

CITY OF BRENTWOOD – SENSUS AMR SYSTEM UPGRADE

Attachment 3 - Work Plan

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CITY OF BRENTWOOD
2201 Elkins Way
Brentwood, CA 94513

SENSUS AUTOMATIC METER READING SYSTEM UPGRADE PROJECT
WATER-ENERGY GRANT

SUBMITTED TO THE
DEPARTMENT OF WATER RESOURCES
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PROJECT DESCRIPTION

The City of Brentwood's Sensus Automatic Meter Reading System Upgrade Project is a Water Conservation Project that would allow for accurate water meter readings to be completed from the City offices. The project would eliminate any unaccounted for water and would facilitate quick identification and repair at system leaks within hours. The project would also assist the City in identifying any unauthorized uses of water, saving approximately 244 Million Gallons per Year (MGY). The project would increase the conservation of vehicles, gasoline, and manpower by eliminating water meter reads, re-reads, and service starts and stops.

The project would be completed Citywide over the course of the next three years and would be expected to be completed by April 2018. Throughout project completion, it is anticipated that the City would realize a continual reduction in unaccounted for water by as much as 7% per year, or roughly 11,000 Acre-Feet (AF) over the life of the project.

TECHNICAL PROJECT DESCRIPTION

The City proposes to upgrade its existing Sensus drive by radio meter reading system to the Sensus Flex Net Automatic Meter Reading system, a radio frequency (RF) wireless fixed base system that transmits information via an exclusive primary use FCC licensed frequency, broadcasting up to two watts of power. The combination of power and licensed spectrum provides a greater range with minimal infrastructure, resulting in lower operating costs.

Two Tower Gateway Base stations (TGBs) are needed to collect water usage data for the City's entire water service area. One TGB will be installed on an existing antenna tower located at the Brentwood Senior Center. The other TGB will be stand-alone structure located at the Zone 2, Reservoir 2.1-2.2 site. Figure 4 presents the location of the Tower Gateway Base stations.

The project will replace the existing meter transceiver units (MXU's) with the new Flex Net 520R model. The City intends to install at least one reading cycle over the next three years.

The new meter transceiver units read water use every minute, and the data is transmitted from the meter to a central station four times a day. The City will monitor the system on a daily basis to find leaks, tampers, unauthorized use, and high consumption. A current estimate of system water savings is 244 MGY or 11,220 AF over the anticipated life of the project.

The meter read is taken from the actual positions of the odometer wheels to ensure valid up-to-date readings. Any errors or non-reads are immediately indicated. High and low reading parameters can also be verified during the meter reading process.

The conversion to the Flex Net system will promote the conservation of vehicle use, gasoline, and manpower by eliminating the need to manual read, and re-read meters, and the required starting and stopping of vehicles. With the existing system, three staff members and three vehicles are required to read the meter cycles on a weekly basis, and return trips are required to recheck high or questionable readings. With the Flex Net system, all meters will be read with accuracy within two minutes from the City's offices.

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The proposed system would virtually eliminate unaccounted for water use by identifying and addressing leaks within hours of occurrence. The proposed meters can identify if continuous water usage occurs over a programmed period of time, and can send a message to staff notifying them of the existence of a possible leak. Unauthorized use of water would also be found immediately, allowing the City to collect fees from customers who have previously not been charged.

BACKGROUND DATA

The City of Brentwood (City) is located in eastern Contra Costa County on the eastern perimeter of the San Francisco Bay Area metropolitan area of Northern California. The City is bounded to the north by the City of Oakley, to the west by the City of Antioch, and to the south and east by unincorporated Contra Costa County. Figure 1 presents the map of the City's location. The City's planning and water service area is presented in Figure 2.

WATER SUPPLY

The City receives 67% of its current water supply from surface water from the Sacramento-San Joaquin River Delta. The City receives 33% of its supply from groundwater from wells located within the San Joaquin Groundwater Basin. Customers receive a blend of surface and groundwater from these sources.

SURFACE WATER

Surface water supplies originate from the Sacramento-San Joaquin Delta. The water is treated at the City of Brentwood Water Treatment Plan (COBWTP) and the Randall-Bold Water Treatment Plant, operated by the Contra Costa Water District (CCWD). The City has first rights to 14,800 acre-feet per year (AFY) of the Sacramento-San Joaquin Delta surface water rights owned by Eastern Contra Costa County Irrigation District (ECCID) under a pre-1914 water right.

GROUNDWATER

The City is permitted for the operation of nine groundwater production wells that extract water from the San Joaquin Groundwater Basin. Seven wells are currently active and have a combined capacity of 6.7 million gallons per day (MGD).

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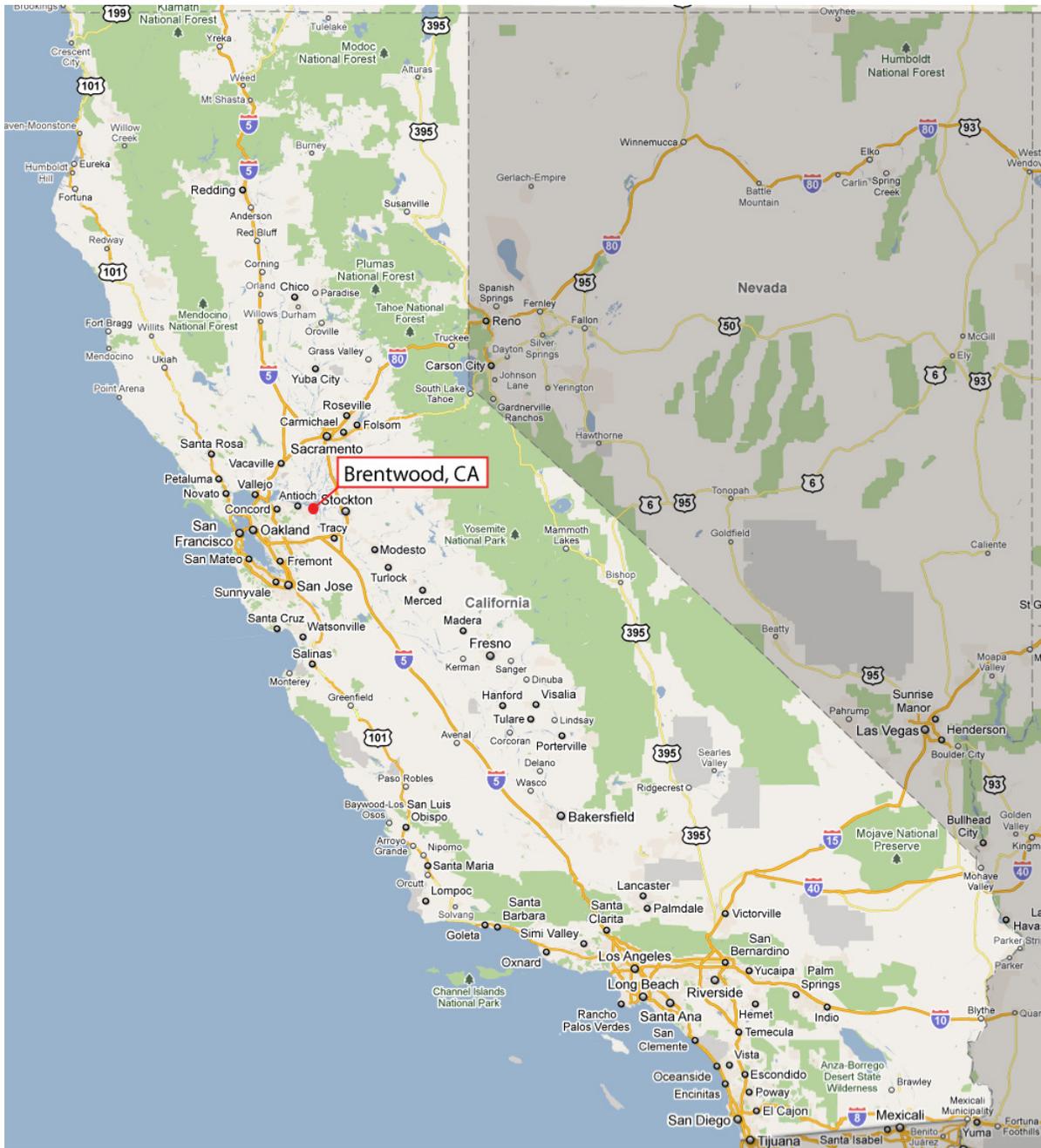


FIGURE 1 CITY OF BRENTWOOD LOCATION MAP

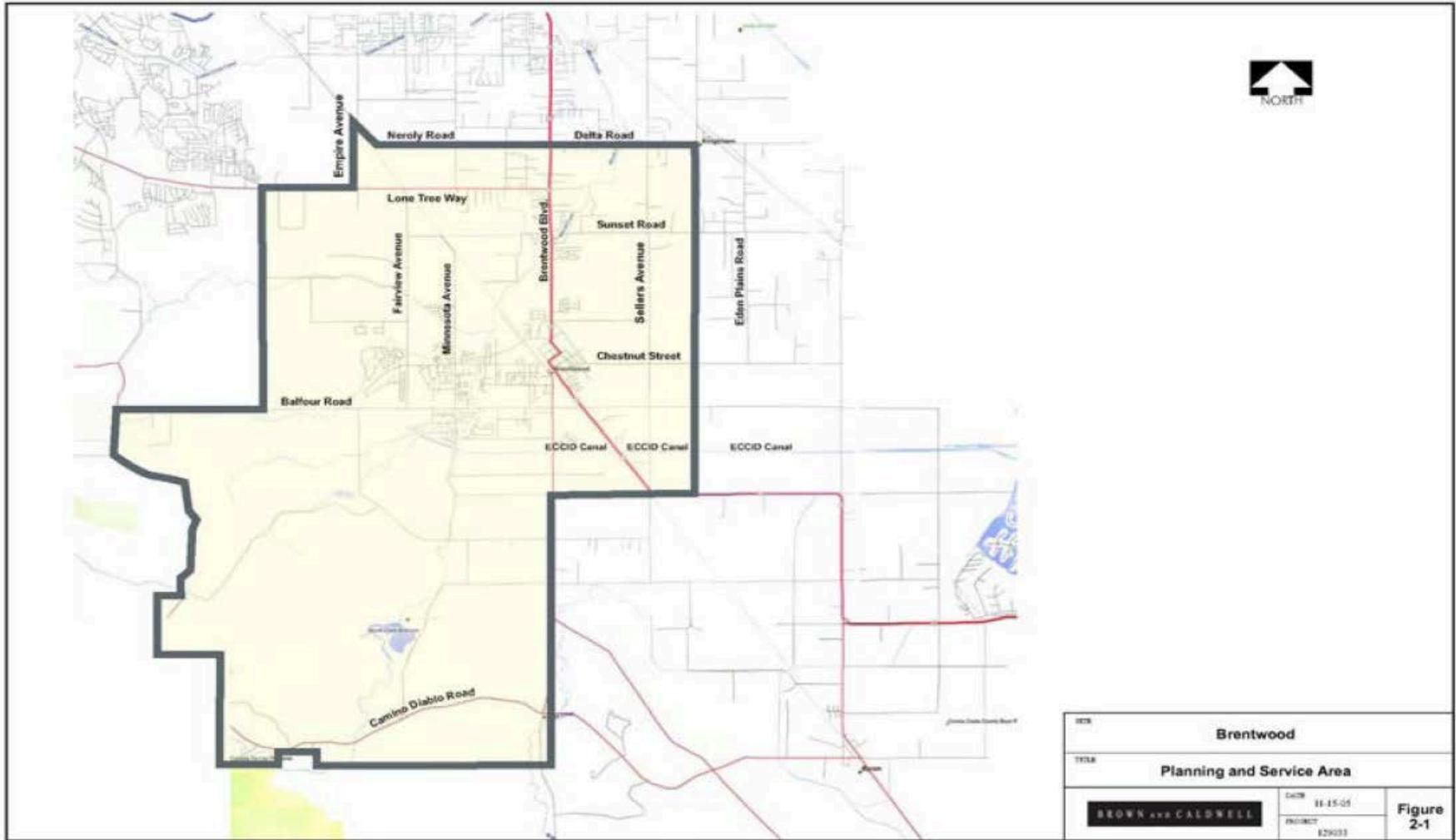


FIGURE 2 PLANNING AND WATER SERVICE AREA MAP

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WATER DEMAND

The City provides water to the following water customer class/ sectors:

- Single-Family Residential
- Multi-Family Residential
- Commercial/Industrial
- Landscape
- Hydrant-construction water

Table 1 presents the 2013 water demands for each customer class/sector.

Table 1
Water Demand for Year 2013

Water Use Sector	Number of Accounts	Demand (MG)
Single-Family Residential	16,364	2,696
Multi-Family Residential	58	113
Commercial/Industrial	496	200
Landscape	558	1,076
Hydrant-construction	53	19
Total	17,529	4,103

Table 2 presents the City's projected Water Demand for years 2015 -2025.

Table 2
Projected Water Demand

Water Use Sector	2015 Demand (MG)	2020 Demand (MG)	2025 Demand (MG)
Single-Family Residential	2,619	2,780	2,921
Multi-Family Residential	97	103	108
Commercial/Industrial	392	416	437
Landscape	367	389	409
Hydrant	16	16	16
Total	3,491	3,704	3,891

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UNACCOUNTED FOR WATER USE AND LOSSES

Unaccounted for water use is unmetered water used for fire protection and training, system flushing, sewer cleaning, construction, system leaks, and unauthorized connections. Unaccounted for water also results from meter inaccuracies. System losses have been estimated as 244 MGY, or 7% of the total water production.

DISTRIBUTION SYSTEM

The City's Water System supplies water to approximately 18,000 water connections with a population of 54,741. The service area is primarily residential, with small areas of commercial, office, and industrial land uses. The City land use plan has numerous parks, large areas of agriculture conservation, and special planning areas that are otherwise undeveloped.

The City's water distribution system consists of three pressure zones, one water treatment facility, nine active groundwater wells, six water reservoirs, seven water booster pump stations, and 266 miles of water main pipeline located throughout the City limits. Water treatment is provided at the City of Brentwood Water Treatment Plant and the Contra Costa Water District's Randall Bold Water Treatment facility. The majority of the water pipelines were originally constructed in 1940 with sizes ranging between 4 to 10 inches in diameter. Larger diameter pipelines have been constructed more recently including pipelines up to 30-inches in diameter. Figure 3 presents a schematic of the City's water distribution system network. Tables 3 and 4 describe the City's storage tanks and pump stations. The City maintains an active Operations and Repair team focused on the maintenance and repair of the distribution system.

AUTHORIZATION

This Project has the support of the City Council and has been described within the City's approved Capital Improvement Program. The City plans to adopt a resolution supporting the project and this Grant application at its regularly scheduled meeting, January 13, 2015. The draft of the resolution is included in Attachment 1 of this grant proposal package.

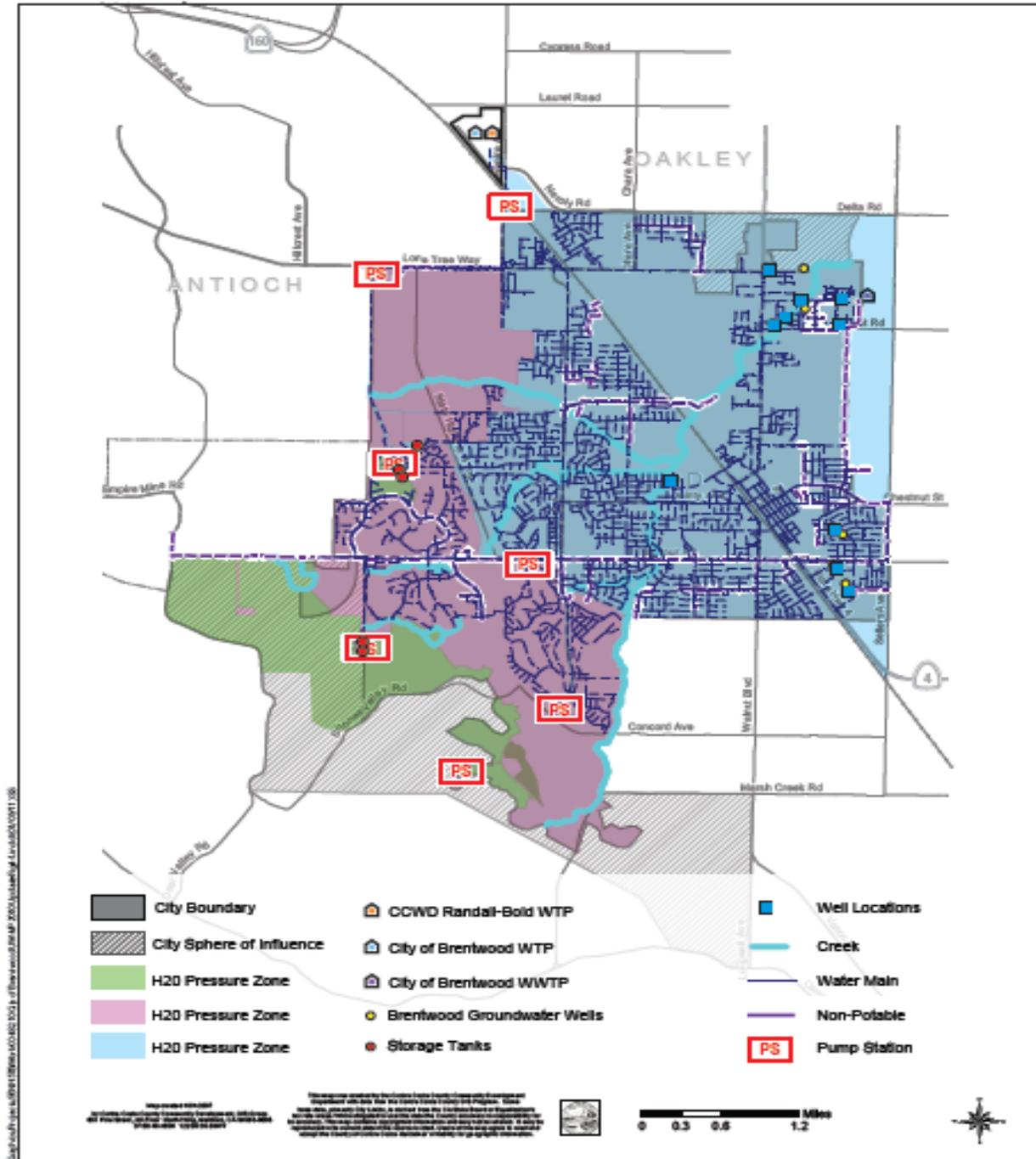


FIGURE 3 CITY OF BRENTWOOD WATER DISTRIBUTION SYSTEM

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TABLE 3
Storage Tank Description

Pressure Zone	Tank Name	Storage Capacity (MG)
Zone 1	Res No. 1.1	2.4
	Res No. 1.2	4.3
	Res No. 1.3	4.0
	Res No. 1.4	5.0
	Res No. 1.5	5.0
Zone 2	Res No. 2.1	2.0
	Res No. 2.2	2.0
	Res No. 2.3	4.0
	Res No. 2.4	3.0
Zone 3	Res No. 2.1	2.0
TOTAL		18.7

TABLE 4
Pump Station Description

Zone	Station Name	Total Pumping Capacity (MGD)
Zone 1	PS 1.1	36
	PS 1.2	Out of Service
Zone 2	PS 2.1	3.6
	PS 2.2	2.3
	PS 2.3	3.9
Zone 3	HPS 3.1	0.65
	HPS 3.2	2.0
	HPS 3.3	4.0
TOTAL		52.45

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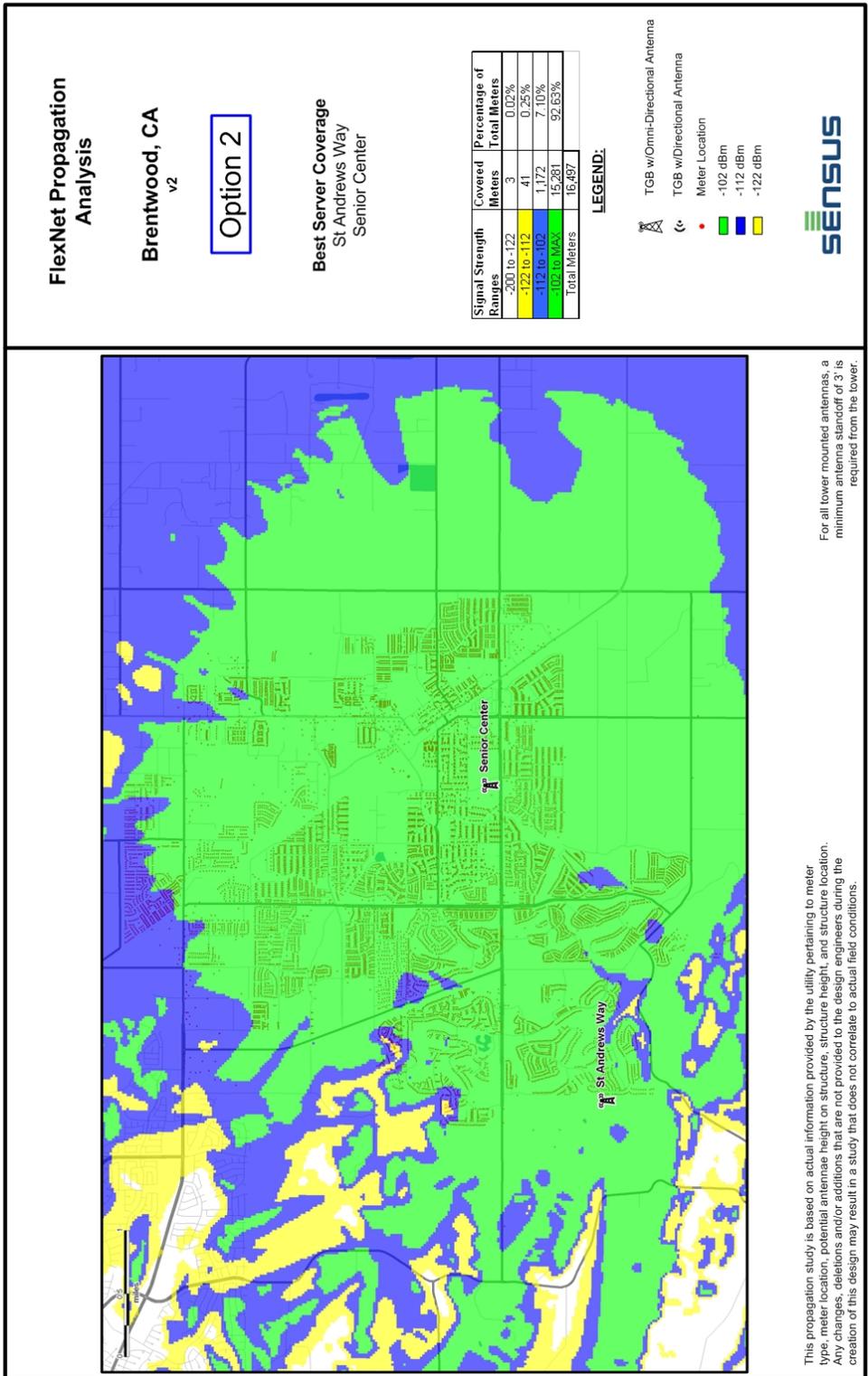


FIGURE 4 PROPOSED TOWER BASE STATION LOCATIONS

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EVALUATION CRITERIA

WATER CONSERVATION/IMPROVED WATER MANAGEMENT

The estimated amount of water expected to be better managed as a result of this project is 748 acre-feet per year (AFY) or 11,220 AF over the 20-year life of the project. The water expected to be saved currently is lost through leaks or unaccounted for connections. The water to be conserved will be available for other users and will provide benefit to the Sacramento San Joaquin Delta habitat. The City's average annual water supply is 10,802 AFY. The amount of water expected to be better managed as a percentage of the average annual water supply is calculated as:

$$\frac{\text{Estimated Amount of Water Better Managed}}{\text{Average Annual Water Supply}} = 7\%$$

PERCENTAGE OF TOTAL SUPPLY CONSERVED

The estimated amount of water expected to be conserved as a result of this project is 748 AFY. The City's total supply is 22,100 AFY. The amount of water expected to be conserved as a percentage of the City's total water supply is calculated as:

$$\frac{\text{Estimated Amount of Water Better Managed}}{\text{Total Supply}} = 3\%$$

ENERGY-WATER NEXUS

INCREASING ENERGY EFFICIENCY IN WATER MANAGEMENT

The following efficiencies are expected to result from the implementation of the Sensus Automatic Meter Reading System Upgrade Project:

- Reduced water treatment and groundwater pumping.
- Reduced vehicle use by eliminating on-site meter reads and re-reads.
- Reduced diversions from the Sacramento San Joaquin Delta. Reduced pumping from the Delta promotes better basin management and availability to all pumpers during drought conditions. In addition, the reduced diversions allow for more flow available for in stream, public trust and protection of environmental species act purposes.

The project would eliminate the need for 3 vehicles to operate for 8 hours each week. Each vehicle would travel approximately 15 miles, consuming approximately 15 miles/gallons. The project would eliminate the consumption of approximately 2,340 gallons of gasoline per year. The project would provide efficiencies that may reduce the number staff required for meter readings.

All assumptions in Attachment 2 (Estimate of Water Savings, Energy Savings, and GHG Emissions Reduction) are derived from the estimates in this work plan.

OTHER CONTRIBUTIONS TO WATER SUPPLY SUSTAINABILITY

The project will provide the City with the opportunity to reduce or eliminate its unaccounted for water by immediately identifying and repairing leaks, overuse, and unauthorized uses of water.

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The project will allow previously unaccounted for water for other water potable water uses within the City, and may reduce the water supply required from the San Joaquin Delta, improving habitat for endangered species. Similarly, decreases in pumping from the San Joaquin Groundwater Basin will facilitate better overall management of the basin to all pumpers, including the City and thereby assist in greater availability of groundwater to meet drought conditions.

The project will increase the awareness of water conservation and efficiency within the community. With staff not required to be out in the field to read and monitor meters, staff is available to assist customers identify overuse and to provide customers with increased support to manage their water use.

IMPLEMENTATION AND RESULTS

PROJECT PLANNING

The City has an on-going water conservation program and has established water conservation Demand Management Measures (DMMs).

The City has completed preliminary engineering for the project in determining appropriate Tower Gateway Base station locations and compatibility with the City's existing radio communications system.

The project helps the City meet the Enactment of California's Water Conservation Act of 2009, SBx7-7 as mandated in the Water Code (Section 10608.20) a 20% per capita water reduction by the year 2020. The project would reduce overall water demands by 7%, which would be a portion of the required 20% per capita reduction. The project will assist the City in identifying a more accurate base water demand for future water supply planning.

READINESS TO PROCEED

The project is ready to proceed upon entering into a financial assistance agreement. Project planning and design are complete. As the project would be considered an Operations and Maintenance improvement, no delays are expected as the result of environmental compliance. No permits are required for implementation of the project.

PERFORMANCE MEASURES

The proposed Sensus Automatic Meter Reading System Upgrade Project will provide greater accuracy to the City's existing meter reading system. Actual water saved will be the performance measure that will be used to quantify the actual benefits of the project. The City will be able to monitor leaks and other unaccounted for water with the upgraded system, and compare those to pre-project conditions. It is anticipated that the project would present a water savings of 7% of the pre-project conditions.

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ENVIRONMENTAL COMPLIANCE

IMPACTS TO THE SURROUNDING ENVIRONMENT

The project is not anticipated to result in any negative impacts to the surrounding environment. No earth-disturbing work will be completed and no work would be done that affects the air, water or animal habitat in the project area. Work will be done within existing disturbed areas at existing meter boxes and distribution facilities.

IMPACTS TO WETLANDS

No wetlands or other surface waters inside the project boundaries fall under the Federal Clean Water Act jurisdiction as “waters of the United States”. Additionally, no isolated waters previously under the regulation of the CWA and under the regulation of the State of California would be impacted.

AGE OF SYSTEM

The water distribution system was originally constructed in 1940.

IMPACTS TO IRRIGATION SYSTEM

The project will not result in the modification of or effects to any irrigation system.

IMPACTS TO LISTING ON NATIONAL REGISTER OF HISTORIC PLACES

No buildings, structures, or features in the distribution system are eligible for listed on the National Register of Historic Places.

IMPACTS TO ARCHAEOLOGICAL SITE

There are no known archaeological sites in the proposed project area.

IMPACTS TO ENVIRONMENTAL JUSTICE

The project does not have a disproportionately high and adverse effect on low income or minority populations.

IMPACTS TO CULTURAL RESOURCES

The project does not limit access to and ceremonial use of Indian sacred sites or other impacts on tribal lands.

IMPACTS TO NATIVE SPECIES

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

EXPECTED MITIGATION MEASURES

No mitigations are expected to be required to lessen environmental impacts of the project.

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REQUIRED PERMITS OR APPROVALS

No additional permits or approvals would be required for implementation of the project.

FUNDING PLAN

The City Council approved a FY 2014/15 – 2018/19 Capital Improvement Program (CIP) Budget on May 27, 2014. The CIP Budget allocates City funding for improvements throughout the City's services including the water distribution system. CIP funds are primarily gained through revenue from development fees. Development activity is forecast for the next five years to determine the amount of fees available for the funding of projects in the CIP. Costs for this Project not obtained from the 2014 Water-Energy grant would be funded by the City's CIP Budget allocation for the Sensus AMR System Upgrade Project in the amount of up to \$150,000 for FY 14/15 and \$175,000 for FY 15/16, FY 16/17, and FY 17/18. These funds are readily available for expenditure for Project costs through 2018. There are no constraints to the availability of the funds.

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