City of Buena Park

Advanced Metering Infrastructure and Customer Portal Project

WaterSMART: Water and Energy Efficiency Grants

Funding Opportunity Announcement No. BOR-DO-17-F012

Due: January 18, 2017

Applicant:

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Executive Summary

The City of Buena Park is located in southern California, in northwest Orange County, and is about 20 miles southeast of downtown Los Angeles. The City's Public Works department operates water utility service inside the City and in two small regions outside of the city limits: in the City of Anaheim and in the City of La Mirada. This region in California is one of the most affected by the current drought. The water supply in this area is routed from the Colorado River Basin and Santa Ana River Basin, which are two heavily stressed water resources that have identified several opportunities for water conservation efforts. The Public Works Department will pursue an Advanced Metering Infrastructure (AMI) and Customer Portal project in order to help alleviate current strain placed on the region's water supply. This project is not located on a Federal facility.

The City has been preparing for deployment of AMI for the past 2 years, and with recent regulatory changes and increasing drought conditions, the project is a top priority to implement in 2017 contingent upon available funding and contract approval. At the end of January 2017, the City Council intends to approve a contract with Equarius & Ferguson WaterWorks to supply Neptune Technology's AMI product, N_SIGHT, and WaterSmart's Customer Portal and engagement platform. Between January 2017 and July 2018, the City intends to replace 100% of existing water meters, coupled with the deployment of AMI technology, and a Customer Portal, which is the basis for future engagement with customers on water conservation efforts. As outlined in detail within the Technical Proposal, AMI-enabled meters facilitate daily readings and can monitor alerts, such as leaks and theft. The data-driven analytics and reports can be pushed to customers to assist with demand management and budget billing, ensuring that water mindfulness becomes a way of life for the City's residents. The full toolkit that will be available to the City from the AMI and Customer Portal systems will help staff manage and reduce customer water demands, while also providing utility operations with data to reduce unaccounted-for system losses.

With the data and tools available to the City through the AMI program, the hope is to build upon progress on aggressive state conservation targets and turn conservation into a lifestyle for all residents. The AMI and Customer Portal Project has several quantifiable water savings as well as improved energy efficiency through reduced use of kWh for pumping and distribution. Overall, the City of Buena Park anticipates the project will result in water conservation of **1,761.74** acre feet per year (AFY),

electricity conservation of **823,318.05** kWh per year, and a reduction of **1.052** metric tons in CO_2 emissions.

Background Data

The City of Buena Park (City) is located in southern California, in northwest Orange County, and is about 20 miles southeast of downtown Los Angeles. See map of the City's location in Figure 1. The City's Public Works department operates water utility service inside the City and in two small regions outside of the city limits: in the City of Anaheim and in the City of La Mirada. Public Works operates a water distribution system that provides potable water to approximately 19,500 metered service connections, which includes Residential, Recreational Open Space, Commercial and Industrial customers. There are no past working relationships between the City and Bureau of Reclamation.

FIGURE 1 - CITY OF BUENA PARK LOCATION

The City's distribution system conveys water to its customers through about 236 miles of buried water mains. The water distribution system includes 1 storage reservoir with 21.5-million-gallon capacity, 8 active groundwater wells with a combined production rate of 14,800 gallons-per-minute, 1 booster pumping station, 13 pressure regulating stations and 4 import water connections. All source water is metered, whether at the well or a Metropolitan Water District of Southern California (MWD)

supply line. According to the City's 2015 AWWA Water Audit, the total water loss, including real and unaccounted for losses, is 7.6%. Total non-revenue water loss is 8.6%. The City is situated in the Santa Ana Watershed Basin and receives water supplies from two main sources. The first source is local groundwater pumped from wells located within the City that extract water from the Orange County Groundwater District (OCWD). The second source of water is imported water from the MWD. The City typically produces about 70% of its water supply from groundwater – OCWD - and purchases the remaining 30% from imported connections – MWD.

The OCWD relies heavily on a local groundwater basin that provides nearly 70% of the water supply for 2.4 million people[1]. In the past 3 years, the OCWD has purchased imported water from the MWD to recharge its groundwater basin. Additionally, OCWD has expanded its Groundwater Replenishment System (GWRS), a water purification system which takes wastewater from the Orange County Sanitation District and purifies the water to exceed drinking water standards and recharges the OCWD groundwater basin. The expansion of the GWRS was completed in 2015, and produces an additional 30 million gallons a day (MGD), taking the GWRS total production to 100 MGD. Ultimate capacity for the GWRS is projected at 130 MGD after all infrastructure improvements are complete[2]. In 2016, the OCWD groundwater levels have risen due to increased rainfall in the region, but are still only at 18% of the storage level[3]. See Figure 2 below.

[1] http://www.ocwd.com/about/

[2] http://www.ocwd.com/media/4267/gwrs-technical-brochure-r.pdf

[3] http://www.ocwd.com/what-we-do/groundwater-management/groundwater-supplies/

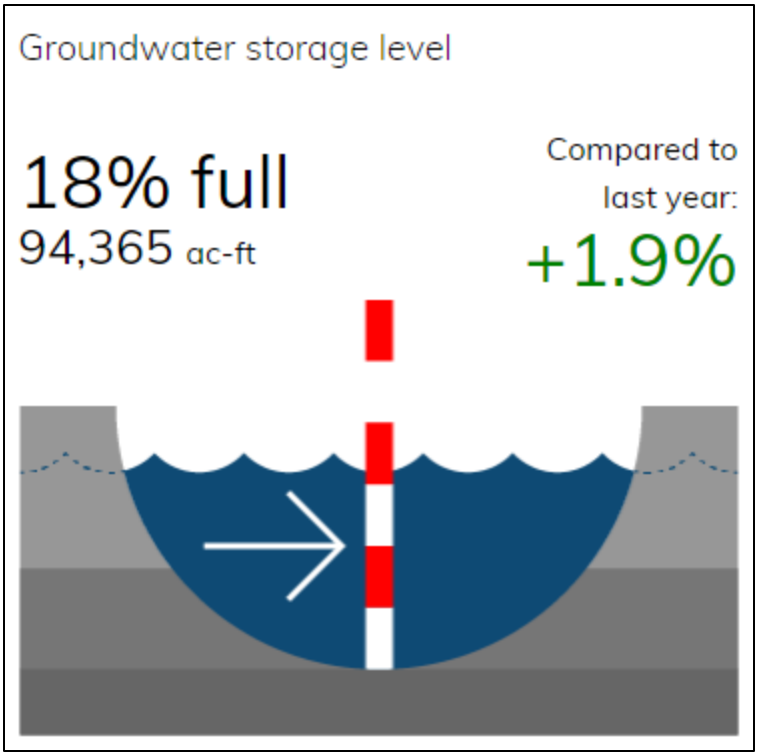

FIGURE 2 - OCWD GROUNDWATER STORAGE LEVEL, OCT 2016

The state of California is currently in the midst of one of the worst droughts in the state's history. In January 2014, Governor Edmund Brown proclaimed a drought state of emergency for the entire state of California due to the conditions. Several executive orders issued during 2014-2016, which accelerated the deployment of a wide range of conservation and water-saving programs and instituted mandatory, state-wide water reductions. In October 2015, Governor Brown signed a new bill that will require improved and more frequent reporting for water utilities. The City of Buena Park is located in the driest region in the state of California, which is represented by the D4 or maroon area in Figure 3.

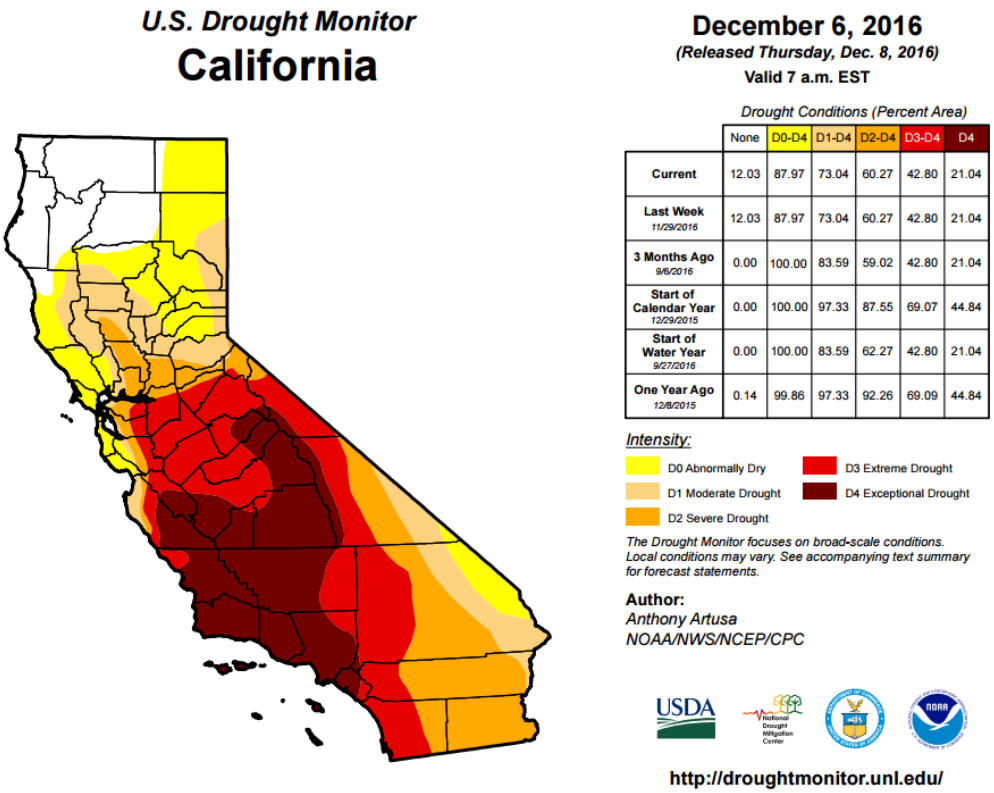

FIGURE 3 - U.S. DROUGHT MONITOR: CA

Continuously from 2013, through the most recently Executive Order (EO) B-37-16 in 2016, the State of California has been in a Drought State of Emergency. Led by the Office of Governor Brown and with leadership from the State Water Resources Control Board (SWRCB) and Department of Water Resources (DWR), California is spearheading a charge to make water conservation a new way of life. Municipalities, Special Districts, and water suppliers throughout the state have been tasked with stress-test calculations, long-term drought planning, water reliability, water reuse and conservation programs that enhance and protect the local and statewide water supplies.

The Utilities Division administers the City's water conservation program which, beginning on June 1, 2015, reported estimates that the City's customers have saved a total of 1.75 billion gallons of water[4] since the program was initiated. This effort from residents and the Utilities Division helped the City meet the state mandated conservation target achieving an 21% overall water conservation savings. The reductions in water demand already accomplished is noted, along with current and

[4] http://www.buenapark.com/city-departments/public-works/water/water-conservation

projected water demand for the City of Buena Park in Table 1. The future projections are based upon an annual 3.3% population growth rate[5].

TABLE 1 - WATER DEMAND FOR BUENA PARK

Period	Population	Total Projected Demand (Ac-ft. /yr.)
2013-2014 (Avg)	-	14,959
2015 (Current)	83,270	12,320.007
2020	86,018	12,726.6

At a local level, the City's Municipal Code identifies several conservation requirements for residents. The following list is the City's permanent water conservation requirements effective at all times:

- Limits on Watering Hours
- Limit on Water Duration
- No Excessive Water Flow or Runoff
- No Washing Down Hard or Paved Surfaces
- Obligation to Fix Leaks, Breaks, or Malfunctions
- Re-circulating Water Required for Water Fountains and Decorative Water Features
- Limits on Washing Vehicles
- Drinking Water Served Upon Request Only
- Commercial Lodging Establishments Must Provide Option to Not Launder Linen Daily
- No Installation of Single Pass Cooling Systems
- No Installation of Non-circulating in Commercial Car Wash and Laundry Systems
- Restaurants Required to Use Water Conserving Dish Wash Spray Valves
- Commercial Car Wash Systems

To date, the savings achieved are largely reactive actions, which depend upon neighbors and businesses reporting water waste, public works personnel or meter readers spotting the behavior, and engaging customers through education and outreach, and a required high level of trust that customers will follow conservation requirements. In practice, these measures are difficult to enforce without the use of AMI alert and alarms and a robust meter data reporting system. Thus, the City expects

[5] http://www.census.gov/quickfacts/table/PST045215/3401313045,0608786

that further savings can be achieved with the adoption of AMI technology and customer-demand management practices, including budget billing. The conservation measures are expected to be increasingly effective in meeting the evolving state and local conservation targets with the monitoring of water consumption in real-time and improved level of customer engagement.

Project Description

The City has planned for an implementation of an Advanced Metering Infrastructure (AMI) and Customer Portal software beginning in Spring 2017. The City's Project Manager is currently engaged in the planning and final contracting stage of the project, with City Council contract approval expected January 24, 2017. AMI is an integrated system of smart meters, communications networks, and data management systems that enables two-way communication between utilities and customers.

The City has been exploring the business case and need for moving towards an investment in AMI since 2013. There are several drivers for the project including:

1. Analytical tools for tracking state-mandated water conservation efforts.
2. Improved data tracking and reporting for Operations, including real time water production vs. deliveries.
3. Enhanced Customer Engagement platform that will:
    a. Provide tools for budget billing and self-monitoring
    b. Help customers avoid high water use and associated high bills by identifying and correcting unknown leaks or other occurrences
    c. Customize alerts to customers of high water use / high bills
4. Increased satisfaction for City employees. Examples include but are not limited to:
    a. Customization of alerts by City personnel
    b. Proactive issue resolution related to leaks and end-of-life meters
    c. Reduce duplication of effort by staff for re-reads, manually generated work requests
    d. Reduced truck roles, associated fuel costs, and CO2 contribution
    e. Improved safety
5. Automated, consistent and accurate meter reading and billing.

The project scope will consist of the installation of a Neptune AMI communication network with 22 collectors, 19,500 smart meters and Neptune and WaterSmart software packages. A preliminary network design can be found in Figure 4. This design includes placement of 20 collectors, with an additional 2 that will be placed at the end of deployment to optimize network coverage.

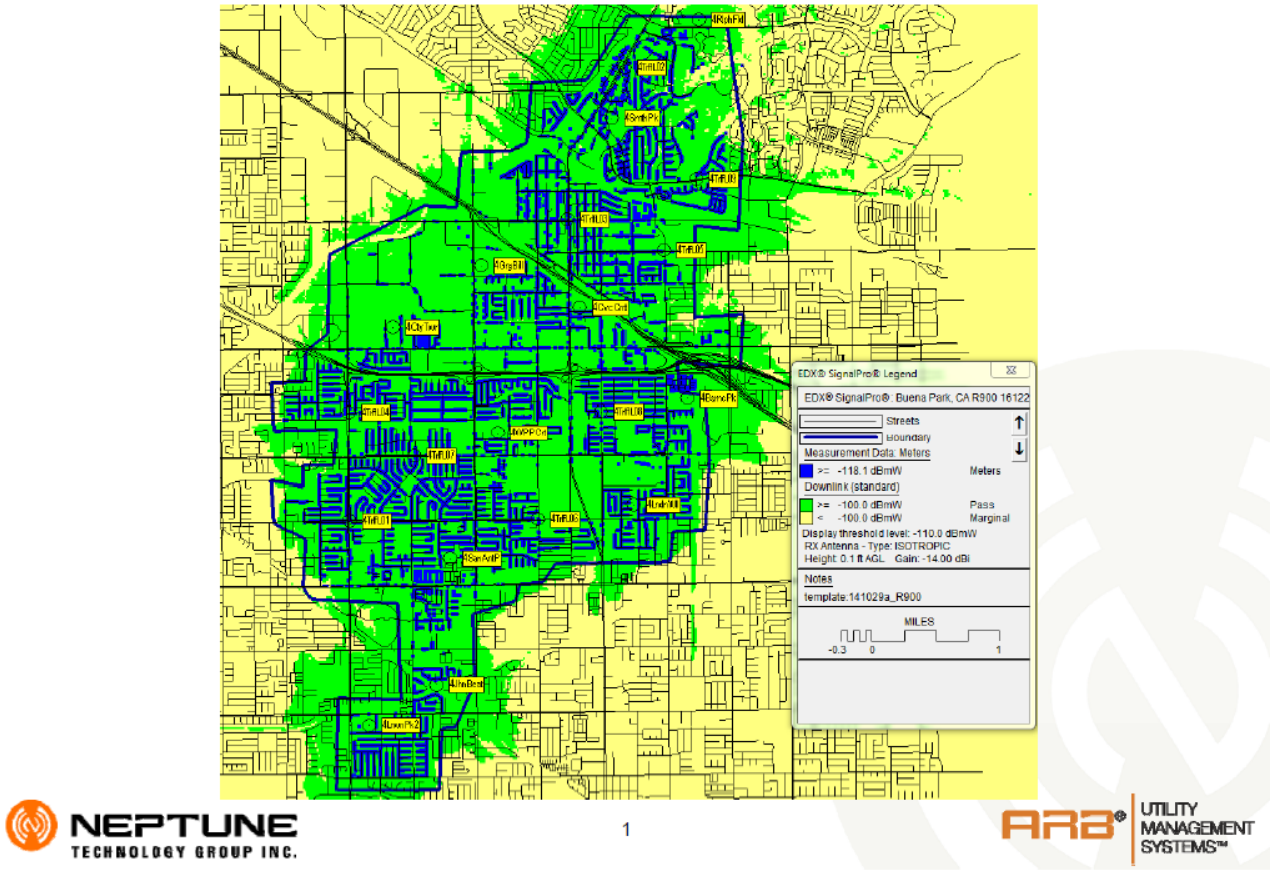

FIGURE 4 - 99% AMI PREDICTED COVERAGE - NEPTUNE PROPOGATION ANALYSIS

All 19,500 meters within the City's service territory will be replaced with AMI-enabled smart meters as part of the project. The supporting Neptune software will be used to analyze reads from the network, send water consumption information in real-time, and display alerts and alarms for leak detection, theft and tamper incidents, among other notifications. The WaterSmart software will be a customer-facing portal that secures a platform for communication of real-time water consumption data, leak resolution procedures and notifications directly to the City's customers. The City has chosen a Managed Services package for software hosting through Neptune on the Amazon Web Services (AWS) cloud, which will minimize IT resources and energy requirements for ongoing operations. Selecting a hosted option also helps keep the City's resources focused on primary tasks of reducing unaccounted-for water, aiding conservation efforts and optimizing customer service. Overall, the AMI Project will better position the City to address future needs and conservation efforts for a growing population since this infrastructure and customer engagement platform will become the backbone for enhanced water management strategies.

AMI technology is quickly becoming the standard for water suppliers to achieve many expected benefits. With an improved dataset showing near real-time status of the water distribution system and customer demands, superior water conservation and incentive programs can be deployed, which will achieve greater water savings in the future. The City expects savings across the following areas as a direct result of this project investment:

1. Improved Customer-side Leak Identification and Resolution
2. Improved Customer Water Demand Management
3. Improved Accuracy of Meters
4. Increased Theft Identification
5. Improved Utility-side Leak Identification and Early Detection

Customer Portal

The installation of AMI meters and subsequent software systems will provide hourly interval customer usage data, in turn helping customers better manage their usage. Home water reports and notifications will drive the community towards building water budgets and closely monitoring water consumption. Customers will have access to an online web portal which will illustrate their usage and allow them to set system notifications, which can automatically alert them when a specified threshold is reached for usage or billing dollar limits. The WaterSmart platform goes a step beyond typical basic bill web-presentation, and includes videos and tips for how to correct leaks or take actions to reduce water consumption. The WaterSmart portal and home reports (Figure 5) are leading market tools for customer engagement and demand management. Engaging customers to understand their consumption data via the new Customer Portal platform will assist with Improved Customer-side Leak Identification and Improved Customer Water Management savings areas identified above.

FIGURE 5 - WATERSMART PORTAL ENGAGEMENT TOOLS

Advanced Metering Infrastructure

At the core of the AMI project is an opportunity to replace aging meter infrastructure. All 19,500 meters will be replaced with a Neptune smart meter, which includes a build-in communication module that does not require any programming in the field. A majority of new meters will be the T-10 model, as shown in Figure 6. New meters improve the accuracy of reporting water consumption data, and an AMI-enabled meter automatically becomes a traceable asset in the field. Once deployed, there is no more guessing about the end of life due to meter accuracy degradation since real-time consumption and degradation over time can be tracked with advanced conservation analytics. The City will use the daily meter read data to assist with identifying customer-side, and utility-side leaks and potential theft in order to conserve water. Early leak detection will help the City to avoid disruptive emergencies, prioritize future pipeline replacements and improve its overall asset management strategy.

FIGURE 6 - NEPTUNE T-10 SMART METER

The AMI system will provide data to help the City identify leaks, other forms of continuous usage and exceptionally high usage outside of the time periods and requirements above, each of which will help the utility to enforce the City's water conservation program. The data provided by the AMI system will open more opportunities for customers and the City to better manage water usage, understand the effectiveness of current restrictions and pursue further conservation measures in partnership with OCWD and MWD.

The City is expected to contract with Equarius & Ferguson WaterWorks to procure and deploy the AMI system. They are a local distributor for Neptune hardware/services related to AMI equipment and meters, and will also sub-contract with WaterSmart software for the Customer Portal. The WaterSmart team has eight years of experience specializing in customer engagement for water utilities. The project will be managed as a coordinated effort between UtiliWorks Consulting and the City. UtiliWorks is a specialized consulting firm that focuses on providing management consulting services to the US municipal utilities and has successfully advised over 50 clients who are looking to or have deployed AMI technology. The phased project plan is provided in Figure 7.

FIGURE 7 - AMI PROJECT TIMELINE

Planning and Development - Phase 1

The City is currently engaged in this phase of the AMI Project. The initial phase of the project includes vendor contracting and project planning and development. This phase is expected to take approximately 3 months and will include finalizing collector sites and conclude with contract execution. Some deployment planning activities may continue into the next phase. A Public Awareness campaign is also anticipated to fall under this phase of the project, which will help the City determine which channels to use in customer education on the project and how to better conserve water resources.

Proof of Concept - Phase 2

The Proof of Concept (POC) Phase will involve the installation and testing of: servers, collectors, and backhaul infrastructure, plus field deployment of up to 5% of meters and endpoints and by the installation contractor. The POC meter area is expected to incorporate multiple service types (i.e., residential, commercial, industrial) and include irrigation meters and other locations that may be difficult to read by the AMI

network. The POC Phase also covers activities surrounding deployment of the AMI head-end software, the MDMS software and the integration of meter data from the AMI head-end to the MDMS and through to the Customer Information System (CIS). The CIS integration must be complete before billing can begin with AMI register reads. The intent of this phase is not to pilot the technology, but rather to prove out end-to-end system connectivity that ensures accurate billing of the City's customers before rolling out installation of the full meter population. The contractor and City shall also discuss deployment sequence routes/meters and engage in remaining Full Deployment project planning during this phase.

Full Deployment - Phase 3

Following a successful POC Phase closure with acceptance testing by the City, the Full Deployment Phase will begin. Activities undertaken will include the replacement of the remaining manually read meters, and any lid drilling if required. Full Deployment will conclude with final system acceptance testing by the City. Upon completion of all meter installations, the City will deploy the WaterSmart Customer Portal software. All final system and business process training will be completed during this close-out stage, as the City transitions to a new operational model. The final training will be important for ensuring the new analytical tools are being used to their full advantage at the City and that staff are trained to appropriately support the City's customers.

Evaluation Criteria

Evaluation Criterion A: Water Conservation

Describe the amount of water saved. 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 provide sufficient detail supporting how the estimate was determined, including all supporting calculations.

The City of Buena Park AMI Project will result in large quantities of water conservation, energy and cost efficiencies for the utility. Overall, the City anticipates the project will result in water conservation of **1,761.74** acre feet per year (AFY), or **14.3%** of total water demand of the City. The water savings will also result in electricity conservation of **823,318.05** kwh per year and CO_2 reduction of **1.052** metric tons. See the sections below for detail.

In addition, all applicants should be sure to address the following:

- **Where is the water that will be conserved currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?**

  A majority of the water that will be conserved is represented by reduced customer demand, which is water currently going to the City's residents via metered connections on supply lines. Leaks, both inside the customer's home and in distribution pipes, are currently seeping into the ground or being flushed into the wastewater collection system. A small amount of theft, or non-technical loss, by individuals by-passing meters also represents water to be conserved by the City.

Applicants proposing municipal metering projects should address the following:

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 City's estimated average annual water savings was totaled from the following five savings areas. All calculations are based upon the data from the City's 2015 AWWA report. Please see section (b) for data source and section (c) below for all supporting assumptions.

Improved Customer-Side Leak Identification

AMI meters will provide hourly usage data on a daily basis to the City of Buena Park and its customers. Regular hourly usage data will identify leaks to the customer and the utility. If a particular account experiences high levels of usage continuously it is very likely the customer is experiencing a leak. The data provided by the AMI meters will illustrate the continuous usage to the utility and the system's supporting software. Customers will have the ability to configure alerts and home reports within the customer portal to improve notify them if a potential leak is present within the system. Additionally, the utility will receive notifications of potential leaks and will work with its customer base to inform them of potential unintended water losses.

Improved Customer-side Leak Identification:

Annual Water Savings = Total Water Consumption * % of Leaks

Annual Water Savings = 11,381.50 AF * 8 % = **910.52 AFY**

Please see section (c) below for all supporting assumptions.

Improved Customer Water Demand Management

The data provided by AMI meters will equip water customers with the ability to better manage their usage via a customer portal and proactive notifications via text or email. The City of Buena Park plans to provide a customer portal that will illustrate interval usage information to customers, allowing them to better understand their usage and take corrective steps to improve water consumption behavior. Additionally, the web-portal will allow customers to set usage alerts to notify them via text or email if their water consumption has reached particular thresholds. System generated notifications will assist customers in better managing their water usage and improve water conservation at the City of Buena Park. Based on a case study with customer facing analytics in Roseville, CA, the City anticipates that informed proactive customers will cause a 5% reduction in total water use when provided water management tools in the form of an AMI facilitated web portal.

Improved Customer Water Demand Management:

Annual Water Savings = Total Water Consumption * % Demand Reduction

Annual Water Savings = 11,381.50 AF * 5 % = **569.08 AFY**

Please see section (c) below for all supporting assumptions.

Improved Accuracy of Meters

The AMI meters will replace less accurate meters that are 15 years old on average. As mechanical meters age they deteriorate and slow down, under-registering the amount of water flowing through the meter. Water users with older meters will use more water because they are charged less for consumption. As meter accuracy improves it will alter some customer water consumption habits. The new AMI meters will reduce consumption by 2% total usage due to increased accuracy and associated consumption reductions.

Improved Accuracy of Meters:

Annual Water Savings = Total Water Consumption * % Inaccuracy

Annual Water Savings = 11,381.50 AF * 2 % = **227.63 AFY**

Please see section (c) below for all supporting assumptions.

Theft Identification

The AMI meters will assist in identifying instances of theft quickly to avoid unnecessary water losses. If water is used at locations which are considered "OFF" accounts, the software system will receive a notification and display the 'vacant consumption' on a report, thus triggering an investigation in the field and eliminating theft. Since the City currently has no tools to measure the amount of water theft, the amount of water theft is uncertain. The City conservatively assumes that AMI meters will lead to water conservation of approximately 2% of total consumption.

Theft Identification:

Annual Water Savings = Net Water Loss * % Theft

Annual Water Savings = Net Water Loss * 2% = **18.77 AFY**

Please see section (c) below for all supporting assumptions.

Improved Utility-side Leak Identification

Over 40% of the City's existing pipelines are 50 years old or older. Although, these pipelines still have many years of service available, the City of Buena Park will see a significant number of leaks and pipeline failures as these pipelines approach the end of their useful life. Currently, the total system loss for the City of Buena Park is calculated to be 7.62%. Some of that water loss is due to system flushing, hydrant use and other activities. However, much of the losses are due to leaks within the distribution system.

The installation of AMI smart meter devices within the water system will assist the utility in identifying water pressure zones with abnormal flow. This can be accomplished by overlaying the real-time customer meter data within pressure zones with the SCADA data used to operate the distribution system. This enables Operations personnel to focus leak identification in a pressure zone experiencing the highest water losses. Identifying leaks and fixing them results in conservation from water leaks and a reduction in high water loss main breaks. The City conservatively estimates that up to 50% of utility-side leaks will be recognized and corrected.

Improved Utility-side Leak Identification:

Annual Water Savings = Net Water Loss * % Leaks Repaired

Annual Water Savings = Net Water Loss * (50%* 7.62%) = **35.75 AFY**

Please see section (c) below for all supporting assumptions.

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

All of the City's supply connections are metered, which allows the Utility to measure total supply versus total water consumed, including billed and unbilled water totals. These figures are reported to Department of Water Resources (DWR) on an annual basis. The complete and validated 2015 AWWA reporting worksheet has been used as the basis for all system loss information used in calculations as shown in Table 2.

TABLE 2 - CITY OF BUENA PARK 2015 AWWA REPORTING

Water Produced (Acre Feet/yr)	Water Consumed (Acre Feet/yr)	Net Water Loss (Acre Feet/yr)	% System Loss
12,320.01	11,381.500	938.51	7.62%

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

Improved Customer-side leak identification is anticipated to reduce the total water demand by 8% based on data available from the EPA[6]. This savings area includes customers that are alerted to fix slow leaks, including: toilet, faucet, or irrigation systems. This behavior modification is possible due to enhanced tools available in the Customer Portal and automated AMI alerts.

Customer water demand reduction of 5% is assumed due to deployment of the WaterSmart Customer Portal, which helps the utility better engage their customers through use of home water reports, customer portal, and utility analytics dashboard. This specific toolkit that is part of the AMI Project has achieved a 5% demand reduction in similar cities such as Roseville, CA[7] and Glendale, CA[8]. These represent two published WaterSmart case studies.

Apparent losses, including theft and meter inaccuracies, are difficult to quantify for many utilities. These are not something closely tracked by the City at this time, since not all theft incidents are reported. However, these areas can make up significant savings with the implementation of AMI, including catching cases of reverse flow, zero consumption in active accounts, and cut wires on the metering equipment. It is assumed that up to 2% of loss is attributed to theft, but could be even higher in a drought prone area such as the City of Buena Park.

The City's meter inaccuracy assumption of 2% was used on the 2015 AWWA worksheet. This figure was verified by Water Loss TAP program[9], initiated by the CA-NV AWWA chapter.

The Utility-side leak identification savings calculation assumes that 50% of all system loss (7.62%, see Table 2) can be identified via the AMI system. This is due to improved analysis surrounding total system supply and total demand as well as more detailed analysis of individual pressure zones, as the metered connections can be analyzed daily over extended periods of time and can be compared against SCADA data to identify possible sources of distribution system loss.

[6] https://www3.epa.gov/watersense/pubs/fixleak.html
[7] http://www.watersmart.com/partner-story/roseville-ca-tackling-customer-education/
[8] http://cmua.org/wpcmua/wp-content/uploads/2014/12/Glendale-Water-Power.pdf
[9] https://ca-nv-awwa.org/CANV/downloads/2016/SectionPRTAP.pdf

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).

No distribution main meters will be installed as part of this project.

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

- 22 Neptune R900 gateway collectors
- 1 Trimble handheld reader
- 19361 meters (sized 5/8" - 2") to be replaced with Neptune T-10 meters equipped with E-Coder® registers and R900® Meter Interface Unit. For a full summary of all meter quantities by size, please refer to Table 3.
- 120 meters (sized 3"-10") to be replaced with Neptune HP Turbine equipped with E-Coder® registers and R900® Meter Interface Unit. For a full summary of all meter quantities by size, please refer to Table 3.
- 1 N_SIGHT (AMI/MDM) software package
- 1 WaterSMART (Customer Portal) software package

TABLE 3 - METER QUANTITIES

Item	Quantity
5/8 x 3/4" (replaced with 3/4"SL)	16250
3/4" Short-Length (7 1/2" LL)	1171
1"	543
1-1/2" (PD)	567
2" (PD)	830
Turbine 3"	90
Turbine 4"	22
Turbine 6"	6
Turbine 10"	2

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

As part of project completion, the City will monitor the measures discussed in the Performance Measures section, and will revisit the methodologies to determine if the overall expected water savings have been met. The AMI system will provide better data that will be available to Operations and can assist the City and their suppliers in refining the assumptions and calculations supporting water savings areas.

Evaluation Criterion B: Water Sustainability Benefits
Please describe in detail where the conserved water will go and how the conserved water is expected to increase water sustainability. Consider the following:

The City's conserved water will stay in the Orange County Water Basin or become available to other MWD customers[10], including many cities in Los Angeles and Orange Counties, and Water Agencies spanning from San Diego to the San Gabriel mountains. All of these customers are in a region of California most affected by drought conditions.

Will the project commit conserved water to instream flows?

No water will go to instream flows. However, the water not supplied by OCWD and MWD will leave more water in the local basin and groundwater supply. According to the US Fish and Wildlife Service, there are 29 known threatened and endangered species are in Orange County[11], including the Santa Ana Suckerfish, which is only found in 3 California river basins. Many other species endangered in the County include fish, birds and flowering plants and would benefit from increased water levels in local river basins. See Table 4 for the full list.

TABLE 4 - US FISH AND WILDLIFE SERVICE - ORANGE COUNTY THREATENED AND ENDANGERED SPECIES

Group	Common Name	Scientific Name	Status
Amphibians	Arroyo (=arroyo southwestern) toad	Anaxyrus californicus	Endangered
Birds	California least tern	Sterna antillarum browni	Endangered
Birds	Light-footed clapper rail	Rallus longirostris levipes	Endangered
Birds	Least Bell's vireo	Vireo bellii pusillus	Endangered

[10] http://www.mwdh2o.com/WhoWeAre/Member-Agencies/Pages/default.aspx
[11] https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=06059

Birds	Western snowy plover	Charadrius alexandrinus nivosus	Threatened
Birds	Coastal California gnatcatcher	Polioptila californica californica	Threatened
Birds	Southwestern willow flycatcher	Empidonax traillii extimus	Endangered
Crustaceans	Riverside fairy shrimp	Streptocephalus woottoni	Endangered
Crustaceans	San Diego fairy shrimp	Branchinecta sandiegonensis	Endangered
Fishes	Tidewater goby	Eucyclogobius newberryi	Endangered
Fishes	Santa Ana sucker	Catostomus santaanae	Threatened
Flowering Plants	Braunton's milk-vetch	Astragalus brauntonii	Endangered
Flowering Plants	Ventura Marsh Milk-vetch	Astragalus pycnostachyus var. lanosissimus	Endangered
Flowering Plants	Thread-leaved brodiaea	Brodiaea filifolia	Threatened
Flowering Plants	Laguna Beach liveforever	Dudleya stolonifera	Threatened
Flowering Plants	Salt marsh bird's-beak	Cordylanthus maritimus ssp. maritimus	Endangered
Flowering Plants	Salt marsh bird's-beak	Cordylanthus maritimus ssp. maritimus	Endangered
Flowering Plants	San Diego button-celery	Eryngium aristulatum var. parishii	Endangered
Flowering Plants	Slender-horned spineflower	Dodecahema leptoceras	Endangered
Flowering Plants	Munz's onion	Allium munzii	Endangered
Flowering Plants	Santa Monica Mountains dudleyea	Dudleya cymosa ssp. ovatifolia	Threatened
Flowering Plants	Big-leaved crownbeard	Verbesina dissita	Threatened

Insects	Quino checkerspot butterfly	Euphydryas editha quino (=E. e. wrighti)	Endangered
Insects	Delhi Sands flower-loving fly	Rhaphiomidas terminatus abdominalis	Endangered
Mammals	Stephens' kangaroo rat	Dipodomys stephensi (incl. D. cascus)	Endangered
Mammals	Pacific pocket mouse	Perognathus longimembris pacificus	Endangered
Reptiles	Leatherback sea turtle	Dermochelys coriacea	Endangered
Reptiles	Leatherback sea turtle	Dermochelys coriacea	Endangered
Reptiles	Olive ridley sea turtle	Lepidochelys olivacea	Threatened

Some projects may address water supply sustainability in ways other than committing water for instream flows. If the questions listed above are not applicable to your project, please address the following to explain how the water savings from the project are expected to result in a public benefit:

- **Is there a specific water supply sustainability concern in the region? What factors are contributing to the concern? Please include a description of the impacted geographic area and stakeholders, the partners that are collaborating to resolve the concern, and any other applicable information.**

  Yes, the southern California region is extremely susceptible to dry, drought conditions, due to the "Mediterranean" climate in this area. The City and its water suppliers are stakeholders that are supplied by the Colorado River Basin. Recent extended drought periods have strained the water resources throughout the state and beyond to other states in the Western United States. Just recently in 2016, increased levels of rain have alleviated the serious drought conditions, but residents in the region continue to be subject to a permanent ban on water wasting. Several actions, such as continued outdoor watering bans, are included in the State's Water Action Plan. The hope is to also build upon the state's coordinated progress, aligning with Executive Order B-37-16 and efforts to turn conservation into a way of life for all residents of the state.

The State and local water suppliers are leading the charge to maintain water reductions achieved in 2015. Building on the Senate Bill (SB) X7 7, a conservation goal of reducing California water use by 20% by the year 2020. SB 1420 and SB 555 recently approved in legislation lay out a foundation of improving water use efficiency through water loss auditing and reporting.

The California Urban Water Management Planning Act[12], states that, "all urban water suppliers are required to prepare and adopt an urban water management plan (UWMP)" which will be updated every five years in accordance with other requirements of the Act. SB 555 increases the burden on utilities and local water suppliers to provide a validated calculation on distribution system water losses. SB 1420, also passed last year, delegates the authority of water loss reporting through the UWMP and the Department of Water Resources addressing the water conservation challenges to local water suppliers in the state.

- **How will the proposed project help to address that concern? Will water conserved through the project result in reduced diversions or be made available to help alleviate water supply shortages due to drought, climate variation, or over-allocation?**

  The AMI Project proposed for this funding opportunity will assist the City in becoming compliant with these new laws related to the Urban Water Management Planning Act, which are vastly important in this drought prone region. The "Mediterranean" climate of Southern California is a semi-arid environment with mild winters, warm summers and moderate rainfall. Yes, the proposed project will make water conserved available to remain in the Orange County Basin and/or to supply other customers of MWD. Any water left in the Basin will help ensure water availability to others in the region, offset saltwater intrusion and reduce pumping and associated electrical costs that would be required to refill the basin.

- **Will the project make additional water available to Indian tribes, and/or rural or economically disadvantaged communities)? If so, please explain.**

  Orange County is the end user and has guaranteed water rights to the Santa Ana River Shed. However, there are several tribes upstream, including San Manuel Indian Tribe. The reduced water demand and improved information sharing via a Customer Portal will help make more water available for all customers, including those in rural and economically disadvantaged communities. City customers will have additional tools available, such as

[12] http://www.leginfo.ca.gov/pub/15-16/bill/sen/sb_0551-0600/sb_555_cfa_20150410_151501_sen_comm.html

consumption and water cost notifications, to more proactively manage their water bill within their budgets.

- **Will water conserved through the project help to address water supply sustainability in a way not listed above?**

  None currently identified.

Evaluation Criterion C: Water-Energy Nexus

E.1.3.1. Subcriterion No. C.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

The City will not pursue a renewable energy project within the WaterSMART Project, but the project will utilize a solar option for some elements of the AMI network. There are expected to be some collectors (of the 22 total) that will be solar-powered. The exact locations and design details, including power supply, will be determined during the initial planning phase of the project in early 2017.

Additionally, the City has chosen a Managed Services package for software hosting through Neptune on the Amazon Web Services (AWS) cloud. This will negate additional energy and hardware demands on the City after implementation of the AMI Project. AWS is currently the leading infrastructure provider to major Fortune 500 companies and offers the latest technology in cybersecurity, data storage techniques, and energy-efficient operations.

E.1.3.2. Subcriterion No. C.2: Increasing Energy Efficiency in Water Management

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

The City's AMI Project will reduce the electrical energy required to pump **1,761.74** AFY of water throughout the distribution system. The City will capture the efficiencies noted below:

- The primary energy efficiencies realized with AMI will be in a reduced volume of water being pumped in the City's ground pumps and booster station. Pumping requirements are expected to be reduced by 14.3%, which equates to **823,318.05 kWh** directly attributed to the AMI project.
- A reduction in manual, bi-monthly meter reading which in turn reduces the City's carbon imprint from an annual 1,776 vehicle miles driven by **1.05 metric tons**.
- 14% savings to OCWD and MWD for reduced water treatment costs.

- **Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.**

  Pumping requirements are expected to be reduced by 823,318.05 kWh directly attributed to the AMI project. The 14.3% reduction represents the expected energy savings from reduced pumping of 1,761.74 acre feet per year (AFY). The kWh and dollar figures represented in Table 5 are from the City's 2016 electricity costs.

TABLE 5 – ENERGY SAVINGS FROM REDUCED PUMPING

Total $ on pumping in 2015	2015 Annual kWh	Expected Water Pumping Reduction	kWh Reduction
$ 587,341.01	5,757,532.00	14.3%	823,318.05

- **Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?**

  Pumping requirements across all groundwater well and booster station locations total 5,757,532 annual KWh, which equates to about $587,341.01 in annual cost. All pumps are identified in Table 6. The AMI Project would result in a reduction of approximately 14.3% in kWh, or 823,318.05 total kWh. This reduction is a directly result of less water consumed due to the AMI project as outlined above.

TABLE 6 - PUMPING EQUIPMENT AT CITY OF BUENA PARK

Site/Pump	Motor Size	Head (ft. H20)	Avg. Flow (GPM)	kWh per Acre Foot	Annual kWh Usage	% of Annual KWh
BOISERANC WELL	350 HP	350-375	2200	529	2,042,837	35.48%
FREEWAY WELL	200 HP	350-390	1000	482	323,008	5.61%
HOLDER WELL	150 HP	350-375	1200	474	656,107	11.40%
KNOTT WELL	200 HP	340-370	1000	592	303,872	5.28%
LINDEN WELL	350 HP	345-375	2400	486	2,115,569	36.74%
SMITH/MURPHY	200 HP	265-285	1200	405	12,267	0.21%
CABALLERO	200 HP	340-370	1000	592	303,872	5.28%
BALL WELL*	350 HP	350-375	2200	529	0	0.00%

*Little run time over the past 4-5 years. Used for emergency only.

- **Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.**

  The savings estimate originates from the point of diversion at the groundwater well and from metered connections to MWD.

- **Does the calculation include the energy required to treat the water?**

  No, all water treatment is performed by OCWD or MWD prior to purchase by the City. It is estimated that up there will be further reductions in treatment costs based upon a reduction of 14% of water demand by the City.

- **Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations. 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).**

  Yes, the AMI Project will directly eliminate the 148 miles/month vehicle miles driven by each of the 2 meter readers for the 19,500 meters that are read bi-monthly. A conservative figure from the EPA assumes a reduction of 8.8 kilogram of carbon emission per gallon. The City estimates its vehicles average 15 miles/ gallon. Therefore, the City will be reducing its carbon footprint impact by 1.05 metric tons for the AMI project. This can be considered a conservative estimate, since other proactive alerts and data analyzed in the AMI system will help eliminate additional of miles driven for field investigations and leak inspections.

TABLE 7 - VEHICULAR GREENHOUSE GAS REDUCTION

Total Annual Miles	CO2 Emissions (grams) per Mile	Vehicle Mile Percentage Reduced from AMI Project	Total CO2 Reduction (Metric Tons)
1,776	592.47	100%	1.0522208

Additionally, several collectors that will be installed for the AMI network will have a solar option. The total number of the 22 that will be solar-powered is to be determined during the initial planning phase of the project in early 2017.

Evaluation Criterion D: Addressing Adaptation Strategies in a WaterSMART Basin Study

Proposals that provide a detailed description of how a project is addressing an adaptation strategy specifically identified in a completed Basin Study (e.g., a strategy to mitigate the impacts of water shortages resulting from climate change, drought, increased demands, or other causes) may receive maximum points under this criterion. Applicants should provide as much detail as possible about the relationship of the proposed project to the adaptation strategy identified in the Basin Study, including, but not limited to, the following:

- **Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project and how the proposed WaterSMART Grant project would help implement the adaptation strategy.**

The "Colorado River Basin Water Supply and Demand Study" is a WaterSMART Basin Study from December 2012 which illustrates a variety of options and strategies to address the water supply and water demand of the Colorado River. Within the section: *Options and Strategies to Resolve Supply and Demand Imbalances* on page SR-43, the study identifies further Municipal and Industrial (M&I) Water Conservation as a potential strategy to positively impact the Colorado River basin. The study cites a potential yield from Municipal and Industrial Water Conservation of 600,000 AFY by 2035.

FIGURE 8 - COLORADO RIVER BASIN STUDY MAP

The proposed project by the City of Buena Park will increase municipal conservation by reducing utility-side and customer-side leaks and improve customer management of their usage. The City of Buena Park relies on MWD for a portion of its water supplies and MWD receives water directly from the Colorado River via the Colorado River Aqueduct. Therefore, this project will directly achieve one of the study's adaptation strategies to reduce demand on the Colorado River Basin with 1,761.74 AFY to assist in the study's potential yield of 600,000 of AFY in 2035 via Municipal and Industrial Conservation.

An update in May 2015 by the Municipal and Industrial Water Conservation and Reuse workgroup from the Colorado River Basin Study identified several specific areas for action. Each of these opportunities is directly addressed by the AMI Project that the City is undertaking in 2017.

a) **Opportunity 1: Increase outdoor water use efficiency through technology improvements and behavior change, and increase the adoption of low-water-use landscapes**

   AMI technology and smart meters equate to decreased CO2 emissions from manually read meters, improved efficiency in billing and leak detection, and real-time consumption data to improve deployment of water conservation programs already in place at the City.

b) **Opportunity 2: Increase the end-user understanding of individual, community, and regional water use**

   The Customer Portal software will directly engage end-users of water with text messages, email notifications, and a real-time web-application showing consumption data. Customers will have the option to setup alerts based on consumption thresholds or billing dollar amounts for a given billing period. The AMI and Customer Portal tools will also help the internal staff in the City's Customer Service department to more positively engage with customers once a leak, theft or watering violation is identified.

c) **Opportunity 3: Increase the integration of water- and energy-efficiency programs and resource planning**

   Digitizing meter reads and increasing the volume of data available to analyze consumption patterns will help drive improved reporting and integration with the City's water suppliers, OCWD and MWD, as well as other stakeholders in the region. Letters of Support from both water suppliers can be found in the Appendix.

d) **Opportunity 4: Expand local and state goal-setting and tracking to assist providers in structuring programs**

The City performance measures, as outlined in this application, will help set up Key Performance Indicators (KPIs) associated with the AMI Project. The AMI data and tools available provide numerous conservation related KPIs that include: identification of high water user patterns of usage, neighborhood water use comparisons, enforceable identification of water use prohibited by City adopted code, individual customer and customer class water reduction progress to established goals, among others. The ability to measure and track KPIs, specifically conservation related KPIs, allow the utility to measure the effectiveness of individual conservation strategies and programs. The effectiveness of multiple strategies and programs can be managed to attain overall utility goals established by the State or locally. This can be immensely helpful to other utilities looking to make similar investments and technology upgrades over the next few years.

The Santa Ana Watershed Basin was a second regional study completed in 2013 that identified several actions. One directly related to the AMI Project that Buena Park is undertaking is to "**promote water conservation**." This action will be met by reduction of water demands, integrating water resources management practices, and promotion of partnerships as previously outlined. For more specific information on how the action will be met by the City's AMI Project, please refer to the response to Opportunity 1-4 in the Colorado River Basin Study paragraph above, as there is significant overlap.

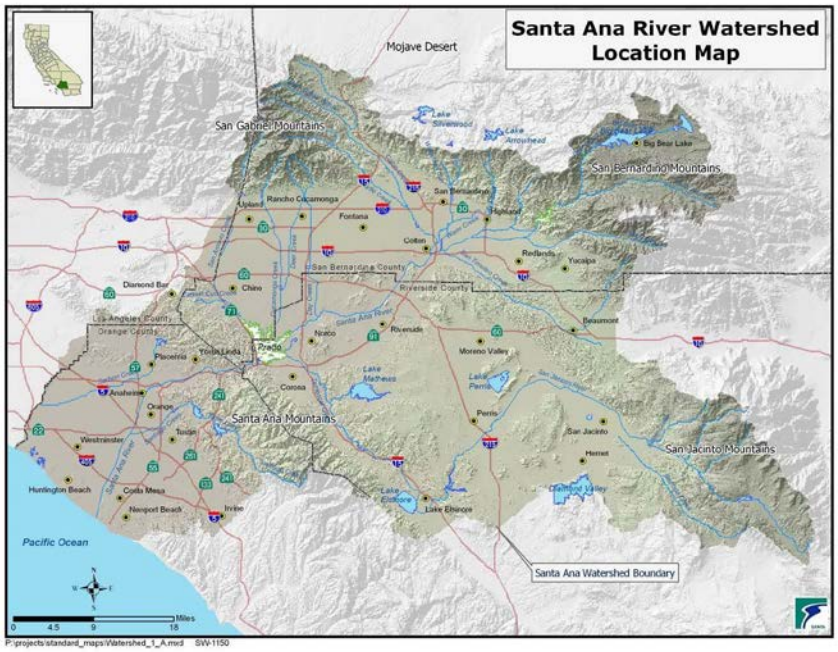

FIGURE 9 - SANTA ANA WATERSHED MAP

- **Describe how the adaptation strategy and proposed WaterSMART Grant project will address the imbalance between water supply and demand identified by the Basin Study.**

  Each opportunity and action identified in the previous section directly relates to the imbalance of water supply and demand. Promotion of conservation, education of customers, technology improvements, increased integration of data and adoption of common reporting standards are all now increasingly possible with AMI technology. Ultimately through the KPIs, City will have a more targeted approach to identifying water loss and reducing customer demand, thereby reducing the total system demand and the City's impact to the regional water supply.

- **Identify the applicant's level of involvement in the Basin Study (e.g., cost-share partner, participating stakeholder, etc.).**

  The City of Buena Park reviewed and commented on the Santa Ana River and Colorado River the Basin Studies.

- **Describe whether the project will result in further collaboration among Basin Study partners.**

  The City is open to future collaboration and sharing project results with other Basin study stakeholders, especially OCWD and MWD, to meet regulatory reporting requirements and address future planning needs.

Evaluation Criterion E: Expediting Future On-Farm Irrigation Improvements

Not applicable to the City's AMI Project.

Evaluation Criterion F: Implementation and Results

Subcriterion No F.1: Project Planning

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

Provide the following information regarding project planning:

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

b) **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 Urban Water Management Planning Act of 1983 requires urban water suppliers to adopt an Urban Water Management Plan (UWMP). The City produces this plan every five years and submits it to the State Department of Water Resources (DWR). The 2015 UMP outlines several key factors contributing to limited water supplies in the area and describes several planned projects for future water supply planning and opportunities. The projects listed include Infrastructure Replacement Program[13], which is directly addressed by the AMI and Customer Portal Project planned for 2017.

In addition to the UMP and state mandated regulatory requirements outlined previously, the State government has a California Water Plan (Water Plan), which is a strategic plan for managing water resources at a state-wide level. This is directly tied to the Governor's Water Action Plan and outlines 10 essential actions[14]. Several of these are achieved or supported through efforts like the City's AMI Project:

- Make Conservation a Californian Way of Life
- Invest in integrated water management and increase regional self-reliance
- Manage and prepare for dry periods
- Provide safe drinking water and secure wastewater systems to all communities
- Improve operational and regulatory efficiency

Subcriterion No F.2: Support and Collaboration

Describe the extent to which the project garners support and promotes collaboration.

Does the project promote and encourage collaboration among parties? Consider the following:

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

  Yes, the City Council, OCWD, MWD, and state's Department of Water Resources, all have a vested interest in the City's AMI Project. Letters of support can be found in the Appendix.

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

[13] http://www.buenapark.com/home/showdocument?id=9566

[14] http://www.water.ca.gov/waterplan/docs/cwpu2013/Final/WaterPlanUpdate2013-Placemat.pdf

As the state moves to locally-driven conservation targets, the collaboration between the City of Buena Park and their supplies, OCWD and MWD, will become extremely important. Moving to AMI meter readings will improve the data that can be shared and integrated across these entities. The City of Buena Park is a member of the Orange County 20x2020 Regional Alliance, which includes 29 retail agencies and was formed by MWD.

- **Will the project help to prevent a water-related crisis or conflict?**

  While the City's project will not prevent a water-related crisis, the improvements with the AMI Project can help manage the water supply to prevent one in the future. Similarly, there will be improvements in management of supply during a future water-related crisis due to the AMI technology that will be in place. Lessons learned during the City's deployment can also be leveraged among other neighboring utilities and those in the Orange Count 20x220 Regional Alliance.

- **Is there frequently tension or litigation over water in the basin?**

  No.

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

  Yes, this project will serve as a case study to other local utilities due to the water savings results from this project. It may ultimately help others pursue similar technology-improvement projects, especially utilities similarly situated in Orange County and supplied by OCWD and MWD.

Subcriterion No F.3: 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, marketed, or better managed, or energy saved). For more information calculating performance measure, see Section D.2.2.5 Performance Measures.

The project scope falls under Measuring Devices: No. A.2.a Municipal Metering and includes full replacement of all existing meter service locations, including metered points of entry into the distribution system, However, the project does not include the addition of AMI main line meters. The City currently utilizes a uniform rate structure adopted in May 2016. There are also Civil Penalties applied for failure to comply with the City's conservation measures. These penalties range in severity according to how many violations the customer has, but can be from $100 to $500 per violation[15]. AMI-enabled devices will allow for more accurate monitoring of rate

[15] http://www.buenapark.com/home/showdocument?id=9566

structures, including assessment of budget-based rates and violation penalties that are applied.

Project-specific business goals have been outlined as part of the work performed AMI Project. The quantifiable measures listed below are driving the AMI Project forward at Buena Park. All metrics will be revisited upon deployment completion to quantify success of the project and will serve as key performance indicators (KPIs) beyond the lifetime of the project. For more detailed methodology and calculations, see the Performance Measures section.

- Increase customer awareness in water conservation with adoption of Customer Portal
- Decrease in overall water consumption – ≥ 5% reduction of 2015 Total Authorized Consumption
- Elimination of manual reads and re-reads (truck rolls) – 99% reduction
- Decrease in customer inquiries for special read requests – <4,657 annual re-read requests
- Replace aging or inaccurate meters – 99% reduction
- Decrease in annual unaccounted-for water – <7.62%
- Decrease in power due to reduction in pumping – < 823,318.05 kwh

Evaluation Criterion G: Additional Non-Federal Funding

The cost of this project will be **$ 6,994,293.** The City of Buena Park will spend $6,694,293 in non-federal funding for the project. The City of Buena Park anticipates federal funding will account for $300,000 of the project cost. The percentage of non-federal funding will be:

$$\frac{\$6,694,293}{\$\ 6,994,293} = \mathbf{95.71\%}$$

Evaluation Criterion H: Connection to Reclamation Project Activities

1) How is the proposed project connected to Reclamation project activities?

The City of Buena Park relies on the OCWD and MWD for water supplies to serve its customers. The OCWD provides water from its water recycling project funded by Reclamation. Additionally, both the OCWD and MWD receive water from the Colorado River which has multiple Reclamation projects within that water basin.

2) Does the applicant receive Reclamation project water?

The City of Buena Park relies on the OCWD and MWD for water supplies to serve its customers. The OCWD provides water from its water recycling project funded by Reclamation. Additionally, both the OCWD and MWD receive water from the Colorado River which has multiple Reclamation projects within that water basin.

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

This project is not on Reclamation project lands, nor involves Reclamation facilities.

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

The project is in the OCWD which manages a groundwater basin that is part of a water recycling and recharge Reclamation project.

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

The proposed AMI meter and Leak Detection project will conserve water by reducing the demand on the OCWD water recycling and recharge Reclamation project. Additionally, it will reduce demand on the OCWD and MWD which both rely on the Colorado River which is a water basin where various Reclamation projects are located.

6) Will the project help Reclamation meet trust responsibilities to Tribes?

This project will reduce demand on the Colorado River and may provide additional water flows which may allow Reclamation to meet trust responsibilities to Tribes.

Performance Measures

Project-specific business goals have been outlined as part of the work performed during the AMI Project. These quantifiable goals, listed below, are driving the AMI Project forward at Buena Park. All metrics will be regularly revisited to quantify success of the project once completed, and will serve as key performance indicators beyond the lifetime of the project.

- **Increase customer awareness in water conservation with adoption of Customer Portal** – Since the City does not currently offer a customer portal, any adoption rate will be an improvement in this area. Ultimately, a savings of 5% of total customer demand is expected due to the portal's adoption (see next bullet).
- **Decrease in overall water usage (≥5%)** – Past results show that the utility has been able to meet the state-mandated water reduction goals. An additional 5% demand reduction is anticipated due to enhanced customer engagement with the WaterSmart customer portal. This will be calculated from a reduction in the Total Authorized Consumption for future years.
- **Elimination of manual reads (99% reduction)** – The number of reads is determined by the number of meters, or service points in use for billing utility customers. The meter reading fleet will no longer roll a truck out to perform manual reads for the City's 19,500 service points. This will reduce operating expenditures and CO_2 emissions.
- **Decrease in customer inquiries for special read requests (<4,657 re-read requests)** – High bill complaints and re-reads are costly customer service activities for utility billing staff. Currently, there are 4,657 re-read requests, which cost the utility an average of $19.41 per read. Near real-time water usage data and alerts via the AMI system will be available directly to the customer. In addition to improved customer water management, the staff efficiency savings will allow customer service staff to focus on water conservation program management and better engagement with customers.
- **Replace aging or inaccurate meters (99% reduction) –** Upon completion of the project, all 19,500 meters will be replaced and AMI equipped. This will help reduce inaccuracies in meter reading, which can occur over time and lead to waste and inaccurate billing.
- **Decrease in average unaccounted-for water (<7.62%)** – This figure is currently 7.62% as of completion of the City's 2015 AWWA report. It is calculated as (Total Water Supplied – Total Authorized Consumption) / Total Water Supplied. This figure decreases as more water is saved, which is possible through improved AMI asset management data available: to **c**atch cases of

reverse flow, zero consumption, and cut wires. Approximately 2% of the total savings predicted are expected to come from a decrease in unaccounted-for water from reduced theft, utility-side leaks and meter inaccuracy.

Environmental and Cultural Resources Compliance

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

The proposed project will not impact the surrounding environment as the work will exclusively focus on current utility property. The utility property will consist of meters and other utility assets in the field which are not part of the surrounding open spaces or animal habitats.

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?

The project area will consist of the municipal service area which is almost entirely an urban environment and will not impact the livelihood or the habitat of any endangered species.

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

This project will not have any impact on wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "waters of the United States".

When was the water delivery system constructed?

Much of the current water infrastructure in the City of Buena Park was built in the 1950s and 1960s.

Will the 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 result in any modifications to an irrigation system.

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.

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 does not plan on impacting any locations on the National Register of Historic Places.

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

The project will not impact any archeological sites in the proposed project area as it will only involve locations which are current utility assets.

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

No, in fact, the project will have a positive impact on low or minority populations as they will have access to interval water usage data and alerts to better manage their water bill.

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

This project will not limit access to and ceremonial use of Indian sacred sites or impact tribal lands.

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

This project will not contribute to the introduction, continued existence, or spread of noxious weeks or non-native invasive species known to occur in the area.

Letters of Support

Please see Appendix I for project Letters of Support from the General Managers of Orange County Water District (OCWD) and Metropolitan Water District of Orange County (MWD). These two entities are the City's water suppliers and coordinate water resource management efforts in the region.

Required Permits or Approvals

No permits or approvals are anticipated for this project as it will involve installation at current utility-owned locations. The implementation of this project will not result in earth-disturbing work, nor require use of non-City assets. The City project team plans to engage with customers to proactively share project updates and installation progress throughout the City as part of a PR campaign.

Official Resolution

The Official Resolution is expected at the January 24th 2017 City Council meeting, and therefore is not available for submission by the January 18th application deadline. The Official Resolution will be submitted within 30 days after the application deadline to Rupal Shah, Grants Management Specialist, at rshah@usbr.gov.

The Official Resolution shall verify the following:

- The identity of the official with legal authority to enter into agreement
- The board of directors, governing body, or appropriate official who has reviewed and supports the application submitted
- The capability of the applicant to provide the amount of funding and/or in-kind contributions specified in the funding plan
- That the applicant will work with Reclamation to meet established deadlines for entering into a cooperative agreement

Project Budget

Funding Plan and Letters of Commitment

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

Project funding provided by a source other than the applicant shall be supported with letters of commitment from these additional sources. This is a mandatory requirement. Letters of commitment shall identify the following elements:

(1) The amount of funding commitment

(2) The date the funds will be available to the applicant

(3) Any time constraints on the availability of funds

(4) Any other contingencies associated with the funding commitment

Commitment letters from third party funding sources should be submitted with your project application. If commitment letters are not available at the time of the application submission, please provide a timeline for submission of all commitment letters. Cost share funding from sources outside the applicant's organization (e.g., loans or state grants), should be secured and available to the applicant prior to award.

The City intends to issue a Revenue Bonds obligated by the Water Enterprise revenues in June 2017. The City does not anticipate any additional costs to be incurred before the project start date of March 2017. The City does not have additional funding from other Federal partners.

Utility Revenue Bonds are expected to be issued in January 2017. Pending City Council approval, the project will move forward and commence in March 2017. If approval is not secured, the project will be cancelled.

TABLE 8 - SUMMARY OF NON-FEDERAL AND FEDERAL FUNDING SOURCES

Funding Sources	Funding Amount
Non-Federal entities	
1. Revenue Bond	$6,694,293
Non-Federal subtotal:	
Other Federal entities	
1. N/A	$0
Other Federal subtotal:	
Requested Reclamation funding:	$300,000

**Denotes in-kind donations*

Budget Proposal

Budget Item Description	COMPUTATION $/unit	Quantity	Quantity Type	Total Cost
Salaries and Wages				
N/A				$ -
Fringe Benefits				
N/A				$ -
Travel				
N/A				$ -
Equipment				
N/A				$ -
Supplies and Materials				
AMI Network Equipment	$ 391,910.00	1		$ 391,910.00
Meters with Node (see detailed section for unit pricing)	$ 251.45	19481		$ 4,898,448.00
MDM Software	$ 56,250.00	1		$ 56,250.00
Customer Portal Software (WaterSmart)	$ 65,000.00	1		$ 65,000.00
Contractual/Construction				
Meter Installation	$ 43.21	19481		$ 841,852.00
Program Management	$ 428,160.00	1		$ 428,160.00
Other				
Contingency (5%)	$ 312,673.00	1		$ 312,673.00
Total Direct Costs				**$ 6,994,293.00**
Indirect Costs				
N/A				$ -
TOTAL ESTIMATED PROJECT COSTS				**$ 6,994,293.00**

Budget Narrative

The City is prepared to take on over 95% of the project cost, but is requesting funding from DOI to help alleviate the cost burden. If received, the $300,000 award will be spent directly on advanced metering equipment and system hardware to offset the high project cost for the Utility. The City has purposely chosen to deploy the AMI Project within a quick 18-month timeframe in order to help realize conservation benefits sooner in the project life cycle.

Salaries and Wages
No additional salaried or wage positions at the City will be part of this project effort. The City has subcontracted for Program Management services, AMI installation, and meter installation work.

The Program Manager is Mike Grisso, Assistant Public Works Director.

Fringe Benefits
No fringe benefits are included in this project.

Travel
No travel is included in this project.

Equipment
No new equipment is included in this project. All items are included in Materials and Supplies (see below).

Materials and Supplies
Equarius & Ferguson WaterWorks has provided the following cost information during the recent public procurement process at the City. All materials, supplies and labor will be supplied through contract with this entity at the rates indicated below.

TABLE 9 - AMI NETWORK INFRASTRUCTURE AND INSTALLATION

Item	Qty	Price	Total Cost
Collectors	23	$ 7,000.00	$ 161,000.00
Installation	22	$ 4,375.00	$ 96,250.00
Extendable Towers	1	$ 12,500.00	$ 12,500.00
Trimble HH and Belt Clip Receiver	1	$ 9,750.00	$ 9,750.00
MRX920 Laptop Receiver	1	$ 6,250.00	$ 6,250.00
Project Management	1	$ 62,500.00	$ 62,500.00
AMI software and integration fees	1	$ 15,000.00	$ 15,000.00
Warehousing	1	$ 13,500.00	$ 13,500.00

TABLE 10 - METER DATA MANAGEMENT, CUSTOMER PORTAL SOFTWARE, AND HOSTING FEES

Item	Qty	Price	Total Cost
MDM system	1	$ 16,250.00	$ 16,250.00
Customer Portal	1	$ 35,000.00	$ 35,000.00
Hosting fees (annual)	1	$ 70,000.00	$ 70,000.00

TABLE 11 - SMART METERS: FULL REPLACEMENT

Item	Qty	Price	Total Cost
5/8 x 3/4" (replaced with 3/4"SL)	16250	$206.25	$ 3,351,562.50
3/4" Short-Length (7 1/2" LL)	1171	$206.25	$ 241,518.75
1"	543	$250.00	$ 135,750.00
1-1/2" (PD)	567	$431.25	$ 244,518.75
2" (PD)	830	$525.00	$ 435,750.00
Turbine 3"	90	$937.50	$ 84,375.00
Turbine 4"	22	$1,062.50	$ 23,375.00
Turbine 6"	6	$1,875.00	$ 11,250.00
Turbine 10"	2	$3,750.00	$ 7,500.00

TABLE 12 - INSTALLATION SERVICES FOR SMART METERS

Item	Qty	Price	Total Cost
5/8 x 3/4" (replaced with 3/4"SL)	16250	$37.00	$ 601,250.00
3/4"SL	1171	$37.00	$ 43,327.00
1"	543	$37.00	$ 20,091.00
1-1/2"	567	$102.00	$ 57,834.00
2"	830	$102.00	$ 84,660.00
Turbine 3"	90	$227.00	$ 20,430.00
Turbine 4"	22	$302.00	$ 6,644.00
Turbine 6"	6	$852.00	$ 5,112.00
Turbine 10"	2	$1,252.00	$ 2,504.00

Contractual/Construction

The City held a public procurement for AMI installation and services from July to August 2016, and selected Equarius & Ferguson WaterWorks. This company will supply the AMI networking, meters, and installation service, and software pending contractual approval by City Council on January 24th, 2017. They are working with Neptune Technologies for AMI deployment, Equarius & Ferguson WaterWorks for meter installations and WaterSmart Software for the Customer Portal. If additional work is requested by City outside of the pricing already agreed upon for installation work, such work will be completed at an agreed hourly rate of $ 100.00 plus materials, to be billed in 15 minute increments.

The City has an existing Professional Services Agreement with UtiliWorks Consulting for work related to AMI technology assessment, procurement, and project management. Pending task order approval by City Council on January 24th, 2017, the City will move forward with UtiliWorks Consulting to perform Program Management services for the project deployment. The award is fixed fee based upon the following tasks in Table 13.

TABLE 13 - UTILIWORKS FEES

Task	Fee
Task 1: POC Project Management	$ 179,840
Task 2: Business Process Re-Engineering	$ 50,000
Task 3: Implementation Planning and Documentation	$ 64,000
Task 4: Full Deployment Project Management	$ 134,320
TOTAL	$ 428,160

Environmental and Regulatory Compliance Costs

No compliance costs are anticipated for this project.

Other

A 5% contingency cost has been included for the unanticipated additional items for this project. This may include gaskets, pipes, meter boxes, etc. that cannot be determined until the meter installation process is underway.

Indirect

No other indirect costs are included in this project.

Total Costs

The total project cost is **$ 6,994,293** and is inclusive of all services, hardware, and software associated with the AMI Project for the City.

Budget Form

See Attachment I-III for completed SF-424 forms.

Funding Restrictions

All anticipated award costs will be incurred between March 2017 – December 2018. In no case will pre-award costs incurred prior to July 1, 2016, be considered for cost-share purposes.

Appendix I – MWD Letter of Support

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Street Address:
18700 Ward Street
Fountain Valley, California 92708

Mailing Address:
P.O. Box 20895
Fountain Valley, CA 92728-0895

(714) 963-3058
Fax: (714) 964-9389
www.mwdoc.com

January 10, 2017

The Honorable Estevan Lopez
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

Re: WaterSmart: Water and Energy Efficiency Program
City of Buena Park – Advanced Metering Infrastructure Program

Dear Mr. Lopez:

On behalf of the Municipal Water District of Orange County, I am writing to express support for the City of Buena Park's application to secure WaterSmart: Water and Energy Efficiency Program Funding to institute an Advanced Metering Infrastructure Project (AMI) creating "smart" water saving solutions through technological advancement helping conserve the regions precious water resources.

By installing and implementing AMI technology, the City of Buena Park will help bring its customers into the 21st century with improved water management tools, including a customer portal, near real-time water consumption data, leak indication, and water budgeting tools that allowing customers to better manage their water usage. This real-time technology will go a long way in helping Buena Park assist customers in becoming active participants in water conservation efforts that will help meet the local and federal water conservation targets.

AMI will help to immediately address issues such as water leakage or overuse, thereby reducing water waste and improving the City's water conservation capabilities. Currently, the City is reliant on consumer calls or bi-monthly meter readings to provide system leak information. This process can lead to exponential water loss if not caught in a timely manner. The proposed AMI Project will help the City respond immediately to these and other issues helping reduce overall water waste.

This project , along with continued community engagement in long-term water conservation planning will help position the City of Buena Park to best align with State and Federal mandates for water conservation such as the 20x2020 Water Conservation Plan. It will create a model for the region on regards to technological advancements in water management practices that translates into water and energy savings.

I urge your favorable support of the City of Buena Park's application for WaterSMART: Water and Energy Efficiency funding to help conserve resources in the Orange County region.

Sincerely,

Robert J. Hunter
General Manager

Appendix II – OCWD Letter of Support

SINCE 1933

ORANGE COUNTY WATER DISTRICT
ORANGE COUNTY'S GROUNDWATER AUTHORITY

January 12, 2017

The Honorable Estevan Lopez
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

Re: City of Buena Park Water Smart and Energy Grant Application

Dear Mr. Lopez:

Orange County Water District (OCWD or District) supports the City of Buena Park's Water Smart and Energy Grant application that seeks funds to institute an Advanced Metering Infrastructure (AMI) program.

OCWD manages the local groundwater basin located in the northern half of Orange County. The City of Buena Park is one of 19 cities and retail water districts served by OCWD and is able to pump about 75% of its water needs from the groundwater basin. 75% equates to about 300,000 to 330,000 acre-feet per year of groundwater pumping.

AMI Technology provides operational benefits and greatly expands the city's response and customer service potential. Key benefits include:

- Immediate indication of customer leaks,
- Ability to quickly notify customers of potential problems, saving water and money,
- Real time meter reads – the city and the customer can see their water use anytime,
- Interactive web portal to display customer consumption data and trending,
- Supports drought response efforts including data allows for water shortage planning and curtailment,
- Accurate meter reading with minimum potential for error,
- Provides city staff the ability to be more proactive in engaging with customers service, and
- Improved billing with the option of a monthly billing cycle instead of bi-monthly

PO Box 8300
Fountain Valley, CA 92728-8300
18700 Ward Street
Fountain Valley, CA 92708
(714) 378-3200
(714) 378-3373 fax
www.ocwd.com

OCWD recognizes the importance of retail agencies such as the City of Buena Park becoming more efficient with stressed water supplies, particularly as changes in climate continue to impact rainfall in the Southern California region. This project aligns with the mission of the OCWD, which is to provide reliable, adequate, high-quality water, at the lowest reasonable cost in an environmentally responsible manner.

We urge you to support this grant application.

Sincerely,

Michael R. Markus, P.E., D.WRE, BCEE, F.ASCE
General Manager

ORANGE COUNTY WATER DISTRICT
SINCE 1933
ORANGE COUNTY WATER DISTRICT
ORANGE COUNTY'S GROUNDWATER AUTHORITY

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We urge you to support this grant application.

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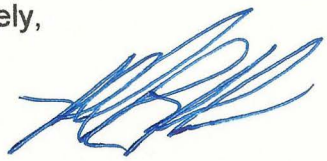

Michael R. Markus, P.E., D.WRE, BCEE, F.ASCE
General Manager

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