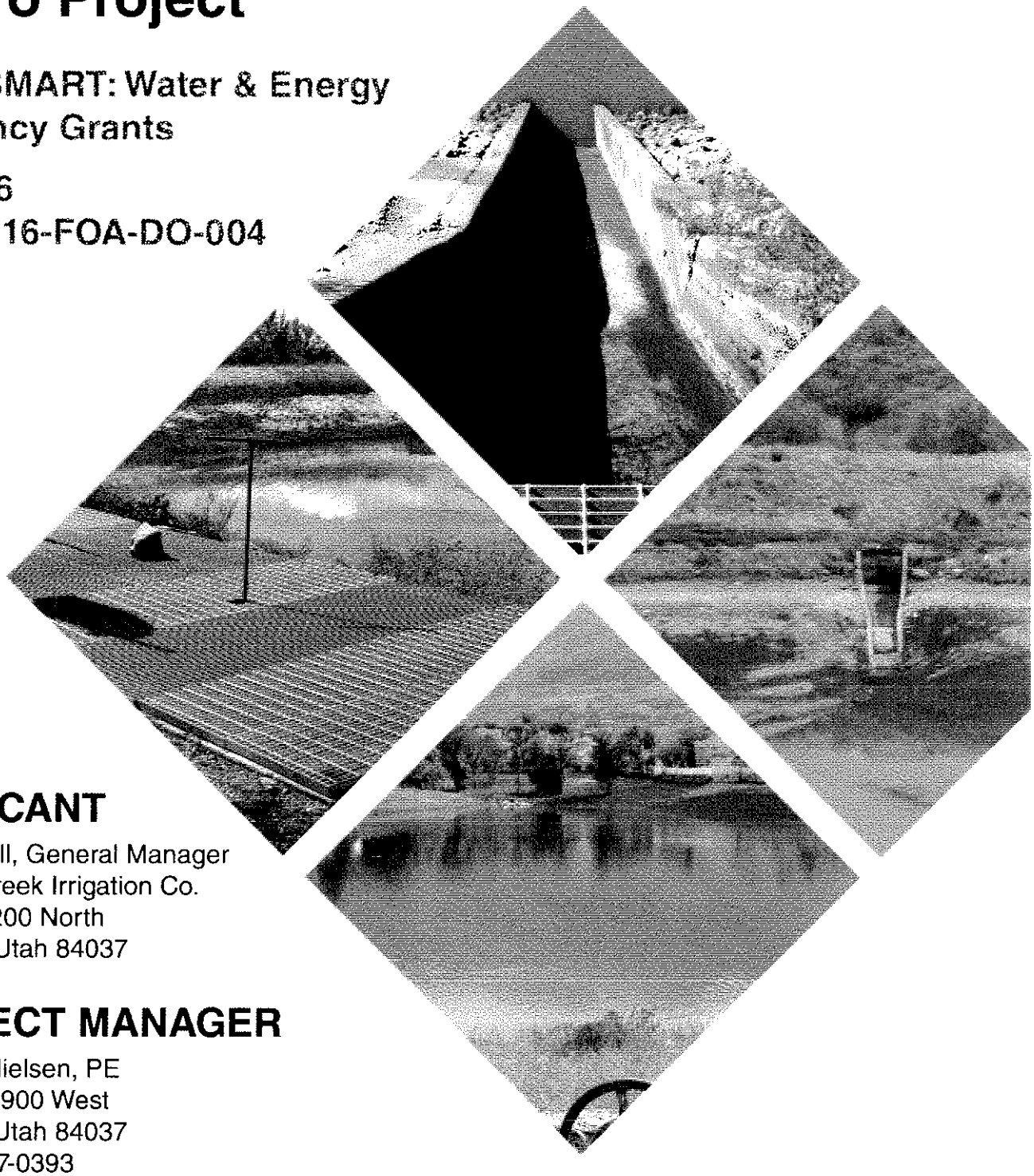
HAIGHTS CREEK IRRIGATION COMPANY
Green Road Piping, Metering and Small Hydro Project

WaterSMART: Water & Energy Efficiency Grants

FY 2016
FOA#R16-FOA-DO-004



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EXECUTIVE SUMMARY

APPLICANT INFO

Date: January 20, 2016

Applicant name: Haights Creek Irrigation Company

City, county, and state: Kaysville, Davis County, Utah

Project Manager:

- Brandon Nielsen, J-U-B Engineers, Inc.
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Project Funding Requested: Funding Group I $231,000 total project cost $550,000

PROJECT SUMMARY

A one paragraph project summary that specifies the work proposed, including how project funds will be used to accomplish specific project activities and briefly identifies how the proposed project contributes to accomplishing the goals of this FOA

The Haights Creek Irrigation Company (HCIC) Green Road Piping, Metering, and Small Hydro Project consists of installing 350 feet of 4-inch, 415 feet of 10-inch, and 210 feet of new 12-inch C-900 PVC pipe that feed the Green Road Reservoir, installing a 12-inch pressure reducing valve, vault and a small hydroelectric turbine on the inlet line of this reservoir. The hydro turbine is estimated to create between 125 and 150 kW of power. Along with this, the proposed project will install 690 feet of new 14-inch C-905 PVC pipe within the Green Road area to reduce water loss due to leaks and line breaks and 75 secondary water meters. These projects improvements will result in better management of 495 acre-feet of water, 159 acre-feet of quantifiable water saving and use of renewable energy sources. The HCIC proposed project will reduce persistent water losses due to 55-year-old asbestos cement pipe and hazards created from valve and pipe wear due to cavitation from an excessive pressure drop into the inlet structure. The proposed project is being requested under Task A – Water Conservation Canal Lining/Piping and Municipal Metering and Task B – Energy –Water Nexus for Implementing Renewable Energy Project Related to Water Management and Delivery.

PHOTO 1 GREEN ROAD RESERVOIR

SCHEDULE

State the length of time and estimated completion date for the project

The Project is ready to move forward as soon as awarded. An environmental document is in the process of being completed and will be ready for approval by Reclamation by February/March 2016.

The permits for the small hydro power will be filed under a "Conduit Exemption" for small hydro and the power sales agreement will need to be negotiated with Rocky Mountain Power.

The project will require some advanced development because Fruit Heights City, the city where the project is located, has plans to do a full reconstruction of the Green Road starting in April/June of 2016. Fruit Heights City will not allow HCIC to dig up the road once it has been repaved. HCIC has plans to install the piping in Green Road at the same time Fruit Heights has the road open in order to save thousands of dollars in road paving. Design for the project has been started and will be completed in the March/April 2016. The Hydro element of the project will take place in October 2016 after the irrigation season. The project will be accomplished within the two-year allowance.

FEDERAL FACILITY

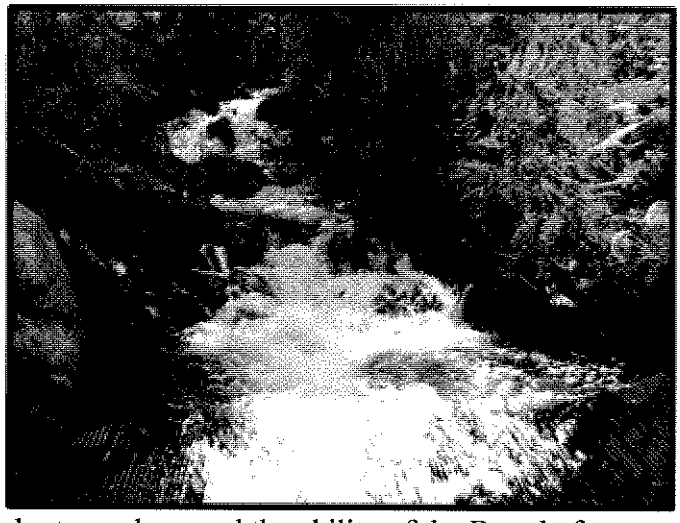
Whether or not the project is located on a Federal Facility

The project is not located directly on a federal facility however HCIC receives water from Weber Basin Water Conservancy District which receives water from Echo Reservoir and Rockport reservoir, which are both owned by Reclamation. This project will permit better managed of water allowing water to stay in those two reservoirs longer during the irrigation season which can benefit the habitats and recreational opportunities within those two reservoirs.

BACKGROUND DATA

Haights Creek Irrigation Company was created in 1899 for the purpose of creating a better management and distribution system for water flowing from Haights Creek and Bair Creek. These creeks flow from the Wasatch Mountains through Bair Canyon in Fruit Heights, Utah. Early in its history, all of the water was delivered via a series of open ditches, canals, and head gates with water turns based on the number of shares owned with flood irrigation being the primary method of application.

PHOTO 2 BAIR CREEK



In 1918, it was apparent that the water source was not capable of handling all of the water needs of the growing Kaysville community. John H. Blood, the then Secretary of the Company, wrote in a letter to the shareholders "... we are virtually out of water after June 15... if there is anything that could be done to benefit us ... we will lend our assistance as far as practicable." The situation was serious because water was the life blood of the community.

The Company made a decision to amend their charter and expand the ability of the Board of Directors to buy water rights from outside sources to help supplement the water. Today 87% of the water used by the HCIC shareholders is purchased from Weber Basin Water Conservancy District.

In the 1960's a loan from the United States Bureau of Reclamation gave HCIC the opportunity to move from flood irrigation to a pressurized system. The Upper Reservoir was constructed and the 200 North farm pond was expanded. As farms turned to houses additions have been made to the existing system resulting in an integration of older and newer technology.

Today the HCIC service area includes 3,200 acres in the cities of Kaysville and Fruit Heights. Agricultural use in the service area totals 668 acres with alfalfa, hay, and fruit orchards being the major crops.

The growth in this area over the past few years has had major impacts on the system. In 2013 the number of connections for residential, commercial, and agricultural use was 3700 whereas today, in 2015, there are 62 agricultural connections and 3944 residential/commercial connections.

MAP

The service area of HCIC includes the cities of Kaysville and Fruit Heights, located in Davis County, Utah. The estimated population of these two cities is 34,500. They serve residential secondary water and agriculture irrigation users. The project location is shown within an

overview of the entire service area and is indicated in Attachment A, Geographic and Project Location Map.

WATER SUPPLY

SOURCE OF WATER SUPPLY: The source of water supply is from direct flow rights from the Bair Creek and from water purchased from Weber Basin Water Conservancy District.

WATER RIGHTS AND PURCHASED WATER: 31-4632 – 2667 acre-feet from Bair Creek and purchased water from Weber Basin Water Conservancy District 6,922 acre-feet. Usable volume of water is 4,846 acre-feet based on conveyance and seepage losses in the delivery system.

CURRENT WATER USES AND NUMBER OF WATER USERS SERVED: The majority of the water used is secondary water for lawns and gardens and consist of 3,944 connections. The remaining water is used for agriculture purposes to irrigate 667.50 acres and of that 60.69 acres are in highly productive fruit orchards.

CURRENT AND PROJECTED WATER DEMAND: Current water demands are for 4,477 acre-feet. The HCIC has seen more and more demands as farmers sell their lands for residential uses. Over the past five years the services area has experienced major population growth, intense drought conditions, and large water losses due to seepage, breaks, and aging infrastructure. During 2014 and 2015 they have reviewed and approved ten new developments.

Water to service the growing populations in Fruit Heights and Kaysville has the Company feeling that they might not have the water available to service all the new users over the next 20 years. This would require HCIC to purchase more water from WBWCD at a higher price than what their current water allocation costs. This has prompted HCIC to want to make major changes to their system to reduce water losses and encourage conservation through metering and education for their secondary water users.

POTENTIAL SHORTFALLS IN WATER SUPPLY: HCIC faces three main areas of potential shortfalls: water losses, drought, and growth.

Water loss: Losses in the delivery system – The principal potential shortfall for the HCIC is water losses within the delivery system due to aging infrastructure. These losses impact delivery to the secondary water users as well as to the agricultural users and impact water delivery in drought years.

Drought: In 2015, the state suffered its warmest and least-snowy winter since the late 1800s, when Utah was still a territory. The lowest-elevation snowpack had melted by May 1st, and most of the higher altitude snowpack quickly followed. Drought has continued to impact the water supply and will continue to have an effect on how HCIC plans. Utah's state water report characterized 2015 as "a dead skunk" and one Utah water strategist warns the ongoing dry conditions are "the new normal." In 2015 federal officials declared eight counties in Utah drought-racked which would allow them to ask for emergency loans.

Streams and reservoirs were running between 10% and 40% of normal. On a 1 – to – 100 scale that state officials use to rank their volume a low of 3 and an average of 25 was reported. Utah state hydrologist Randall Julander stated in an article in the Los Angeles Times, "that twenty-five is bad and three is a picture of a dead cow with a couple of buzzards on it. Drought now grips 40% of the West, with no end in sight: globally, 9 of the 10 warmest years recorded since 1880 have occurred since 2000."

Growth: In recent years, residential developments have closed in on the farmland. Many of the agriculture fields in the HCIC service area are surrounded on all three sides by housing tracts. This farmland has become more and more valuable and developers keep knocking on the farmer's doors with offers. Many cannot pass up the offers.

At buildout the demand for water will exceed the useable volume by 804 acre-feet, requiring HCIC to think differently. Conservation has to be at the forefront of their thinking and anticipation of growth has to be guiding them to be more aggressive in reducing their water losses and incorporating better conservation methods.

WATER DELIVERY SYSTEM

Describe the applicant's water delivery system as appropriate. For agricultural systems, please include the miles of canals, miles of laterals, and existing irrigation improvements (i.e., type, miles, and acres). For municipal systems, please include the number of connections and/or number of water users served and any other relevant information describing the system.

Reservoirs

- Upper Reservoir storage capacity: 30 acre-feet
- Green Road storage capacity: 15 acre-feet
- 200 North storage capacity: 25 acre-feet

Delivery and Pressurized Secondary Systems

Comprised of approximately 63 miles of a pressurized gravity fed pipe, connections, valves, and over 3,200 acres. The elevation drop across the distribution system is approximately 650 feet.

PHOTO 3 55-YEAR-OLD ASBESTOS CEMENT PIPE

To offset the pressure increases, a series of pressure reducing valves (twelve in all) are located throughout the system. The system consists of concrete cylinder, asbestos cement, ductile iron, PVC, HDPE, galvanized steel, and other plastic pipe with sizes ranging from 30 to 1 inch. Much of the asbestos cement pipe is over 55 years-old. Many of the main secondary delivery lines in the older areas of Kaysville City, are located within the backyards of residential property making it difficult to service these pipes.

ENERGY EFFICIENCY

If the application includes renewable energy or energy efficiency elements, describe existing energy sources and current energy uses.

This project will have renewable energy components by installing a small hydro power generation turbine that will produce 183,000 kWh/year. The hydro power generation will give HCIC greater renewably energy opportunity within their system which will allow them in the future to reduce their reliance on outside power sources. HCIC will have future development within their service area, located above the Upper Reservoir, that will require pumping. By developing the hydro portion of this project they will have renewable energy available to help offset those cost of running the pump and reduce the amount of energy they are using. The balance of power generated that is not being used by HCIC can be sold back to Rocky Mountain Power. This facility will help reduce the need to use more fossil fuels to meet the energy demands of the Company

RELATIONSHIP WITH RECLAMATION

Identify any past working relationships with Reclamation. This should include the date(s), description of prior relationships with Reclamation, and a description of the projects(s).

In 1962, one-third of HCIC's service area open ditch system was replaced with a piped pressure irrigation system through a Small Reclamation Projects Act loan. In 1967 another loan was received for $718,000 from the Small Reclamation Projects Act to replace all of the remaining open ditch system with a pressure irrigation system. Along with the pressurizing of the system, the loan money was used to construct a new reservoir (Green Road Reservoir) and expand the Upper Reservoir and the 200 North Reservoir.

TECHNICAL PROJECT DESCRIPTION

Describe the work in detail, including specific activities that will be accomplished as a result of this project. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal.

The proposed project will consist of installing 350 feet of 4-inch, 415 feet of 10-inch, and 210 feet of 12-inch C-900 and 690 feet of 14-inch C-905 PVC pipe in the roadway which will allow them to abandon 55-year-old distribution lines. The project also includes the installation of approximately 75 secondary flow meters, 12-inch flow control valve, vault, and a small hydro power generation turbine on the inlet of the Green Road Reservoir creating between 125 and 150 kW of power that can be used to help power some of the HCIC facilities and/or be sold back to Rocky Mountain Power. Future development located above the Upper Reservoir will require pumping. By developing the hydro portion of this project HCIC will have renewable energy available to help offset the cost of running the pumps and reduce the amount of fossil fuels they are using to meet the energy demands of the Company.

Over the years the distribution lines that are located within the Green Road require frequent repairs because of their age (55+ years), pipe materials (asbestos cement pipe), and high pressures within this area. The HCIC staff is continually called to this area because of breaks and

leaks that are impacting residential homes and basements. Fruit Heights City is preparing to do major road work on the Green Road. After working closely with the City, HCIC has negotiated with them to allow them to replace their distribution line while the City has the roads open doing some of their own infrastructure work. Because of this, the cost to complete this work will be much less than if HCIC had to cut into the roads and repair them on their own. Fruit Heights City will be waiving the excavation fees and not requiring HCIC to do the asphalt repairs after they have done their work in the road.

The Green Road Reservoir has had a major issue with high pressure and damaging cavitation caused by the need to throttle the inlet flow. Cavitation damage resulted in eroding the inlet pipe to the reservoir. Fixing this leak takes time, requires shutting down the inlet that fills the reservoir, it waste thousands of gallons of water by the time you can respond to the leak. This project will allow HCIC to install a 12-inch flow control valve station at the inlet and install new PVC waterlines within the public roads. As HCIC researched they also found that they could insert a small hydro turbine inlet which will help reduce the pressures and create between 125 and 150 kW of power that can be used to help power some of the HCIC facilities and/or be sold back to Rocky Mountain Power.

Metering has become an essential conservation measure that has been proven in the area to help educate users of their water usage. The project includes the installation of approximately 75 secondary flow meters. This may seem like a small amount as compared to the number of connections within the system. However, it is the beginning of a number of planned projects for the Company that will bring them closer to their goal of metering all of their system by 2026.

Education is also a major part of this project. HCIC will take a clue from WBWCD in how to inform and educate its user on the significant conservation that comes from metering their secondary water system. As users become more aware of their actual water use as compared to what is truly required to keep their lawns and gardens green and growing, they will begin to take note and join in on the conservation movement.

Weber Basin Water Conservation District, the major wholesale water supplier for HCIC has set a goal to reduce water use 25% by 2025. This project helps to meet this goal as HCIC improves its distribution system and begins the process of metering its users.

This project will result in:

- reduced persistent water losses and frequent repairs due to the 55-year-old pipe
- facilitate better management of 495 acre-feet of water
- have a quantifiable water saving of 159 acre-feet of water
- installation of 75 secondary water meters
- improved inlet control to the Green Road Reservoir
- development of hydroelectric renewable energy source that can produce up to 183,000kWh annually.

EVALUATION CRITERIA

EVALUATION CRITERIA A: WATER CONSERVATION

SUBCRITERION A.1: QUANTIFIABLE WATER SAVINGS

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 average annual acre-feet of water usage for HCIC is approximately 4,477 acre-feet (five-year measured average). The water is diverted from the Bair Creek and WBWCD aqueduct which is upstream from the Upper Reservoir. The water directly diverted to this project area is 495 acre-feet and is delivered directly from the Upper Reservoir. This project will help better manage that 495 acre-feet of water as it is delivered to this specific project area. However, overall in the large scheme of things, this project will also allow for a better management of all the water released into the Green Road Reservoir (1,983 acre-feet) and will allow water to be held up in the Upper Reservoir and within WBWCD reservoirs for longer in the season. This will consequently be a benefit to the environment, fish and wildlife, and recreation opportunities.

- *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, etc.)?*

  Water is seeping through the leaking and crumbling 55-year-old asbestos cement and into the ground, roads, residential property, and being diverted into storm drains, and taken up by vegetation.

- *Where will the conserved water go?*

  The conserved water will provide a more secure water right, be more available as a buffer during times of drought, be available for secondary use as agriculture lands continue to convert to residential lawns and gardens, benefit the environment, and fish and wildlife habitats. As the water is held up in Echo and Rockport Reservoirs for longer time frames it will benefit the Weber River through prolonged and better balanced stream flows of available water.

(1) CANAL LINING/PIPING

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.

For the piping portion of the project the water loss estimates have two facets – historic water losses and losses from the Green Road Reservoir inlet. The total water loss from these is estimated at 132 acre-feet/year.

The historic water loss calculations have two elements— 1) estimated breaks in the lines and 2) losses due to the Green Road Reservoir inlet.

PHOTO 4 GALVANIZED STEEL PIPE 55-YEARS-OLD

Estimated breaks in the lines:

The meters will also allow for the detection and repair of leaks downstream of individual meters. It has been assumed that one in three individual connections has a leak of an average size of 0.1 inches in diameter. The average pressure for the project area is 100 pounds per square inch. The American Water Works Association (AWWA) Manual 36 *Water Audits and Loss Control Programs* was used to estimate the amount of water loss through such a leak. This value is 2.39 gallons per minute (gpm). The water savings that can be realized by detecting and repairing these leaks was calculated as:

75 metered connections / 3 = 25 leaking connections

25 connections x 2.39 gpm = 59.75 gpm

59.75 gal/min x 60 min/hr x 24hr/day x 183 day/irrigation season = 15,745,320 gallons

15,745,320 gallons = 48.3 acre feet

Estimated savings from the Green Road Reservoir inlet:

The project will also include improving the delivery system of water to the Green Road Reservoir by installing a valve designed to control flow with significant pressure differential.

Currently the Green Road Reservoir is filled through by throttling a 12" gate valve with a pressure of 100 psi. The typical flow rate for filling the reservoir is 8 cfs. This creates cavitation at the valve and has eroded a hole in the downstream pipe. The reservoir is filled by water from this leaking pipe for an average of 8 hours per day. The size of the damaged section is estimated as the area of a 1.7" diameter hole and the pressure at the location of the damage is taken to be 20 psi, resulting in a flow rate of 309 gpm (AWWA M36). The water loss over the irrigation season for this is calculated as:

309 gal/min x 60 min/hr x 8 hours/day x 183 day irrigation season = 27,142,560 gallons

27,142,560 gallons = 83.3 acre feet

The total piping water savings for the project is calculated as:

48.3 acre-feet + 83.3 acre-feet = 132 acre-feet

b) How have average annual canal seepage losses been determined? Have ponding and/or inflow/outflow tests been conducted to determine seepage rates under varying conditions? If so,

please provide detailed descriptions of testing methods and all results. If not, please provide an explanation of the method(s) used to calculate seepage losses. All estimates should be supported with multiple sets of data/measurements from representative sections of canals.

Documentation of all leaks and breaks this past 2015 irrigation season and compared to other historical leaks and breaks. The information was evaluated and, as previously stated above was calculated based on the previously mentioned published studies.

c) What are the expected post-project seepage/leakage losses and how were these estimates determined (e.g., can data specific to the type of material being used in the project be provided)?

PVC pipe with gasket joints will be used which has an estimated loss factor of minus 0.4% (*AWWA M23 PVC Pipe – Design and Installation*). These losses will be minimal and have not been noted in the calculations for the water loss savings. Data specific information is available if needed. This is a commonly used material with historical loss information that is often used by Reclamation in projects

d) What are the anticipated annual transit loss reductions in terms of acre-feet per mile for the overall project and for each section of canal included in the project?

This project includes 210 feet of 12" and 690 feet of 14" PVC pipe with a total pipe length of 900 feet. The piping water savings are estimated to be 132 acre-feet. Thus the anticipated annual loss reductions are calculated as:

900 ft / 5,280 ft/mile = 0.17 mile

132 acre-feet / 0.17 miles = 776 acre-feet per mile

e) How will actual canal loss seepage reductions be verified?

There is a meter on the outflow of the Upper reservoir through which all of the Company's water passes. The meter is continuously recording flows on the system and a baseline can be measured from this which can then be compared to the historical flows on a monthly basis. This will allow HCIC to identify the savings after the project has been in use for at least one irrigation season.

Another way to which HCIC will verify the actual water savings is by reading and documenting the new meters being installed as part of this project. The water use will have a baseline assumption of 3 acre-feet, which is the allotted share amount. The use will be compared to the actually use over a series of two irrigation seasons. By documenting this information and analyzing it, a verification of saving will be accomplished.

f) Include a detailed description of the materials being used.

The pipe for the project will be ranging from 4-inch to 12-inch C-900 PVC and 14-inch C-905 PVC pipe with gaskets at each joint to prevent water seepage. Gate valves will be used to isolate sections of the line. In addition, a hydroelectric turbine and flow control valve will be installed to better manage and control water at the Green Road Reservoir inlet.

(2) MUNICIPAL METERING:

Municipal metering projects can provide water savings when individual user meters are installed where none exist to allow for unit pricing and when new meters are installed within a distribution system to assist with leakage reduction. 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 average annual water savings for the metering portion of the project is 27 acre-feet which was determined by estimating water savings resulting from the installation of 75 individual use meters.

Green Road – The average annual water savings for the project was determined by estimating water savings resulting from the installation of individual use meters.

Annual water savings from the individual use meters will occur through reduced usage.

To calculate reduced usage resulting from meter installation an assumption was made that the average unmetered water use is approximately equivalent to the allocation of 3.0 acre-feet per gross acre.

Reduced water use in pressure irrigation systems has recently been observed locally upon meter installation as reported by Weber Basin Water Conservancy District's (WBWCD) *2013 Secondary Water Metering Report*. WBWCD's retail allocation of irrigation water is also 3 acre-feet per acre which provides parity in the savings calculation. The report lists an average water use of 2.2 acre-feet for metered connections. Thus 0.8 acre-feet of water per acre is saved.

The total acreage served by the 75 individual meters was determined and results in 34.0 acres. Thus the water saved through reduced usage was calculated as:

34.0 acres x 0.8 acre-feet/acre = 27.2 acre-feet

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

The losses have been based on WBWCD experience after installing secondary water system meters over the past few years. WBWCD published the *2013 Secondary Water Metering Report* with their findings.

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

WBWCD secondary water projects are in the same region and within 10 miles of the proposed project. The water losses have been based on WBWCD experience. WBWCD

published the *2013 Secondary Water Metering Report* with their findings that was used as a guide for the water loss calculations.

(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).

Mainline meters exist in the system. No new mainline meters will be installed.

PHOTO 5 SENSUS IPERL METER

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

75 Sensus 1" IPERL Meters will be installed in the system. This is the meter that WBWCD adopted after a pilot study of several different meters and has a proven track record for accuracy on secondary irrigation systems in this area. **See Attachment B Project Technical Support**

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

There is a meter on the outflow of the Upper reservoir through which all of the Company's water passes. The meter is continuously recording flows on the system and a baseline can be measured from this which can then be compared to the historical flows on a monthly basis. This will allow HCIC to identify the savings after the project has been in use for at least one irrigation season.

Another way to which HCIC will verify the actual water savings is by reading and documenting the new meters being installed as part of this project. The water use will have a baseline assumption of 3 acre-feet, which is the allotted share amount. The use will be compared to the actually use over a series of two irrigation seasons. By documenting this information and analyzing it, a verification of saving will be accomplished.

SUBCRITERION A.2: PERCENTAGE OF TOTAL SUPPLY

Provide the percentage of total water supply conserved: *State the applicant's total average annual water supply in acre-feet. Please use the following formula:*

The Company provides agriculture and secondary water irrigation through the main distribution system. The total system deliveries through the pressurized irrigation system is approximately 4,477 acre-feet/year. The proposed project area has an annual delivery from the Green Road reservoir of approximately 495 acre-feet/year. It is anticipated that 159 acre-feet/year savings will be achieved by installing new pipe, Green Road Reservoir inlet improvements, and meters. The new piping portion of the project will see an annual water savings of 132 acre-feet by

reducing leaks, seepage losses, and large breaks in the exiting 55-year-old pipe. Metering, coupled with education and/or possibly implementing various rate structures or other financial incentives will help motivate end users to cut back on what is now considered over usage and conserve an estimated 27 acre-feet.

$$\frac{\textit{Estimated Amount of Water Conserved}}{\textit{Average Annual Water Supply}}$$

$$\frac{\text{159 acre-feet Estimated Amount of Water Conserved}}{\text{495 acre-feet Average Annual Water Supply (delivered through the project)}} = \mathbf{32\%}$$

EVALUATION CRITERIA B: ENERGY-WATER NEXUS

SUBCRITERION B.1: IMPLEMENTING RENEWABLE ENERGY PROJECTS RELATED TO WATER MANAGEMENT AND DELIVERY

Describe the amount of energy capacity. *For projects that implement renewable energy systems, state the estimated amount of capacity (in kilowatts) of the system. Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.*

The proposed project would install a hydroelectric turbine. A 125 kW turbine can easily be added to the inlet at the Green Road Reservoir to generate power. The potential power is determined by the following calculation:

(231 feet of head x 8 cfs x 80% efficiency x 62.4)/737 = 125 kW

Describe the amount of energy generated. *For projects that implement renewable energy systems, state the estimated amount of energy that the system will generate (in kilowatt hours per year). Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.*

The inlet to the reservoir delivers water during off peak times of day from 10:00 am to 6:00 pm. Power can be generated for 8 hours a day from April 12th to October 15th. The total power generated for the year would be 183,000 kWh per year.

125 kW x 8 hour/day x 183 days x = 183,000 kilowatt-hours per year

Describe any other benefits of the renewable energy project. *Please describe and provide sufficient detail on any additional benefits expected to result from the renewable energy project, including:*

•Expected environmental benefits of the renewable energy system

This renewable energy source will operate during the months of the peak electrical energy uses usually May - September and could be used to power any HCIC energy needs in the area. The balance of power generated that is not being used by HCIC can be sold back to Rocky Mountain Power. This facility will help reduce the need to use more fossil fuels to meet the energy demands of the Company

•Any expected reduction in the use of energy currently supplied through a Reclamation project

Electricity along the Wasatch Front comes from a variety of sources. Two of these sources is the hydropower at Rockport Reservoir and Echo Reservoir which are Reclamation projects. It is unlikely that this project will have any impact on hydro power generation from the Reclamation projects in the area.

•Anticipated beneficiaries, other than the applicant, of the renewable energy system

Although this is a small amount of power in the overall scheme of things, the power generated will allow HCIC to sell power to Rocky Mountain Power, thus benefiting on a small scale the population along the Wasatch Front.

•Expected water needs of the renewable energy system

The small hydro turbine will be placed on the existing inlet to the Green Road reservoir and will be operated by the water that flows through the secondary piping into the reservoir. No additional water will be needed to operate the generator and, the generator will not deplete any water resources.

SUBCRITERION NO. B.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).

•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. 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?

HCIC is a gravity fed system and does not require any pumping within their current system. However, as future development occurs above the Upper Reservoir this will require pumping. By developing the hydro portion of this project HCIC will have renewable energy available to help offset the costs of running the pumps and reduce the amount of energy they are using. The balance of power generated that is not being used by HCIC can be sold back to Rocky Mountain Power. This facility will help reduce the need to use more fossil fuels to meet the energy demands of the Company.

•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.

N/A

•Does the calculation include the energy required to treat the water?

N/A

•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).

N/A

EVALUATION CRITERION C: BENEFITS TO ENDANGERED SPECIES

For projects that will directly benefit federally-recognized candidate species, please include the following elements:

•What is the relationship of the species to water supply?

The development of this project will allow for more water to be saved and held in Echo and Rock Port Reservoirs and within the Weber River system. After talking with Darren Hess, Assistant General Manager, with WBWCD, he indicated that by working with WBWCD and their partners, more water could be released in the Weber River during the irrigation season to help the Bonneville Cutthroat Trout and Bluehead Sucker which are listed on the state's sensitive species list and are located between the Echo and Rock Port within the Weber River. HCIC and WBWCD are both committed to working with the Utah Division of Wildlife Resources (UDWR) and Trout Unlimited (TU) to establish a percentage of the saved water to be released at critical times when the UDWR feels this could enhance the habitat for the Bonneville Cutthroat Trout and Bluehead Sucker. HCIC will work closely with WBWCD to help meet this commitment. See a letter of support from the UDWR to WBWCD under Letters of Support.

Based upon information obtained from UDWR, there are recent documented occurrences of the Bonneville Cutthroat Trout within a 2-mile radius of the Weber River in the area above Echo Reservoir. As well as recent occurrences for the bald eagle and bluehead sucker within ½ mile of the Echo reservoir all of which are included on the Utah Sensitive Species List. Although this project does not directly enhance the habitats for the species listed above, it is proven and documented that by allowing for more available water to stay within the habitat areas for longer periods of time, these species are benefited.

•What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?

Low stream flows affect many aspects of the Weber River and Echo Reservoir. The ability to conserve water and make it available in the Weber River and Rock Port and Echo Reservoirs will allow for better flows and take necessary steps in the right direction to protect and conserve native species.

For projects that will directly accelerate the recovery of threatened or endangered species or address designated critical habitats, please include the following elements:

(1) How is the species adversely affected by a Reclamation project?

N/A

(2) Is the species subject to a recovery plan or conservation plan under the ESA?

Both species are covered by conservation agreement that the State of Utah has entered into with the U.S. Fish and Wildlife Services. The population status of these two sensitive species warrants additional conservation efforts to diminish the likelihood of future listings under the endangered Species Act

(3) *What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?*

This project alone will not reduce the likelihood of listing but it is a step in the right direction. HCIC, WBWCD, and UDWR are willing to work together to allow for more water to flow at some of the most critical times of the year. This alone could improve the habitat and enhance the continuity of the Weber River

EVALUATION CRITERION D: WATER MARKETING

Estimated amount of water to be marketed

- *A detailed description of the mechanism through which water will be marketed (e.g., individual sale, contribution to an existing market, the creation of a new water market, or construction of a recharge facility)*

It is anticipated that HCIC will be required to purchase addition water to service their growing service area. By completing projects such as this proposed project it is anticipated that HCIC can reduce the need to purchase water from WBWCD thus allowing for them to use this water in other markets. The conserved water will be saved within the HCIC system to service new customers.

- *A detailed description of the mechanism through which water will be marketed (e.g., individual sale, contribution to an existing market, the creation of a new water market, or construction of a recharge facility)*

HCIC purchase 87% of its water in order to service their current connections. During drought situations HCIC uses all of its purchased water and is at risk of having to purchase additional water form WBWCD, at a much higher cost, in order to make it through the irrigation season. If this happens, HCIC will have to continue to purchase this water at the higher rate and will have to continue to pay for this water even if they do not use it every irrigation season. Thus, tying up hundreds of acre-feet of water that could be sold to others within the Weber Basin District. By developing the proposed project, it will reduce the need to purchasc additional water and will allow for water to be contributed to an existing market. The metering and education portion of this project is one more step that HCIC is taking to reduce the need to buy more water from WBWCD.

HCIC will set aside 50% of their conserved water (79.5 acre-feet) for new customers and save the other 50% for future development to reduce the need to buy additional water from WBWCD.

- *Number of users, types of water use, etc. in the water market*

The 79.5 acre-feet could supply lawn and garden irrigation water to approximately 26 new customers just with the development of this project. All the water would still be considered agricultural/secondary water and be supplied to users through the secondary pressure irrigation system.

- *A description of any legal issues pertaining to water marketing (e.g., restrictions under Reclamation law or contracts, individual project authorities, or State water laws)*

  Utah State law does not currently allow for water marketing. However, marketing this water to new customers within the existing service areas as described above does not violate any state laws

- *Estimated duration of the water market*

  There would be no time limit on the duration of the water market. This conserved water would be treated just as the WBWCD wholesale water and would remain in the system as long as it can be beneficially used.

EVALUATION CRITERION E: OTHER CONTRIBUTIONS TO WATER SUPPLY SUSTAINABILITY

SUBCRITERION E.1: ADDRESSING ADAPTATION STRATEGIES IN A WATERSMART BASIN STUDY

Within the Colorado River Basin; Water Supply and Demand Study updated in 2013 there are 27 options submitted that related to municipal and industrial (M&I) conservation to reduce demand in areas receiving Colorado River supply. Many of these options were related to specific M&I conservation programs (e.g., metering, water accounting and loss control, public education, leak detection, irrigation efficiency, etc.) or targeted specific M&I water use sectors (e.g., golf courses, industrial use) that might provide additional opportunities for conservation in the Colorado River Basin (Basin) as a whole.

The project is consistent with this study as well as the State Regional Water Plan for the Weber River Basin in that the project address metering, irrigation efficiency, leak detection, and loss control. In the "Weber River Basin Planning for the Future" document prepared in September 2009 it states:

> *"The challenges facing the Weber River Basin are complex – solutions will involve many stakeholders and may stir emotional public debate and scrutiny...In order to meet future water needs, water planners and managers within the Weber River Basin must promote effective water conservation programs and measures. They must also ensure that agricultural water conversions are transferred to meet both indoor and outdoor urban water needs, and implement innovative water management strategies. This, along with carefully planned water developments, will secure sufficient water for the future."*

The Weber River Basin Plan of 2009 indicates, in Chapter 4 of the plan, several conservation goals that they would like to implement, most of which, this project will help to satisfy. The

specific goal that this project will help implement is to help reduce outdoor use through better monitoring and more efficient application and delivery of the water. It also implements incorporating public conservation information programs which will be part of the metering portion of the project.

The 2009 Plan is available at http://www.slideshare.net/StateofUtah/weber-river-basin-2009-water-plan

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

  In the Colorado Basin Study three levels of conservation were considered based on assumed levels of reductions and adoption rates for … landscape, and water loss. The levels of reduction are based on estimates of the use rates by demand type. It indicated that outdoor landscaping target reduction is between 15% - 30%. Because HCIC purchases 87% of their water from WBWCD and they have set a goal to reduce their water use by 25% by 2025, HCIC is working got help them fulfill this goal.

  Within the 2009 Plan it indicates that "as the basin's population grows, so will the demand for water." This project will work at conserving water to reduce the need to purchase more water from WBWCD so that they can have that water available for other areas within the basin who may have a greater need.

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

  HCIC is a major stakeholder in the development of the plan and was part of the planning process along with WBWCD.

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

  This project will require the collaboration with WBWCD who is the major water seller in the basin. It will also allow for the collaboration between Kaysville City and Fruit Heights City as they work with HCIC through development reviews and approvals.

SUBCRITERION E.2: EXPEDITING FUTURE ON-FARM IRRIGATION IMPROVEMENTS

Include a detailed listing of the fields and acreage that may be improved in the future.

- *Describe in detail the on-farm improvements that can be made as a result of this project. Include discussion of any planned or ongoing efforts by farmers/ranchers that receive water from the applicant.*

  N/A

- *Provide a detailed explanation of how the proposed WaterSMART Grant project would help to expedite such on-farm efficiency improvements.*

N/A

- *Fully describe the on-farm water conservation or water use efficiency benefits that would result from the enabled on-farm component of this project. Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.*

  N/A

- *Projects that include significant on-farm irrigation improvements should demonstrate the eligibility, commitment, and number or percentage of farmers/ranchers who plan to participate in any available NRCS funding programs. Applicants should provide letters of intent from farmers/ranchers in the affected project areas.*

  N/A

- *Describe the extent to which this project complements an existing or newly awarded NRCS funded project or a project that either has been submitted or will be submitted to NRCS for funding.*

  N/A

SUBCRITERION E.3: OTHER WATER SUPPLY SUSTAINABILITY BENEFITS

Will the project make water available to alleviate water supply shortages resulting from drought?

Yes, 159 acre-feet of saved water is a step in the right direction to addressing shortages from drought. As mentioned earlier this is just the first step for HCIC as thy begin to address drought, climate change, and conservation. HCIC has a goal to have their entire service area metered by 2030. For a small irrigation company with limited funds this may be a challenge. However, the Board has raised rates over the past three years to begin to address the needs of HCIC and have changed the regulation to require all new development install meters on the secondary connections.

- *Explain in detail the existing or recent drought conditions in the project area. Describe the impacts that are occurring now or are expected to occur as a result of drought conditions.*

  In 2015, the state suffered its warmest and least-snowy winter since the late 1800s, when Utah was still a territory. The lowest-elevation snowpack had melted by May 1st, and most of the higher altitudes quickly follow. Drought has continued to impact the water supply and will continue to have an effect on how HCIC plans. Utah's state water report characterized 2015 as "a dead skunk" and one of Utah water strategist warns the ongoing dry conditions are "the new normal." In 2015 federal officials declared eight counties in Utah drought-racked which would allow them to ask for emergency loans.

  Streams and reservoirs were running between 10% and 40% of normal. On a 1 – to – 100 scale that state officials use to rank their volume shows a low of 3 and an average of 25. Utah state hydrologist Randall Julander, stated in an article in the Los Angeles Times, "that twenty-five is bad and three is a picture of a dead cow with a couple of buzzards on it.

Drought now grips 40% of the West, with no end in sight: globally, nine of the 10 warmest years recorded since 1880 have occurred since 2000."

- *Describe the severity and duration of drought conditions in the project area.*

Utah has had six drought years out of the past ten years. The severity of the drought from year to year is what is having a real impact on the HCIC service area. HCIC project area has had four of the past five years in a drought situation with three of those years requiring reduced allocations and shorter irrigation seasons. Because user's conservation is swayed by the daily news, weather, and how they perceive the shortage is going to affect them HCIC has no real way to ensure that users are conserving. This project will begin to change that with the instillation of service meters and education.

Scientists have said that droughts in Utah aren't random. Instead, "there is a natural periodicity to them — distinct, multi-year wet and dry cycles of various durations." Climate cycles happen slowly in scale of a human lifetime, and an impending wet period doesn't mean Utah's in the clear when it comes to drought. Climate models still show that with human activities leading to a warmer planet, the West is going to continue getting drier overall so HCIC needs to plan and prepare to conserve water within their system.

- *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by drought.*

HCIC purchases 87% of their water from WBWCD. The allocation from WBWCD has been reduced by over 1,400 acre-feet three out of the past four years.

- *Provide a detailed explanation of how the proposed WaterSMART Grant project will improve the reliability of water supplies during times of drought.*

By HCIC taking action now with metering and new pipe technology they can be on the road to conservation. More than just tools for calculating water bills, meters can tell households a lot about their habits. While a hit to the wallet might be enough for some water consumers to curb their habits, most might only need to know how much, exactly, they're overwatering. This will help through drought years. With at least 67% of all water consumed in Utah, in a year, by residents, is outdoors on lawns and gardens and, usually for just six months of the year.

Using WBWCD experience over the past five years as the example of how to meter and the benefits of metering HCIC will be able to send out monthly, customized usage reports to hopefully affect the behavior of their users. WBWCD data shows that the amount of people exceeding their water use allocation dropped from 26% in 2012 to 9% in 2013. HCIC see this as a positive step to improve the reliability of their water supplies during not only drought times but all the time!

- *Will the project make water available to address a specific concern? For example:*

  - *Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)?*

Yes, if the HCIC does not make efforts to conserve, even small efforts, they will be required to purchase more water to service the growing population within their service area. Over-allocation by secondary users and little to no conservation put the Company at risk of having to purchase additional water form WBWCD, at a much higher cost, in order to make it through the irrigation season. If this happens, HCIC will have to continue to purchase this water at the higher rate and will have to continue to pay for this water even if they do not use it every irrigation season. Thus, tying up hundreds of acre-feet of water that could be sold to others within the Weber Basin District. By developing the proposed project, it will reduce the need to purchase additional water and will allow for water to be contributed to an existing market. The metering and education portion of this project is one more step that HCIC is taking to reduce the need to buy more water from WBWCD.

- *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by climate variation.*

Climate variation has had an impact on the Bair Creek. HCIC has 2667 acre-feet that is normally available from April to the end of July. HCIC has noticed that over the past few years the Creek does not run as long in the irrigation season as it had in the past. HCIC normally can take all the water that is needed to service their users out of the Bair Creek through July1st without having to draw on the WBWCD purchased water. But due to drought conditions over the past four years they are lucky to be able draw out of the Creek until June 1st requiring them to draw on their purchased water almost 30 days earlier than normal. Climate variation and drought condition influence the timing and length of their use of the Bair Creek and as the drought continues the impact will continue to intensify. WBWCD has seen an even larger impact on their water sources and therefore have reduced HCIC water allocation by over 1,400 acre-feet for three of the past four years.

- *Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved?*

WBWCD has a limited amount of water that is available to HCIC. If HCIC has to purchase additional water it will be at a much greater cost, than what they are currently paying. Water is tight in the Basin and Utah Division of Water Rights website indicates that Surface water supplies are generally considered to be fully appropriated in Davis and Weber Counties.

Therefore, the Basin is closed for new available rights. This makes it difficult for growing communities in the Basin. HCIC service area residential areas are growing and their need for water will grow right along with it. According to the Census, one of the four most highly populated counties in Utah is Davis County. Davis County population saw an increase of 21% between 2003 and 2013. The cities in HCIC service area saw an increase between 2003 and 2013 of 19%

- *Will the project make additional water available for Indian tribes?*

  No.

- *Will the project make water available for rural or economically disadvantaged communities?*

  Yes, possibly. HCIC purchases a large majority of water form WBWCD who service many rural and economically disadvantaged communities (Coalville City, Clearfield City, Sunset City, etc.), the water saving made by HCIC can then be made available for others as they grow or require additional water.

- *Does the project promote and encourage collaboration among parties?*

  - *Is there widespread support for the project?*

  Yes, the users in this project area want the distribution lines and inlet to reduce the risks of leaks and flooding. WBWCD, the cities in the service area, and other irrigation companies in the Weber Basin support the improvements because they will help the move the state of Utah and WBWCD closer to their goal of 25% in reduce water use by 2025.

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

  Collaboration with WBWCD, users, and the cities in the HCIC's service area has been happening for over a year. They have worked with public works departments to plan the best areas to lay the new pipe in the public right-of-way and with Rocky Mountain Power to work out the development of the hydro power.

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

  Yes, as previously mention, flooding and leaks will continue to happen more often as the 55-year-old pipe continues to deteriorate and cause seepage losses and breaks.

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

  There is always tension when it comes to water. Natural disasters, drought, and un-maintained pipes and ditches seem to be the major factors in developing tension within any service area. HCIC has had its share and, will continue to feel the tension especially as demands for more water come from expanding residential growth. However, over the past several years there has been more tension than usual. Lack of water because the drought situation (irrigation water allocations cut by 25%), breaks and leaks, neighbors overusing water, and leaking pipes has increased the tension levels at times from medium to high.

  The tension this year stems from two issues 1) the drought and 2) water disruption and seepage and other losses. These issues contributed to anxiety, stress, and limited water availability to all users. This tension will continue and could be far worse if HCIC does not move forward with this project.

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

  Yes. This project will educate secondary water users. It will also help them think differently about proper water usage and help them become more accountable for their water usage.

- *Will the project increase awareness of water and/or energy conservation and efficiency efforts?*

  Yes, the educational programs developed on conservation that will be incorporate with the metering portion of the project are ones that WBWCD has incorporated, when they installed meters for their secondary water. HCIC plans to incorporate these programs to help increase awareness to all users not just those who will be getting meters. The education campaign will be for the entire service area. The 75 meters installed on this project will be used as examples of how things will work as HCIC moves closer towards its goal of having the entire service area metered by 2030.

- *Will the project serve as an example of water and/or energy conservation and efficiency within a community?*

  Yes. The metering and hydro project can be used as an example to other secondary water providers that maintain and operate their own secondary water systems.

- *Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?*

  Yes. HCIC has plans to incorporate metering for all of their customers so that they can realize water conservation across their entire service area. This project includes metering for their existing users. HCIC has required all new developments and users, as of 2015, who come onto the system install meters. The goal of HCIC is to have their entire system metered by 2030.

- *Does the project integrate water and energy components?*

  Yes. The project has both a water conservation of 159 acre-feet and a better management of 495 acre-feet. It also has an energy component that will produce 183,000 kWh/year allowing the HCIC to use or sell back the produced energy.

EVALUATION CRITERION F: IMPLEMENTATION AND RESULTS

SUBCRITERION NO. F.1: PROJECT PLANNING

Does the project have a Water Conservation Plan, System Optimization Review (SOR), and/or district or geographic area drought contingency plans in place? Does the project relate/have a nexus to an adaptation strategy developed as part of a WaterSMART Basin Study)? Please self-certify, or provide copies of these plans where appropriate, to verify that such a plan is in place.

HCIC has a limited conservation management plan that was developed in 2014.

Provide the following information regarding project planning:

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

HCIC has a limited plan that was prepared in 2014 for the delivery system which touches on elements of metering, conservations, and system improvements. The Plan is inadequate in that it does not adequately address renewable energy opportunities and the benefits of these opportunity. However, a number of other plans previously mentioned within the Weber River Basin do address this and HCIC will rely on their guidelines for this project. HCIC works closely with WBWCD in their planning and this project will help WBWCD reach the goals they have set in their 2010 SOR plan. The project will allow for better conservation and allow for more accountability from its users in the secondary water irrigation system.

WBWCD has a Conservation Plan which includes aspects of this project. They also have an Emergency Action and Response Plans, and an Operation and Management Plan, which includes responses during times of drought or water shortage conditions. HCIC has participated in development of these plans and has recently participated in the update of the conservation plan for the Weber River Water Users' Association. (Copies of these plans can be made available upon request)

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

Other plans that this project is consistent with is the State Regional Water Plan for the Weber River Basin. In the "Weber River Basin Planning for the Future" document prepared in September 2009 it states:

> *"In order to meet future water needs, water planners and managers within the Weber River Basin must promote effective water conservation programs and measures. They must also ensure that agricultural water conversions are transferred to meet both indoor and outdoor urban water needs, and implement innovative water management strategies. This, along with carefully planned water developments, will secure sufficient water for the future."*

SUBCRITERION NO. F.2: READINESS TO PROCEED

Points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a financial assistance agreement.

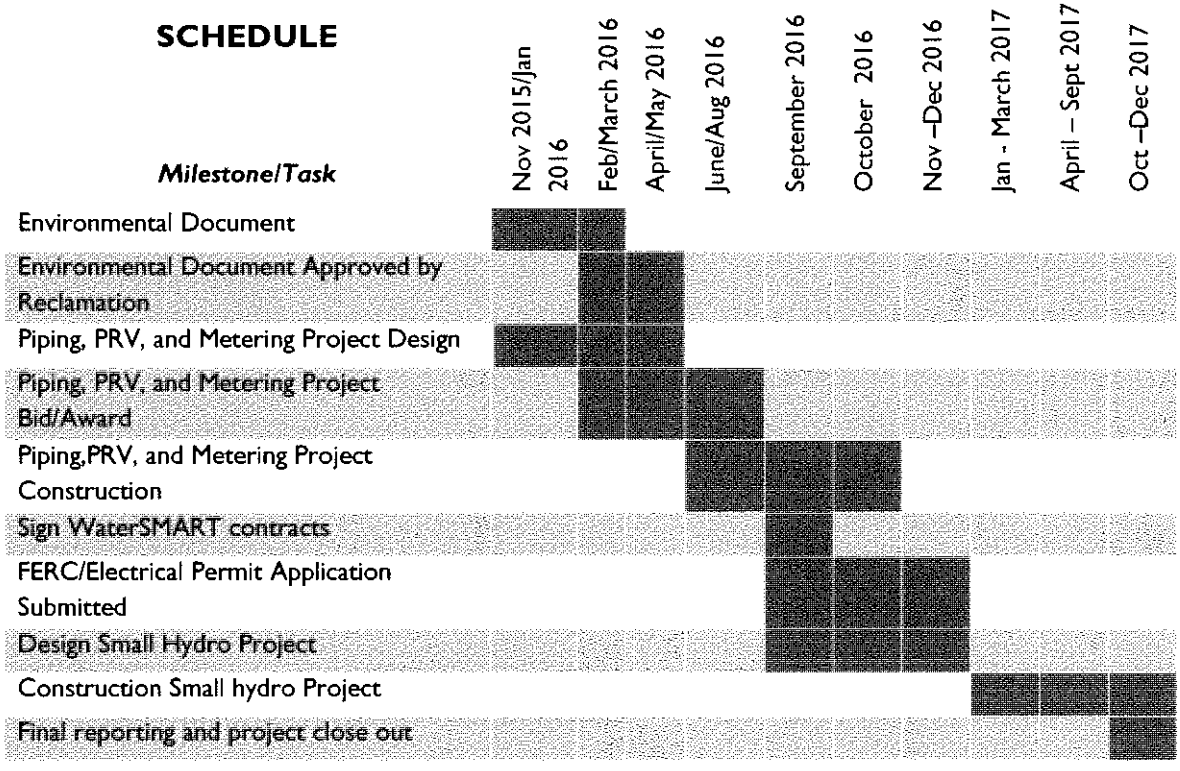
Fruit Heights City, where Green Road is located, is going to be undertaking some major road construction projects on many of their roads with the Green Road being one of those projects this year. After they have repaved this road, the City will not allow anyone to excavate in the road for three years, unless it is an emergency or you pay exorbitant fees. HCIC has been working with the City to get them to hold off on the project for as long as they can. The City is willing to work with HCIC to help them reduce the expenses of digging up the road if they can move as soon as the City is ready. This is the reason HCIC is preparing the Environmental Review now. This would give them the ability, if their project was funded, to start quickly and move on the project

as soon as the award is made. HCIC will also prepare the designs for the project this coming February/March to ensure they are ready to go right to bid on the project.

The environmental document is expected to be submitted to Reclamation by February/March 2016 with design taking place in February/March 2016. The project is located in existing public road easements and in previously disturbed areas. The permits for the small hydroelectric equipment will be submitted once the project has been awarded. The estimated completion of this project is based on contractual approvals and should take 18 to 24 months to complete.

Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.

Estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.



Please explain any permits that will be required, along with the process for obtaining such permits. Identify and describe any engineering or design work performed specifically in support of the proposed project.

An application for the FERC permit will need to be submitted. It is expected to take 3 to 6 months to obtain the permit. The Company is anticipating qualifying for a "Qualified Conduit Hydropower facility "under the provisions of the Hydropower Regulatory Efficiency Act of 2013 or a Conduit Exemption. An electrical utility permit will also need to be applied for. The application will take place at the same time as the FERC permit. No other permits will be required.

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).

There are two areas of this project where performance measures can be documented and quantified to show the actual benefits upon completion of the project. They include renewable energy that will be generated and water that is saved and/or better managed.

ENERGY GENERATED PERFORMANCE MEASURES

The energy produced by the turbine will be metered. The metered output will be recorded monthly and compared to the estimation of power generated in this application.

WATER SAVINGS AND/OR BETTER WATER MANAGEMENT PERFORMANCE MEASURES

All water entering the secondary water system is metered. HCIC has records for four years of reliable flows into their secondary system. The flows into the system are tracked on a monthly basis. The difference between the water currently used and the water used after the new piping and meters are installed will be calculated. This difference will be used to compare to the 159 acre-feet shown in this application

SUBCRITERION NO. F.4: REASONABLENESS OF COSTS

Please include information related to the total project cost, annual acre-feet conserved, energy capacity, or other project benefits and the expected life of the improvement(s).

Total project cost: **$550,000.00**

Annual acre-feet conserved (or better managed): 495 acre-feet will be better managed and 159 acre-feet conserved, which will initiate similar future water and energy efficiency and savings projects

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer's guarantee, industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.).

EVALUATION CRITERION G: ADDITIONAL NON-FEDERAL FUNDING

$319,000.00Non-Federal Funding
$550,000.00Total Project Cost = **58%**

EVALUATION CRITERION H: CONNECTION TO RECLAMATION PROJECT ACTIVITIES

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

HCIC purchases a large amount of their water from Weber Basin Water Conservancy District (WBWCD). Water supplies for the WBWCD come from Echo and Rock Port Reservoirs which are both Reclamation projects

(2) Does the applicant receive Reclamation project water?

Yes. They receive water from WBWCD who receives water from Echo and Rock Port Reservoirs, which are Reclamation projects.

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

No.

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

Yes, the project is located in the Weber River Basin where Echo and Rock Port Reservoirs are located.

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

Yes, the project will conserve water that can now be held over in Echo and Rock Port Reservoirs contributing to the storage and potential flow of the Weber River

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

No.

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

1. *Will the 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.*

   Impacts will be those associated with piping and installing meters in existing road and trench areas. The proposed project improvements will take place entirely within the existing road right-of-ways. In the past similar projects have had minimal impacts. The surface vegetation will be restored upon completion of the project.

2. *Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?*

   After having completed the Environmental Document and submitting it to Reclamation, HCIC is not aware of any impacts concerning threatened or endangered species in this area.

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

   After having completed the Environmental Document and submitting it to Reclamation, HCIC is not aware of any impacts to wetlands in this area.

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

   Many improvements have been done over the years. As part of the completed environmental document the required historical documentation for the entire service area was completed.

5. *Will the project result in any modification of or effects to, individual features of an irrigation system (e.g., head gates, 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.*

   This project will install piping ranging from 4-inch to12-inch C-900 PVC and 690 feet of 14-inch C-905 PVC pipe, 75 secondary water meters within the existing road, and a 125 kW hydroelectric turbine and flow control valve on previously disturbed land at the Green Road Reservoir.

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

   After having completed the Environmental Document and submitting it to Reclamation, HCIC is not aware of any building, structures or features that would qualify. A cultural resource inventory was completed as part of the submitted environmental document.

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

   After having completed the Environmental Document and submitting it to Reclamation, HCIC is not aware of any impacts to or locations of archeological sites.

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

   No. The project would not require a right-of-way or relocations from adjacent properties and would have no impact on residential uses within the study area.

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

   No.

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

    No.

REQUIRED PERMITS OR APPROVALS

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

A FERC permit will be required for the hydro turbine, including a power sales agreement. These documents will be prepared when the application is awarded. An electrical utility permit will be required for the hydro and conversations have taken place with Rocky Mountain Power to allow HCIC to move forward as soon as the FERC permit is ready to go.

LETTERS OF PROJECT SUPPORT

Weber Basin Water Conservancy District letter of support from Paul Thompson, Northern Region Aquatics Manager, Utah Division of Wildlife Resources

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Wildlife Resources
GREGORY J. SHEEHAN
Division Director

January 11, 2016

Darren E. Hess, P.E.
Assistant General Manager, Strategic Initiatives
Weber Basin Water Conservancy District
2837 East Highway 193
Layton, Utah 84040

Subject: U.S. Bureau of Reclamation Water and Energy Efficiency Grant

Dear Mr. Hess:

As the Aquatics Manager in Northern Utah for the Utah Division of Wildlife Resources (UDWR) , I am pleased to write in support of the grant application you are submitting to the U.S. Bureau of Reclamation Water and Energy Efficiency Grants Program. I applaud your efforts to increase the efficiency of your system to conserve valuable water and energy. All water savings in the Weber River are valuable to ensure that we have adequate water for future generations.

The Bonneville cutthroat trout and bluehead sucker are native fish species found in portions of the Weber River. Both species are covered by conservation agreements the State of Utah has entered into with the U.S. Fish and Wildlife Service and other parties. The population status of these two sensitive species warrants additional conservation effort to diminish the likelihood of future listings under the Endangered Species Act. UDWR's approach to aquatic species conservation and management in the Weber River, in part, focuses on reconnecting and maintaining connectivity of priority habitats by removing unnecessary barriers to fish migration, or by modifying existing barriers to allow upstream movement of these species, particularly for Bonneville cutthroat trout and bluehead sucker. Naturally of course, stable and connecting flows between those habitats are a fundamental requirement for those conservation actions to be successful. Within that context, most any project that enhances the continuity and maintenance of flows within the Weber River is a step in the right direction, as we work cooperatively to protect and conserve these native species.

The Weber Basin Water Conservancy District has been a great partner and contributed to a graduate student project that is currently studying bluehead sucker in the Weber River. The outcome from this study will be to determine important spawning locations (including spawning habitat requirements) and the type of low velocity/backwater habitats needed for juvenile bluehead sucker survival and recruitment. The results from this study will guide future management of bluehead sucker in the Weber River into the future and will help guide future habitat restoration projects.

The population of Bonneville cutthroat trout in the lower Weber River is quite unique in that they travel significant distances in the mainstem Weber River and

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ultimately up into tributary streams to spawn. This life history attribute has been lost from almost all Bonneville cutthroat trout populations, but still persists in the Weber River! We are very excited regarding the objective in this grant application that specifically addresses a culvert in Jacobs Creek that needs to be modified to allow better access for adult spawning Bonneville cutthroat trout. Our data demonstrates that Jacobs Creek is the single most utilized stream for this spawning cutthroat trout population. The UDWR and Trout Unlimited (TU) have worked with Questar and replaced a culvert lower in Jacobs Creek and the modification of this culvert would remove the last barrier to movement and allow access to all cutthroat trout. Both the UDWR and TU are fully committed to partner with the Weber Basin Water Conservancy District to ensure that the work in Jacobs Creek is completed, thus allowing spawning access to this stream. This project will help ensure that Bonneville cutthroat trout do not become a federally listed species under the Endangered Species Act in the future.

Sincerely,

Paul Thompson
Northern Region Aquatics Manager
Utah Division of Wildlife Resources

OFFICIAL RESOLUTION

Attached.

OFFICIAL RESOLUTION

RESOLUTION NO. 2016 - 002

HAIGHTS CREEK IRRIGATION COMPANY

WHEREAS, The **Haights Creek Irrigation Company** must maintain, provide for, and service the Water System,

WHEREAS, The **Company** sees the need to construct the **Green Road Piping, Metering, and Small Hydro Project** to improve water and energy conservation and efficiency,

WHEREAS, The **Company** desires to obtain grant funding from the Bureau of Reclamation through the **WaterSMART: Water and Energy Efficiency Grant.**

NOW THEREFORE, BE IT RESOLVED that the Board of Directors, agrees and authorizes that:

1. The **WaterSMART: Water and Energy Efficiency Grant** application prepared by **J-U-B Engineers, Inc.** has been reviewed by the Board of Directors and supports the contents therein;

2. The **Haights Creek Irrigation Company** is capable of providing the amount of funding specified in the funding plan; and

3. If selected for a **WaterSMART: Water and Energy Efficiency Grant,** the **Company** will work with the Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement.

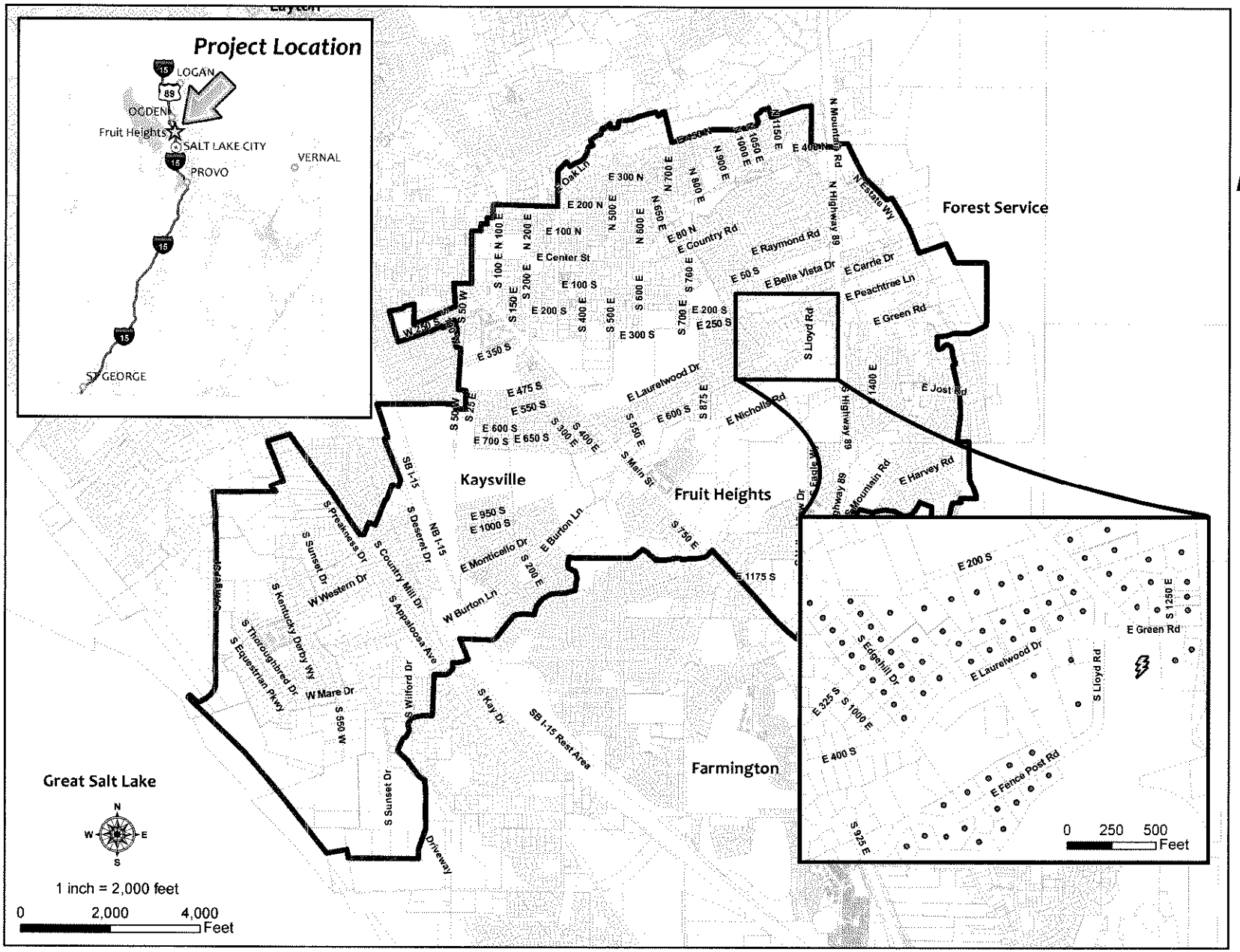
DATED: January 18, 2016

Richard H. Green, Vice President & Director

ATTEST:

Rodney G. Hill, General Manager & Treasurer

Attachment A



Haights Creek Irrigation Company

Green Road Project Location

Legend

- Flow Meters
- Hydroelectric Facility
- Project Area
- Haights Creek Service Area

J·U·B ENGINEERS, INC.

iPERL™ Water Management System

Specifications

Attachment B

TYPE

Solid state, battery operated electromagnetic flow measurement system with a hermetically sealed, glass covered, electronic register with a programmable 9-digit display.

CONFORMANCE TO STANDARDS

Must conform to American Water Works Standard C-700 and C-710 as most recently revised with respect to accuracy and pressure loss requirements, or other appropriate American Water Works Standard. Must be compliant with NSF/ANSI Standard 61 Annex F and G.

REGISTER

The register must be an electronic device encapsulated in glass with 9 programmable digits utilizing a liquid crystal display (LCD). It will have indicators for flow direction, empty pipe, battery life and unit of measurement. The register must be hermetically sealed with a heat tempered glass cover and be tamperresistant. The register shall not be removable from the measuring sensor. The register shall utilize a magnetic coupling technology to connect to a touch read, radio read or fixed base meter reading system in either an inside or pit set installation.

MEASURING ELEMENT

The measuring element shall be made of a noncorrosive, lead-free glass fiber reinforced, composite alloy material. A battery powered magnetic flow sensor utilizing silver/silver chloride electrodes will be utilized to measure the velocity of the ater which is linearly proportional to the volume. The measuring element will have no moving parts and will be specific for each size.

EXTERNAL HOUSING

The register and measuring element will be an integrated unit housed within a thermal plastic external casing. This integrated unit will not be removable from the external housing. The systems shall have the size and direction of water flow through the system imprinted on the external housing.

PRESSURE CAPABILITY

System shall operate up to a working pressure of 200 pounds per square inch (psi), without leakage or damage to any parts. The accuracy shall not be affected by variation of pressure up to 200 psi.

PERFORMANCE WARRANTIES

In evaluating bid submittals, warranty coverage will be considered. All bidders are required to submit their most current nationally published warranty statements for water meter maincases, registers and measuring chambers.

OPERATING CHARACTERISTICS

Under normal operating conditions, the unit shall be calibrated for flow as low as:

Sizes	Starting Flow (GPM)	Low Flow Range (+/-3%)	Normal Operating Range (+/-1.5%)	Pressure Loss (Not to Exceed)
5/8"	0.03	>0.11<0.18	0.18 to 25	4psi @ 15gpm
5/8" x 3/4"	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
3/4" Short	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
3/4" Reg	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
1"	0.11	>0.3<0.4	0.4 to 55	2psi @ 25gpm

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SENSUS