses | Drinking Water | 28,992 | 40,124 | 30,471 | 37,799 |
| CII | Indoor and outdoor uses | Drinking Water | 15,539 | 46,350 | 17,064 | 46,072 |
| Irrigation | Landscape irrigation | Drinking Water | 7,359 | 23,538 | 7,679 | 22,668 |
| Other | Dust mitigation, cleaning | Drinking Water | 214 | 89 | 464 | 0 |
| **Subtotal of Retail Area** | | | **271,659** | **177,368** | **279,840** | **167,112** |
| Wholesale Water Sales | Domestic | Raw and Drinking Water | N/A | 11,493 | N/A | 10,229 |
| **Total City Service Area** | | | **271,659** | **188,860** | **279,840** | **177,341** |

In July 2015, the City developed its Update of Long-Term Water Demand Forecast, which is used for water supply planning and development of the City's water capital improvement program. The long-term water demand forecast is derived from econometric models of residential and non-residential water use that account for explanatory factors such as weather, income, price of water, economy, drought, and passive (or code/ordinance based) conservation.

Per the current Drought restrictions in California, the Department of Water Resources (DWR) determined 4 methods for water agencies to calculate water use per capita baselines. In order to determine 2020 per capita baseline, the City opted for DWR's Method 3, which is to calculate 95 percent of the applicable hydrologic regional target as presented in the DWR Guidebook (DWR, 2009). Under Method 3, the South Coast Hydrological Region has a year 2020 target of 95 percent of 149 gallons per capita daily (GPCD), which is 142 GPCD. The 2015 target is set at 157 GPCD, which is half of the 2020 target based on the 10-year baseline. The City has enforced several demand management measures that will assist with staying on track to meet the 2020 water use baseline. San Diegans have met and exceeded the initial 16 percent conservation goal through February 2016. The PUD's Water Conservation Section continues to focus on developing long-term water savings through site surveys, hardware replacement i.e. AMI technology, and irrigation and landscape efficiencies. The City continues to make strides in educating customers and encouraging San Diegans to adopt and maintain a strong water conservation ethic, day in and day out.

***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).***

N/A – Proposed project does not include installation of distribution main meters.

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

The vendor and device selection is pending City Council approval. On June 9, 2017, the City posted an RFP for AMI Technology companies to compete to provide the City with AMI equipment to upgrade 270,000 service meter locations.

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

Water savings will be monitored and identified for a statistically significant sample (5000-10,000 meters) of the total meter population connected with the AMI technology, on a before and after basis.

## Evaluation Criterion B: Water Supply Reliability (18 points)

**Please describe how the project will increase water supply reliability.**

The AMI project shall achieve the goal of measuring water savings and thereby, reducing water waste. The new meters with its ability for customers to set alerts for water consumption and to identify leaks will lessen the demand for water. The widespread use translates to a reduction in the amount of imported water demanded by the City, leaving more water available in the State Water Project and Colorado River water system and therefore, ensuring reliability of water year-round.

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

As drought conditions continue to challenge the region, AMI technology will provide new tools that empower customers to make better decisions, about their water use. AMI is proving to be an effective solution around the world for educating consumers about their water consumption and the impact such conservation would have in reducing expenses. This enhanced meter has the potential to yield reductions in water use and increased conservation awareness by all customer groups served and ultimately, contribute to the achievement of sustainable solutions to water supply reliability. As a result of the project implementation, water saved will reduced water importation and shall support ecosystem restoration and water quality.

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

The City has widespread support for the AMI project amid customers. The smart meters will assist customers to make conscious water use decisions, which will lead to cost savings. Also, the installation of the AMI devices does not pose any intrusive burdens and requires no action on part of the customer.

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

The support of customers is vital to the implementation process of this project. AMI smart meters will help the City meet our conservation objectives by creating awareness of water consumption among consumers.

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

Water conservation improvements are enhanced by the completion of PUD's AMI Project. Once full implementation has been done, the department can track and collect data that will determine outcomes and benefits of the Project. The performance measures can be shared to other water agencies/districts who have yet to deploy AMI technology. Such agencies include our municipal clients that purchase water from PUD as follows: City of Del Mar, the Santa Fe and San Dieguito Irrigation Districts, and the California American Water Company, which, in turn, serves the Cities of Coronado and Imperial Beach.

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

Due to ongoing drought conditions, population growth, and uncertain climatic changes the San Diego region has a water supply sustainability concern. The San Diego region is described as an arid desert with infrequent rain falls at low levels. Ground water basins are not adequate for collecting and sustaining rain water, thus overtime, PUD has constructed and maintained 9 surface level reservoirs.

Currently the City has partnered with the Bureau of Reclamation (Reclamation) to conduct a WaterSMART Basin Study (Study). The Study will help determine San Diego's sustainability position if current conditions continue or worsen, and will identify adaptive strategies to resolve water supply concerns. The Study has also help to organize the continued collaboration efforts between member agencies of the San Diego County Water Authority (SDCWA) to help moderate the impact of water shortages among the San Diego region.

***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 AMI Project will result in an estimated 10% reduction in consumption therefore the amount of water demanded from CWA/MWD/SWP will decrease as the demand will decrease. Any amount conserved will remain at its source, in the State Water Project and in the Colorado River, for environmental and other uses.

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

The AMI project will help to address water reliability concerns by reducing the City's demand for imported water. The Project will contribute towards water conservation efforts that will alleviate water supply shortages AMI technology enables consumers to become self-aware of

their daily water use via virtual access to a web-based portal that collects time-of-use data retrieved from metered service locations. As customers become conscious of their daily use, it is anticipated that excessive consumption will be reduced. Additionally, AMI data identifies and alerts staff and customers of unusual consumption patterns as a result of possible leaks or water theft. Since the City imports approximately 90% of its water, AMI not only decreases the amount of water drawn from the SWP and Colorado River, it also increases the City's reliability and ability to meet water demands.

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

The Project will not directly fulfill Reclamation's legal or contractual obligations. However, it will reduce demand for imported water on an acre-foot basis, including water from the Colorado River. This could potentially result in additional Colorado River supplies in the River which may be used by Reclamation to help fulfill legal or contractual obligations.

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

The conserved water will not be taken from the City's wholesaler, Metropolitan Water District, which will allow it to remain in the State Water Project and Colorado River and available for other uses.

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

The City currently does not have any partners for this project. However the City is willing to share any information garnered and/or partner with others in the future on similar projects.

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

The AMI project is anticipated to have a 20-year life span and will allow for more rapid and reliable electronic meter readings which will assist in faster identification of meter malfunctions, leaks, tampering and vandalism. The real-time usage data can also be used by the customers to develop water conservation plan. The 10% water savings is expected year-round and is estimated to save 504,641 A.F. of water.

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

While there are no Indian tribes located within the City of San Diego, the project will benefit the entire State of California through water conservation.

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

Yes, the Project will provide water throughout the city to both economically disadvantaged and non-economically disadvantaged communities. The City of San Diego is comprised of several smaller communities of which some are economically disadvantaged based on Appendix H of SANDAG's

2050 Regional Transportation Plan, adopted October 2011. The disadvantaged communities are described below in response to No. 6b2. The project does not serve a rural community.
The following communities within the San Diego service area are defined as economically disadvantaged per SANGDAG's Regional Plan.

**Barrio Logan:** 74% of the population in this neighborhood is Hispanic, 15% White, 6.4% African American, 2.5% Asian and Pacific Islander, and the remainder other races. 76.2% of the residents live in poverty with an unemployment rate of 24.5%. Almost 44% of the adult population did not graduate from high school and 31.5% of the residents do not speak English well.

**City Heights:** 59% of the population in this neighborhood is Hispanic, 16.8% Asian and Pacific Islander, 11% African American, 10.4% White, and the remainder other races. Almost 65% of the residents live in poverty with an unemployment rate of 13%. Almost 36% of the residents do not speak English well.

**Encanto:** 53% of the population in this neighborhood is Hispanic while 20.5% are African American, followed by almost 17% Asian and Pacific Islander and 6.6% are White. Almost 53% live in poverty with a 14% unemployment rate. 32% of the adults did not finish high school and 14% do not speak English.

**Linda Vista:** 37% of the population in this neighborhood is White while 33% are Hispanic and 20.5% are Asian and Pacific Islander. 5% are African American and the remainder of other races. 41% live in poverty while unemployment is 12.5%. Almost 18% of the adult population did not finish high school and 11.4% of households are isolated linguistically.

**San Ysidro:** Almost 94% of the population in this neighborhood (directly on the border with Mexico) is Hispanic. The remainder of the population is 2.4% White, 2.2% Asian and Pacific Islander, and 0.9% African American or other race. Almost 60% of the residents live in poverty with an unemployment rate of 16.3%. 44% of those over 25 do not have a high school diploma and 22.4% of households are isolated linguistically.

**Skyline Paradise Hills:** 38% percent of the population in this neighborhood is Hispanic, while 32% are Asian or Pacific Islanders. Almost 14% of the population is African American while only 11% are White. The remainder is other races. 36% live in poverty with an unemployment rate of 13.5%. 9% of households are isolated linguistically and 18.5% of residents 25 and older did not finish high school.

**Southeastern San Diego:** 84% of the population in this neighborhood is Hispanic, while almost 8% are African American. Only 3.5% are White and 2.4% Asian or Pacific Islander with the remainder of other races. 70% of the population lives in poverty while unemployment is almost 17% percent. 50% of the population 25 and older did not finish high school and almost 2% of households are linguistically isolated

***Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance). Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.***

The San Diego region supports a number of listed species and designated Critical Habitat areas. However the AMI project involves upgrades to existing meters and should pose not impact to the surrounding environment. This project will install advanced metering technology to existing water meter boxes and will not result in an expansion of capacity and will not result in impacts to the environment

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

N/A

## Evaluation Criterion C: Implementing Hydropower (18 points)

This project does not include a hydropower system.

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

The Project does not have an on-farm irrigation improvements component.

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

**Up to 10 points may be awarded based on the extent that the proposal demonstrates that the project supports the Department of the Interior priorities. Please address those priorities that are applicable to your project. It is not necessary to address priorities that are not applicable to your project. A project will not necessarily receive more points simply because multiple priorities are addressed. Points will be allocated based on the degree to which the project supports one or more of the priorities listed, and whether the connection to the priority(ies) is well supported in the proposal.**

**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**

The unpredictable water supply and ever increasing demand on California's complex water resources have resulted in a coordinated effort by the DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban Best Management Practices (BMPs), or also known as demand management measures (DMMs), for conserving water. This consensus-building effort resulted in a Memorandum of Understanding Regarding Urban Water Conservation in California, (MOU), which formalizes an agreement to implement these BMP's and makes a cooperative effort to reduce the consumption of California's water resources. The

MOU is administered by the California urban Water Conservation Council (CUWCC). The City was an original signatory of the MOU on September 23, 1991.

## Evaluation Criterion F—Implementation and Results (6 points)

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

The City of San Diego Urban Water Management Plan (UWMP) June 2015 was adopted by City Council in June 2016.

**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's Urban Water Management Plan (UWMP) (June 2015) includes measures that support the proposed AMI project. The UWMP addresses the City of San Diego water system and includes a description of the water supply sources, magnitudes of historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years. The City receives approximately 85-90 percent of its water from CWA, which obtains water principally from the MWD and transferred water from Imperial Irrigation District (DD)). This Plan serves as a long-range planning document for the City's water supply. The City Council adopted the 2015 UWMP in June, 2016.

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

The AMI project conforms and meets the goals of the State Water Plan by reducing water demand through water conservation. In addition the unpredictable water supply and ever increasing demand on California's complex water resources have resulted in a coordinated effort by the DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban Best Management Practices (BMPs), or also known as demand management measures (DMMs), for conserving water. This consensus-building effort resulted in a Memorandum of Understanding regarding Urban Water Conservation in California (MOU), which formalizes an agreement to implement these BMPs and makes a cooperative effort to reduce the consumption of California's water resources. The MOU is administered by the California Urban Water Conservation Council (CUWCC). The City was an original signatory of the MOU on September 23, 1991.

The Council's Board of Directors prepared a Strategic Plan 2016-2020 where the five year goals and objectives were established. The Governance Committee further developed the tasks that are contained in the Plan. Each year thereafter, during the Strategic Plan's five-year planning horizon, Council staff solicits input from its membership and the Board to develop an annual Action Plan. The emphasis of the annual Action Plan is to identify tasks that will be accomplished during the following year and to re-focus staff and material resources in the areas most needed to realize the objectives identified in the Strategic Plan. The City Council adopted the 2015 UWMP in June, 2016.

## Subcriterion 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).**

A major objective of this project is to monitor, evaluate and quantify the specific benefits associated with deployment of this technology in the City's unique water system and operational landscape. The Department has developed performance measures which will be used to confirm project related goals and objectives are met, quantify the level of benefit received where appropriate and ensure unanticipated negative impacts are identified and mitigated. These measures fall into several key categories:

- Achievement of projected operational efficiencies, risk reduction and costs savings
  - Reduction in the number of Meter reading/field investigations
  - Reduction in work related injury and vehicle accidents

- Achievement of customer service improvements
  - Reduction in estimated reads
  - Reduction in the Meter misreads

Water savings will be monitored and identified for a statistically significant sample (5,000 - 10,000 meters) of the total meter population connected with the AMI technology, on a before and after basis.

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

**Up to 4 points may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.**

*1) Is the proposed project connected to Reclamation project activities?*

The AMI project technology will provide new tools to assist users to more effectively manage their consumption. The City will emphasize water-use awareness and resources conservation in

the use of these tools. This enhanced meter has the potential to yield considerable measurable reductions in outdoor water use and increased conservation awareness by all customer groups served and ultimately, contribute to the achievement of sustainable solutions to water supply reliability. As a result of this savings less water will be imported. The City receives water from MWD via CWA which currently relies upon water from the State Water Project and the Colorado River Basin. The AMI project benefits Reclamation activities by improving water use efficiency and reducing the demand on the State Water Project and Colorado River Basin.

***2) Does the applicant receive Reclamation project water?***

Yes, the City of San Diego imports approximately 90% of its water from MWD via CWA which currently relies upon water from the State Water Project and the Colorado River Basin.

***3) Is the project on Reclamation project lands or involving Reclamation facilities?***

No, the AMI project in not on Reclamation project lands nor involves Reclamation facilities.

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

No, the AMI project is not in the same basin as a Reclamation project or activity.

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

The new AMI meters, with its ability to monito r consumption and ability to detect leaks will lessen the demand for water. The 10% water savings is expected year-round and is estimated to save 504,461 A.F. of water. Since the City imports 90% of its water supply, this water savings will result in less water being imported out of the State Water Project and Colorado River Basin. This water will therefore remain in the basin and be available to meet demands in other areas of the State.

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

No, the Project will not benefit any tribes as there are no tribes in the project area.

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

**Up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided using the following calculation:**

The Non-federal cost-share of 98% to be provided through ratepayer fees. The City will also pursue additional funding opportunities as they become available.

$$\frac{\$66,568,898 \text{ Non-Federal Funding}}{\$67,568,898 \text{ Total Project Cost}} = 98\%$$

## Project Budget

### Funding Plan and Letters of Commitment

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

The City's monetary cost share of $66,568,898 will be derived from ratepayer fees while $1,000,000 will be funded by a BOR grant. The City has submitted a State Revolving Fund loan application to the State Water Resources Control Board for $39,027,797 for this project. The City will also pursue other funding opportunities as they become available.

***2. Project funding provided by a source other than the applicant shall be supported with letters of commitment from these additional sources.***

No additional funding commitments have been secured at this time.

***3. 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 City's monetary cost share will be derived from ratepayer fees.

***3. 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 were incurred.

***4. Describe any funding requested or received from other Federal partners.***

The City has submitted to the State Water Resources Control Board for potential State Revolving Fund loan funding of $39,027,797 for this project.

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

The City has submitted to the State Water Resources Control Board for potential State Revolving Fund loan funding of $39,027,797 for this project. The Project will not be effected by non-award of any pending funding future requests.

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

| Funding Sources | Funding Amount |
|---|---|
| **Non-Federal Entities** | |
| City of San Diego/Public Utilities Department | $66,568,898 |
| *Non-Federal Subtotal:* | **66,568,898** |
| **Other Federal Entities** | |
| *Other Federal Subtotal:* | |
| **Requested Reclamation Funding:** | **1,000,000** |
| *Total Project Funding:* | $ 67,568,898 |

## Budget Proposal

| Budget Item Description | Computation | Computation | Quantity type (hours/days) | Total Cost ($) |
|---|---|---|---|---|
| | $/Unit | Quantity | | |
| City Labor | | | | $23,684,809 |
| Materials & Supplies | | | | 43,447,558 |
| Contingency | | | | 436,531 |
| Total Project Cost | | | | $67,568,898 |

**See Attachments C to F for budget detail.**

## Budget Narrative

### *City Labor*

City forces will be used for installation of meters and AMI equipment and additional resources. City staff will also manage the project and staff installations.

See Attachment G for detail labor information.

### *Contingencies*

Budget for unanticipated costs.

### *Materials*

AMI devices and related materials, meter replacement and radio frequency (RF) friendly meter lids.

See Attachment E and F for detail materials information.

## Environmental and Cultural Resources Compliance

***To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with each application, all applicants must respond to the following list of questions focusing on the NEPA, ESA, and NHPA requirements. Please answer the following questions to the best of your knowledge. If any question is not applicable to explain why. The application should include the answers to:***

1. ***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 project involves upgrades to existing meters and the work will be performed on property that is considered already disturbed and will not impact the surrounding environment.

2. ***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?***

   Not applicable.

3. ***Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States?" If so, please describe and estimate any impacts the proposed project may have.***

   No, there are not wetlands or other surface waters inside the project boundaries that fall under CWA jurisdiction. Therefore no impacts would occur.

4. ***When was the water delivery system constructed?***

   The City's water delivery system was constructed in 1930.

5. ***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 AMI project will not result in any modification of or effect to, individual features of an irrigation system.

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

   No there are not any building, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places.

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

   No there any not any known archeological sites in the proposed project area.

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

   No the project will not have a disproportionately high and adverse effect on low income or minority populations.

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

   No, the project will not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

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

No the project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

## Required Permits or Approvals

***Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals.***

CEQA Status:

The CEQA process is complete for this project. The Project is covered under CEQA categorical or statutory. Evaluation from for environmental review and federal coordination and supporting attachments E1.1 to E1.13 have been processed. The project has a Notice of Determination.

San Diego Air Pollution Control District

The project is subject to a State Implementation Plan (SIP) conformity determination. It is in a nonattainment area or attainment area subject to maintenance plans for a federal criteria pollutant.

Clean Air Act:

Estimated project construction air emissions have not been calculated for this project. There will be vehicle trips associated with retrofitting existing meters with this technology. Once the advances metering technology is installed, physical meter reading and bi-monthly inspection will be eliminated. This project significantly, reduces the number of vehicle trips to tract water usage at bi-monthly potable water meters. As such, no project specific air quality assessment was completed as no increase emissions or pollutants would occur. The project has a net benefit for air quality in eliminating thousands of truck trips annually.

Coastal Barrier Resources Act

The project will not affect or be located within or near the Coastal Barrier Resources System or its adjacent wetlands, marshes, estuaries, inlets and near-shore waters. It is located entirely within developed areas and includes minor retrofitting work at existing plan.

Coastal Zone Management Act:

Water meters that will be modified with advanced metering technologies are located throughout the entire San Diego service area. A portion of the service area is within the coastal zone. No coastal zone permit is required for maintenance to existing facilities with no expansion of use. A California Coastal Commission Permit exemption request was sent to the CCC on Dec 18, 2015 and the Commission has determined the Permit is not necessary because the proposed development is a repair and maintenance activity not resulting in an addition to or enlargement or expansion of the object of the activities (Section 30610 (d) of the Coastal

Act).

Endangered Species Act (ESA):

The project is located entirely within developed areas and includes minor retrofitting work at existing water meters. No vegetation removal, habitat impacts or noisy activity is associated with the project.

Environmental Justice:

The project will install technologies that allow for remotely monitoring water usage. It will result in more effective and efficient readings and will isolate leaks more promptly. All bi-monthly meters will be retrofitted.

Farmland Protection Policy Act:

Project activities are limited to the meters and meter boxes of existing potable water customers.

No conversion of lands will occur.

Flood Plain Management:

The project will install advance water metering technologies to existing meters. Some existing water meters are located within the 100 year floodplain. No excavation, no new structures or buildings are associated with this project. The project will not result in physical alterations to the environment that would aggravate or exacerbate flooding.

National Historic Preservation Act:

The project does not include any excavation or demolition of buildings or structures. There is no potential for impacts to cultural or historic resources.

Magnuson-Stevens Fishery Conservation and Management Act:

Work will not occur in open water, coastal waters or wetlands. Construction includes manually installing advance water metering technology to existing meters.

Migratory Bird Treaty Act:

No trimming or removal of vegetation will occur to implement the project. The project will not result in adverse modification of habitat and could not result in the taking of birds, active nests or eggs.

Protection of Wetlands:

No discharge or dredged or fill materials into a waterway will occur as part of this project. Project activities will be located entirely within developed areas at existing water meters. Water meters are accessed via public street fight-of-ways and staff walk to the meters. No activity proposed is located in an Army Corps wetland. Meters are often placed in sidewalks and driveways.

Safe Drinking Water Act, Sole Source Aquifer Protection:

The project is not within the boundaries of a sole source aquifer.

Wild and Scenic Rivers Act:

No impacts to wetlands or waterways would result from installing advance water metering technologies on existing water meters.

## Official Resolution

Include an official resolution adopted by the applicant's board of directors or governing body, or, for State government entities, an official authorized to commit the applicant to the financial and legal obligations associated with receipt of a financial assistance award under this FOA, verifying:

1. ***The identity of the official with legal authority to enter into an agreement***

   To be provided.

2. ***The board of directors, governing body, or appropriate official who has reviewed and supports the application submitted***

   To be provided.

3. ***The capability of the applicant to provide the amount of funding and/or in- kind contributions specified in the funding plan***

   To be provided.

4. ***That the applicant will work with Reclamation to meet established deadlines for entering into a grant or cooperative agreement***

   To be provided.

***An official resolution meeting the requirements set forth above is mandatory.***

An official resolution from the City of San Diego Council shall be provided within the specified time period indicated in the guidelines.

## Unique Entity Identifier and System for Award Management

**All applicants (unless the applicant has an exception approved by Reclamation under 2 CFR §25.110[d]) are required to:**

1. ***Be registered in the System for Award Management (SAM) before submitting its application.***

   The City of San Diego is registered in SAM.

2. ***Provide a valid unique entity identifier in its application; and***

The City's SAM number is

3. ***Continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.***

The City will maintain an active SAM registration.

**Attachment A**

**Direct Project Benefits to the SWP**

| WATER SAVINGS: A.F. | 20 Years | | | | TOTAL | Annual Average |
|---|---|---|---|---|---|---|
| | 2020-24 | 2025-29 | 2030-34 | 2035-39 | | |
| Water Demand | **1,049,450** | **1,243,780** | **1,355,425** | **1,397,750** | 5,046,405 | 252,320 |
| Less: 10% estimated savings due to AMI | 104,945 | 124,378 | 135,543 | 139,775 | 504,641 | 25,232 |
| **Project Water Savings A.F. -** | | | | | **504,641** | |
| **Average Annual Savings A.F. - SWP** | | | | | | **25,232** |

**Notes:**

1) Water Demand (based on Table 1 Projected Water Demand) calculated on a straight line basis.

**Attachment B**

**Water Demand in Acre Feet (20 years project life)**

| Fiscal Year | 2020-24 | 2025-29 | 2030-2034 | 2035-2039 | Total |
|---|---|---|---|---|---|
| Water Demand Base Per Year (1) | 209,890 | 248,756 | 271,085 | 279,550 | |
| 5-year total | 1,049,450 | 1,243,780 | 1,355,425 | 1,397,750 | 5,046,405 |
| Average Annual Water Demand | | | | | 252,320 |

**Source: City of San Diego Urban Water Management Plan 2015**

**ATTACHMENT F**

Estimated AMI Ready Meter Purchase Cost

| | Quantity | Size | Unit Price | Price |
|---|---|---|---|---|
| | 159343 | 3/4" | $ 91.86 | $ 14,637,247.98 |
| | 14783 | 1" | $ 123.38 | $ 1,823,926.54 |
| | 3868 | 1 1/2" | $ 288.99 | $ 1,117,813.32 |
| | 1757 | 2" | $ 390.29 | $ 685,739.53 |
| Total | 179751 | | | $ 18,264,727.37 |