

WaterSmart
Water and Energy Efficiency Grants for FY 2018
OPPORTUNITY # BOR-D0-18-F009

TITLE: Installation of Automated Canal Headgates to Increase Operational Efficiency

APPLICANT:

Placer County Water Agency
PO BOX 6570
Auburn CA, 95604

PROJECT MANAGER:

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Technical Proposal and Evaluation Criteria

Executive Summary

July 30, 2018

Applicant: Placer County Water Agency

Auburn

Placer County

California

In 2015, PCWA installed three Rubicon automated gates on smaller branch canals. The installation resulted in stable flows into the branch canals, consistent deliveries to raw water customers, and a reduction of unrecoverable losses from the canal ends. For this project, USBR funding, matched with Placer County Water Agency (PCWA) funds and in-kind services, proposes to install five automated headgates, manufactured by Rubicon Water, at the heads of five canals. The automated headgates will modulate as conditions change in the main canal, reducing over/under deliveries into the branch canals, and potentially reduce irrecoverable water losses from the ends of the project canals. As the raw water distribution communication network is installed, these Rubicon headgates, and others, will be incorporated into the existing SCADA system to allow for remote monitoring and control.

Once the funding agreement with USBR has been finalized, work is expected to begin in the fall of 2018, or early 2019.

None of the locations for automated headgate installations are located on Federal lands or facilities.

Background

Placer County Water Agency (PCWA) operates a 164 mile raw water conveyance system that had it start as a water conveyance system during the California gold rush, later conveying water to irrigate fruit trees and other crops. The raw water conveyance system is comprised of earthen canals (50.5 miles), lined canals (67.4 miles), pipe (44.6 miles – AC, Steel, Ductile Iron), and flumes (1.5 miles), to deliver raw water to several private water treatment plants, eight PCWA Water treatment plants, and raw water customers. There are over 4,000 service connections to the raw water conveyance system, delivering raw water to agricultural customers for Christmas trees, citrus, wine grapes, nurseries, stock watering, flowers, small farms, and to private citizens for irrigation of hobby gardens, landscape, green belts, and other general irrigation purposes. The total number of actual irrigated acres of land that receives water from the raw water canal system is unknown, PCWA has a current, California Prop 1 State funded grant project, using aerial imagery analysis to calculate this amount.

The primary source of raw water is surface water through agreements with Pacific Gas and Electric (PG&E) Drum/Spaulding hydroelectric project. PCWA service area begins in the Sierra Foothills near the community of Alta California, at an elevation of 3,745 feet. Generally flowing from the east to west to an elevation of 285 feet in Roseville, California. Other sources of water include groundwater wells (used only during water supply shortages), pre-1914 water rights, and the Middle Fork Project, a hydroelectric project owned and operated by PCWA on the Middle Fork of the American River in Placer County.

Surface water supplies for PG&E and PCWA are dependent upon precipitation to refill reservoirs, especially as accumulated snow. The snow pack acts like an additional reservoir, providing water storage, slowly melting to maintain reservoir levels into June or early July. With climate change, more precipitation is expected to fall as rain, effectively reducing the amount of water stored as snow, potentially reducing the amount of water available in the later summer months. Any water conserved from this project has the potential to remain in storage for use later in the year, or be available for hydroelectric generation. Actual fate of any conserved water that remains in PG&E storage is dependent upon operation of the PG&E Drum/Spaulding hydroelectric project. There is a potential that some of the conserved water will flow into Folsom Reservoir, a USBR operated reservoir. This again is dependent upon PG&E Drum/Spaulding Hydroelectric Operations.

Project Location

Placer County is located approximately 30 miles north east of the California State capital of Sacramento, with its eastern boarder ending at the Nevada State line at Lake Tahoe (see map at end of this application). The headgates will be installed at four different locations in the western portion of the PCWA service area. Each area is locally identified as an YB point. (See attached .kmz file)

Lat/Long of each project location:

YB 70 – 38°55'15.30"N -121°04'58.74"W (two gates to be installed at this location)

YB 147 - 38°53'10.64"N -121°04'18.10"W

YB 180 – 38°51'45.84"N -121°07'6.27"W

YB 149 - 38°49'20.51"N -121°08'15.22W

Technical Project Description

Currently, the heads of each of the project canals has a manually operated headgate or check boards, that are adjusted by the canal operator, generally once a day, after a flow change in the main canal, or changes in demand in the branch canal. Water usage in the main and branch canals varies throughout the day, causing increases and decreases in water level, which causes under or over deliveries into the branch canal. Under deliveries result in customers at the end of the branch canal not receiving water; an over delivery in the branch canal results in unrecoverable water loss at the end of the canal. The installation of automated headgates will modulate, as needed, to maintain a constant flow into each of the project branch canals, regardless of the water level in the main canal, resulting in reduced unrecoverable losses at canal ends. This headgates for this project will assist PCWA in better managing an average of 15,000 acre feet of water per year.

PCWA annually allocates funds to increase the efficiency of the operation of the raw water conveyance system. Initially, this was accomplished by lining earthen canals with gunite, a cement sand mixture that is “shot in place” to the canal bottom and sides. This has resulted in a substantial reduction of unrecoverable water loss and increase in efficiencies in delivering raw water. Reductions in unrecoverable water losses reduces or delays the need to develop additional sources of supply to meet new demands.

Seeking to continue along the path of increasing the efficiency of the raw water system, PCWA installed three solar powered Rubicon Automated gates, two “SlipMeter” gates and one “Flume” gate, as a pilot project to assess their applicability to the PCWA Raw Water conveyance system. After the installation of each gate, there was an immediate reduction in the number of “no water” instances from customers and a reduction of unrecoverable water loss from each of the canal ends. These headgates are currently being integrated into the Raw Water SCADA system, the ends of the canals will be monitored and the headgates adjusted in real time by the host computer to further minimize unrecoverable releases from the canal ends. Each of the automated headgates have included instrumentation that allows them to be used as flow and totalizing meters.

The ends of two canals included in this project return water the main canal, so there will not be any unrecoverable water loss directly from these canals, but this is an unknown amount of water retuning to the main canal. Because the amount of returned water can vary, the main canal must be operated in a manner that does not account for this returned water, allowing the returned water to be released at the end of the main canal as an unrecoverable water loss. This project seeks to minimize the return flow from the project canals into the main canal, reducing overall unrecoverable water loss.

This project will install four Rubicon SlipMeter and one Flume gate automated headgates to regulate the inflow to each of the project canals listed above, normalizing over/under inflows into the project canals. PCWA Field Service Division crews will construct mounting frames for each Rubicon headgate, then remove the existing, manually operated, headgates and, if needed modify the canal to accept the mounting frame. Under the supervision of Rubicon Water personnel, PCWA crews will install the automated headgates. Rubicon Water personnel will then commission the gate, making it operational. Installation of the headgates are expected to begin in the fall of 2018 and be complete by late spring of 2019.

Once each gate is installed and operational, the gate will be controlled in “Local” mode; the canal operator must make any changes at the gate, no remote control or monitoring. When PCWA canal operators visit the gate location, they record the current rate of flow, and adjust the desired flow set point as needed. The gate will then maintain the set flow within plus or minus 0.2 cubic feet per second.

Concurrently with this project, PCWA will be designing communication infrastructure to allow for remote monitoring and control of the installed headgates, future headgate installations, and other monitoring sites within the raw water distribution system. The remote monitoring and control of the automated headgates will allow the canal operator to make changes to the operation of the canal from the office, or remote location. This will also allow for the canal operator to schedule a gate to open or close at a desired time, permitting the canal operator to schedule increases/decreases of the inflow to a canal to match customer demand patterns, potentially reducing unrecoverable water losses further. Remote operation of automated headgates will allow the canal operator to respond to changing conditions remotely, saving considerable travel time to get to the site.

Project Implementation

PCWA annually budgets to improve the raw water conveyance system. Ongoing improvements include, but are not limited to: lining earthen canals with gunite; replacing lined sections of canal that have reached or exceeded their expected service life; encasing sections of canal in pipe; installing automated headgates; adding monitoring locations to the SCADA system. Grant funding allows PCWA to leverage limited funds to accomplish projects, such as this proposed project, at an improved pace.

Once funding for this project is awarded, PCWA Field Service crews will begin ordering the headgates and materials. Once PCWA receives notification of the delivery date of the Rubicon headgates, a firm schedule for installation will be finalized and canal outages scheduled.

The majority of work is expected to occur between January 1 and April 15, 2019, prior to increased summer irrigation demands. It is expected to take two days to install each headgate; one day to prepare the canal, and one day to install and commission the headgate.

Because all of the work will be performed within a small radius of the existing headgate, and earth disturbance will be minimal, no permits are expected to be required. Prior to any work, the PCWA Environmental Scientist will visit and evaluate the work site(s), following the PCWA Natural Resources Management Plan, to determine if any mitigation measures must be taken prior to construction.

Nexus to Reclamation

During the operation of the PG&E Drum/Spaulding Hydroelectric Project, water stored in the upper PG&E reservoirs can flow into Folsom Reservoir, a USBR operated reservoir. There is a potential that all or a portion of the water conserved with this project could enter Folsom Reservoir. The fate of the conserved water is dependent future PCWA demands and how PG&E operates their Hydroelectric Project.

Department of Interior Priorities

This project is part of an overall goal to modernize and fully automate the raw water conveyance system to improve the efficiency of water deliveries by being able to respond to changes as they occur; to monitor and control the automated headgates, and reduce unrecoverable losses.

Project Budget

PCWA is seeking grant funding for the purchase of the Rubicon automated headgates, up to the maximum available from this funding opportunity.

The non-Federal funds for this project will be in the form of:

- In-kind services include, but is not limited to:
 - Labor for Project Management/Administration/Reporting;
 - Labor/equipment/materials needed to construct the automated headgate mounting frames;
 - Labor/equipment/materials needed to remove existing manual headgate and prepare the canal to receive the automated headgate;
 - Labor/equipment/materials needed to install headgates
 - Any “shot in place” gunite needed for a complete project;
 - Cost incurred for the purchase of the Rubicon Headgates in excess of awarded grant funds
 - Other expenses as they occur

See detailed budget below

PCWA matching funds are currently available in the 2018 Field Service Operations budget. There are no identified constraints to the funding for this project.

See attached letter of commitment of funds for this proposed project.

Table 1

FUNDING SOURCES	AMOUNT
Non Federal Entities	
1. Placer County Water Agency *	\$122,368.42
2.	
Non-Federal Total	\$122,368.42
Other Federal Entities	
1.	
2.	
Other Federal Total	
REQUESTED RECLAMATION FUNDING	\$75,000

Budget Narrative

Construction

At a minimum, three of the headgate installations will require Placer County Water Agency (PCWA) personal to fabricate an aluminum frame that will attach to the canal walls to provide a location for the Rubicon mounting frame to be attached.

When attaching the fabricated frames to the canal, an application of gunite, a cement sand mixture that is “shot in place”, may be required to build up and shape the sides of the canal in a manner to create a mounting surface for the frame. Gunite is applied by an on-call contractor on an as needed basis. Gunite is billed at a flat rate based on the amount, measured in cubic yards, of material “shot in place”. The current 2018 rate is \$399.25 per cubic yard. Gunite costs may increase by 5% in 2019.

PCWA crews will then install the Rubicon headgates, under the supervision of a representative of Rubicon Water (the gate manufacture) to insure that the headgate is installed according to specifications and will function as designed.

A representative from Rubicon Water will then commission the gate. Commissioning includes calibration of water level and gate position sensors, initializing the control software, initial gate control set points, and operating the gate between full open and full close positions to confirm functionality.

Salaries and Wages

All PCWA employees that perform any work directly related to this project will be accounted for as In-Kind services. For the development of the budget, the highest hourly wage for each position that is expected to work on this project is used to calculate the total projected labor costs. Actual amounts paid to the employee, including fringe benefits, will be reported on the reimbursement requests.

Fringe Benefits

PCWA employees are paid a salary or hourly wage commensurate with their current job title and wage step. PCWA employees are also provided with fringe benefits. The amount of fringe benefit paid to each employee varies from pay period to pay period due to how the benefits are calculated each pay period.

For the development of this project budget, the fringe benefits are estimated to be 30% of the positions top earning step. When filing a reimbursement claims, actual amounts paid to the employee(s) for time worked on the project and fringe benefits paid will be reported.

Travel

No travel expenses are expected, nor will any travel expenses be included with this project.

Equipment

No new equipment will be purchased or rented for this project. Only equipment currently in the PCWA inventory and fleet will be used.

Materials and Supplies

All materials and supplies will be In-kind expenses. PCWA will be purchasing various materials and supplies to fabricate the mounting frames for the Rubicon headgates. Miscellaneous supplies may include: gunite, reinforcing wire for gunite applications to stabilize the finished work, red wood lumber, sack concrete, and Ductile Iron pipe.

Contractual

All contractual costs will be In-Kind expenses. PCWA will use an established “on call” contractor to apply gunite to those areas directly related to the Rubicon headgate installation. Costs for gunite applications that occur at the same time and location as the project, but are not directly related to the project, will be excluded from reimbursement claims.

The commissioning of the Rubicon Headgates will be an in-kind expense.

Environmental and Regulatory Compliance Costs.

Though no compliance costs are expected with this project, any that may occur will be considered in-kind costs. All work performed will follow the Best Management Practices from the PCWA Natural Resources Management Plan for construction activities in or near the canal system.

Further, a PCWA Environmental Scientist will evaluate each work location and determine if any additional measures are to be taken to comply with and environmental or regulatory rules or regulations and file any required documentation with the respective regulatory agency prior to any work being performed.

Other Expenses

No other expenses are expected with this project. If such expenses occur, they will be documented, but not included with any reimbursement requests.

Indirect Costs

PCWA does not have a Federal negotiated indirect cost rate and will be using the *de minimis* rate of 10%.

Total Project Costs

This project has a total estimated project cost of \$197,368.42. \$75,000 from WaterSmart Funding and \$122,368.42 from PCWA funding in the form of: In-Kind services (labor and indirect costs), equipment costs (PCWA equipment and rental), materials, gunite, and monetary contributions.

Detailed Budget

Budget Item Description	Computation		Quantity		TOTAL COST
	\$/unit	Quantity	Type		
Salaries and Wages					
Project Manager					
Randy Cox - Water Management Specialist	\$ 42.03	100	Hour		\$ 4,203.00
Service Worker	\$ 34.69	140	Hour		\$ 4,856.60
Service Worker	\$ 34.69	140	Hour		\$ 4,856.60
Maintenance Worker 2	\$ 30.69	140	Hour		\$ 4,296.60
Maintenance Worker 2	\$ 30.69	140	Hour		\$ 4,296.60
Environmental Scientist	\$ 53.65	20	Hour		\$ 1,073.00
Right of Way Technician	\$ 36.41	8	Hour		\$ 291.28
Estimated Fringe Benefits					
(Actual costs to be reported when occurred)		30%			\$ 7,162.10
Equipment					
Large Truck	\$ 25.00	100	Hour		\$ 2,500.00
Large Truck	\$ 25.00	100	Hour		\$ 2,500.00
Excavator	\$ 17.00	40	Hour		\$ 680.00
Compressor	\$ 27.00	20	Hour		\$ 540.00
Backhoe	\$ 54.00	20	Hour		\$ 1,080.00
Dump Truck	\$ 43.00	20	Hour		\$ 860.00
Materials					
80# Sack Concrete	\$ 3.40	125	Each		\$ 425.00
Rough Cut Redwood (2x12" x 12')	\$ 7.13	180	Feet		\$ 1,283.40
1/4" Angle Aluminum (4" x 4" x 12')	\$ 183.46	10	Each		\$ 1,834.60
1/4" Channel Aluminum (1 1/2" 6" x 12')	\$ 183.46	10	Each		\$ 1,834.60
Gunite	\$ 399.25	22	Yards		\$ 8,783.50
4" x 4" Reinforcing Wire	\$ 1.02	200	Feet		\$ 204.00
24" Ductile Iron Pipe	\$ 85.87	40	Feet		\$ 3,434.80
Material Contingency	\$ 2,100.16	1	Each		\$ 2,100.16
Rubicon SlipMeter 4 foot opening	\$ 29,840.00	1	Each		\$ 29,840.00
Rubicon SlipMeter 2 foot opening	\$ 19,150.00	3	Each		\$ 57,450.00
Rubicon Flume Gate 4 foot opening	\$ 25,540.00	1	Each		\$ 25,540.00
Rubicon Gate Comissing	\$ 1,500.00	5	Each		\$ 7,500.00
TOTAL DIRECT COSTS					\$ 179,425.84
Indirect Costs					
Default de minimis rate of 10%		10%			\$ 17,942.58
TOTAL ESTIMATED PROJECT COSTS					\$ 197,368.42

Environmental and Cultural Resources Compliance

- Will the proposed project impact the surrounding environment?
 - The work locations for the installation of the Rubicon headgates are not expected to adversely impact the surrounding areas. The installation of two headgates are not expected to result in any earthwork, only the drilling of six to twelve 3/8 inch holes into the existing concrete
The remaining headgate installations will require the removal of existing gunite, reshaping of the canal and placement of new gunite. Earthwork will be minimal and limited to the canal and berms, typical to regular PCWA canal maintenance activities.
- 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?
 - No known species or critical habitats are known to occur at or near any of the project work areas. Each project work area will be visited by the PCWA Environmental Scientist prior to construction to insure that no listed or endangered species or critical habitats may be present.
- Are there wetlands or other surface water inside the project boundaries that potentially fall under CWA jurisdiction?
 - There are no wetlands or other surface waters within or potentially within the project boundaries. Each of the project work sites are directly on the canal, or canal berm.
- When was the water delivery system constructed?
 - The canal system began in 1855 to provide water needed for hydraulic mining. In 1910 PG&E purchased the reservoirs and canal system and began installing hydroelectric generators, and deliver raw water to supply western Placer County agriculture. Gradually, the canals also delivered water to a treatment plants for a growing urban population.
In 1967, PCWA formed Zone 1 by purchasing the lower treated and raw water system from PG&E, later purchasing the upper zone 3 treated and raw water system. Today, there are 164 miles of raw water conveyance and over 600 miles of treated water distribution pipes.
- Will the proposed project result in and modification of or efforts to, individual features of the irrigation system?
 - This project is replacing existing headgates and check boards with an automated headgates. Each of the existing headgates was installed or replaced within the last 30 years with headgates that were purchased “off the shelf” as a stock offering from a headgate manufacture. Since the existing headgates have been installed, no modifications have been made other the normal replacement of worn parts.
- Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic places?
 - None are known to exist within the raw water distribution system. All features within the raw water distribution system have been continually maintained or

replaced since before PCWA took ownership of the water system in 1967 as part of ongoing efforts to decrease water loss and increase efficiencies.

- Are there any known archeological sites in the proposed project area?
 - There are no known archeological sites in the proposed project area. Construction activities are expected to be limited to a 30 foot radius of the existing headgate.
- Will the proposed project have a disproportionately high and adverse effect on low income or minority population?
 - No. This project will not affect any populations of any sort. This project strives to increase the efficiency of raw water deliveries to customers and potentially reduce irrecoverable water losses.
- Will the proposed project limit access to and ceremonial use of Indian sacred sites or result on other tribal lands?
 - No, this project will not restrict access.
- Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native species known to occur in the area?
 - No, there are no known noxious weeds or non-native species known to occur at or near any of the proposed work locations. PCWA Brush and Weed control division continually manages all weeds and vegetation, and access routes to each of the project headgates to facilitate operation and maintenance of the headgates. Weeds and vegetation is also managed for the safety of the canal operators to deter snakes and insects from the areas around the headgates.

Required Permits or Approvals

Permits and approvals are not expected to be needed for this project as all activities are within the canal, canal berm, and PCWA operated facilities. No work is expected to be performed within a State or County, or Railroad right-of-way, negating the need for encroachment permits.

If the need for a permit is identified during the process, all rules and procedures to obtain the permit will be followed prior to any work continuing.

Official Resolution

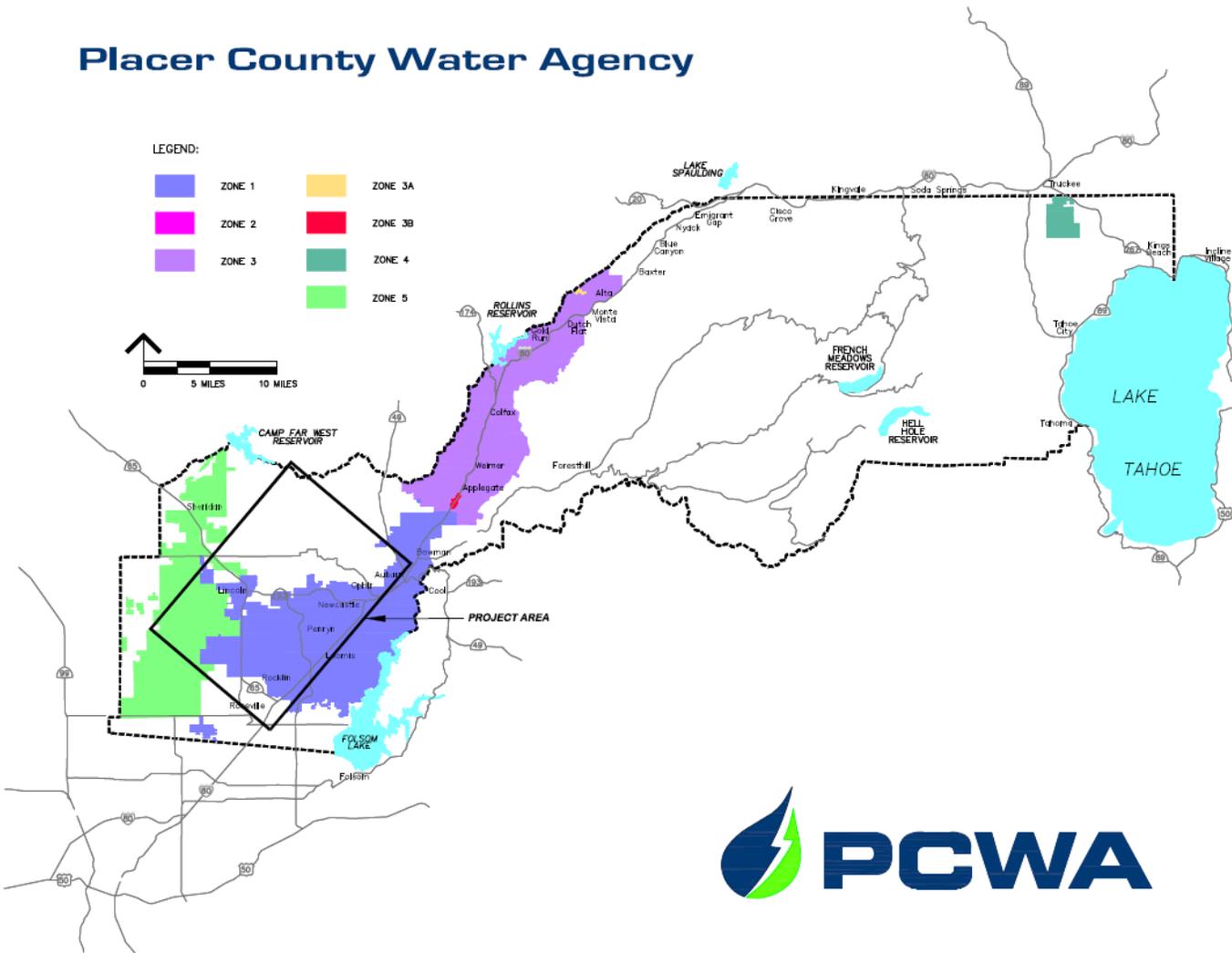
An official resolution cannot be submitted by the application deadline. A resolution will be presented to the PCWA Board of Directors at a regularly scheduled Board meeting in August 2018.

Map of Project Area

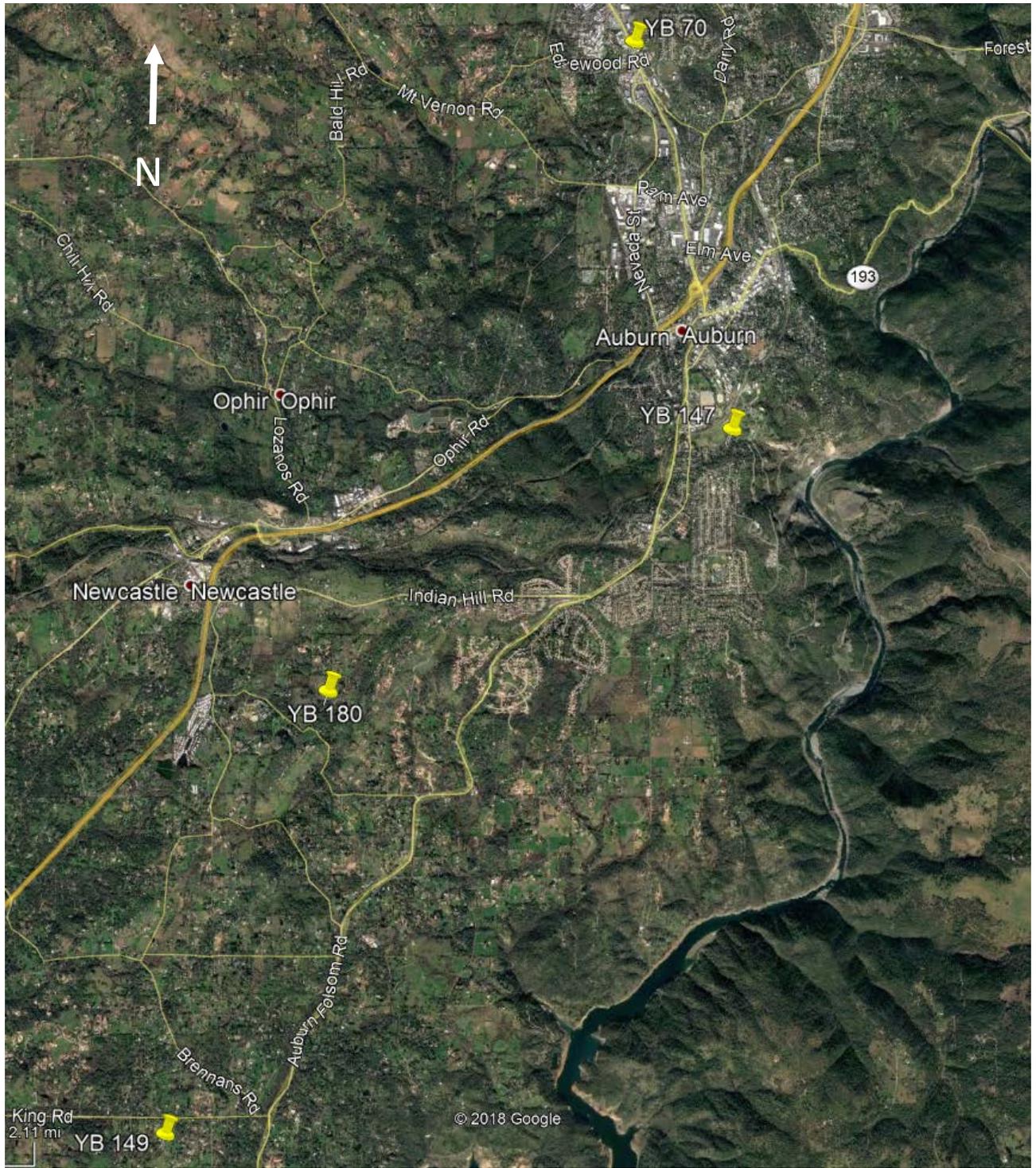
Placer County Water Agency

LEGEND:

- ZONE 1
- ZONE 2
- ZONE 3
- ZONE 3A
- ZONE 3B
- ZONE 4
- ZONE 5



Google Earth Image of Project Area





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WaterSMART Grants
Small Scale Water Efficiency
Projects for Fiscal Year 2018

Letter of Commitment for Funding of Project

RE: Installation of Automated Canal Headgates to Increase Operational Efficiency

Placer County Water Agency is committed to providing the highest level of service to their rate payers, seeking to continually improve both the raw and treated water delivery efficiencies, while reducing unrecoverable water losses where feasible. This proposed project is just one example of measures that the Placer County Water Agency is dedicated to in the ongoing efforts to improve operational efficiencies and potential reduction in unrecoverable water losses within the raw water conveyance system.

Placer County Water Agency is committed to paying the costs associated with this project even if they exceed the grant amount. Payment may be in the form of: In-Kind services (labor and indirect costs), equipment costs (PCWA equipment and rental), materials required for a complete project, and monetary contributions, as needed.

Funding for this project are appropriated in the 2018 Water Division Operating Budget for the Field Services Department. The Proposed 2019 Water Division Operating Budget for the Field Services Department includes an appropriation for this project, which will be considered by the Placer County Water Agency Board in November 2018. The amount of the Agency's funding commitment is \$120,058.25.

If additional information is desired, do not hesitate to contact me.

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