

Bradshaw Drop Irrigation Canal Piping Project, Phase 2



Rogue River Valley Irrigation District

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Technical Proposal

Executive Summary

January 2017

Rogue River Valley Irrigation District

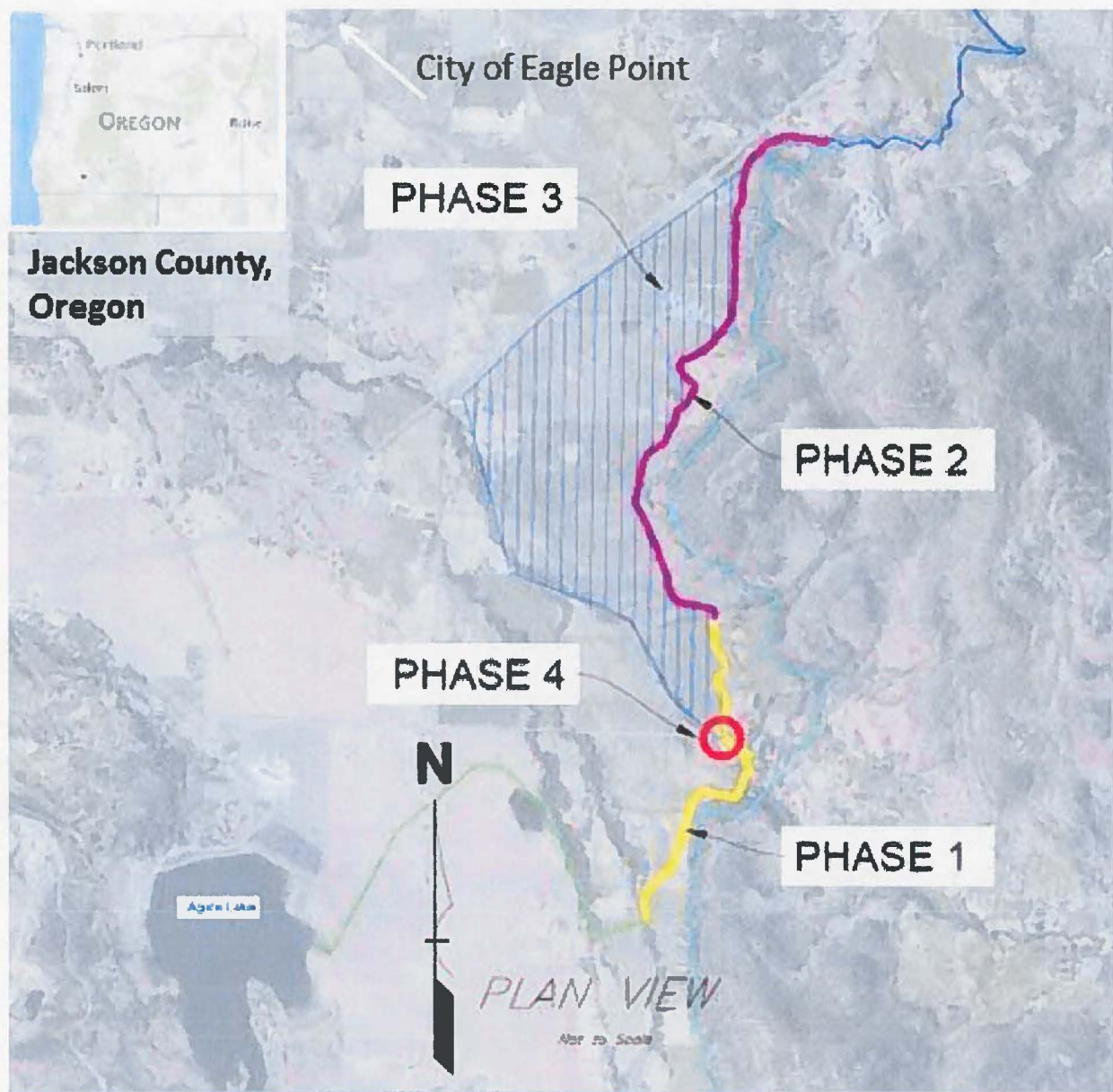
Medford, Jackson County, OR

This project proposes to pipe 2.4 miles of conveyance ditch in order to conserve water and provide pressurized water to patrons of the Rogue River Valley Irrigation District (RRVID). This is phase two of a three phase project; the first phase of the piping project will pipe 1.2 miles of canal and leave 7 CFS of water instream in the month of June for Coho and other threatened/endangered salmonids. This phase is expected to conserve over 1 CFS of water and will provide pressurized water the length of the project, which will allow phase three to occur. In phase three (no funding requested), the Jackson Soil & Water Conservation District and Natural Resources Conservation Service will work with interested landowners to convert from flood irrigation to more efficient sprinkler irrigation systems. Project funds will be used primarily to purchase materials and pay for pipe installation.

Pre-construction work (bidding, contracting, etc.) will begin fall of 2017. This construction project (phase 2 of the total project) is expected to begin the spring of 2018 depending on weather and funding, and should be completed within 6 months of initiation.

This project is not located on a Federal facility.

Background Data



This map shows the four phases of the Bradshaw Drop Project. The light blue line to the right of the project area is the Medford Irrigation District Canal, which actually sits above the RRVID canal.

| | |
|---------|--|
| Phase 1 | Install lower 1.2 miles of pipe |
| Phase 2 | Install upper 2.4 miles of pipe (WaterSMART funding requested) |
| Phase 3 | On-farm irrigation conversion |
| Phase 4 | Potential hydropower generation |

Rogue River Valley Irrigation District (RRVID) has water rights from Little Butte Creek, Fish Lake and Four Mile Lake. These are primary rights listed on certificate 17213.

Rogue River Valley Irrigation District provides irrigation water for agricultural users. There are no domestic use rights from RRVID water. The district serves 890 patrons on a total of 9000 acres. Approximately 73% the total district acreage is pasture and hay ground, and approximately 23% is orchards and vineyards. A small portion of the acreage is in other crops. Just over 50% of the total acreage is flood irrigated, with the remained in sprinkler or drip systems.

RRVID's main canal is 28.5 miles long, of which 20% is piped. There are 48 miles of laterals within the district, with 55% of those laterals piped. The current water demand in an average year is 28,500 acre feet. In hot and/or dry years, demand rises to 33,000 acre feet. Due to canal layout through their district, RRVID accepts and has the right to use tailwater and leakage from Medford and Talent Irrigation Districts' canals. However, as both Medford and Talent Irrigation Districts seek to pipe their canals, RRVID will not receive this water so must conserve water in their own canals to continue to meet their patrons' needs.

Within the project area, all but one of the patrons has expressed an interest in converting from flood irrigation to more efficient systems (see attached letters of intent, appendix B). The single "no" response said financial burden was a roadblock, but we plan to provide funding for that phase and hope his response may change with more information and financial support. However, the cost of getting power to the canal or area to be irrigated continues to be a major roadblock, and in most situations, it has not been cost-effective to bring power to the site and most users are reluctant to develop a system dependent on diesel pumps, particularly for lower-value crops such as pasture and hay. In general, it has been the vineyards and orchards that have been able to convert to more efficient irrigation systems, either because of existing proximity to power or the increased value of their crop.

Connected to this project is a canal piping project that is being funded by Reclamation. That project is projected to be installed the fall of 2017, and will include piping 1.2 miles of canal in order to conserve enough water in storage to allow the district to leave 7 CFS of water instream during the month of June. This project will connect to that pipe, conserve additional water and provide pressurized water the length of the pipe. The prior project (phase 1) does not have the drop necessary to provide pressurized water.

RRVID has also worked with the Bureau to install a fish screen and ladder, to construct a feeder canal that fills a reservoir, and to build the Agate Lake Dam.

Project Description

The Little Butte Creek Watershed is considered one of the prime spawning tributaries for salmonids, especially Coho. In fact, outside the Columbia River Basin, it is believed to have the highest spawning returns of any tributary. However, the Little Butte Creek and its tributary, Antelope Creek, are also water quality limited for a variety of factors that negatively impact fish and wildlife, including sedimentation, bacteria and temperature.

The Rogue River Irrigation District (RRVID) and Medford Irrigation District (MID) divert water from Little Butte Creek through a shared canal that then splits at the top of what is known as Bradshaw Drop. The area from Bradshaw Drop to Antelope Creek, which is approximately 3.6 miles and is completely within RRVID's jurisdiction, is known have substantial leakage. RRVID has collaborated with the Bureau of Reclamation (BOR) to leave (not divert) 7 CFS of water from Little Butte Creek during the month of June in normal water years in order to help Coho, but must pipe this stretch of canal to achieve sufficient water savings to leave that water instream. The canal piping project will be broken into two installation phases to allow the district to serve patrons during the water season and also avoid installing in the worst weather of winter.

This project is phase two of the piping project. It proposes to pipe 2.4 miles of the total 3.6 miles of open canal in order to conserve water and provide pressurized irrigation water to district patrons. Measurements performed by the Oregon Water Resource Department (Watermaster) showed that the canal in this phase is leaking approximately 1.1 CFS. It is difficult to quantify the actual leakage and evaporation because the Medford Irrigation District canal is above the RRVID canal and shows significant signs of leakage into the RRVID canal. It is believe that this water is currently replacing some of the water leaking and evaporating out of the RRVID canal, so it is likely that the RRVID canal is losing significantly more than the measured 1 CFS.

Several other substantial related efforts are occurring in this watershed and in the greater Rogue Basin. The Natural Resource Conservation Service (NRCS), in partnership with the Jackson Soil & Water Conservation District (JSWCD) wrote a Conservation Implementation Strategy to specifically impact agricultural-related water quality in the Little Butte Creek Watershed; their efforts have focused on flood to sprinkler conversion to eliminate polluted tailwater from returning to streams. This program is in its fifth year and has been successful in achieving its goal. In addition, JSWCD declared the Little Butte Creek Watershed its Oregon Department of Agriculture Focus Area, which has concentrated staff resources and money in that area for a variety of projects that improve soil and water resources. JSWCD has committed to continuing its focus in this area until 2022. The effort of these two programs and the

associated monitoring has shown great reduction in surface water pollution. In particular, the elimination of tailwater prevents water with elevated bacteria and temperature as well as altered pH from returning to the streams.

This project has also been selected as a WISE (Water for Irrigation, Streams and the Economy) Demonstration Project. WISE is an ambitious project to pipe all the main canals and laterals of three irrigation districts within the Rogue Basin in order to conserve water and benefit fish and wildlife, stream ecology and provide additional irrigation water. It is a very complex project and will take years to plan; however, this project is of a manageable size and can be used to demonstrate the benefits of piping irrigation canals. There is tremendous political interest and support in WISE and its benefits.

The Bradshaw Drop piping project, which extends from the top of Bradshaw Drop to the flume immediately before Antelope Creek, will not only eliminate leakage and put water back instream. The piping of this section will provide pressurized water to RRVID's patrons within this stretch, many of whom have been unable to convert to sprinkler irrigation because of the cost of bringing electricity to the site. While some patrons may still require booster pumps, depending on the sprinkler system chosen, the pressurized water opens a host of conversion opportunities, which previous work has shown to have a substantial effect on water quality.

In addition, the piping project allows the district to pursue hydroelectric energy generation, which may be sold to nearby patrons needing it for their booster pumps or put back on the grid. This portion of the total project is still being investigated and is not part of this application.

Evaluation Criteria

E.1.1. Evaluation Criterion A: Quantifiable Water Savings

The Oregon Department of Water Resources (Watermaster) performed inflow-outflow measurements at the beginning and end of the project area when no irrigation gates were in use and confirmed that approximately 1.1 CFS of water is currently being lost from the section of canal included in this project. However, the Medford Irrigation District has a main canal directly above the RRVID canal that is visibly leaking substantial amounts of water into the RRVID canal, which is likely replacing water lost through evaporation and leakage from the RRVID canal, so it is believed that total water loss in the project area is higher than the measured (net) quantity.

Some of the water that is currently being lost from the canal is leaking across stretches of “wasteland” that is not truly irrigated and is not being intentionally cropped or grazed. It creates green patches but overall does not provide any agricultural value. Some is seeping into the ground and some is evaporating. In other areas, it is leaking onto pasture and hay ground, creating swampy areas that cannot be farmed and eventually end up as patches of blackberry and teasel plants.

(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.

Oregon Water Resources Department (OWRD) performed a series of open channel inflow/outflow measurements in the Hopkins canal in August of 2016 to determine the flow rate losses in the canal due to seepage, evaporation, leakage, and non-beneficial plant use. Specifically, the measurements were done by Shavon Haynes, the Assistant Jackson County Watermaster using a SonTek FlowTracker®. Shavon Haynes has been doing flow measurements with the OWRD and using the SonTek FlowTracker for over 8 years. The FlowTracker was calibrated in February, 2016 and again in July, 2016. Supporting data from OWRD (see b below) shows the calibration results, and the individual discharge measurement notes for each measurement.

The flow rate lost in the Hopkins canal after it is piped in a high-density polyethylene (HDPE) pipe will be negligible because the pipe will be water tight using fusion welded joints and will not allow seepage, evaporation, leakage, or other losses. This specific pipe type has been used in major canal pipeline projects around the world and nearby in central Oregon. In addition to local successful case studies, the plastic pipe institute claims this pipeline has a conservative lifespan of 50-100 years. This result will be verified using the existing flow measurement weir at the entrance to the proposed pipe (accuracy $\pm 5\%$) and another flow meter at the end of the pipeline. The flow meter at the end of the pipeline may be an Ultrasonic type flowmeter with totalization.

(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.

Oregon Water Resources Department (OWRD) performed a series of open channel inflow/outflow measurements in the Hopkins canal in August of 2016 to determine the flow rate losses in the canal due to seepage, evaporation, leakage, and non-beneficial plant use. Specifically, the measurements were done by Shavon Haynes, the Assistant Jackson County Watermaster using a SonTek FlowTracker®. Shavon Haynes has been doing flow measurements

with the OWRD and using the SonTek FlowTracker for over 8 years. The FlowTracker was calibrated in February, 2016 and again in July, 2016. Supporting data from OWRD shows the calibration results, and the individual discharge measurement notes for each measurement.

The summary of the inflow/outflow test is shown below. This test was done in the month of August, 2016.

| TEST LOCATION | RESULT (CFS) |
|---|-----------------|
| Inflow - Bradshaw Drop | 19.6 |
| Outflow - Hopkins 1 (end of this phase) | 18.5 |
| TOTAL LOSSES = | 1.1 |
| % of Total Flow Lost = | 5.6% |

(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)?

The flow rate lost in the Hopkins canal after it is piped in a high-density polyethylene (HDPE) pipe will be negligible because the pipe will be water tight using fusion welded joints and will not allow seepage, evaporation, leakage, or other losses. This specific pipe type has been used in major canal pipeline projects around the world and nearby in central Oregon. As well as local case studies of success the plastic pipe institute claims this pipeline has a conservative lifespan of 50-100 years. This result will be verified using the existing flow measurement weir at the entrance to the proposed pipe (accuracy +5%) and another flow meter at the end of the pipeline. The flow meter at the end of the pipeline may be an Ultrasonic type flowmeter with totalization.

(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?

The anticipated annual transit loss reductions for the overall project are shown below. The transit loss flow rate multiplied by the number of days the canal generally operates multiplied by a conversion factor will give the volume of water lost for a typical year in acre-ft. The equation is shown below.

$$\text{Acre-ft} = Q \times T \times 1.98$$

Q = Transit loss flow rate (cfs)

T = Time of canal operation (days)

1.98 = Acre-ft per 1 cfs-day

Acre -ft = 1.1 cfs x 200 days x 1.98 acre-ft/ 1 cfs-day

Acre -ft lost per year = 436 acre-ft total loss for the overall project

Miles of canal = 2.07 miles (from Bradshaw drop to End of Phase 2 at Spring Creek)

Anticipated annual transit loss reduction = 210.6 acre-ft per mile

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

The canal loss seepage reductions will be verified using the existing flow measurement weir at the entrance to the proposed pipe (accuracy +/-5%) and another flow meter at the end of the pipeline. The flow meter at the end of the pipeline may be an Ultrasonic type flowmeter with totalization.

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

High-density polyethylene (HDPE) pipe will be the material used in this project. This pipe will be 48" in diameter, have a wall thickness 1.477", and a pressure rating of 80psi. The HDPE pipe will be fusion welded to ensure no opportunities for leakage. This specific pipe type has been used in major canal pipeline projects around the world and nearby in central Oregon. As well as local case studies of success the Plastic Pipe Institute claims this pipeline has a conservative lifespan of 50-100 years and the paper by Commonwealth Scientific and Industrial Research Organization (CSIRO) titled 'Life Cycle Analysis of Water Networks' explains that HDPE pipe provides the lowest life cycle cost when compared to other systems due to significantly reduced or no leakage, increased billable dollars, water conservation, reduced maintenance crews, and no loss in flow capacity over the long term.

E.1.2. Evaluation Criterion B: Water Sustainability Benefits

This phase of the project will not immediately commit conserved water to instream flow. The prior phase (phase 1) will commit 7 CFS of water in the month of June as part of an agreement with the Bureau of Reclamation. Because water from the Medford Irrigation District canal is currently seeping into the RRVID canal in this phase, the actual quantity of water to be saved is difficult to quantify before piping. However, the board and management of RRVID are open to conversations about leaving additional water instream. RRVID is in the process of establishing a meeting with the WISE instream benefits committee to determine where the water is most needed.

Most of the streams in the Rogue Basin are water quality limited, and additional flows play a role in diluting pollutants for increased water quality. In addition, many are flow limited, which impedes fish passage during certain times of the year. Additional instream flows help mitigate both water quality and quantity issues. Of specific concern in the Little Butte Creek Watershed are the threatened and endangered species including Coho, chinook, summer and winter steelhead, and rainbow and cutthroat trout. It is assumed that the same water quality benefits that enhance habitat for the above listed species will also improve aquatic habitat for Klamath smallscale suckers, reticulate sculpin, pacific lampreys and giant pacific salamanders, although less is known about these species. This project also makes on-farm improvements possible in phase 3, which will further improve water quality and habitat in Antelope Creek for Coho, summer and winter steelhead, rainbow and cutthroat trout, and most likely Klamath smallscale suckers, as well as have positive downstream effects on Little Butte Creek and eventually the Rogue River.

In addition to habitat benefits, increased water flow and/or water quality will have positive effects on recreation, as the area is known for its fishing. Equally important, improved water quality may allow children of the nearby town of Eagle Point to actually play in the water as Little Butte Creek passes through their town. Currently, the creek is water contact limited and posted each summer due to elevated bacterial levels.

This project also helps to address water sustainability from an agricultural standpoint. More and more users are requesting or seeking water in the Basin despite increasing non-agricultural demands on the existing water. In addition, water piping projects being pursued by the other irrigation districts (Medford and Talent) will effectively diminish the amount of water in RRVID's canals because RRVID canals currently receive leakage and irrigation tailwater returns from those two districts. This project reduces water loss within RRVID's canals and helps RRVID meet their obligation to their patrons despite diminishing water supplies.

E.1.3. Evaluation Criterion C: Energy-Water Nexus

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

Describe the amount of energy generated.

The estimated amount of energy that the system will generate is 197,664 kW-hrs per year. This calculation is based on using a conservative flow rate of 9.5 cfs from May 1st to September 30th. The water to wire efficiency of a custom built Francis reaction turbine/generator is 63.75% and the elevation difference between the pipeline entrance and the turbine, less the friction loss, was ~105 feet.

The flow rate value was determined from discussions with the RRVID district manager regarding the new amount of water diverted and the amount of water used by landowners according to their water rights. The number of operation hours was estimated from the median or "typical year" diversion hydrograph for the RRVID Bradshaw Drop diversion location. A water to wire efficiency of custom built reaction turbine/generators is known to be about 63% and the NRCS State Irrigation engineer has verified using this as a reasonable assumption for estimating energy generation. The elevation difference and friction loss was determined using GPS grade survey gear and publically available elevation data from USGS and DOGAMI as well as EPAnet hydraulic modeling software. Calculations are outlined in the attached report titled "Energy Savings for Pressurized Irrigation Water Delivery from RRVID" directly following this section.

Describe any other benefits of the renewable energy project.

This project provides pressurized water to RRVID patrons who have been unable to convert from flood to more efficient irrigation systems due to an inability to get electricity to the various sites. This is of direct benefit to the patrons, but will also provide environmental benefits as irrigation tailwater and its associated pollutants can be eliminated.

AND/OR

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

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

The total energy savings for the system is estimated at 467,110 kilowatt hours per year mainly due to reduced pumping. The energy savings were determined using a scenario where each landowner was pumping from the existing canal before the canal was piped and pressure was added to the system. The energy savings result in having to use less power to get the same

results from the sprinkler system because any pressure added before the pump is that much less pressure and electrical power the pump needs to supply.

The attached "Energy Savings for Pressurized Irrigation Water Delivery from RRVID" paper (directly following this section) shows the calculations in detail and the following is a summary of this paper. The energy savings is based on the landowners using the allowed water right flow rate (1/100th cfs per acre) over the entire irrigation season (April 15th to October 15th). The added pressure added to the system averaged over each landowner minus the friction loss in the pipe was estimated at 89 feet of head. Pump station efficiencies were conservatively estimated at 90% motor efficiency and 75% pump efficiency. NRCS National Engineering Handbook, part 623 – irrigation, US Department of Energy and a paper entitled "Flow of Fluids through valves, fittings, and pipe" were used for this calculation. The added pressure was determined using DOGAMI Digital Coast LIDAR elevation data as well as field verified elevation data using GPS grade survey gear.

•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?

Currently, there are 2 small pumps being used on the 3.6 total miles of canal (phase A not funded by this grant and phase B) because the cost to bring electricity to the site is cost-prohibitive. (Some of the sprinkler irrigated land receives gravity pressure via another, higher ditch through an agreement with Medford Water Commission; this agreement will likely cease once pressurized water is available). Piping both sections of canal will provide pressurized water and for many landowners, eliminate the need for pumps. Depending on the sprinkler irrigation system chosen, some landowners may require small horse power booster pumps.

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

The energy savings estimate originates from an alternate site of origin at the start of the Bradshaw Drop where the Joint system canal splits into two canals, one being the Medford Irrigation District canal and the other being the RRVID Hopkins Canal. The average landowner turnout elevation was used in calculating the energy savings.

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

No energy is currently used to treat the irrigation water. No treatment is expected in the future except screening and filtering, neither of which should require additional electrical power. However, sprinkler filtration energy will be reduced for the individual landowners due to the installation of an automatic screen at the entrance to the main canal pipeline.

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

Currently, the district drives the canal three to four times each week throughout the approximately 26 week irrigation season to monitor the canals. After conversion, they will drive it once per week.

Current: 3.5 times (ave) / week X 26 weeks X 26 miles = 2366 miles

After: 1 time/week X 26 weeks X 26 miles = 676 miles

The project should result in 1690 fewer miles driven each year.

ENERGY SAVINGS FOR PRESSURIZED IRRIGATION WATER DELIVERY FROM RRVID

Cost Savings Equation

$$OC = \frac{.746 Q H \rho}{247,000 \eta_M \eta_P \eta_V} OH \times \$/kWh$$

Where

OC = Operating cost (\$/year)

Q = Flow rate (gpm)

H = Head (feet of fluid)

ρ = Density (lb/ft³)

η = Efficiency, M motor, P pump, V variable speed drive (VSD) (percent)

O = Operating hours in evaluation (hours per year)

\$/kWh = Electrical power cost (\$/kWh)

Q = Flow Rate

Flow Rate = Water Right Value (cfs/acre) x Acres x 448.8 gpm/cfs

| | | |
|----------------------------------|-------|----------|
| Irrigated Area (RRVID Manager) = | 638 | acres |
| Water Right (RRVID Manager) = | 1/100 | cfs/acre |

Flow Rate = 1/100 cfs/acre x 638 acres x 448.8 gpm/cfs

Q (gpm) = 2,863 Gallons per Minute

H = Head (feet of Fluid)

| | |
|--|---------------|
| Elevation at beginning of Pipeline = | 1624 ft |
| Avg Elevation at landowner turnouts = | 1533 ft |
| Friction Loss in 48" pipeline @ 16 cfs = | 2 ft |
| H (ft) = | 89 Ft of Head |

ρ = Density (lb/ft³)

ρ (lb/ft³)= 62.4 at 50 degrees F

η = Efficiency, M motor, P pump, V variable speed drive (VSD) (percent)

Motor Efficiency = 90%

Pump Efficiency = 75%

VSD Efficiency = None

O = Operating hours in evaluation (hours per year)

Total Irrigation Time per season

April 15th to October 15th

183 Days of Irrigation

O (hrs) 4392 Hours of Irrigation per Year

\$/kWh = Electrical power cost (\$/kWh)

\$/kWh = 0.07

| |
|---|
| $OC (\$/\text{year}) = \frac{(0.746 \times 4280 \times 89 \times 62.4)}{(247,000 \times 0.9 \times 0.75)} \times 4392 \times 0.07$ $\text{\$ } 21,874.93$ |
|---|

Therefore, the energy savings per year by having available water pressure to landowners is \$33,434

| |
|--|
| $\text{kW-hrs per Year Energy Savings} = 467,109.61 \text{ kW-hrs per Year}$ |
|--|

References

NRCS National Engineering Handbook, Part 623 - Irrigation

DOGAMI Digital Coast LIDAR

***<https://www.coast.noaa.gov/dataviewer/#app=b1ed&bda3-selectedIndex=0>
2009 Lidar Data***

US Department of Energy

***Premium Efficiency Motor Selection and Application Guide
Table 2-1***

Flow of Fluids through valves, fittings, and pipe. (1957). Chicago: Crane

BRADSHAW DROP ENERGY GENERATION POTENTIAL

ROGUE RIVER VALLEY IRRIGATION DISTRICT MEDFORD, OREGON



Prepared by:



January, 2017



INTRODUCTION:

Rogue River Valley Irrigation District (RRVID) is investigating the power generation potential of hydropower generation resulting from piping a section of Hopkins canal up through the Bradshaw Drop section. (Figures #1, #2). The drop occurs at the split of the Main Joint Delivery Canal into the Medford Irrigation District and Rogue River Valley Canals. The Main Joint Delivery Canal is fed by reservoirs in the Cascade Mountains, and diversions from the north and south forks of Little Butte Creek. The proposed hydroelectric project would be built into the proposed pipelines installed by Bureau of Reclamation and RRVID (Figure #3) and would be phase 4 of the project. The elevation drop between the beginning of Bradshaw drop inlet and proposed power station is about 107 ft.

POWER GENERATION POTENTIAL

Data Used in Hydropower Analyses:

The Oregon Department of Water Resources (ODWR) gage #14346500 (Rogue River Valley Canal at Bradshaw Drop), and the United States Bureau of Reclamation (USBR) Gage RRVO daily flow data was used to estimate hydropower generation potential. The ODWR operated the gage from 1958 to 1996. The USBR took over the gage operation in 2001, and is currently collecting data at the gage site. The typical diversion or irrigation season occurs from April through mid October. The diversion pattern can vary greatly from year to year, depending on whether it is a drought, average, or wet year.

Irrigation Deliveries Between the Penstock Intake and Proposed Power Station:

There are approximately 16 turnouts (11 different landowners) between the proposed pipeline intake at the top of Bradshaw drop and the hydropower station. (see Fig. #2). RRVID indicates that when water is diverted into the Hopkins Canal, about 1 cfs is continuously taken through the Edghal Diversion while the remaining turnouts will use about 5.5 cfs. Therefore, 6.5 cfs of flow was subtracted from the historical flow values when calculating the potential for hydropower generation.

Figure #1, Project location

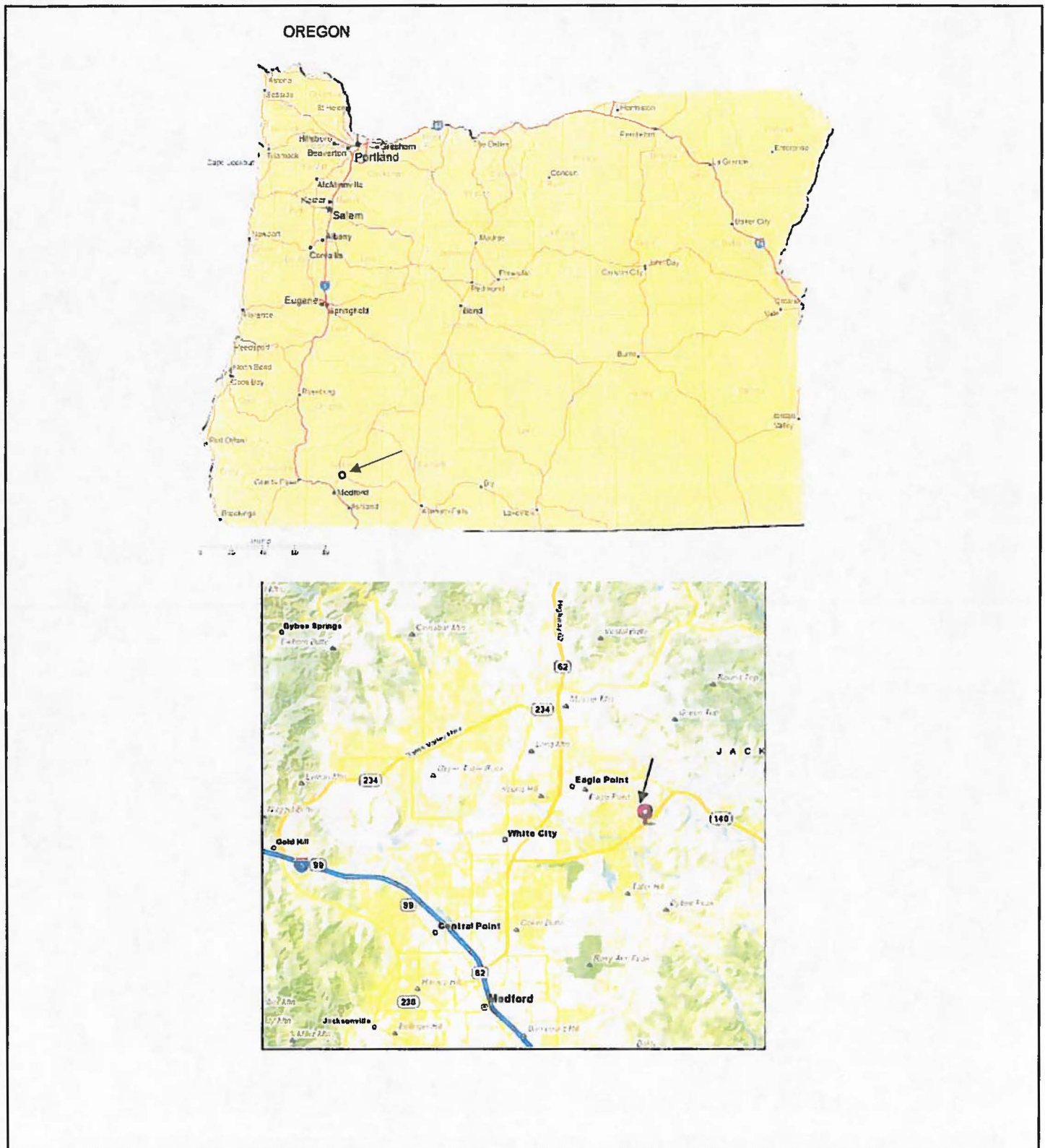
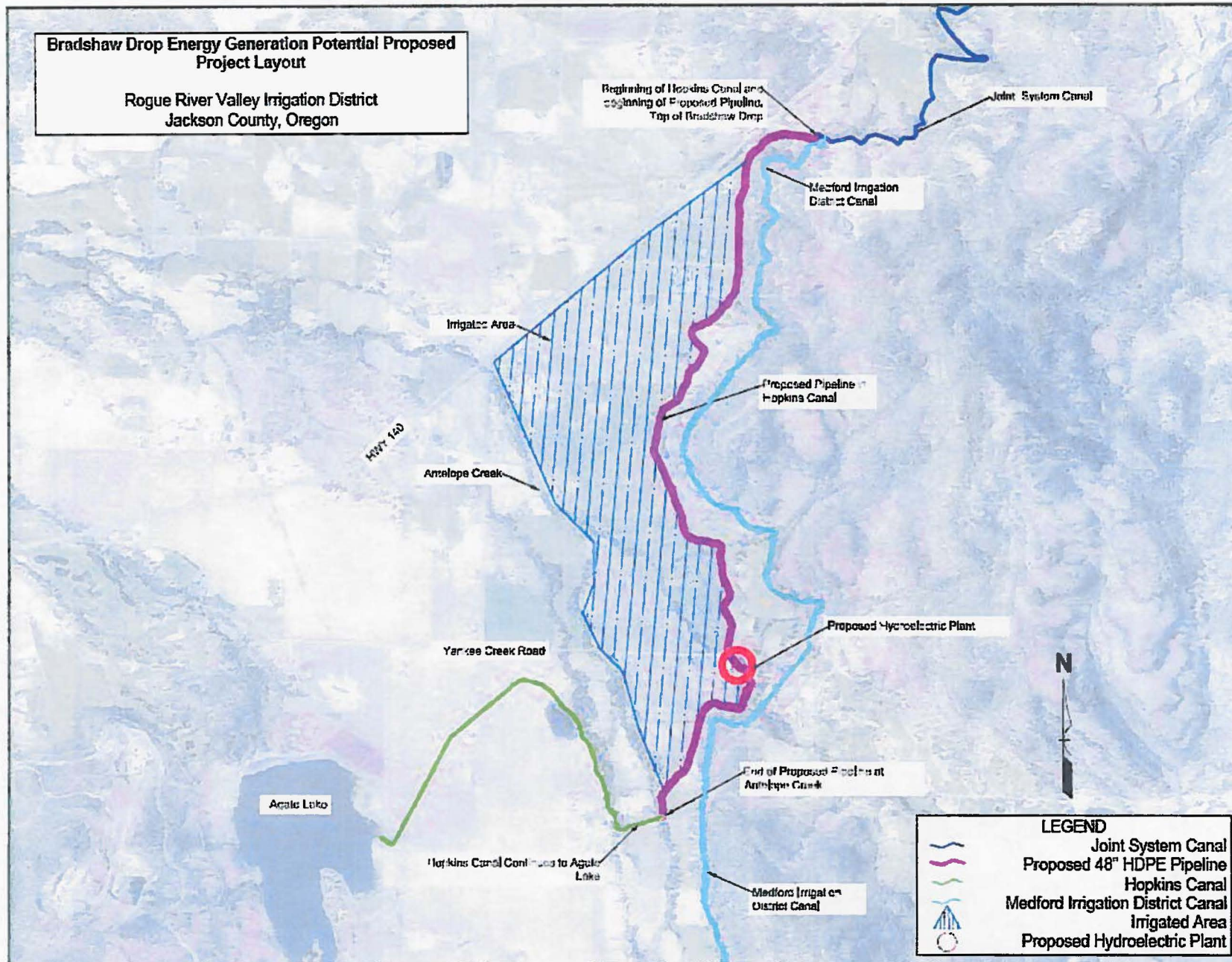


Figure #2, Proposed Project Layout



Flow Duration Analyses:

Canal diversion flows were analyzed to determine the percentage of time that diversion flows were within a certain range. Flow data for the time period March 15 through October 31st were used in the analysis. No zero flow data were used (only data with the canal in operation were used). The following table #2 summarizes the results.

Table #2, Flow Duration Results

Rogue River Valley Canal at Bradshaw Drop
Period of Record = 1961-1984, 1989-1996, 2002-2010
ODWR Gage # 14346500, USBR Gage # RRVO

| Flow Range (cfs) | % of Time Diversion Flow Within Range |
|------------------|---------------------------------------|
| 0 to 5 | 6.2 |
| 5 to 10 | 7.9 |
| 10 to 15 | 13.7 |
| 15 to 20 | 31.9 |
| 20 to 25 | 23.1 |
| 25 to 30 | 8.7 |
| 30 to 35 | 5.6 |
| 35 to 40 | 2.0 |
| 40 to 45 | 0.4 |
| 45 to 50 | 0.5 |

When diversions are occurring into the Hopkins Canal, about 70% of the time the diversion flow is between 10-25 cfs based on historical data. The flow is between 15-25 cfs about 55% of the time.

According to a meeting with RRVID manager Brian Hampson, the new flow rate diverted into the pipeline to account for reduced irrigation delivery needs, and water conserved instream, may be around 16 cfs for the majority of the season. That will leave about 9.5 cfs available for hydropower generation because 6.5 cfs is used for irrigation from the pressurized penstock.

Typical or Average Year Power Capacity Estimates:

Statistical analyses were conducted to produce a median or “typical year” diversion hydrograph (Figure #3) for the RRVID Bradshaw Drop Diversion gage location. Head losses from the proposed penstock inlet to the power station were calculated and median flow values used to estimate the power generation potential using the below equation.

$$P = (Q \times H_n \times e) / 11.81$$

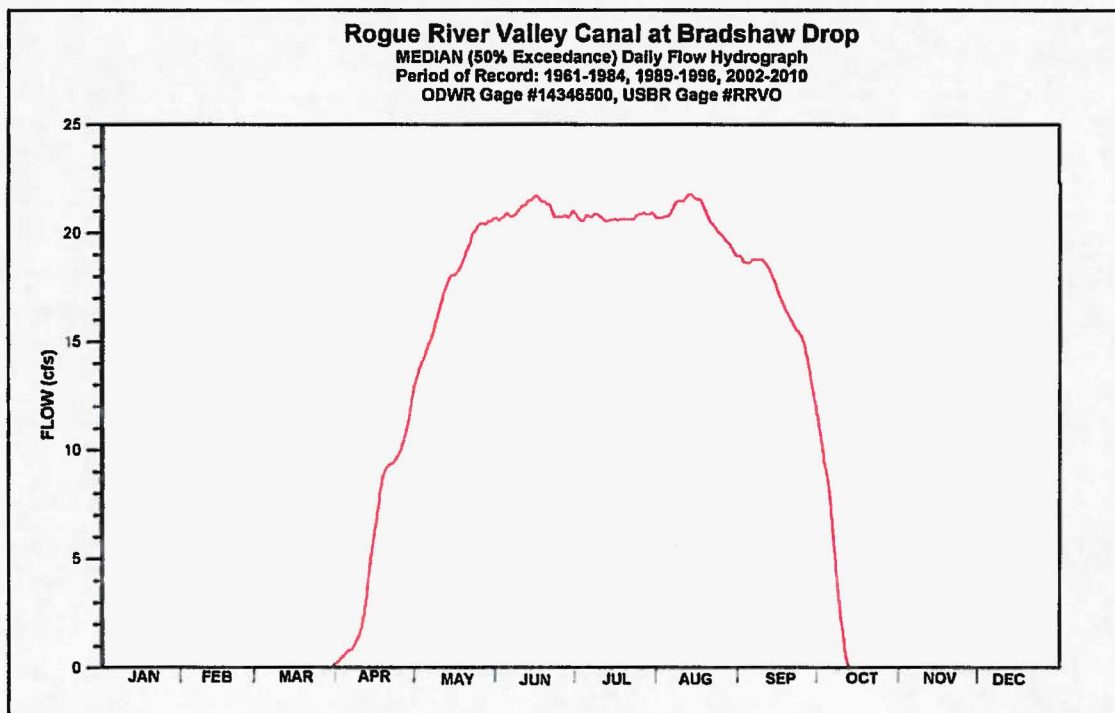
P = Power (kW)

Q = Turbine Flow Rate (cfs)

H_n = Head at turbine inlet (ft of H₂O)

e = Water to Wire Efficiency (combined turbine and generator efficiency)

Figure #3, Median Daily Flow Diversions



$$Q = 9.5 \text{ cfs}$$

$$H = 105 \text{ (ft of H}_2\text{O)}$$

$$e = 63.75\%$$

$$P = 53.8 \text{ kW}$$

Assumptions Used in Energy Generation Estimates/Turbine Options:

The following assumptions were used for the power generation estimate in this report:

1. The water to wire efficiency of the proposed custom built turbine/generator conservatively is 63.75% over the full head and flow turbine operating range. The turbine efficiency estimate is 75% while the generator efficiency estimate is 85%.
2. The flow rate used was 9.5 cfs. This is a conservative value for the purpose of estimating energy generation.
3. Turbines are 100% reliable. No turbine downtime.
4. Headloss in 48" HDPE pipe from Bradshaw Drop to Yankee Creek road is included in the elevation difference calculation.
5. Operation Hours (OH) was determined to be the time between May 1st to September 30th. This is a conservative assumption from discussions with the RRVID manager.

Typical or Average year Energy Generation Estimate

$$EG = OH \times P$$

EG = Energy Generated (kW-hrs)

OH = Operating Hours (hrs)

P = Power (kW)

$$EG = 3,671 \text{ hours} \times 53.8 \text{ kW}$$

$$\underline{EG = 197,664 \text{ kW-hrs}}$$

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E.1.4. Evaluation Criterion D: Addressing Adaptation Strategies in a WaterSMART Basin Study

This project does not occur in a basin with a funded or completed WaterSMART Basin Study. However, for the last 13 years, a number of partners have been working on the same issues that a WaterSMART Basin Study would evaluate – climate change, increased demand as a result of increased population, wildlife and habitat needs, etc. This group of partners and the project they propose to complete is called WISE – Water for Irrigation, Streams and the Economy.

The WISE project addresses water need imbalances within the Rogue River Basin and includes three irrigation districts, including the Rogue River Valley Irrigation District (RRVID), Jackson County, the City of Medford and the Medford Water Commission. In addition, there are 18 members on the Project Advisory Committee (PAC Committee), which includes Watershed Councils, local agricultural corporations, the Oregon Water Resources Department, BOR, the Farm Bureau, environmental groups/NGOs and local governments. As a result of years of planning and considering conflicting needs and potential consequences of various actions, WISE proposes to pipe all irrigation district canals and laterals to eliminate leakage and evaporation, which would allow water to be left in stream as well as provide additional water to irrigation district patrons, most of whom have never received their full allocation of righted water. Piping the canals would also help mitigate water theft, which is becoming a bigger issue in Southwestern Oregon as it becomes more and more difficult and expensive to obtain irrigation water. RRVID has been an important partner in the WISE project.

This project, in conjunction with phase 1 as outlined in the Background Data section, has been approved as a WISE pilot project with the intent of showing the benefits of piping irrigation canals in order to conserve water and provide pressurized irrigation water. As with most piping projects of this scale, cost is a major hurdle so this grant, and the other funding secured and sought, makes the project possible. The total project (phase1-3) will increase stream flows a minimum of 7 CFS during the time period identified as critical to the endangered Coho salmon, helping to address wildlife needs, without harming the needs of the farmers and ranchers who depend on irrigation to grow their crops.

We believe that this project will encourage further collaboration and also increase attention and funding for future phases of the WISE project.

E.1.5. Evaluation Criterion E: Expediting Future On-Farm Irrigation Improvements

If the proposed projects will help expedite future on-farm improvements please address the following:

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

| Map ID | Approximate Acres that could be Improved |
|------------------|--|
| 36-1E-01 TL 1800 | 0 |
| 36-1E-18 TL 101 | 25.5 |
| 36-1E-18 TL 100 | 56.4 |
| 36-1E-18 TL 900 | 80.6 |
| 36-1E-18 TL 901 | 53.4 |
| 36-1E-18 TL 1201 | 83.2 |
| 36-1E-19 TL 201 | 25.9 |
| 36-1E-19 TL 100 | 35.1 |
| 36-1E-19 TL 1200 | 288.4 |
| 36-1E-19 TL 701 | 57.2 |
| 36-1E-30 TL 100 | 68.5 |
| TOTAL | 774.2 |

- *Describe in detail the on-farm improvements that can be made as a result of this project.*

Within the project area, the majority (approximately 775 acres) is flood irrigated. Most of the land in the project area is pasture or hay ground, and there is no power available to most of the landowners. Bringing in power has proven uneconomical. As a result of this project, which will provide pressurized water as well as conserve water, landowners will be able to convert from wild flood to a variety of sprinkler systems. Depending on the system selected, some landowners may need diesel-powered booster pumps, but all the properties could convert to low-pressure sprinkler systems without a booster.

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

Flood-to-sprinkler conversion projects in the project area would not be possible without this WaterSMART Grant project because the cost of bringing power to the various sites is cost prohibitive. The WaterSMART Grant allows RRVID to pipe the upper section of the canal, which will then provide pressurized water and make

- *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.*

The on-farm water conservation will result from increased water use efficiency when individual landowners upgrade from a low efficiency flood irrigation system to a high efficiency sprinkler irrigation system. Therefore, the landowners will use less total water to achieve the same results as they achieved with the flood irrigation system because less water is lost due to surface runoff, and deep percolation. The efficiency of the existing flood irrigated fields is between 30% to 60%, so a value of 45% was used in the calculation. The quality of the existing flood irrigation can easily be verified using publically available satellite imagery and a value of 45% is reasonable for this topography. The efficiency of a modern sprinkler system used for this calculation is between 65% and 85% so a value of 75% was used. These values are from NRCS National Engineering handbook – Part 651 – Irrigation and the 'Surface Irrigation Manual by Burt, 1995'

The estimated potential on-farm water savings per year is 712 acre-ft. The existing water use was determined to be 1780 Acre-ft per year based on a 1/100 cfs per acre water right, an irrigation season of 183 days, and a flood irrigated acreage of 491.26 acres (77% of total acreage in project area). The net water use, or water beneficially used for crop production was estimated to be 801 acre-ft per year based on an irrigation efficiency of 45%. RRVID manager provided the water right, irrigation season and flood irrigated acreage information.

Summary of Calculations:

Acre-ft per year used by existing Flood Irrigation System = 1780 acre-ft per year
 NET water used beneficially for plant growth by Flood System ($1780 * 0.45$) = 801 acre-ft per year

NET water used beneficially for plant growth by Sprinkler System = 801 acre-ft per year
 Acre-ft per year need for new Sprinkler Irrigation System ($801 / 0.75$) = 1068 acre-ft per year.

Savings = $1780 - 1068 = 712$ Acre-ft per year.

- *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.*

RRVID sent out a survey to patrons within the project area. All but two patrons indicated an interest in converting to sprinkler irrigation. One patron indicated he/she needed more information before making a decision, and the other was not interested. Overall, there is very high interest in converting to more efficient irrigation systems.

This project occurs in a watershed that for the last five years was a Natural Resources Conservation Service (NRCS) Conservation Implementation Strategy (CIS) Area. In addition, the Jackson Soil & Water Conservation District (JSWCD) declared the watershed their Oregon Department of Agriculture (ODA) Focus Area through 2022. As a result of these synergistic efforts, several large irrigation conversion projects have occurred in the watershed that have resulted in measurable reductions in pollutants reaching streams through irrigation tailwater runoff. NRCS and a variety of other funders have provided funding for the conversions while JSWCD, who has an on-staff irrigation engineer, has provided project engineering, planning and grant writing assistance. The two organizations work well together and expect to continue doing so for the on-farm conversion associated with this project.

Although the NRCS CIS funding pool ends this year, the JSWCD and NRCS are in continuing conversations regarding renewing the CIS with a focus on landowners within this piping project area. That funding pool would be timed to start in 2019 when both this and the previous piping project would be completed, effectively making on-farm conversion phase three of this overall project. The JSWCD and NRCS have also discussed using the Regional Conservation Partnership Program RCPP) to fund these on-farm conversions; the final decision will be made when applications to the programs are due based on program guidelines and budget conditions at the time.

In addition to NRCS funding, the JSWCD is already in conversation with the Oregon Watershed Enhancement Board (OWEB) regarding the use of their Focused Investment Priority (FIP) funds as match to the NRCS funds. Again, final decisions regarding the use of this program will be made closer to the application deadline based on program guidelines and budget conditions at the time.

See attached letters of intent from RRVID patrons within the project area (Appendix B).

E.1.6. Evaluation Criterion F: Implementation and Results

E.1.6.1. Subcriterion No. F.1: Project Planning

Does the project have a Water Conservation Plan and/or System Optimization Review (SOR) in place?

(1) Identify any district-wide, or system-wise, planning that provides support for the proposed project.

RRVID has both a Systems Optimization Review (SOR) and a Water Conservation Plan (WCP). The existing SOR was completed by geo-engineers over the 2009-2010 irrigation season. A new WCP is in draft form and should be completed within the next three months. RRVID can provide all documents 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).

The SOR conducted in the 2009-2010 irrigation season conducted seepage rates tests in 7 canal reaches within the RRVID district. Their calculations showed a seepage loss of 717 acre-feet over a 1.81 mile test area, equaling 396 acre feet per mile of lateral or canal per season. This is an especially substantial number given that RRVID currently receives water from other irrigation districts (Medford and Talent Irrigation Districts) via their canal leaks as well as tailwater returns, which bolsters the amount of water in RRVID ditches. However, both Talent and Medford are aggressively pursuing piping projects under the WISE project, which would effectively eliminate this 3,000-5,000 acre-feet of water that RRVID currently has the right to use. This puts RRVID in a position of needing to eliminate all water loss in their own canals in order to continue serving their own patrons.

The Bradshaw Drop Piping Project begins to reduce the loss RRVID is currently experiencing and works towards a more water-secure future. In addition, it makes on-farm water conservation through irrigation conversion a possibility. RRVID is partnering with the Jackson Soil & Water Conservation District (technical and financial support) along with other funders to perform these conversions.

E.1.6.2. Subcriterion No. F.2: Support and Collaboration

This project has widespread support from a variety of stakeholders. RRVID patrons, staff and board all support the proposal, as does a variety of natural resource and environmental groups such as the Jackson Soil & Water Conservation District, Natural Resources Conservation Service, Water for Irrigation, Streams and the Economy (WISE), Oregon Department of Environmental Quality (DEQ), Rogue River Watershed Council, the Governor's office (State of Oregon Regional Solutions Office, Governor Kate Brown), City of Central Point, Talent Irrigation District and Medford Irrigation District. See attached letters of support in Appendix A.

This support is significant because the project itself is a Rogue River Valley Irrigation Project, but has garnered such wide support because of the environmental benefits it provides as well as the demonstration this project provides for how the WISE project could move forward throughout the basin. When successful, this project proves the viability of WISE, indicates how WISE could move forward and increases support for WISE.

This project helps avoid water conflict in this project area, and by encouraging the implementation of WISE, eventually in the Basin. Marijuana has been legalized in Oregon for both medicinal and recreational use, and many people anxious to get in on the perceived opportunity purchase rural property without understanding Oregon water use laws. They begin pumping from district canals without a permit; piping these canals will make water theft much more difficult. It will help prevent future problems as the overall project leaves water instream for wildlife, including threatened and endangered species, provides pressurized water to farmers to allow for conversion to more efficient systems and potentially more profitable crops, and also should reduce district maintenance.

For years, water in the Rogue Basin has been over-allocated. More water was provided in water rights than frequently is available, particularly in dry years. Some of the irrigation districts have waiting lists for water rights that are over 30 years long. Non-irrigation demands are also increasing; the population is growing rapidly and demanding more municipal water, and wildlife needs are also great. Water flow in the Rogue Basin's streams and rivers is often cited as a limiting factor for fish and wildlife population health. There is frequent tension between various groups and individual users as to how best use the water.

This project does enhance the possibility of future water efficiency improvements. Patrons on this stretch of canal have not, for the most part, been able to convert to sprinkler irrigation systems because the cost of bring power to the site is cost-prohibitive. This, in turn, has prevented conversion to more profitable crops. This phase of the project will make pressurized water available to users along the entire project (including the portion not funded by this grant), and make it possible to move from flood to sprinkler irrigation. The Jackson Soil & Water Conservation District and Natural Resources Conservation Service are already planning programs to help willing landowners make this conversion starting in 2019.

E.1.6.3. Subcriterion No. F.3: Performance Measures

Performance measure A.1: Canal Lining/Piping

Pre-project estimations of baseline data:

Oregon Water Resources Department (OWRD) performed a series of open channel inflow/outflow measurements in the Hopkins canal in August of 2016 to determine the flow rate losses in the canal due to seepage, evaporation, leakage, and non-beneficial plant use. Specifically, the measurements were done by Shavon Haynes, the Assistant Jackson County Watermaster using a SonTek FlowTracker®. Shavon Haynes has been doing flow measurements with the OWRD and using the SonTek FlowTracker for over 8 years. The FlowTracker was calibrated in February, 2016 and again in July, 2016. Supporting data from OWRD shows the calibration results, and the individual discharge measurement notes for each measurement.

Post-project methods for quantifying the benefits of canal piping:

The flow rate lost in the Hopkins canal after it is piped in a high-density polyethylene (HDPE) pipe will be negligible because the pipe will be water tight using fusion welded joints and will not allow seepage, evaporation, leakage, or other losses. This specific pipe type has been used in major canal pipeline projects around the world and nearby in central Oregon. As well as local case studies of success the plastic pipe institute claims this pipeline has a conservative lifespan of 50-100 years. This result will be verified using the existing flow measurement weir at the entrance to the proposed pipe (accuracy +/-5%) and another flow meter at the end of the pipeline. The flow meter at the end of the pipeline may be an Ultrasonic type flowmeter with totalization.

The anticipated annual transit loss reductions for the overall project are shown below. The transit loss flow rate multiplied by the number of days the canal generally operates multiplied by a conversion factor will give the volume of water lost for a typical year in acre-ft. The equation is shown below.

$$\text{Acre-ft} = Q \times T \times 1.98$$

Q = Transit loss flow rate (cfs)

T = Time of canal operation (days)

1.98 = Acre-ft per 1 cfs-day

$$\text{Acre -ft} = 1.1 \text{ cfs} \times 200 \text{ days} \times 1.98 \text{ acre-ft/ 1 cfs-day}$$

$$\text{Acre -ft lost per year} = \underline{436 \text{ acre-ft total loss for the overall project}}$$

$$\text{Miles of canal} = 2.07 \text{ miles (from Bradshaw drop to End of Phase 2 at Spring Creek)}$$

$$\underline{\text{Anticipated annual transit loss reduction} = 210.6 \text{ acre-ft per mile}}$$

Performance measure A.2.b: Irrigation Metering

Pre-project estimations of baseline data:

There were a total of about 16 different landowner irrigation turnouts along this stretch of canal that is projected to be piped. Each turnout varied in size but most were either a 6" gate valve or an 8" gate valve placed in the side of the canal bank connected to a section of either concrete pipe or pvc pipe which extended under the canal road out to the top of the landowners field. Flow rates of each of these turnouts was not performed during the 2016 irrigation season, but these flow rates could be estimated during the 2017 irrigation season. This would allow the irrigation district to tell if landowners are using the correct amount of flow or not, before project implementation of the pipeline. These measurements would have poor accuracy due to the configuration of the turnouts (most are round openings), the pipeline under the canal road is of unknown condition and flow characteristics at the pipeline entrance may not allow for very accurate measurements (eddies and varying flow veins). The estimate given now is that each turnout provides about 1 to 2 cfs of flow when opened full but this varies as the water level in the canal varies, which easily be a half a foot. There are no water level control structures such as automatic gates, or long crested weirs to ensure the flow entering the turnouts is at the correct height and there isn't a reliable way to determine total volume used per irrigation. The existing measurements take into account canal losses and irrigation use.

Post-project methods for quantifying the benefits of projects to install measuring devices:

During the pipeline installation, each individual turnout will be fitted with a valve and a flow meter. This flow meter will be able to provide instant flow rate measurements as well as totalizing flow volume measurements and will be positioned to be easily read by the ditch rider. This data will be compared to the pre-project irrigation estimates taken during the 2017 irrigation season to quantify the actual amount of savings.

Since the pipeline will have no transit losses, the inflow (measured with the existing weir) minus the outflow (measured with an acoustic meter) will equal the total irrigation use at that time.

Performance Measure: A.3: SCADA and Geographic Informations Systems (GIS)

Pre-project estimates of baseline data:

Oregon Water Resources Department (OWRD) performed a series of open channel inflow/outflow measurements in the Hopkins canal in August of 2016 to determine the flow rate losses in the canal due to seepage, evaporation, leakage, and non-beneficial plant use.

Specifically, the measurements were done by Shavon Haynes, the Assistant Jackson County Watermaster using a SonTek FlowTracker®. Shavon Haynes has been doing flow measurements with the OWRD and using the SonTek FlowTracker for over 8 years. The FlowTracker was calibrated in February, 2016 and again in July, 2016. Supporting data from OWRD shows the calibration results, and the individual discharge measurement notes for each measurement.

The district monitors the open canal three to four times per week throughout the irrigation season (April 15th to October 1st). It takes employees approximately 1 hour to monitor the system. It is a 26 mile round-trip, with 3.6 miles driven on dusty canal roads. Overall, this project will save at least 91 hours of labor and 2360 driving miles each year, at least 330 of which are on canal roads.

Post-project methods for quantifying benefits of SCADA or SCADA/GIS projects:

The new system will track and record the inflow to water users and can be compared to the pre-project uses. The SCADA system will allow for remote monitoring within the RRVID office of the system without having to travel out to the canal. This will be beneficially and will reduce mileage driven by operators, and will reduce dust from traveling on dusty roads near the pipeline.

Performance measure B.1: Implementing renewable energy improvement related to water management and delivery

The estimated amount of energy that the system will generate is 197,664 kW-hrs per year. This calculation is based on using a conservative flow rate of 9.5 cfs from May 1st to September 30th. The water to wire efficiency of a custom built Francis reaction turbine/generator is 63.75% and the elevation difference between the pipeline entrance and the turbine, less the friction loss, was ~105 feet.

The flow rate value was determined from discussions with the RRVID district manager regarding the new amount of water diverted and the amount of water used by landowners according to their water rights. The number of operation hours was estimated from the median or "typical year" diversion hydrograph for the RRVID Bradshaw Drop diversion location. A water to wire efficiency of custom built reaction turbine/generators is known to be about 63% and the NRCS State Irrigation engineer has verified using this as a reasonable assumption for estimating energy generation. The elevation difference and friction loss was determined using GPS grade survey gear and publically available elevation data from USGS and DOGAMI as well as EPAnet hydraulic modeling software. For calculations, see the report starting on page 18.

The total energy savings for the system is estimated at 467,110 kilowatt hours per year due to reduced/eliminated pumping. The energy savings were determined using a scenario

where each landowner was pumping from the existing canal before the canal was piped and pressure was added to the system. The energy savings result in having to use less power to get the same results from the sprinkler system because any pressure added before the pump is that much less pressure and electrical power the pump needs to supply.

The attached "Energy Savings for Pressurized Irrigation Water Delivery from RRVID" paper (page15) shows the calculations in detail and the following is a summary of this paper. The energy savings is based on the landowners using the allowed water right flow rate (1/100th cfs per acre) over the entire irrigation season (April 15th to October 15th). The added pressure added to the system averaged over each landowner minus the friction loss in the pipe was estimated at 89 feet of head. Pump station efficiencies were conservatively estimated at 90% motor efficiency and 75% pump efficiency. NRCS National Engineering Handbook, part 623 – irrigation, US Department of Energy and a paper entitled "Flow of Fluids through valves, fittings, and pipe" were used for this calculation. The added pressure was determined using DOGAMI Digital Coast LIDAR elevation data as well as field verified elevation data using GPS grade survey gear.

Performance measure B.2: Increasing Energy efficiency in water management

Increasing energy efficiency in water management will be achieved through working with landowners during the on-farm improvement portion of the project. All available information will be used to help landowners schedule irrigation effectively which will reduce unnecessary water usage. An irrigation water management plan will be developed for each landowner that will be at or above the NRCS standard for practice 449, Irrigation water Management. Jackson Soil and Water Conservation district will provide on-farm irrigation scheduling assistance to willing landowners using soil moisture sensors, soil probes, and crop water use values. Water saved on-farm will translate to more water used for generating power at the hydro power facility but at this time it is unclear how much water can be saved due to water management and what the anticipated cost savings are. Pre-project water management values could be documented once the on-farm flow meters are installed and post-project water management values can be determined after the irrigation water management practices have been implemented.

E.1.7. Evaluation Criterion G: Additional Non-Federal Funding

Non-Federal Funding / Total Project Cost = \$2,665,080 / 2,995,080 = 90% Non-Federal Funding

This phase of the project currently has \$216,454 in grant money awarded from the Governor's Regional Infrastructure Finance competitive funding pool. Application has been submitted for an Oregon Department of Environmental Quality (DEQ) Clean Water State Revolving Fund Loan in the amount of \$3,198,944. Funds from the Revolving Fund Loan will be used as bridge

financing. In addition to this application, an application for approximately \$1,900,000 will be made to the Oregon Water Resource Department (OWRD) Water Project Grant and Loan Program. We are also in conversation with the Cow Creek Band of the Umpqua Tribe of Indians regarding application for Pacific Coast Salmon Recovery Funds.

E.1.8. Evaluation Criterion H: Connection to Reclamation Project Activities

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

The water that flows through RRVID's ditches (to be piped) goes into the Agate Reservoir, which is a Reclamation project. Phase one of this project pipes approximately 1.2 miles of canal in order to conserve enough water to leave 7 CFS in Little Butte Creek. This is a result of a Biological Opinion that was completed in 2012. RRVID also has benefited from Reclamation improvement of Fourmile Lake Dam and Fish Lake Dam.

(2) Does the applicant receive Reclamation project water?

RRVID stores water in Agate Reservoir, a Reclamation water project with storage capabilities of 4,620 acre feet. RRVID also has storage rights in Emigrant Reservoir, another Reclamation project, in the amount of 4,000 acre feet.

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

This project is not located on Reclamation lands, but the water from this project flows into Agate Reservoir which is a Reclamation-owned facility.

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

Yes, there are several Reclamation projects within the Rogue Basin, including Fourmile Lake, Fish Lake and structures throughout the three irrigation districts (Medford, Talent and RRVID)

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

Yes, the conserved water from phase 1 will contribute water to the Rogue Basin. The work of phase two will make possible additional water instream as well as an improvement in water quality from irrigation conversion completed in phase three.

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

According to Kathy Kahera in the Bend, Oregon office, there are no trust responsibilities in the Rogue Basin nor with this project.

Environmental and Cultural Resources Compliance

Will the proposed project impact the surrounding environment?

This project will require soil-moving activities. However, the following steps and methodologies are being used to minimize impacts. The pipe will be laid in the existing canal and the soil from the existing pad (road) will be used as cover. When completed, the pad will be on top of the pipe. The project will be done during time periods when water is not in the canal to avoid water pollution.

Are there T&E species or designated critical habitat in the project area?

The proposed water conservation project is directly tied to Endangered Species recovery efforts in the Rogue Basin. RRVID is a partner with two other Irrigation Districts, the Bureau of Reclamation, USFWS, and NMFS to manage multiple species of plants and animals known to occur within the footprint of the Rogue Project. A detailed Baseline Conditions report was produced in 2006 by GeoEngineers, Inc. that addressed multiple species and habitats in the project vicinity. From that report, the Bureau of Reclamation produced a Biological Assessment (in conjunction with the three Irrigation Districts) to form the basis of the ESA Consultation with the federal agencies. Two Biological Opinions were completed for this overall Rogue Project – one by USFWS for non-commercial species and one by NMFS focused on coho salmon recovery.

The proposed water conservation activity will benefit listed species and improve critical habitats. The water saved by this project would supplement instream flows in July which is a critical time for coho juveniles. The added water will supplement low summer flows, increase aquatic habitat and add cool water during a normally warm summer month.

Pertinent documents for the Rogue River Project may be obtained at the following website: <https://www.usbr.gov/pn/programs/esa/oregon/rogue/index.html>

Are there wetlands or other surface waters inside the project boundaries that fall under CWA jurisdiction as Waters of the United States?

No. There are no wetlands or other surface waters inside the project boundaries that fall under CWA jurisdiction.

When was the delivery system constructed? Will the proposed project result in any modification of or effects to individual features of an irrigation system?

This project will modify features of an irrigation system, in particular, the canal and headgates. The water delivery system was originally constructed in 1902, but headgates throughout the system were rehabilitated in 1955 and the canal has been under continuous maintenance since its construction. Individual headgates and other features are replaced or repaired as necessary to ensure function.

Are there known archeological sites in the proposed project area?

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

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

We do not believe the proposed project will have a disproportionately high and adverse effect on low income or minority populations.

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

The proposed project will not limit access to and ceremonial use of Indian sacred sites or result in any other impacts on tribal lands.

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

The project will not contribute to the introduction, continued existence or spread of weeds or non-native invasive species. The existing road will be used to fill in over the pipe, and weed-free fill from an established quarry will be used if more material is needed.

Required Permits or Approvals

No permits are required for this phase of the project. All work in the plan is permitted outright for this land use and is within the RRVID easement. There are no stream crossings within the project area.

Project Budget

Funding Plan and Letters of Commitment

This application is seeking funding for phase 2 of the overall project. RRVID is providing equipment and labor (in-kind), and the JSWCD and NRCS have provided an in-kind feasibility study for the project. The JSWCD is also providing grant writing as an in-kind donation.

Rogue River Valley Irrigation District is providing all their labor (\$28,665.50), fringe benefits (\$13,273.36), vehicle use and mileage (\$5,738) and equipment use (\$15,587) as in-kind. These costs will be paid out of the annual operating budget.

We expect to begin construction the spring of 2018. However, pre-construction costs such as RFP preparation (\$13,000), construction contractor bidding and contracting (\$26,000) will be performed in late summer and fall of 2017. These items will be covered by other grants and/or from the DEQ Revolving Loan (see next paragraph) that we plan to use for bridge funding if this grant is not awarded when those costs are incurred. These costs are necessary for finding competitive contractors to perform the work.

At this point, \$216,454 has been awarded from the Governor's Regional Investment Fund (see Appendix D). Application has been made for a Department of Environmental Quality Clean Water State Revolving Fund Loan, which includes a competitive loan forgiveness element. This loan amount can be reduced as other funds become available. An additional application will be submitted for an Oregon Water Resource Department Water Project Grant. In addition, we are also in contact with the Cow Creek Band of the Umpqua Indian Tribe and hope to submit a Pacific Coast Salmon Recovery Fund Grant; the application has not been released and we don't know if or how much we will be able to request (not shown in chart below). We are applying for more funds than our total project costs to ensure the project will occur. As grants are awarded, the loan amount requested from DEQ will be reduced. This would in turn reduce the amount of principal forgiveness available. The loan also provides bridge financing in case grant funds are not available at the time of the expenditure.

Of the total project costs of \$2,955,080, the only federal source of funds would be this Water SMART grant, with \$290,000 requested. This results in over 90% of the project being funded by non-federal dollars.

Non-federal funding/total project costs = \$2,665,080/\$2,955,080=90.18%

Table 1 – Summary of Non-Federal and Federal Funding Sources

| Funding Sources | Amount |
|--|--|
| Non Federal Entities | |
| 1. Governor's Regional Infrastructure Fund (RIF) | \$216,454 |
| 2. OWRD Water Project Grant | 1,900,000 |
| 3. DEQ Clean Water State Revolving Fund Loan | \$799,736 (principal forgiveness sought) |
| 4. RRVID | \$63,263 |
| <i>Non-Federal Subtotal</i> | <i>2,879,453</i> |
| Other Federal Entities | |
| | |
| REQUESTED RECLAMATION FUNDING | \$290,000 |

| Source | Amount | Confirmed/Pending | Notification of Funding |
|---|--|--------------------------|--------------------------------|
| Governor's Regional Infrastructure Fund (RIF) | \$216,454 | Confirmed | See attached letter |
| OWRD Water Project Grant | 1,900,000 | Pending | November 2017 |
| BOR WaterSmart | \$290,000 | Pending | May 2017 |
| DEQ Clean Water State Revolving Fund Loan | \$3,198,944 (\$799,736 forgiveness possible) | Pending | Not yet announced |

Budget Proposal

| Budget Item Description | Computation | | Quantity Type | Total Cost |
|---|-----------------|----------|---------------|-------------|
| | \$/Unit | Quantity | | |
| Salaries and Wages | | | | |
| Secretary/Manager | \$37.17/hr | 350 | hours | \$13,011.00 |
| Foreman | \$22.35/hr | 320 | Hours | \$7,151.90 |
| Crew 3 | \$20.77/hr | 144 | Hours | \$2990.16 |
| Bookkeeping/Admin | \$24.61/hr | 224 | Hours | \$5,512.44 |
| Fringe Benefits | | | | |
| Secretary/Manager | \$14.28/hr | 350 | Hours | \$4998.00 |
| Foreman | \$13.30/hr | 320 | Hours | \$4,257.00 |
| Crew 3 | \$13.37/hr | 144 | Hours | \$1,897.20 |
| Bookkeeping/Admin | \$9.47/hr | 224 | Hours | \$2,121.16 |
| Travel | | | | |
| Truck 1 | .54/mile | 3750 | Mile | \$2,025.00 |
| Truck 2 | .54/mile | 3750 | Mile | \$2,025.00 |
| Truck 3 | .54/mile | 3125 | Mile | \$1688.00 |
| Equipment | | | | |
| Excavator, 305CR Cat | \$36.66/hr | 180 | Hour | \$6,598.80 |
| Excavator, 305 CR Cat, stand-by time | \$33.35/hr | 30 | Hour | \$1,000.50 |
| Excavator, 334 Kobota | \$21.56/hr | 150 | Hour | \$3,234.00 |
| Excavator, 334 Kobota, stand-by time | \$20.54 | 90 | Hour | \$1,848.60 |
| Dump Truck, GMC 5 yd | \$47.01 | 30 | Hour | \$1,410.30 |
| Dump truck, GMC 5 yd stand-by time | \$45.21 | 15 | Hour | \$678.15 |
| Equip Trailer, 18 ft, Miller Tilt | \$4.08 | 24 | Hour | \$97.92 |
| Equip Trailer, 18 ft, Miller Tilt stand-by time | \$3.63 | 198 | Hour | \$718.74 |
| Supplies and Materials | | | | |
| 48" C-10 Headgate | \$8000/unit | 1 | Headgate | \$8000.00 |
| Intake Screen | \$1000/unit | 1 | Screen | \$1,000.00 |
| Auto Intake-Travelling Screen (35 CFS) | \$40,000/unit | 1 | Screen | \$40,000.00 |
| Concrete Headwall Structure | \$10,000/unit | 1 | Structure | \$10,000.00 |
| Ultrasonic Pipeline Flow Meter | \$9,000/unit | 1 | Meter | \$9,000.00 |
| 8" Standpipe Air vent tee-riser | \$4,500/unit | 1 | Vent | \$4,500.00 |
| 48"x48" Tees | \$3,500/fitting | 24 | Fitting | \$84,000.00 |
| CalVal Flow Control Valves & parts | \$30,000/valve | 1 | Valve | \$30,000.00 |
| 6" Pressure Relief Valves | \$850/valve | 5 | Valve | \$4,250.00 |
| 4" Air/Vac Valves | \$300/valve | 9 | Valve | \$2,700.00 |

| | | | | |
|---------------------------------|---------------------|----------------------|---------|----------------|
| 6" Butterfly Valve | \$500/valve | 10 | Valve | \$5,000.00 |
| 6" HDPE Pipeline Section | \$2.50/ft | 100 | Foot | \$250.00 |
| 2" Air/Vacuum vent | \$210/vent | 12 | Vent | \$2520.00 |
| ¾ minus rock (backfill/bedding) | \$15/yd | 7000 | Yards | \$105,000.00 |
| 48" HDPE DR 32.5 IPS Pipe | \$104/ft | 20,842 | Ft | \$1,127,568.00 |
| Contractual/Construction | | | | |
| Legal Research/Consultation | \$325/hr | 80 | Hours | \$26,000.00 |
| CPA, P.C. | \$7,000/yr | 1 | Year | \$7,000.00 |
| Bid Package Preparation | \$13,000/pkg | 1 | Package | \$13,000.00 |
| Biologist Fees | \$249/hr | 100 | Hours | \$24,900.00 |
| Engineering Fees | \$154/hr | 100 | Hours | \$27,720.00 |
| Contractor Installation Costs | \$1,353,082/project | 1 | Project | \$1,353,082.00 |
| Other | | | | |
| | | | | |
| TOTAL DIRECT COSTS | | | | \$2,948,753.87 |
| Indirect Costs | | | | |
| Type of rate: de minimis | Percentage: 10% | \$ base: \$63,263.87 | | \$6,326.39 |
| TOTAL ESTIMATED PROJECT COSTS | | | | \$2,955,080.26 |

Budget Narrative

Salaries and Wages:

Brian Hampson, Secretary/Manager: Direct labor rate of \$37.17/hr and fringe benefits of \$14.28/hr. Estimated 350 hours over course of project, with tasks including working on the bid packages, reviewing bids and selecting contractors, acting as general contractor, managing installation and contractors, etc. Salary generally increases less than or equal to 3% per year, however, the rate shown in the budget is an average of the two years of the expected installation.

Jeff Shock, Foreman: Direct labor rate of \$22.35 and fringe benefits of \$13.30/hr. Estimated 320 hours over the course of the project, with tasks including direct on-site project management, working with Crew 3 to prep site, and assist in construction. The foreman will also be responsible with working with the contractor in cost-estimating and ordering of material. Salary generally increases less than or equal to 3% per year, however, the rate shown in the budget is an average of the two years of the expected installation.

Lee Siebert, Crew 3: Direct labor rate of \$20.77/hr and fringe benefits of \$13.37/hr. Estimated 144 hours over the course of the project, with tasks including working with the foreman to prep the site and assist in construction. Salary generally increases less than or equal to 3% per year, however, the rate shown in the budget is an average of the two years of the expected installation.

June Condie, Bookkeeping/Administration: Direct labor rate of \$24.61/hr. Estimated 224 hours over the course of the project, with tasks including collecting all the project information, tracking receipts, meeting deadlines, payroll, and grant management. Salary generally increases less than or equal to 3% per year, however, the rate shown in the budget is an average of the two years of the expected installation.

Fringe Benefits:

Brian Hampson, Secretary/Manager: Fringe benefit rate is \$14.28/hr. Estimated 350 hours over course of project.

Jeff Shock, Foreman: Fringe benefit rate is \$13.30/hr. Estimated 320 hours over the course of the project.

Lee Siebert, Crew 3: Fringe benefit rate is \$13.37/hr. Estimated 144 hours over the course of the project.

June Condie, Bookkeeping/Administration: Fringe benefit rate is \$9.47/hr. Estimated 224 hours over the course of the project.

Included in the fringe benefit package is health and dental, workmen's compensation, social security, PERS and unemployment. The actual rate varies based on the employee's choice of medical coverage (family versus individual, etc.). These are actual costs to Rogue River Valley Irrigation District.

Travel:

The trips shown in the budget are staff travel from the RRVID office to the job site and other potential locations such as stores to get supplies. Rate is calculated at \$0.54/mile.

Equipment:

Rates shown vary by equipment type. Standby time is indicated separately at a lower cost/hour. These rates are from the USACE recommended equipment rates for our region.

Materials and Supplies:

All materials shown are construction materials. Prices/unit and number of units needed were provided by Bill Cronin, PE and NRCS State Engineer and Paul DeMaggio, PE with the Jackson Soil & Water Conservation District. Both have past experience with many similar projects. Bill Cronin in particular has extensive experience with large piping projects.

Contractual:

Legal Research/Consultation: Review bid package for legal compliance. Help prepare contract agreement for engineering and construction. Provide legal advice in case of patron conflict. Provide legal advice and/or protection in case of environmental lawsuit, etc. Estimate was provided by attorney based on past projects.

CPA, P.C.: By law, the CPA is required to do separate audits for projects over \$1 million. This estimate was provided by the CPA based on prior projects.

Bid Package Preparation: Prepare bid packages for engineering and construction. The number was a bid provided by the attorney as a set rate for this work.

Biologist Fees: Do all required work for NEPA compliance and other work or reports that may arise in the course of this project. Estimate was provided by a consulting firm.

Engineering Fees: Provide engineering and design work for the project. This is an estimate based on phase 1 estimates and adjusted based on Bill Cronin's expertise with prior projects.

Contractor Installation Costs: This is an estimate based on bids from phase 1 and adjusted with Bill Cronin's expertise based on components of the project that are similar. This number will be adjusted upon receipt of bids from contractors.

Environmental and Regulatory Compliance Costs:

This is an estimate based on the cost of compliance for phase 1. Again, it is adjusted according to similar and dissimilar elements of the project. This number will be adjusted upon receipt of bids.

Other Expenses:

None

Indirect Costs:

We are claiming the 10% de minimis and using a base rate of RRVID's actual and direct costs incurred (wages, fringe benefits, vehicle and equipment).

Total Costs:

The total cost of the project, including indirect costs, is \$2,955,080. We are requesting \$290,000 from this grant, which is the only federal cost share amount. The remainder of the project will be funded by RRVID's in-kind and state monies.

Unique Entity Identifier and System for Award Management

Rogue River Valley Irrigation District's SAM number (CAGE code): 31YA5

Letters of Support

See Appendix A (pg 46)

Official Resolution

See Appendix C (pg 65)

Appendix A - Letters of Support



Jackson Soil & Water Conservation District
89 Alder Street, Central Point, Oregon 97502
Telephone: (541) 423-6159 FAX: (541) 727-7471
web-site: www.jsacd.org

January 9, 2017

Bureau of Reclamation
PO Box 25007
Denver, CO 80225

Subject: Letter of Support for Rogue River Valley Irrigation District
WaterSMART 2017 grant application for Bradshaw Drop Piping project

To whom it may concern:

Jackson Soil and Water Conservation District (JSWCD) is very supportive of Rogue River Valley Irrigation District's (District) proposed Bradshaw Drop piping project. This project involves piping 2.4 miles of the District's main canal which will help improve water, quality, protect fish habitat, enhance instream flows, as well as protecting the regional agricultural economy. JSWCD fully supports Rogue River Valley Irrigation District's application for funding that is needed to proceed with project improvements for further improving water conservation, fish habitat, water quality and aquatic weed control and stream temperatures within the project area.

JSWCD strongly promotes water conservation, efficiency and fish habitat enhancement. The Bradshaw Drop piping project is a good demonstration project that improves water quality and quantity and fish habitat within the District boundaries.

JSWCD supports funding this project.

Sincerely,

A handwritten signature in cursive script, appearing to read "Randy White".

Randy White, District Manager



Oregon

Kate Brown, Governor

Department of Environmental Quality

Western Region Medford Office

221 Stewart Avenue, Suite 201

Medford, OR 97501

(541) 776-6010

FAX (541) 776-6262

TTY 711

January 13, 2017

Bureau of Reclamation
PO Box 25007
Denver, CO 80225

Subject: Letter of Support for Rogue River Valley Irrigation District
WaterSMART 2017 grant application for Bradshaw Drop Piping project

To whom it may concern:

The Oregon Department of Environmental Quality strongly supports Rogue River Valley Irrigation District's application for funding the Bradshaw Drop piping project.

This project will pipe 2.4 miles of the District's main canal. The pipe will conserve water, help improve water quality, protect fish habitat, reduce aquatic and invasive weeds, and enhance the regional agricultural economy. The Bradshaw Drop piping project will serve as a local demonstration of the benefits of the WISE project, the region-wide plan to modernize the larger irrigation system comprised of operations by BOR, RRVID, Talent ID and Medford ID.

ODEQ promotes projects that protect water quality, result in conservation and improve efficiency and has worked closely with Rogue River Valley Irrigation District to reach toward these goals. The delivery of pressurized water to irrigators creates opportunities for on-farm irrigation improvements. Such improvements further benefit all partners, multiply the environmental benefits of piping, and offer the option of higher value crop choices from increased reliability and resilience of the delivery system through normal and drought years.

Therefore, ODEQ supports the RRVID Bradshaw Drop piping project.

Sincerely,

A handwritten signature in black ink that reads "Kate Jackson".

Kate Jackson
Regional Liaison
DEQ Medford office
503-975-0895



**REGIONAL SOLUTIONS OFFICE
GOVERNOR KATE BROWN**

January 9, 2017

Bureau of Reclamation
PO Box 25007
Denver, CO 80225

Re: Rogue River Valley Irrig. Dist. WaterSMART 2017 application: Bradshaw Drop Piping project

To whom it may concern:

The Southern Oregon Regional Solutions Team and Advisory Committee are pleased to provide this letter in support of RRVID's proposed Bradshaw Drop piping project. This project—which provides water quality and conservation benefits by piping 2.4 miles of the District's main canal—will serve as a demonstration project for the larger WISE (Water for Irrigation, Streams and the Economy) project. WISE is a multi-agency, multi-stakeholder effort to complete a similar effort systematically across much of the Rogue Valley. It is a vital effort to preserve the long term viability of southern Oregon's vibrant and important agricultural industry.

Regional Solutions is a collaborative program housed in the Governor's office that works to bring state agencies and other stakeholders together around regional priorities. As such, the team has been heavily involved in WISE since its inception. The larger project is moving into preliminary engineering and is at a critical stage in its development. The Bradshaw Drop project will provide a tangible, on-the-ground demonstration of the feasibility and benefits of this approach and will be very important to building the momentum of the larger project. Partner agencies and others are well-prepared to measure the impacts of the project.

We urge your careful consideration of RRVID's application; not only does it build momentum for the larger project, but its direct impact on water quality, quantity and temperature will provide valuable benefits to the endangered coho salmon.

Sincerely,

Alex Campbell

Regional Coordinator

SOUTHERN OREGON REGIONAL SOLUTIONS CENTER
100 EAST MAIN ST., SUITE A, MEDFORD, OR 97501

City of Central Point, Oregon
140 S 3rd Street, Central Point, OR 97502
541.664.3321 Fax 541.664.6384
www.centralpointoregon.gov



Community Development
Tom Humphrey, AICP
Community Development Director

January 12, 2017

Bureau of Reclamation
PO Box 25007
Denver, CO 80225

Subject: Letter of Support for Rogue River Valley Irrigation District (RRVID)
WaterSMART 2017 Grant Application for Bradshaw Drop Piping Project

Dear Bureau Staff:

The City of Central Point supports the Rogue River Valley Irrigation District's Bradshaw Drop piping project. This project involves piping 2.4 miles of the District's main canal which will help improve water volume, water quality, protect fish habitat, enhance instream flows, and contribute to the overall wellbeing of the regional agricultural economy.

Central Point has had a long-standing cooperative relationship with RRVID and the City has made a point of including the District in its land use and public facilities decisions. We appreciate this opportunity to reciprocate by writing this letter of support for RRVID's application for funding improvements to their infrastructure. We're hopeful that a grant award will be made to implement piping for all of the reasons stated above. We understand that system improvements will also include aquatic weed control and improving stream temperatures within the project area.

In 2002 the City and RRVID collaborated in the redesign of a district irrigation system in the Twin Creeks Mixed Use Development. This resulted in the construction of a new pump station, several hundred feet of piping and the addition of fish screens on Griffin Creek. The City of Central Point promotes water conservation, efficient use of resources and the enhancement of fish habitat. For all of the above reasons, the City enthusiastically supports the Bradshaw Drop piping project. We encourage you to give this proposal your careful consideration and approval.

Sincerely yours,

Tom Humphrey AICP
Community Development Director

cc. Chris Clayton, City Manager



January 9, 2017

Bureau of Reclamation
PO Box 25007
Denver, CO 80225

Subject: Letter of Support for Rogue River Valley Irrigation District
WaterSMART 2017 grant application for Bradshaw Drop Piping project

To whom it may concern:

The WISE Project Board is very supportive of Rogue River Valley Irrigation District's proposed Bradshaw Drop piping project. This project involves piping 2.4 miles of the District's main canal which will provide the following benefits:

- Improve water quality through pressurized water and on-farm conversion
- Leave water in-stream for endangered fish
- Hydroelectric possibilities
- Approved WISE demonstration project
- Protect fish habitat
- Eliminate leakage and evaporation
- Protect regional agricultural economy

The WISE Board strongly supports water conservation and efficiency and fish habitat enhancement. The Bradshaw Drop Piping project is a great demonstration project of the WISE Project, which will improve water quality, quantity and fish habitat within the District boundaries. The WISE Board supports funding this project.

Sincerely,

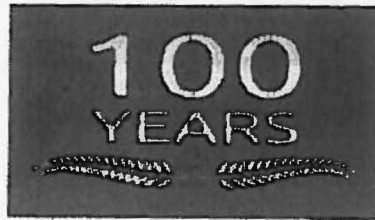
Robert C. Jones
Board Chair

TALENT IRRIGATION DISTRICT

P.O. Box 467

104 W. Valley View Rd.

Talent OR 97540-0467



Phone: 541-535-1529

Fax: 541-535-4108

Email: tid@talentid.org

Web: www.talentid.org

December 28, 2016

1916-2016

Bureau of Reclamation
PO Box 25007
Denver, CO 80225

Subject: Letter of Support for Rogue River Valley Irrigation District
WaterSMART 2017 grant application for Bradshaw Drop Piping project

To Whom It May Concern:

Talent Irrigation District supports Rogue River Valley Irrigation District seeking funding for their Water Conservation Piping project. The Medford Irrigation District and Talent Irrigation District, in partnership with WISE, has worked closely with Rogue River Valley Irrigation District to help improve water, quality, protect fish habitat, enhance instream flows, as well as protecting the regional agricultural economy. Talent Irrigation District fully supports Rogue River Valley Irrigation District's application for funding that is needed to proceed with project improvements for further improving water conservation, fish habitat, water quality and aquatic weed control and stream temperatures within the project area.

Talent Irrigation District strongly promotes water conservation, efficiency and fish habitat enhancement. The Bradshaw Drop piping project is a good demonstration project that improves water quality and quantity and fish habitat within the District boundaries. Talent Irrigation District supports funding this project.

Sincerely,

A handwritten signature in cursive script that reads "Wanda Derry".

Wanda Derry
Assistant Manager

MEDFORD IRRIGATION DISTRICT

PO Box 70
Jacksonville OR 97530
Office (541)899-9913
Fax (541)899-9968

Bureau of Reclamation
PO Box 25007
Denver, CO 80225

January 16, 2017

Subject: Letter of Support for Rogue River Valley Irrigation District
Water SMART 2017 grant application for Bradshaw Drop Piping project

To whom it may concern:

Medford Irrigation District supports Rogue River Valley Irrigation District seeking funding for Water Conservation Piping project. The Medford Irrigation District and Talent Irrigation District, in partnership with WISE, has worked closely with Rogue River Valley Irrigation District to help improve water, quality, protect fish habitat, enhance instream flows, as well as protecting the regional agricultural economy. Medford Irrigation District fully supports Rogue River Valley Irrigation District's application for funding that is needed to proceed with project improvements for further improving water conservation, fish habitat, water quality and aquatic weed control and stream temperatures within the project area.

Medford Irrigation District strongly promotes water conservation, efficiency and fish habitat enhancement. The Bradshaw Drop piping project is a good demonstration project that improves water quality and quantity and fish habitat within the District boundaries. Medford Irrigation District supports funding this project.

Sincerely,

Carol Bradford
Manager

Appendix B - Letters of Intent

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: Funding Opportunity Announcement No. BOR-DO-17-F012
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

Dear Ms. Shah,

I am a water patron of the Rogue River Valley Irrigation District (RRVID) located in the Rogue River Basin of the Talent Division in Southern Oregon. I am very supportive of RRVID upgrading the District facility to pressurized pipe which will enhance water supplies, improve water quality, protect fish habitat and give me a more reliable water delivery. The pressurized pipe will allow our farm the opportunity to convert from flood to sprinkle or drip irrigation.

Please mark the appropriate box that best suits your interest.



If RRVID receives this grant, I am very interested in on-farm conversion.

Please comment as to why you are interested and how this project will help you as a farmer.

Comments: I am interested in up grading,
will be a safer & more efficient
way of watering.



If RRVID receives this grant, I am not interested in on-farm conversion.

Comments: _____

Sincerely,

Alma Cornish

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: Funding Opportunity Announcement No. BOR-DO-17-F012
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

Dear Ms. Shah,

I am a water patron of the Rogue River Valley Irrigation District (RRVID) located in the Rogue River Basin of the Talent Division in Southern Oregon. I am very supportive of RRVID upgrading the District facility to pressurized pipe which will enhance water supplies, improve water quality, protect fish habitat and give me a more reliable water delivery. The pressurized pipe will allow our farm the opportunity to convert from flood to sprinkle or drip irrigation.

Please mark the appropriate box that best suits your interest.

☒ If RRVID receives this grant, I am very interested in on-farm conversion.
Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: In the future, my son
would like to farm
different crops than beef &
this water project would
really improve his options.

☐ If RRVID receives this grant, I am not interested in on-farm conversion.
Comments: _____

Sincerely,

Velda Litz

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: Funding Opportunity Announcement No. BOR-DO-17-F012
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

Dear Ms. Shah,

I am a water patron of the Rogue River Valley Irrigation District (RRVID) located in the Rogue River Basin of the Talent Division in Southern Oregon. I am very supportive of RRVID upgrading the District facility to pressurized pipe which will enhance water supplies, improve water quality, protect fish habitat and give me a more reliable water delivery. The pressurized pipe will allow our farm the opportunity to convert from flood to sprinkle or drip irrigation.

Please mark the appropriate box that best suits your interest.

☒ If RRVID receives this grant, I am very interested in on-farm conversion.
Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: WE support RRVID's efforts to
CONSERVE WATER AND THIS PROJECT WOULD
GREATLY REDUCE THE BURDEN OF CONVERTING
OUR PASTURE FROM FLOOD TO SPRINKLER
IRRIGATION.

☐ If RRVID receives this grant, I am not interested in on-farm conversion.
Comments: _____

Sincerely,

Dennis P. O'Donoghue
Kelley L. O'Donoghue

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: Funding Opportunity Announcement No. BOR-DO-17-F012
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

Dear Ms. Shah,

I am a water patron of the Rogue River Valley Irrigation District (RRVID) located in the Rogue River Basin of the Talent Division in Southern Oregon. I am very supportive of RRVID upgrading the District facility to pressurized pipe which will enhance water supplies, improve water quality, protect fish habitat and give me a more reliable water delivery. The pressurized pipe will allow our farm the opportunity to convert from flood to sprinkle or drip irrigation.

Please mark the appropriate box that best suits your interest.



If RRVID receives this grant, I am very interested in on-farm conversion.

Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments:

*I think it will be a more efficient
watering system*



If RRVID receives this grant, I am not interested in on-farm conversion.

Comments:

Sincerely,

John H Cornish

Rogue River Valley Irrigation District

3139 Merriman Road
Medford, OR 97501

Phone: (541) 773-6127
Fax: (541) 773-5420
Email: rrvid@rrvid.org
www.rrvid.org

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: **Funding Opportunity Announcement No. BOR-DO-17-F012**
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

Dear Ms. Shah,

I am a water patron of the Rogue River Valley Irrigation District (RRVID) located in the Rogue River Basin of the Talent Division in Southern Oregon. I am very supportive of RRVID upgrading the District facility to pressurized pipe which will enhance water supplies, improve water quality, protect fish habitat and give me a more reliable water delivery. The pressurized pipe will allow our farm the opportunity to convert from flood to sprinkle or drip irrigation.

Please mark the appropriate box that best suits your interest.

☒ If RRVID receives this grant, I am very interested in on-farm conversion.
Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: Already sprinkles but is very
interested in getting rid of his pump.

☐ If RRVID receives this grant, I am not interested in on-farm conversion.
Comments: _____

Sincerely,

Steven Dulany

Via Phone Conversation

Rogue River Valley Irrigation District

3139 Merriman Road
Medford, OR 97501

Phone: (541) 773-6127
Fax: (541) 773-5420
Email: rrvid@rrvid.org
www.rrvid.org

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: **Funding Opportunity Announcement No. BOR-DO-17-F012**
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

Dear Ms. Shah,

I am a water patron of the Rogue River Valley Irrigation District (RRVID) located in the Rogue River Basin of the Talent Division in Southern Oregon. I am very supportive of RRVID upgrading the District facility to pressurized pipe which will enhance water supplies, improve water quality, protect fish habitat and give me a more reliable water delivery. The pressurized pipe will allow our farm the opportunity to convert from flood to sprinkle or drip irrigation.

Please mark the appropriate box that best suits your interest.



If RRVID receives this grant, I am very interested in on-farm conversion.
Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: Excited about the pressurized
water and the options that will open
up because of it.



If RRVID receives this grant, I am not interested in on-farm conversion.
Comments: _____

Sincerely,

James Roberts

Via phone conversation

Rogue River Valley Irrigation District

3139 Merriman Road
Medford, OR 97501

Phone: (541) 773-6127
Fax: (541) 773-5420
Email: rrvid@rrvid.org
www.rrvid.org

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: **Funding Opportunity Announcement No. BOR-DO-17-F012**
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

Dear Ms. Shah,

I am a water patron of the Rogue River Valley Irrigation District (RRVID) located in the Rogue River Basin of the Talent Division in Southern Oregon. I am very supportive of RRVID upgrading the District facility to pressurized pipe which will enhance water supplies, improve water quality, protect fish habitat and give me a more reliable water delivery. The pressurized pipe will allow our farm the opportunity to convert from flood to sprinkle or drip irrigation.

Please mark the appropriate box that best suits your interest.

☒ If RRVID receives this grant, I am very interested in on-farm conversion.
Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: likes the idea of water conservation
and the possibility of more efficient
irrigation w/ sprinklers

☐ If RRVID receives this grant, I am not interested in on-farm conversion.
Comments: _____

Sincerely,

Kathy Warne
Via Phone Conversation

Rogue River Valley Irrigation District

3139 Merriman Road
Medford, OR 97501

Phone: (541) 773-6127
Fax: (541) 773-5420
Email: rrvid@rrvid.org
www.rrvid.org

Bureau of Reclamation Acquisition Operations Branch
Attn: Ms. Rupal Shah
Mail Code: 84-27852
P.O. Box 25007
Denver, Colorado 80225

RE: **Funding Opportunity Announcement No. BOR-DO-17-F012**
WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2017

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Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: _____

☐ If RRVID receives this grant, I am not interested in on-farm conversion.
Comments: _____

Sincerely,

Via phone conversation,
Murphy Clark

☒ He's not sure if he will do on farm conversion, still wants to think about it.

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Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: _____

☐ If RRVID receives this grant, I am not interested in on-farm conversion.
Comments: _____

not educated enough on matter

Sincerely,

Justin
12-29-16
509-953-9174
509 953 9174

Rogue River Valley Irrigation District

3139 Merriman Road
Medford, OR 97501

Phone: (541) 773-6127
Fax: (541) 773-5420
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Please mark the appropriate box that best suits your interest.

☐

If RRVID receives this grant, I am very interested in on-farm conversion.

Please comment as to **why** you are interested and **how** this project will help you as a farmer.

Comments: _____

☒

If RRVID receives this grant, I am not interested in on-farm conversion.

Comments: The financial burden would be
to great for him

Sincerely,

Ronald Aschbacher
Via Phone conversation

Appendix C – Official Resolution

ROGUE RIVER VALLEY IRRIGATION DISTRICT
Resolution No. 2
2017

RESOLUTION TO COMMIT ROGUE RIVER VALLEY IRRIGATION DISTRICT TO THE
FINANCIAL AND LEGAL OBLIGATIONS ASSOCIATED WITH RECEIPT OF WATER
SMART: WATER AND ENERGY EFFICIENCY GRANTS FOR FISCAL YEAR 2017

WHEREAS, Rogue River Valley Irrigation District is applying for a WaterSMART grant to:
Pipe a section of the Hopkins Canal with pressurized pipe. And


WHEREAS, the Board has reviewed and supports the application submitted and has agreed that
the District will provide in-kind contributions and monies set aside in the Districts' 2017 annual
budget for water management planning expenditures as outlined in the grant application. And

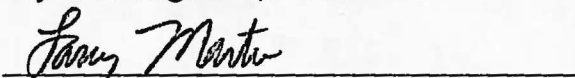
WHEREAS, The District will work with the Bureau of Reclamation to meet established
deadlines for entering into this cooperative agreement,

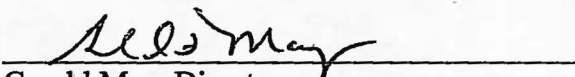
THEREFORE, IT IS HEREBY RESOLVED:

That the Board of Rogue River Valley Irrigation District is giving Manager Brian
Hampson legal authority to enter into a agreement with the U.S. Department of the Interior,
Bureau of Reclamation for a Water SMART Grant.

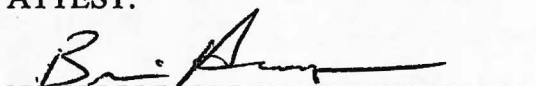
ADOPTED BY BOARD OF DIRECTORS THIS 4 DAY OF JANUARY, 2017
THEREFORE, IT IS HEREBY RESOLVED:

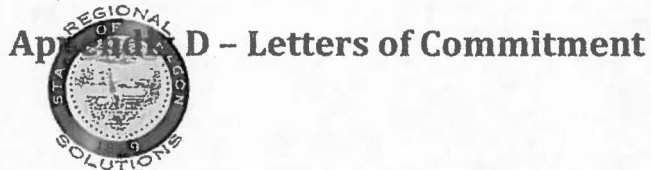

Bryan Baumgartner, President


Larry Martin, Vice-President


Gerald May, Director

ATTEST:


Brian Hampson, Secretary Manager



Appendix D - Letters of Commitment

REGIONAL SOLUTIONS OFFICE
GOVERNOR KATE BROWN

January 13, 2017

Angela Boudro
Jackson County Soil & Water Conservation District
89 Alder St.
Central Point, OR 97502
Via e-mail

Dear Ms. Boudro:

This letter is to confirm an allocation of Regional Infrastructure Fund monies was made for the Bradshaw Drop Irrigation Canal Piping Project and related efforts. The funding was approved under Oregon HB 5030 in the 2015 General Session, and identified in the staff report as "Flood Irrigation Conversion in Little Butte Creek Watershed." The project was further described: "Purchase irrigation equipment to support a new set of innovative irrigation projects that conserve water." Piping and other infrastructure improvements necessary to carry out the project are eligible costs.

After some program funding adjustments, the final amount of State funds that will be available to contribute to the project is \$282,000. The revenues will be generated by a sale of bonds, backed by Oregon lottery revenues, scheduled for spring of 2017. The award will be subject to the provisions and requirements of a forthcoming grant agreement.

If you have any questions in the meantime, please do not hesitate to contact me.

Sincerely,

Alex Campbell
Regional Solutions Coordinator

SOUTHERN OREGON REGIONAL SOLUTIONS CENTER
100 EAST MAIN ST., SUITE A, MEDFORD, OR 97501