WaterSMART

Water and Energy Efficiency Grants for FY 2019

Funding Opportunity Announcement No. BOR-DO-19-F004

Funding Group I

Milburn West Irrigation Company Pipeline

Milburn, Utah

Milburn West Irrigation Company (Applicant)
Raymond Compton, Secretary
P.O. Box 298
Fairview, Utah 84629

March 19, 2019

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Appendices

Technical Proposal and Evaluation Criteria

Executive Summary

The executive summary should include:

- *The date, applicant name, city, county, and state*
- *A one paragraph project summary that specifies the work proposed, including how funds will be used to accomplish specific project activities and briefly identifies how the proposed project contributes to accomplishing the goals of this FOA*
- *State the length of time and estimated completion date for the proposed project*
- *Whether or not the project is located on a Federal facility*

Date: Application due date is March 19, 2019

Applicant: Milburn West Irrigation Company
Milburn, Sanpete County, Utah

Project Title: Milburn West Irrigation Company Pipeline Project

Project Summary:

The Milburn West Irrigation Company (MWIC) Pipeline Project plans to replace nearly 4.4 miles of irrigation canal with 2.8 miles of pressurized irrigation pipeline. The project will allow MWIC to conserve and use water more efficiently by eliminating canal seepage and evaporation losses. The project will assist in eliminating conflict in the area due to the limited amount of water available in recent years by conserving the water source. This project will also allow MWIC to qualify for assistance from the local NRCS office to complete on-farm irrigation improvements that will further increase the efficiency of the MWIC irrigation system.

Approximate Length: 21 Months

Completion Date: Estimated completion date is June 30, 2021.

Federal Facility: This project is not located on a federal facility.

Background Data

Applicant's Water Supply

As applicable, describe the source of water supply, the water rights involved, current water uses (e.g., agricultural, municipal, domestic, or industrial), the number of water users served, and the current and projected water demand. Also, identify potential shortfalls in water supply. If water is primarily used for irrigation, describe major crops and total acres served.

Milburn West Irrigation Company (MWIC) receives its irrigation water from the San Pitch River in Sanpete County, Utah. The MWIC is located nearly 6 miles downstream of the headwaters of the San Pitch River. The MWIC water right is based on Utah Water Right number 65-3242. The water right has a base flow of 1.75 cfs from April 1 to October 15. The water is used to irrigate 371.6 acres of agricultural farm fields. The farms served by the MWIC produce wheat, barley, potatoes, alfalfa, and grass hay. This water right serves 13 shareholders.

Table 1: Water Rights Diverted into the Milburn West Irrigation Company Canal

Water Right	Source	Flow (cfs)	Type	Priority
65-3242	San Pitch River	1.75 (Base)	Decree	/ /1870

The San Pitch River is 65 miles long and is the primary source of water for Sanpete County. The river is principally supplied by seasonal snow pack in the San Pitch Mountains. The area has been in drought six of the last seven years, with summers being hotter and drier than normal. This led to the area being ravaged by the Pole Creek Fire in 2018 that burned over 102,000 acres and left the northern portion of the county scorched. Ash and debris have been contaminating the San Pitch River and filling the MWIC canal system.

Due to the warmer than normal temperatures and lower than normal snowpack over these drought years, the available water for irrigation usually comes quick and early in the season with water usually running out by August. The 2018 irrigation season was extremely unusual as the maximum flow the company was able to divert was 0.3 cfs and, due to canal losses, the water never reached the first water user 0.7 miles down the canal. The Utah State Engineers 2018 Annual Report for the area said:

"For the 2018 irrigation season, the upper San Pitch River experienced severe drought conditions. The winter snowpack was the worst it had been for several years and this was reflected in the water diversion totals, which were only about 60% of what they have been in other recent years, which were themselves significantly below average… I know this was a very difficult year for the water users."

Water supply to the MWIC over the last 18 years is summarized in the MWIC Total Annual Diversions (Table 2) below and the Upper San Pitch River Commissioner reported flows for MWIC are included in Appendix F. This information shows that in the last seven years the MWIC water supply is, in general, gradually reducing due to the changing weather conditions. The MWIC 2018 irrigation season total diversion amount was 5% of the average total diversion amount for the previous 18 years.

Table 2: MWCI Total Annual Diversions

Water Year	Total ACFT
2000	309.1
2001	502.7
2002	175.0
2003	373.9
2004	330.1
2005	807.9
2006	481.6
2007	311.6
2008	578.9
2009	423.5
2010	401.6
2011	639.7
2012	170.8
2013	132.2
2014	139.3
2015	85.9
2016	156.9
2017	375.1
2018	17.7
Average	337.55

The current water delivery method is based on a turn system. When it is a water user turn, that user can use any and all water in the canal. This method works well when there is enough water in the canal to reach all users, but this has not been the case. Users near the end of the canal often do not receive water due to the canal losses and on average do not receive water unless the canal flows are greater than the MWIC water right base flow.

Water Delivery System

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

The MWIC irrigation system currently consists of a nearly 4.4-mile-long section of open ditch canal locally referred to as Long Ditch. See Figure 1. The canal diversion structure is concrete with a 24" canal gate and 24" Parshall flume. The canal diversion structure is located on the Sanpitch River nearly 1.7 miles north of Milburn. The canal travels along the west side of the valley on the hillside above the farmland in the Milburn valley. The canal travels nearly 4.4 miles along this path before ending nearly one mile southwest of Milburn. The canal cross section at the beginning of the canal

is nearly 4.2 feet wide and 1.4 feet deep, while the canal cross sections near mile markers 1.0 and 2.7 are 3.1 feet wide by 1.1 feet deep and 1.9 feet wide by 0.8 feet deep respectively.

The gradually shrinking size of the main canal shows that there are water losses and the water users near the middle and end of the canal can expect far less water than what is diverted from the river. The most evident location to visually see water losses from the canal is nearly 2,000 feet south of the diversion structure. At this location the canal is running along the side of a rocky hill and there are some areas of fractured bedrock that the canal flows against. The MWIC water master has observed water leaking from the canal at this location and resurfacing 30-40 feet downhill of the canal. The water then flows down the hill and returns to the San Pitch River

All water users currently flood irrigate their farm lands. Some of the water users have ponds located on their lots that they fill on their turn and use to flood their crop lands. The MWIC has seen, from improvements that other local irrigation companies have made, the potential for the significant benefits of installing an irrigation pipeline to conserve and manage their irrigation water more effectively.

Hydropower or Energy Efficiency

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

No hydropower or other energy efficiency benefits are expected with the proposed project. No irrigators currently use pumps or other methods of irrigating that use energy. They rely solely on gravity and open irrigation ditches to flood irrigate their crop lands.

Prior Work with Reclamation

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

The MWIC has not had any previous working relationships with Reclamation. However, Reclamation has worked extensively with the Sanpete Water Conservancy District to build the Narrows Project in the mountains above Milburn to the east. This Narrows Project included a reservoir with carryover capacity and pipelines in the valley to distribute the stored water. The Milburn areas was included in the service area for the Narrows Project. Reclamation completed an EIS for the Narrows Project but permitting issues with the Corps of Engineers and opposition from an adjacent county has prevented this project from moving forward. As a result, the north end of Sanpete County has very limited storage and suffers greatly during periods of drought due to the lack of storage. Reclamation has spent decades trying to build the Narrows Project for Sanpete County without success.

Project Location

Provide specific information on the proposed project location or project area including a map showing the geographic location. For example, {project name} is located in {state and county} approximately {distance} miles {direction, e.g. northeast} of {nearest town}. The project latitude is {##°##'N} and longitude is {###°##'W}.

The Milburn West Irrigation Company Pipeline project is located in Sanpete County in Utah approximately 5.8 miles north of Fairview, Utah and 76 miles south-southeast of Salt Lake City, Utah. The projects latitude is 39°42.7' and the longitude is 111°26.2'W. See Figure 1 below.

Technical Project Description

The technical project description should describe the work in detail, including specific activities that will be accomplished. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal. Please note, if the work for which you are requesting funding is a phase of a larger project, please only describe the work that is reflected in the budget and exclude description of other activities or components of the overall project.

The West Millburn Irrigation Company Pipeline project entails installing nearly 2.8 miles of PVC pipe to convey a maximum of 6.4 cfs to the MWIC shareholders. A sediment trap/regulating pond will be constructed at the start of the pipeline. The pipeline is intended to be pressurized and will start at the sediment structure and follow the canal for nearly a mile before departing the canal alignment and heading south. See Figure 2. The pipeline will follow some property lines from the canal 0.5 miles to Milburn road before heading 0.8 miles southwest across several farm fields to Hill Top Road. The pipeline will then travel 0.4 miles south to the last water user, where it will terminate.

Water users will receive turnouts sized according to their water right and property area. The turnouts will contain valves and a water meter to monitor water use and measure project benefits.

The project will start when an agreement with Reclamation is complete and funding becomes available. An engineering firm will be contracted to begin data collection and prepare a preliminary design of the pipeline and associated facilities. NEPA compliance activities will then be performed. The design process will incorporate any issues the NEPA process uncovers and an acceptable pipeline design will be finalized.

The project will then be bid from a pool of acceptable contractors with construction expected to begin in the fall of 2020. The pipeline will follow the approved alignment and the diversion sedimentation structure will be constructed. Final project reporting will also be completed.

Figure 1: Milburn West Irrigation Company System & Points of Reference

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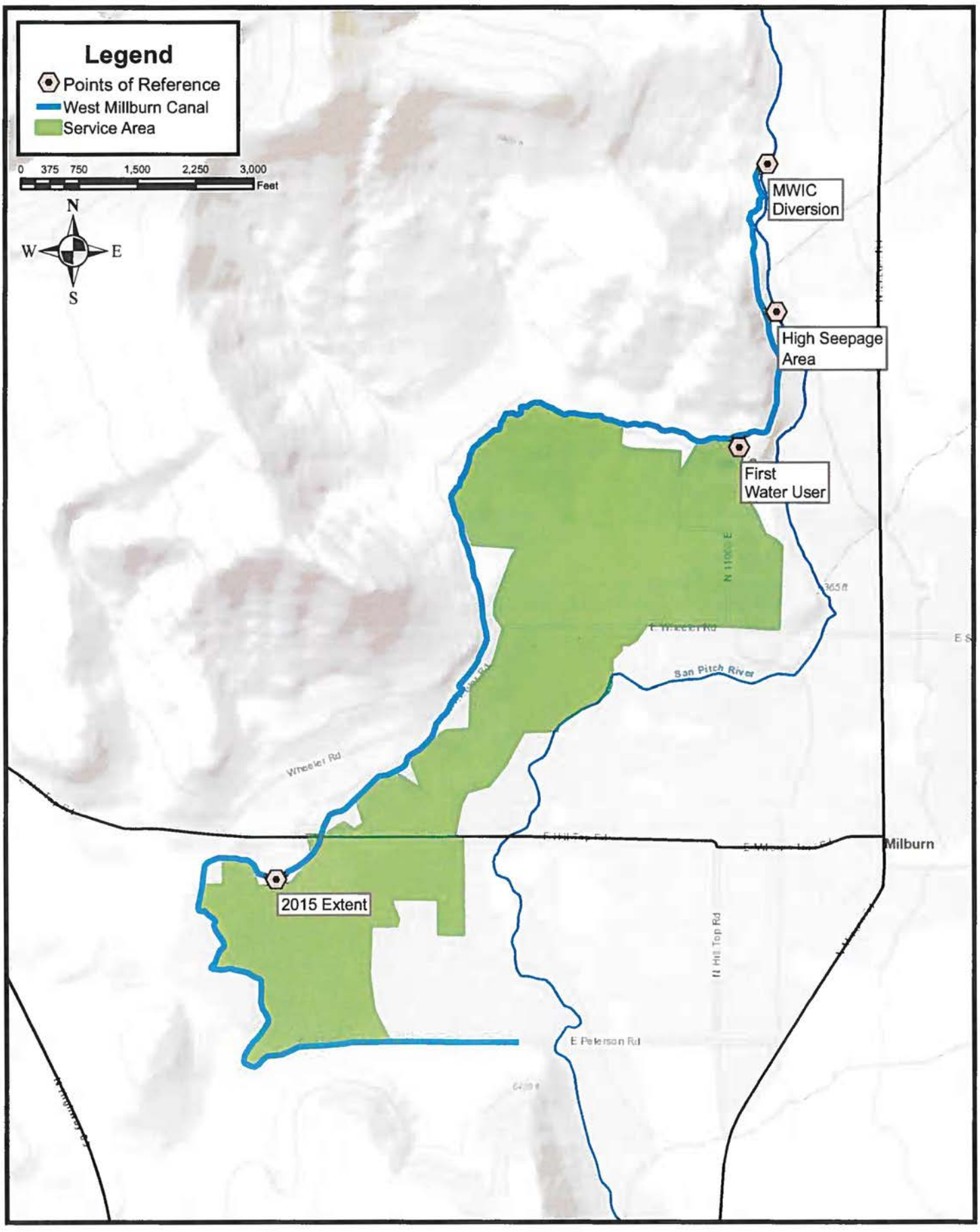

Figure 2: Proposed Pressurized Irrigation Pipeline Alignment

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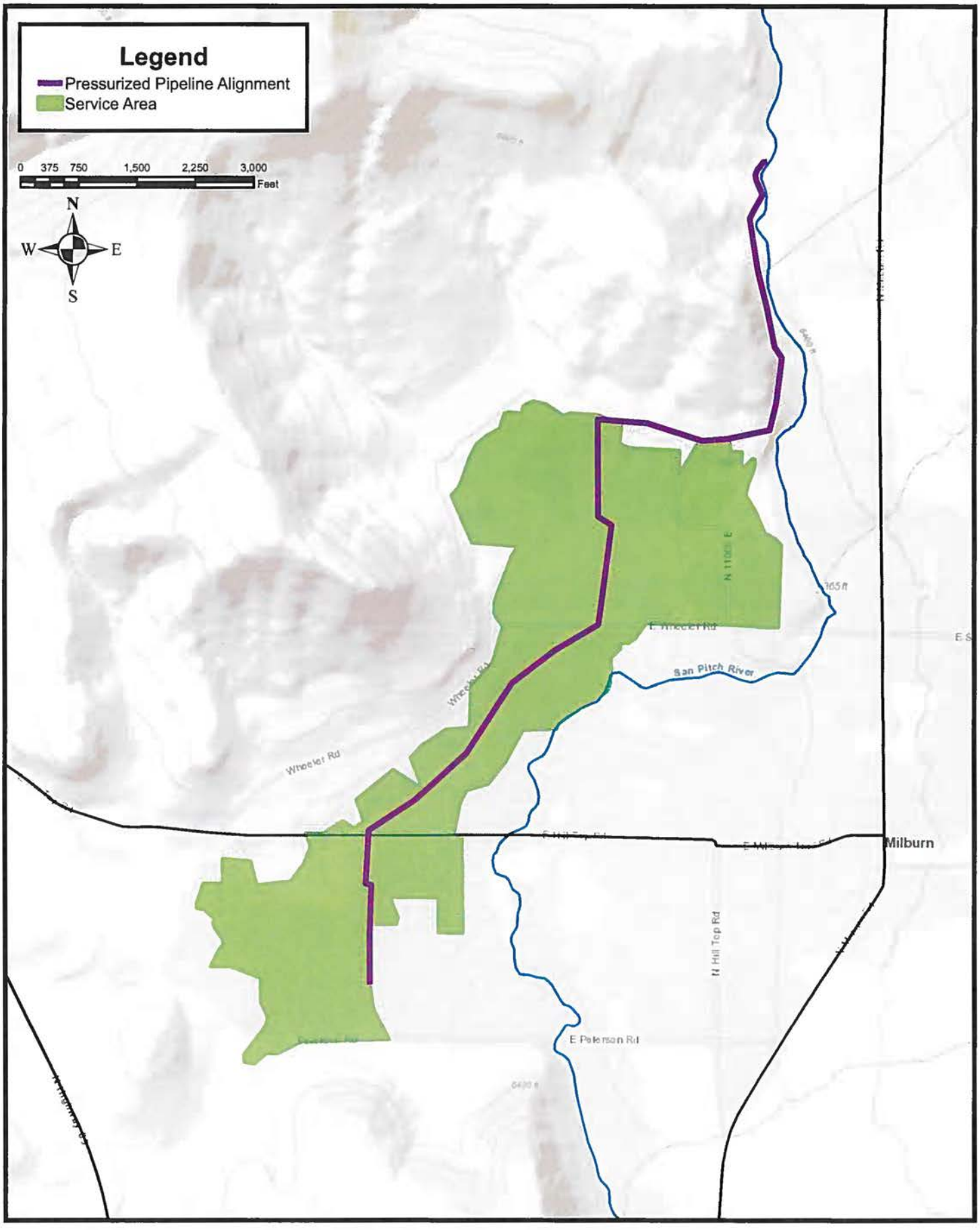

Evaluation Criteria

Evaluation Criterion A: Quantifiable Water Savings

Up to 30 points may be awarded for this criterion. This criterion prioritizes projects that will conserve water and improve water use efficiency by modernizing existing infrastructure. Points will be allocated based on the quantifiable water savings expected as a result of the project. Points will be allocated to give greater consideration to projects that are expected to result in more significant water savings. All applicants should be sure to address the following:

Water Savings

Describe the amount of estimated water savings. *For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project.*

The estimate of water savings is based on two methods. The first method is based on measurements made during drought years when the full stream of water in the canal failed to reach the first water user in 2018 and a greater flow in 2015 that failed to reach the end water users. During the 2018 irrigation season MWIC only received 17.7 ac-ft of water for the year due to drought conditions. The maximum flow that the MWIC was able to divert was 0.3 cfs, see the river commissioner reports in Appendix F. This flow was diverted into the MWIC canal, but no water was seen at the first water user near mile post 0.7 on the canal (see Figure 1). The water master investigated this and observed water leaking from the canal upstream of the first water user as shown on Figure 1 and resurfacing 30-40 feet downhill of the canal. The water then continued to flow down the hill and return to the San Pitch River.

Water losses are estimated to be at least 18 acre-feet per year on the first 0.7 miles of the MWIC canal system, based on the 2018 diversion records and observing where all water in the ditch was lost. During the latter part of the 2015 irrigation season there was 0.66 cfs being diverted into the irrigation canal. The water users beyond mile marker 2.8 never received any water. These two situations equate to nearly 0.4 cfs/mile and 0.2 cfs/mile loss respectively. This shows that the first section of canal has the greatest losses.

The first section of canal, according to the 2018 irrigation season, would lose 0.3 cfs/0.7 miles or 100%/mile, which is not realistic. This measurement helps us to know where a large volume of water is being lost but does not allow us to correlate that loss to higher flows. This does show that all MWIC water users receive far less water due to the amount of canal loss at the start of the canal.

The 2015 measurements help us to better quantify the losses and correlate those losses to other years. During the 2015 irrigation season the canal lost 0.66 cfs in 2.8miles, which equates to a loss of 0.2 cfs/mile or 35.7%/mile. This, however, does not take into account the higher loss rate of the first section of the canal. To correct for this, we assume the first 0.7 miles of the canal continued to lose 0.3 cfs, the 2015 canal flow rate at mile marker 0.7 would then have been nearly 0.36 cfs (0.66 cfs – 0.3 cfs). This 0.36 cfs would then be lost to seepage along the section of canal from mile markers 0.7 to 2.8 (2.1 miles). Taking the loss of 0.36 cfs and dividing that over the distance of 2.1 miles

gives us a loss of 0.17 cfs loss per mile of the canal between mile markers 0.7 and 2.8. Taking the loss of 0.3 cfs and dividing that over the distance of 0.7miles gives us a loss of 0.429 cfs loss per mile of the canal between mile markers 0 and 0.7.

$$\frac{0.3\ cfs}{0.7\ miles} = \frac{0.429\ cfs}{mile}$$

$$\frac{0.429\ cfs}{0.66\ cfs} = \mathbf{64.9\%}\ loss\ per\ mile\ (between\ mile\ marker\ 0\ and\ 0.7)$$

$$\frac{0.36\ cfs}{2.1\ miles} = \frac{0.171\ cfs}{mile}$$

$$\frac{0.171\ cfs}{0.66\ cfs} = \mathbf{26.0\%}\ loss\ per\ mile\ (between\ mile\ marker\ 0.7\ and\ 2.8)$$

This estimate is based on actual measurements. Another method that can be used to validate the above estimated water losses is by measuring the canal dimensions at different points along its alignment and calculating what the maximum canal flow could be. Over time the canal cross-section has decreased to convey only the actual maximum flow in the canal at that location. Under ideal circumstances the full flow diverted at the head of the canal would reach the final water user and the canal size would stay consistent. In reality the canal is constantly losing water and the size of the canal adjusts based on the actual flows.

The potential flow that the canal would be able to handle is estimated using the industry standard Manning's Equation shown below. Sections of the MWIC canal were measured and analyzed to determine what the maximum flow would be at these locations. These locations were selected because they are outside of the area of greatest loss. We wanted a check to see how reasonable our estimate of losses is for the whole system. We were expecting to see a loss close to the 26.0% estimated, but not significantly different since a comparison of 2015 and 2018 measurements indicated that nearly half of the losses occur in the first 0.7 miles. The dimensions and slopes of the canal at mile markers 1.0 and 2.7 were measured. Using Manning's open channel flow approximation equation, the flow in these sections of the canal was approximated.

$$Manning's\ Equation:\ Flow = \frac{1.49}{n} A\, R_h^{2/3}\, S_e^{1/2}$$

Where n is Manning's n; A is the canal flow area; R_h is the hydraulic radius; and S_e is the canal slope. Manning's n value ranges between 0.045 and 0.055 for a natural winding channel like the Milburn West Irrigation Company canal with pools, shoals, and some weeds. The canal slope at mile markers 1.0 and 2.7 were measured to be 0.010% and 0.026%. the canal side slopes at mile marker 1.0 are measured to be 0.5:1 (H:V) on the uphill side and 0:1 (vertical) on the downhill side. The canal at mile marker 2.7 has an uphill slope of 0.4:1 and a downhill slope of 0.5:1. Using the measurements above and the Excel Open Channel Flow calculator provided by the USDA-NRCS, the maximum flow at these locations is calculated to be between 7.1-5.8 cfs (average 6.45 cfs) at mile marker 1.0 and 3.7-3.0 cfs (average 3.35 cfs) at mile marker 2.7.

The estimated flows at both locations were averaged and then converted to a percentage and applied to the length of the canal segment, shown below. This method gave a canal loss of 28.2%/mile.

$$\frac{cfs\ loss\ (6.45 - 3.35)}{6.45\ cfs} = \frac{3.1}{6.45} = 48\%\ loss \rightarrow \frac{48\%\ loss}{mile(2.7 - 1.0)} = \frac{48\%}{1.7\ miles} = \frac{28.2\%}{mile}$$

The estimated 28.2% loss per mile of canal is an estimated average for the section of canal between mile markers 1.0 and 2.7. The section of canal between the diversion structure and mile marker 1.0 is significantly higher due to the fractured rock on this section. Knowing that nearly 50% of the losses occur in the first 0.7 miles the average loss of 26% per mile outside of the first 0.7 miles appears conservative.

On average, over the latest 18-year period, MWIC diverted 337.5 acre-feet of water per year. Calculating the average distance to all the users on the canal to be 2.3 miles, i.e. with the turn system, water is being used at times by the first user and at times the last user. On average the water is traveling 2.3 miles. Assuming a 26.0% loss/mile and an average flow distance of 2.3 miles the estimated average annual water losses would be 201.8 acre-feet.

$$\frac{26.0\%\ loss}{mile} * 2.3\ miles = 59.8\%\ average\ loss$$

$$59.8\% * 337.5\ acft = 201.8\frac{acft}{year}$$

This is a significant amount of water being lost to groundwater seepage and canal leaks. In reality the losses are likely greater since we are assuming the lower 26.0% loss rate for the entire canal length.

Current Water Losses

Describe current losses: *Please explain where the water that will be conserved is currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?*

See Water Savings section above.

Support/Documentation of Water Savings

Describe the support/documentation of estimated water savings: *Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Note: projects that do not provide sufficient supporting detail/calculations may not receive credit under this section. Please be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal. In addition, please note that the use of visual observations alone to calculate water savings, without additional documentation/data, are not sufficient to receive credit under this section. Further, the water savings must be the result of reducing or eliminating a current, ongoing loss, not the result of an expected future loss.*

Appendix F – Supporting Documentation contains the daily diversion amounts and total annual diversion amounts of the Milburn West Irrigation Company as reported by the Utah State Engineers office and the Upper San Pitch Water Commissioner. These records are available online at the Utah Department of Water Rights. (https://www.waterrights.utah.gov/cgi-bin/docview.exe?Folder=DSYS047REPORT&Key=Sort%20by%20Date)

The MWIC annual diversion table (Table 1) for MWIC was summarized from this same information and is also attached in Appendix F. The estimated loss is based on flow data collected by the San Pitch River Commissioner. Correlating a flow at the diversion to the location where all water had been lost is in essence a measurement of zero flow. These measurements were taken in 2015 and 2018. Identifying where there is no flow left in the canal is more accurate than field measurements of flow where there is some level of error in any measurement method. A zero flow can be identified very accurately. The analysis of the flow capacity of the ditch was to validate the losses estimated based on the river commissioner records and observations. The flow capacity analysis demonstrated that the loses based on the measurements are likely conservative and actual loses are likely significantly greater

Project Types

Please address the following questions according to the type of infrastructure improvement you are proposing for funding. See Appendix A: Benefit Quantification and Performance Measure Guidance for additional guidance on quantifying water savings.

(1) ***Canal Lining/Piping:*** *Canal lining/piping projects can provide water savings when irrigation delivery systems experience significant losses due to canal seepage. Applicants proposing lining/piping projects should address the following:*

a. *How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.*

See Water Savings section above and Appendix F.

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.*

See Water Savings section above where the process is explained in detail. The estimated seepage losses in the canal were calculated from measurements at the canal diversion by the river commissioner and the extent to where the water was able to reach. The losses based on this data were validated by physical observations and calculations based on how the canal cross-section gets smaller the farther it is from the diversion. A good correlation was found.

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)?*

Other pipeline projects with pressurized irrigation pipe (PIP) typically experience less than a 1% loss after the project has been in operation for a few years. This estimate is based on Franson Civil Engineers experience from other PIP irrigation system projects that have meters installed. Typically, these projects are not able to measure less than 1% losses due to the meter resolution being around 2%. When a system is installed, a pressure test is required. Specifications can be met with a very small pressure loss, but the acceptable pressure loss is meant to account for expansion and contraction of the pipes based on temperature and other factors. To pass the pressure test the pipeline essentially needs to be free of leaks. When the pipeline is completed, water loss is negligible in this context

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 average annual transit loss reduction is estimated to be 201.8 acre-feet for the system as a whole. The 201.8 acre-feet of conservation is for the 4.4 miles of open canal equating to 45.8 acre-feet of water per mile of canal replaced, or 72.1 acre-feet of water conserved for every mile of pipe installed.

e. *How will actual canal loss seepage reductions be verified?*

Canal loss seepage reductions will be verified with the information provided by the meters on the water users turnouts and the Utah State Engineer Annual Distribution Report.

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

The Milburn West Irrigation Company Pipeline Project is expected to contain the following list of materials:

Material	Description
Concrete	A concrete diversion sedimentation structure will be constructed to remove waterborne sediments from depositing in the pipeline. Concrete thrust blocks will also be used.
Canal gates	Will be used on the sedimentation basin to control water and sediment flow.
Steel grating	Will be used on the diversion structure to cover and prohibit foreign contaminates, objects, people, livestock, wildlife, and others from entering or falling into the sediment basin.
Pressurized Irrigation Pipe (PIP), PVC, fittings	The 2.8-mile pipeline, turnouts, and fittings will be used to construct the main trunk line of the pipeline and the water user turnouts.
Valves	Water user turnouts will have valves attached in order for the irrigation company to control the flow of water to the water users and also allow for system service. Valves will also be used to flush and drain the system
Water flow meters	Meters will be installed on individual water user turnouts to monitor water use and verify system performance.

(2) ***Irrigation Flow Measurement:*** *Irrigation flow measurement improvements can provide water savings when improved measurement accuracy results in reduced spills and over-deliveries to irrigators. Applicants proposing irrigation flow measurement projects should address the following:*

a. *How have average annual water savings estimates been determined? Please provide all relevant calculations, assumptions, and supporting data.*

See Water Savings section above for supporting calculations and assumptions. Supporting data and information is contained in Appendix F. Although the proposed meters will improve the use of water and ultimately conserve water, the savings realized by better measurement are dwarfed by the elimination of seepage losses and therefore are not quantified.

b. *Have current operational losses been determined? If water savings are based on a reduction of spills, please provide support for the amount of water currently being lost to spills.*

Operational losses are not a contributor to the current system loss amount. The water savings estimate is not based on a reduction of spills or other operational deficiencies.

c. *Are flows currently measured at proposed sites and if so what is the accuracy of existing devices? How has the existing measurement accuracy been established?*

Currently there is one measurement device on the MWIC system at the point of diversion. This device is a 24" Parshall Flume. Measurements are recorded by the San Pitch River Commissioner. The accuracy for the diversion flume is expected to be around 5-8% within its operational range. This accuracy is based on industry standard methods of testing and documented long term accuracy reporting.

d. Provide detailed descriptions of all proposed flow measurement devices, including accuracy and the basis for the accuracy.

The MWIC pipeline will use inline paddle wheel water meters with a manufacturer reported accuracy of ±2%. See Appendix F. Metering technology is improving rapidly so a meter with a greater accuracy may be used.

e. Will annual farm delivery volumes be reduced by more efficient and timely deliveries? If so, how has this reduction been estimated?

Annual farm water deliveries will not be reduced as part of this project. Annual farm deliveries are expected to increase due to the amount of water the pipeline is expected to conserve. Shareholders who have not received any water during some years due to seepage losses will receive water even in drought years. MWIC has experienced extreme shortages in all but the best years. The system will allow the shareholders to irrigate far more land than they have been able to in the past. However, late season shortages are still likely to occur due to reduced flow in the San Pitch River.

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

Water diversions will be measured by the river commissioner using the existing diversion structure flume. Water use will be measured using the water user meters installed on the pipeline turnouts. Water savings will be verified by comparing the river commissioner reports to the water meter readings.

Evaluation Criterion B: Water Supply Reliability

Up to 18 points may be awarded under this criterion. This criterion prioritizes projects that address water reliability concerns, including making water available for multiple beneficial uses and resolving water related conflicts in the region.

Please address how the project will increase water supply reliability. Proposals that will address more significant water supply shortfalls benefitting multiple sectors and multiple water users, will be prioritized. General water supply reliability benefits (e.g., proposals that will increase resiliency to drought) will also be considered. Please provide sufficient explanation of the project benefits and their significance. These benefits may include, but are not limited to, the following:

1. Will the project make water available to address a specific water reliability concern? Please address the following:

- *Explain and provide detail of the specific issue(s) in the area that is impacting water reliability, such as shortages due to drought, increased demand, or reduced deliveries.*

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

The MWIC Pipeline Project will make more water available to the MWIC water users. Water supply levels have been decreasing over the last 10 years due to drought conditions. The decreased water supply has further exasperated the water users by the canal losses that the MWIC system experiences. As described in the Water Savings section above, water users during the 2018 irrigation season did not receive any water due to drought conditions and canal losses. Some water users also received no water in 2015 due to seepage losses. These effects were also compounded by local fires that burned large areas of the watershed. The water users are desperate to improve their irrigation system and make the necessary improvements to mitigate water shortage issues. The improved delivery system and measurement will reduce conflict within the company. Conflict with adjacent downstream water users will also be improved by better measurement and records the project will make possible.

- *Describe how the project will address the water reliability concern? In your response, please address where the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversion or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.*

The Milburn West Irrigation Company Pipeline Project will address water reliability by conserving water from canal losses and delivering it to the water users. This will improve water delivery times and minimize the impact of water shortages and drought conditions. The conserved water will be used to irrigate land not frequently irrigated and/or increase the length of time the land is able to be irrigated. The project will facilitate the conversion of all shareholders from flood irrigation to sprinkler irrigation. All water users are currently working with NRCS to obtain EQIP funding for their on-farm improvements. The pressure generated by the pipeline will allow most areas to be sprinkler irrigated without the use of pumps. During periods of high flow, the water users took all the water they could due to the inherent inefficiency of the system. With a pressurized pipeline and sprinkler systems, less water will need to be diverted to meet the need. As a result, more water will be left in the San Pitch River during periods of high flow. The system will be configured to allow excess water that may be diverted to be returned to the river at the sediment basin. If water is not being used the sediment structure will overflow back to the river rather than the current situation where the water is diverted whether it is being used or not.

- *Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.*

The conserved water will be delivered to the water users via the pipeline from the diversion structure to the last water user's property line. The individual shareholders in the company are working with NRCS to fund on-farm improvements to take the water from the pressurized pipeline to the private sprinkling systems.

- *Indicate the quantity of conserved water that will be used for the intended purpose.*

It is estimated that there will be an average of 201.8 acre-feet of water conserved that will be delivered to the MWIC water users.

2. Will the project make water available to achieve multiple benefits or to benefit multiple water users? Consider the following:

- *Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)?*

The MWIC Pipeline Project will provide benefit to the MWIC water users on their agricultural fields. These fields are used for crop production and livestock winter feeding areas. The water left in the river during periods of high flow will benefit downstream water users (agricultural, recreational, and environmental).

- *Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.*

This project is not expected to benefit any endangered species. The project will benefit local livestock herds which are economically important to the locals in the area. The livestock in the area are not directly dependent on the pipeline but are dependent on the hay and feed that is grown from the irrigation water the pipeline will provide. The livestock in the area are not adversely affected by a Reclamation project.

- *Will the project benefit a larger initiative to address water reliability?*

This project will go a long way to meeting the water needs of the shareholders. The project is making it possible for shareholders to seek on-farm improvement assistance from NRCS. Prior to submitting this application most shareholders had requested assistance from NRCS. They were told that they needed a pressurized pipeline before assistance was likely due to poor scores without a pressurized system. NRCS will likely set aside funds for the on-farm improvements to occur concurrent with the pressurized pipeline if this project is successful in receiving a grant.

- *Will the project benefit Indian tribes?*

This project will not benefit Indian tribes.

- *Will the project benefit rural or economically disadvantaged communities?*

The project will benefit Milburn, which is a small rural community.

- *Describe how the project will help to achieve these multiple benefits in your response, please address where the conserved water will go and where it will be used, including whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce*

deliveries, made available for transfer, left in the river system, or used to meet another intended use.

The Milburn West Irrigation Company Pipeline Project will address water reliability by conserving water from canal losses and delivering it to the water users. This will improve water delivery times and minimize the impact of water shortages and drought conditions. The improved water supply will improve agricultural production on land currently flood irrigated by allowing more efficient irrigation and allowing the land to be irrigated for a longer period of time. During periods of high flow, less water will be diverted, thus leaving more water in the river.

3. Does the project promote and encourage collaboration among parties in a way that helps increase the reliability of the water supply?

The MWIC Pipeline Project will encourage the water users to collaborate and work together to achieve the maximum beneficial use for the project. The users will be required to schedule and operate their irrigating activities to match the amount of water that the MWIC is diverting. The water users will be able to irrigate within these parameters as long as there is water to divert. This will allow for all water users to irrigate their crops outside of the existing turn-based system provided to optimize production. The meters will also allow shareholders to better manage their water use since they can avoid overwatering because they will actually know how much water they are applying to the land.

- *Is there widespread support for the project?*

Yes, there is widespread support for the MWIC Pipeline Project. The MWIC water users voted unanimously to support this WaterSMART application. 12 of the 13 water users have already applied for funding assistance from the NRCS On-Farm program. The remaining water user has indicated that he will also apply for the NRCS funding. The local NRCS office has indicated this project will bring added benefit to the area and has included a letter of project support in Appendix A.

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

MWIC water user support is complete as they understand the project will take collaborative efforts to ensure the success of the project. The NRCS supports the efforts of the MWIC and is planning to provide funding to the water users for on-farm improvements. Prior to this unanimous decision to support the project, annual shareholder meetings were often contentious. This proposed project and its benefits have unified the shareholders.

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

Just as the MWIC water users were encouraged to complete this project by seeing the benefits other irrigation companies have received from similar projects, MWIC believes this will influence other irrigation groups in the area to consider similar projects to help conserve and become more efficient with their use of water.

- *Will the project help to prevent a water-related crisis or conflict? Is there frequently tension of litigation over water in the basin?*

There have been discussions among water users in the basin and with the Sanpete County Water Commissioner concerning people stealing water and diverting more than their set diversion amounts. MWIC board members have attended several of the county commissioner meetings recently where this has been a topic of concern. Better measurement and more efficient use will help to reduce contention.

- *Describe the roles of any partners in the process. Please attach any relevant supporting documents.*

A letter of support from the local NRCS office can be found in Appendix A.

4. Will the project address water supply reliability in other ways not described above?

None that we are aware of.

Evaluation Criterion C: Implementing Hydropower

Up to 18 points may be awarded for this criterion. This criterion prioritizes projects that will install new hydropower capacity in order to utilize our natural resources to ensure energy is available to meet our security and economic needs.

If the proposed project includes construction or installation of a hydropower system, please address the following:

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

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

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

- *Any expected reduction in the use of energy currently supplied through a Reclamation project*
- *Anticipated benefits to other sectors/entities*
- *Expected water needs, if any, of the system*

No hydropower is planned as part of this project.

Evaluation Criterion D: Complementing Future On-Farm Irrigation Improvements

Up to 10 points may be awarded for projects that describe in detail how they will ***complement on-farm irrigation improvements*** *eligible for NRCS financial or technical assistance.*

If the proposed projects will complement an on-farm improvement eligible for NRCS assistance, please address the following:

- *Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.*
  - *Provide a detailed description of the on-farm efficiency improvements.*
  - *Have the farmers requested technical or financial assistance from NRCS for the on-farm efficiency projects, or do they plan to in the future?*
  - *If available, provide documentation that the on-farm projects are eligible for NRCS assistance, that such assistance has or will be requested, and the number or percentage of farms that plan to participate in available NRCS programs.*
  - *Applicants should provide letters of intent from farmers/ranchers in the affected project areas.*

Nearly all Milburn West Irrigation Company water users are currently planning or are in the process of applying for NRCS funding for on-farm improvements (see letter in Appendix A). Thus far 12 of the 13 water users have applied for NRCS assistance to complete on-farm improvements to install sprinkler hand lines, wheel lines, pivots, and drip irrigation. Due to the irrigation company's lack of a pipeline delivery system, the NRCS funding applications would not score well in the ranking process. The NRCS has communicated to MWIC that the applications would need to be declined and that MWIC can reapply again the following year when MWIC would know for sure if the pipeline project is moving forward. The local NRCS has provided a letter documenting the situation and has indicated that MWIC would be a good candidate for EQIP funding assistance.

- *Describe how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.*
  - *Will the proposed WaterSMART project directly facilitate the on-farm improvement? If so, how? For example, installation of a pressurized pipe through WaterSMART can help support efficient on-farm irrigation practices, such as drip-irrigation.*

    OR
  - *Will the proposed WaterSMART project complement the on-farm project by maximizing efficiency in the area? If so, how?*

As described above, the MWIC Pipeline Project would allow for the NRCS On-Farm improvement applications to potentially be awarded to the water users of MWIC. The on-farm improvements will add to the water conservation from this project to maximize water efficiency for MWIC.

- *Describe the on-farm water conservation or water use efficiency benefits that are expected to result from any on-farm work..*
  - *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.*

This project will improve water sustainability for 341.6 acres of agricultural land. This entire area is currently irrigated using flood or furrow irrigation. The Utah State University extension office indicates that, in Utah, surface (flood or furrow) irrigation has an average of 50% efficiency while sprinkler irrigation is 70% efficient (see Appendix F). The on-farm improvements are expected to improve current irrigation efficiencies by 20%. If all of the diverted water is conserved with the pipeline then the on-farm improvements would affect the total water diverted which is an average of 337.5 acre-feet annually. With the 20% improvement for flood irrigated acres being converted to sprinkler the estimated water conserved provided the project is completed, is nearly 67.5 acre-feet annually.

$$\frac{337.5\ acft}{yr} * 20\% = \frac{67.5\ acft}{yr}$$

Evaluation Criterion E: Department of the Interior Priorities

Up to 10 points may be awarded based on the extent that the proposal demonstrates that the project supports the Department of the Interior priorities. Please address those priorities that are applicable to your project. It is not necessary to address priorities that are not applicable to your project. A project will not necessarily receive more points simply because multiple priorities are addressed. Points will be allocated based on the degree to which the project supports one or more of the priorities listed, and whether the connection to the priority(ies) is well supported in the proposal.

1. *Creating a conservation stewardship legacy second only to Teddy Roosevelt*
    a. *Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment;*
    b. *Examine land use planning processes and land use designations that govern public use and access;*
    c. *Revise and streamline the environmental and regulatory review process while maintaining environmental standards.*
    d. *Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity;*
    e. *Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands;*
    f. *Identify and implement initiatives to expand across to DOI lands for hunting and fishing;*
    g. *Shift the balance towards providing greater public access to public lands over restrictions to access.*

a-The MWIC Pipeline Project is based on scientific methods and proven technology to improve the management, conservation and use of irrigation land and water.

2. *Utilizing our natural resources*
    a. *Ensure American Energy is available to meet our security and economic needs;*
    b. *Ensure access to mineral resources, especially the critical and rare earth minerals needed for scientific, technological, or military applications;*
    c. *Refocus timber programs to embrace the entire 'healthy forests' lifecycle;*
    d. *Manage competition for grazing resources.*

d-With the anticipated increased crop production for the MWIC water users, feed for livestock will become more readily available and affordable. This will decrease the competition for grazing resources in the area which are already scarce due to wild fires in the area.

3. *Restoring trust with local communities*
    a. *Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;*
    b. *Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.*

a-This project will improve the relationship between MWIC, local irrigators, and the community. The project goes a long way to showing the community that the MWIC is taking water conservation seriously and recognizes the importance of water in the area.

b-This project will expand the lines of communication between the MWIC and the county commissioners, the local NRCS office, and the local communities who depend on the water in the San Pitch River. Collaboration between these parties will be improved because MWIC is showing that they are doing everything possible to improve water management, usage, and are working to improve the lifestyle of the community as a whole.

4. *Striking a regulatory balance*
    a. *Reduce the administrative and regulatory burden imposed on U.S. industry and the public;*
    b. *Ensure that Endangered Species Act decisions are based on strong science and thorough analysis.*

The MWIC Pipeline Project will conform with NEPA compliance to ensure that there are minimal harmful impacts to the surrounding environment. The pipeline will follow the existing canal or cross existing agricultural fields.

5. *Modernizing our infrastructure*
    a. *Support the White House Public/Private Partnership Initiative to modernize U.S. infrastructure;*
    b. *Remove impediments to infrastructure development and facilitate private sector efforts to construct infrastructure projects serving American needs;*
    c. *Prioritize DOI infrastructure needs to highlight:*
        1. *Construction of infrastructure;*
        2. *Cyclical maintenance;*
        3. *Deferred maintenance.*

The MWIC Pipeline Project seeks to facilitate private sector efforts to construct infrastructure projects serving American needs. The pipeline will serve the MWIC water users and local community by conserving irrigation water.

Evaluation Criterion F: Implementation and Results

Up to 6 points may be awarded for these subcriteria.

Subcriterion No. F.1 – Project Planning

Points may be awarded for proposals with planning efforts that provide support for the proposed project.

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

Provide the following information regarding project planning:

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

The Sanpete Water Conservancy District has a Water Conservation Plan and a Master Plan. The Water Conservation Plan encourages the district to support projects like this. This particular project was not identified in the Master Plan but many similar projects are showing district support for pressurized irrigation projects.

(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 Sanpete Water Conservancy District Water Conservation Plan identified piping canals and installing sprinkler irrigation as preferred methods for conserving water in the county.

Subcriterion No. F.2 – Performance Measures

Points may be awarded based on the description and development of performance measures to quantify actual project benefits upon completion of the project.

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved). For more information calculating performance measure, see Appendix A: Benefit Quantification and Performance Measure Guidance.

The benefits of the MWIC Pipeline Project performance will be measured by the amount of water conserved. The amount of water diverted to MWIC will be measured and recorded by the river commissioner using the existing diversion structure. The water utilized by the water users will be measured by the meters on the individual turnouts. Water conservation will be determined by the amount of water that is delivered to the water users. Water delivery in excess of 40.2% of the total water diverted will be the total volume of water conserved by the pipeline project.

Subcriterion No. F.3 - Readiness to Proceed

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

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

The project, should it be selected for grant award, will begin immediately upon notification of award. NEPA compliance will begin as the details of the grant contract are being finalized. MWIC and the engineer will finalize the pipeline alignment as part of the NEPA process. Design of the pipeline will follow. Following the initial NEPA compliance process and once a FONSI has been completed, engineering of the pipeline can be adjusted to accommodate any findings obtained from the NEPA process and then finalized. Permit acquisition would take place during the design process. The construction portion of the pipeline project will then be bid to area contractors mid-summer to allow adequate time to order parts and materials. Pipeline construction is expected to begin in the late summer, early fall after the water has left the canal system. The construction of the diversion structure and the pipeline is expected to take five months and be completed by February of 2021, in time for the irrigation season. Final reporting on the project is expected to be completed by the end of June 2021, along with the measured performance benefits of the pipeline. The estimated project timeline is included below.

Task	Start Date	Duration (Months)
Complete Contract with Reclamation	September 2019	1
Finalize Pipeline Alignment	September 2019	2
Begin NEPA Compliance	September 2019	6
Finalize Pipeline Design	April 2020	4
Permit Acquisition	May 2020	3
Bid Pipeline Construction	July 2020	1
Order Materials	August 2020	2
Pipeline Construction	September 2020	6
Collect Pipeline Performance Measures	April 2021	3
Final Project Reporting	May 2021	1

- *Describe any permits that will be required, along with the process for obtaining such permits.*

NEPA compliance will require environmental clearances like an EA or Simplified EA. A FONSI will need to be prepared and filed. Environmental compliance will be provided by the contracted engineering firm. A construction permit and a road crossing permit will need to be obtained from the county. These permits will be part of the construction work and will be bid with the construction contract. The existing diversion will be utilized so obtaining a stream alteration permit or 404 permit are not anticipated.

- *Identify and describe any engineering or design work performed specifically in support of the proposed project.*

An engineering firm was contracted to help prepare an initial pipeline design, prepare initial cost estimates and prepare this WaterSMART application.

- *Describe any new policies or administrative actions required to implement the project.*

Administrative actions to implement the project require updated water user's assessment fees to be issued and collected. Operation and maintenance procedures will need to be established and updated as necessary.

- *Describe how the environmental compliance estimate was developed. Has the compliance cost been discussed with the local Reclamation office?*

The environmental compliance estimate was developed by a local engineering firm who have experience in WaterSMART pipeline projects as well as familiarity with Reclamation's NEPA compliance process. The estimation was based on their experience and the actual costs of similar pipeline projects in the area requiring NEPA compliance.

Evaluation Criterion G: Nexus to Reclamation Project Activities

Up to 4 points may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.

- *Is the proposed project connected to Reclamation project activities?*
    - *Does the applicant receive Reclamation project water?*
    - *Is the project on Reclamation project lands or involving Reclamation facilities?*
    - *Is the project in the same basin as a Reclamation project or activity?*
    - *Will the proposed work contribute water to a basin where a Reclamation project is located?*

The MWIC Pipeline Project does not receive Reclamation project water. The project is not located on Reclamation project lands nor does it involve Reclamation facilities. The MWIC Pipeline Project is located in the same Sevier River Watershed Basin as several Reclamation projects or activities. Other Reclamation projects or activities in the area include the Moroni Irrigation Company Pipeline Project, Ephraim Tunnel Rehabilitation, the Ephraim Drought Response Well Project, the Scipio Ivie Creek Pipeline Project, and the Native Planning Institute Basin Study Program. Reclamation has contributed to these projects because there is a real need for assistance in the area. The MWIC Pipeline Project will contribute directly to the San Pitch River which supplies irrigation water to the Moroni Irrigation Company Pipeline Project. Moroni's total annual diversions can be seen with MWIC annual diversions in Appendix F on the State Engineer's Water Distribution System Annual Report. The Milburn area was to receive water from Reclamation's Narrows Project before it was put on hold due to permitting issues with the Corps of Engineers.

- *Will the project benefit any tribe(s)?*

This project will not benefit any tribes.

Evaluation Criterion H: Additional Non-Federal Funding

Up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided using the following calculation:

$$\frac{\textit{Non-Federal Funding}}{\textit{Total Project Cost}} = \frac{\$\ 312,400}{\$\ 568,000} = \mathbf{55\%}$$

Project Budget

Project costs for environmental and cultural compliance and engineering/design that were incurred or are anticipated to be incurred prior to award should be included in the proposed project budget.

If the proposed project is selected, the awarding Reclamation Grants Officer will review the proposed pre-award costs to determine if they are consistent with program objectives and are allowable in accordance with the authorizing legislation. Proposed pre-award costs must also be compliant with all applicable administrative and cost principles criteria established in 2 Code of Federal Regulations (CFR) Part 200, available at www.ecfr.gov, and all other requirements of this FOA. ***In no case will costs incurred prior to July 1, 2018 be considered for inclusion in the proposed project budget.***

Funding Plan and Letters of Commitment

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

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

- *The amount of funding commitment*
- *The date the funds will be available to the applicant*
- *Any time constraints on the availability of funds*
- *Any other contingencies associated with the funding commitment*

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

Reclamation will not make funds available for an award under this FOA until the recipient has secured non-Federal cost-share. Reclamation will execute a financial assistance agreement once non-Federal funding has been secured or Reclamation determines that there is sufficient evidence

and likelihood that non-Federal funds will be available to the applicant subsequent to executing the agreement.

Please Identify the sources of the non-Federal cost share contribution for the project, including:

- *Any monetary contributions by the applicant towards the cost-share requirement and source of funds (e.g., reserve account, tax revenue, and/or assessments)*
- *Any costs that will be contributed by the applicant*
- *Any third-party in-kind costs (i.e., goods and services provided by a third party)*
- *Any cash requested or received from other non-Federal entities*
- *Any pending funding request (i.e., grants or loans) that have not yet been approved and explain how the project will be affected if such funding is denied*

The applicant will provide their share of project funding through company assessments and by obtaining a loan from the Utah Department of Water Resources (DWR). The loan from the Utah DWR has not yet been approved but is likely to be funded once the application has been submitted. Utah DWR has a long history of providing funding for other similar projects. Should the Utah DWR loan not be approved, it is highly unlikely that this project will move forward. Utah Division of Water Resources has funded so many WaterSMART funded projects that they have decided that they will not process a funding application for a WaterSMART project until after an award has been announced. The Utah Division of Water Resources is very supportive of WaterSMART funded projects but they do not want to spend resources on projects that will not receive WaterSMART funding. A funding application will be prepared but Water Resources will not process the application until after grant awards have been announced.

In addition, please identify whether the budget proposal includes any project costs that have been or may be incurred prior to award. For each cost, describe:

- *The project expenditure and amount*
- *The date of cost incurrence*
- *How the expenditure benefits the project*

The plan is that any costs incurred prior to the project award will not be included as part of the proposed project costs.

Please include the following chart to summarize all funding sources. Denote in-kind contributions with an asterisk (*).

Table 3: Summary of Non-Federal and Federal Funding Sources

FUNDING SOURCES	AMOUNT
Non-Federal Entities	
1. Utah Department of Water Resources Loan	$ 312,400
2.	$0
3.	$0
Non-Federal Subtotal	**$ 312,400**
Other Federal Entities	
1.	$0
Other Federal Subtotal	**$0**
REQUESTED RECLAMATION FUNDING	**$255,600**

Budget Proposal

The total project cost (Total Project Cost), is the sum of all allowable items of costs, including all required cost sharing and voluntary committed cost sharing, including third-party contributions, that are necessary to complete the project.

Table 4: Total Project Cost Table

SOURCE	AMOUNT
Costs are reimbursed with the requested Federal Funding	**$255,600**
Costs to be paid by the applicant	**$312,400**
Value of third party contributions	**$ 0**
TOTAL PROJECT COST	**$568,000**

The budget proposal should include detailed information on the categories listed below and must clearly identify ***all*** *items of cost, including those that will be contributed as non-Federal cost share by the applicant (required and voluntary), third-party in-kind contributions, and those that will be covered using the funding requested from Reclamation, and any requested pre-award costs. Unit costs must be provided for all budget items including the cost of services or other work to be provided by consultants and contractors. Applicants are strongly encouraged to review the procurement standards for Federal awards found at 2 CFR §200.317 through §200.326 before developing their budget proposal.*

It is also strongly advised that applicants use the budget proposal format shown below in Table 5 or a similar format that provides this information. If selected for award, successful applicants must submit detailed supporting documentation for all budgeted costs. Additional information regarding the types of documentation that will be necessary to support budgeted costs can be found in Attachment 1 to this FOA.

Table 5: Budget Proposal

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	TOTAL COST
	$/Unit	Quantity		
Legal Services	$200/hr	15	Hours	$3,000
Environmental Services	$150/hr	133	Hours	$20,000
Engineering Services	See Appendix C			$48,000
Construction Management	See Appendix C			$24,000
Construction Contract	See Appendix D			$458,000
Reclamation Reporting	See Appendix D			$15,000
TOTAL ESTIMATED PROJECT COSTS				**$568,000**

Budget Narrative

Submission of a budget narrative is mandatory. An award will not be made to any applicant who fails to fully disclose this information. The budget narrative provides a discussion of, or explanation for, items included in the budget proposal. The types of information to describe in the narrative include, but are not limited to, those listed in the following subsections. Costs, including the valuation of third-party in-kind contributions, must comply with the applicable cost principles contained in 2 CFR Part §200, available at the Electronic Code of Federal Regulations (www.ecfr.gov).

Salaries and Wages

Indicate the Project Manager and other key personnel by name and title. The Project Manager must be an employee or board member of the applicant. Other personnel should be indicated by title alone. For all positions, indicate salaries and wages, estimated hours or percent of time, and rate of compensation. The labor rates must identify the direct labor rate separate from the fringe rate or fringe cost for each category. All labor estimates must be allocated to specific tasks as outlined in the applicant's technical project description. Labor rates and proposed hours shall be displayed for each task.

The budget proposal and narrative should include estimated hours for compliance with reporting requirements, including final project and evaluation. Please see Section F.3. Program Performance Reports for information on types and frequency of reports required.

Generally, salaries of administrative and/or clerical personnel will be included as a portion of the stated indirect costs. If these salaries can be adequately documented as direct costs, they should be included in this section; however, a justification should be included in the budget narrative.

All wages and salaries will be paid under contractual agreements.

Fringe Benefits

Identify the rates/amounts, what costs are included in this category, and the basis of the rate computations. Federally approved rate agreements are acceptable for compliance with this item.

All fringe benefits will be paid under contractual agreements.

Travel

Identify the purpose of each anticipated trip, destination, number of persons traveling, length of stay, and all travel costs including airfare (basis for rate used), per diem, lodging, and miscellaneous travel expenses. For local travel, include mileage and rate of compensation.

All travel will be paid under contractual agreements.

Equipment

If equipment will be purchased, itemize all equipment valued at or greater than $5,000. For each item, identify why it is needed for the completion of the Project and how the equipment was priced. Note: if the value is less than $5,000, the item should be included under materials and supplies.

If equipment is being rented, specify the number of hours and the hourly rate. Local rental rates are only accepted for equipment actually being rented or leased.

If the applicant intends to use their own equipment for the purposes of the project, the proposed usage rates should fall within the equipment usage rates outlined by the United States Army Corps of Engineers (USACE) within their Construction Equipment Ownership and Operating Expense Schedule (EP 1110-1-8) at www.publications.usace.army.mil/USACE-Publications/Engineer-Pamphlets/u43545q/313131302D312D38.

Note: If the equipment will be furnished and installed under a construction contract, the equipment should be included in the construction contract cost estimate.

All equipment will be supplied under contractual agreements.

Materials and Supplies

Itemize supplies by major category, unit price, quantity, and purpose, such as whether the items are needed for office use, research, or construction. Identify how these costs were estimated (i.e., quotes, engineering estimates, or other methodology). Note: If the materials/supplies will be furnished and installed under a contract, the equipment should be included in the construction contract cost estimate.

All materials and supplies will be supplied under contractual agreements.

Contractual

Identify all work that will be accomplished by consultants or contractors, including a breakdown of all tasks to be completed, and a detailed budget estimate of time, rates, supplies, and materials that will be required for each task. For each proposed contract, identify the procurement method that will be used to select the consultant or contractor and the basis for selection. Please note that all procurements with an anticipated aggregate value that exceeds the Micro-purchase Threshold (currently $10,000) must use a competitive procurement method (see 2 CFR §200.320 – Methods of procurement to be followed*). Only contracts for architectural/engineering services can be awarded using a qualifications-based procurement method. If a qualifications-based procurement method is used, profit must be negotiated as a separate element of the contract price. See 2 CFR §200.317 through §200.326 for additional information regarding procurements, including required contract content.*

The contractual cost estimates for engineering, environmental and regulatory compliance, and construction were prepared by a professional engineering firm with experience on other WaterSMART pipeline projects in the area. The Engineering cost estimate and manpower estimates are attached in Appendix C. The construction cost estimate and source references are attached in Appendix D. The environmental and regulatory compliance cost estimate and manpower estimates are attached in Appendix E.

Third-Party In-Kind Contributions

Identify all work that will be accomplished by third-party contributors, including a breakdown of all tasks to be completed, and a detailed budget estimate of time, rates, supplies, and materials that will be required for each task. Third-party in-kind contributions, including contracts, must comply with all applicable administrative and cost principles criteria, established in 2 CFR Part 200, available at www.ecfr.gov, and all other requirements of this FOA.

There are no third-party contributions as part of this project.

Environmental and Regulatory Compliance Costs

Prior to awarding financial assistance, Reclamation must first ensure compliance with Federal environmental and cultural resources laws and other regulations ("environmental compliance"). Every project funded under this program will have environmental compliance costs associated with activities undertaken by Reclamation and the recipient.

To estimate environmental compliance costs, please contact compliance staff at your local Reclamation Office for additional details regarding the type and costs of compliance that may be required for your project. Note, support for your compliance costs estimate will be considered during review of your application. Contact the Program Coordinator (see Section G. Agency Contacts) for Reclamation contact information regarding compliance costs and requirements.

Environmental compliance costs are considered project costs and must be included as a line item in the project budget and will be cost shared accordingly.

The amount of the line item should be based on the actual expected environmental compliance costs for the project, including Reclamation's cost to review environmental compliance documentation. Environmental compliance costs will vary based on project type, location, and potential impacts to the environment and cultural resources.

How environmental compliance activities will be performed (e.g., by Reclamation, the applicant, or a consultant) and how the environmental compliance funds will be spent, will be determined pursuant to subsequent agreement between Reclamation and the applicant. The amount of funding required for Reclamation to conduct any environmental compliance activities, including Reclamation's cost to review environmental compliance documentation, will be withheld from the Federal award amount and placed in an environmental compliance account to cover such costs. If any portion of the funds budgeted for environmental compliance is not required for compliance activities, such funds may be reallocated to the project, if appropriate.

Costs associated with environmental and regulatory compliance must be included in the budget. Compliance costs include costs associated with any required documentation of environmental compliance, analyses, permits, or approvals. Applicable Federal environmental laws could include NEPA, ESA, NHPA, CWA, and other regulations depending on the project. Such costs may include, but are not limited to:

- *The cost incurred by Reclamation to determine the level of environmental compliance required for the project*
- *The cost incurred by Reclamation, the recipient, or a consultant to prepare any necessary environmental compliance documents or reports*
- *The cost incurred by Reclamation to review any environmental compliance documents prepared by a consultant*
- *The cost incurred by the recipient in acquiring any required approvals or permits, or in implementing any required mitigation measures*

Environmental and regulatory compliance costs were provided by a professional engineering firm, based on their experience on similar projects. These costs are presented in Appendix E. These costs came from other environmental and regulatory costs on the WaterSMART pipeline project in Scipio and the Ephraim Tunnel Rehabilitation. Construction permit costs were estimated based on costs from the Benson Pipeline project bids.

Other Expenses

Any other expenses not included in the above categories shall be listed in this category, along with a description of the item and why it is necessary. No profit or fee will be allowed.

No other expenses are expected for this project.

Indirect Costs

Indirect costs are costs incurred by the applicant for a common or joint purpose that benefit more than one activity of the organization and are not readily assignable to the activities specifically

benefitted without undue effort. Costs that are normally treated as indirect costs include, but are not limited to, administrative salaries and fringe benefits associated with overall financial and organizational administration; operation and maintenance costs for facilities and equipment; and, payroll and procurement services. If indirect costs will be incurred, identify the proposed rate, cost base, and proposed amount for allowable indirect costs based on the applicable cost principles for the applicant's organization. It is not acceptable to simply incorporate indirect rates within other direct cost line items.

If the applicant has never received a Federal negotiated indirect cost rate, the budget may include a de minimis rate of up to 10 percent of modified total direct costs. For further information on modified total direct costs, refer to 2 CFR §200.68 available at www.ecfr.gov.

If the applicant does not have a federally approved indirect cost rate agreement and is proposing a rate greater than the de minimis 10 percent rate, include the computational basis for the indirect expense pool and corresponding allocation base for each rate. Information on "Preparing and Submitting Indirect Cost Proposals" is available from Interior, the National Business Center, and Indirect Cost Services, at www.doi.gov/ibc/services/finance/indirect-cost-services. If the proposed project is selected for award, the recipient will be required to submit an indirect cost rate proposal with their cognizant agency within 3 months of award.

No indirect costs are expected as part of the project.

Total Costs

Indicate total amount of project costs, including the Federal and non-Federal cost-share amounts.

The total project cost is $568,000.

Required Permits or Approvals

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

NEPA compliance will require environmental clearances such as an EA or Simplified EA. A FONSI will need to be prepared and filed. Environmental compliance will be completed by the contracted engineering firm. A construction permit and a road crossing permit will need to be obtained from Sanpete county. These permits will be part of the construction work and will be bid along with the construction contract.

Letters of Support

Please include letters from interested stakeholders supporting the proposed project. To ensure your proposal is accurately reviewed, please attach all letters of support/partnership letters as an appendix. (Note: this will not count against the application page limit.) Letters of support received after the application deadline for this FOA will not be included with your application.

Letters of Support are included in Appendix A.

Official Resolution

Include an official resolution adopted by the applicant's board of directors or governing body, or for State government entities, an official authorized to commit the applicant to the financial and legal obligations associated with receipt of a financial assistance award under this FOA, verifying:

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

An official resolution meeting the requirements set forth above is mandatory. *If the applicant is unable to submit the official resolution by the application deadline because of the timing of board meetings or other justifiable reasons, the official resolution may be submitted up to 30 days after the application deadline.*

The signed Official Resolution is shown in Appendix B.

Unique Entity Identifier and System for Award Management

All applicants (unless the applicant has an exception approved by Reclamation under 2 CFR §25.110[d]) are required to:

(i) Be registered in the System for Award Management (SAM) before submitting its application;

(ii) Provide a valid unique entity identifier in its application; and

(iii) Continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency.

Meeting the requirements set forth above is mandatory. *If the applicant is unable to complete registration by the application deadline, the unique entity identifier must be obtained and SAM registration must be initiated within 30 days after the application deadline in order to be considered for selection and award.*

Reclamation will not make a Federal award to an applicant until the applicant has complied with all applicable unique entity identifier and SAM requirements and, if an applicant has not fully complied with the requirements by the time the Reclamation is ready to make an award, Reclamation may determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

Milburn West Irrigation Company has initiated registration with the SAM and will continue to maintain an active registration throughout the award and construction process. The Milburn West Irrigation Company has provided its unique entity identifier in the attached SF-424 application.

Appendix A

Letters of Support

United States Department of Agriculture

3/11/19

Bureau of Reclamation
P.O. Box 25007
Denver, CO 80225

Subject: Grant

To Whom it may concern;

The West Milburn Irrigation Company shareholders have applied with NRCS through EQIP (Environmental Quality Incentives Program) to install on-farm sprinkler irrigation systems on the agricultural acres (371.6) serviced by Long Ditch. To date all shareholders have applied. The resource concern of "Insufficient use of irrigation" is a priority for NRCS and applies to this project. NRCS supports the effort to pressurize the off-farm ditch and have encouraged the irrigation company to seek other funds where as our program would match up better with the on-farm systems. NRCS is also currently involved with other partners to improve the uplands above Long Ditch after the Hilltop Fire in the summer of 2018.

Sincerely,

Brian R Miller
NRCS, District Conservationist

Natural Resources Conservation Service
EPHRAIM FIELD OFFICE
5 S MAIN ST 2ND FL
EPHRAIM, UT 84627
Phone: (435) 283-8004 Fax: (844) 715 - 4933

Minutes
West Milburn Irrigation Company, Inc. Annual Meeting

Fairview Fire Station/City Hall meeting room
23 February, 2019 -- 6:00 p.m.

Attendance

Board Members:

Lane Walsh
Scott Peterson
Brian Peterson
Raymond Compton
Kathryn Crandall
Calvin Crandall
Casey Hall
Patricia Richards
James Gillespie
Fred Christensen
Jon Nuttall

Guests:

Alan York
Mary Lynne York
Brian Miller, NRCS
Kyle DeVaney, FCE

Conducting: James Gillespie, President
Minutes read by Kathryn Crandall
Seconded: James Gillespie
Motion to approve: Raymond Compton
Approved

- **Upper Sand Pitch Update**, Raymond Compton
  - 17.7 acre-feet of water diverted for 2018
  - Water did not reach Raymonds ditch
  - Budget for the upper Sand Pitch is the same as 2018
  - $10/acre dues with .30 cents/acre going to the state
  - Question asked -- What is being done about the water being illegally diverted? It was discussed that a complaint must first be filed. Instead, it was discussed that someone would ask Bryce Jackson to stop before it becomes a law suit.
- **Finance Report by Raymond Compton**
  - $1000 to Jon Nuttall who is working harder to get water when there is no water.
  - Assessments will remain the same until the new water project costs are established.
- **Presentation by Kyle Devaney from Franson Civil Engineers**
  - **Water Smart** is a Bureau of Reclamation Grant working to ensure water for future generations.
  - 24 million grant
  - 50/50 cost share up to 1.5 million

- For a higher tier the Reclamation will pay 40% for higher acceptance
- 24" pipe was proposed as the pipeline size which would allow for 23cfs. Pipe size could be smaller but would need to be sized for maximum flow in recent history. 1.7 allotted
- Over 5 cfs is the most we've seen
- Biggest cost is the PVC pipe
- Environmental study, permitting, engineering, and NEPA coordination is estimated to be around $100,000
- **Construction cost $440,000 for an estimated cost of $540,000.**
- WMIC will be paying 60% of the cost
- Financing through the Utah Board of Water Resources: 25 yrs at 1%
- **Gravity system $638,010.87 and with cost share of 60% it would cost $382,806.52.**
- **<u>Option 2</u>**
  Pressurized Pipeline
  It can push water back up hill and can reach everyone-
  Smaller pipe, cost less, requires on farm improvements
  Best conservancy comes from wheelines and pivots.
  Pressures up to 83.8% for gravity. 1.75 cfs
  $550,000 estimated project cost.
- Discussed meters being installed and booster pumps to reach higher areas.
- March 2020 will be the soonest to begin project
- 1.3 miles of 15" pipe would be about $278,000, plus the NEPA, permitting, legal, and engineering.

- **Brian Miller, NRCS** next explained how to do cost share applications at a flat rate for ag producers. NRCS can pay as high as 60%.
  - Individuals will sign up again for 2020.
  - Location in Ephraim City Bldg upstairs at NRCS and Farm Service Agency.
  - Limited help for flood irrigating
  - Pressurized systems receive more help for pivots, linears, etc.
  - Water Smart deadline March 19th.
  - Higher priority if doing pressurized systems
  - WaterSMART is a grant and will not need to be payed back. Utah Water Resources loan can be used to meet WaterSMART cost share requirement. Typical loan rates are around 20 years at 1%.
- **Moved by James Gillespie and seconded by Raymond Compton to do a Pressurized system.**

- **Vote to run Pressurized system was a 100% unanimous vote**

- **Annual Assessment may be increased to cover grant writing of $5000**

- **Jon Nuttall discussed ditch cleaning being more difficult this year because of fire debris**
- **Officer Change discussed.** Calvin Crandall moved by acclamation that we keep the officers the same. Seconded by Brian Peterson. Officers were voted unanimously to remain the same.
    - President: James Gillespie
    - Vice President: Fred Christensen
    - Sec Treasurer: Raymond Compton
    - Secretary: Kathryn Crandall

- **Water issue rediscussed - Bryce Jackson diversion**
    - Letter has been sent by James Gillespie
    - Discussed that before any further action take place that Fred Christensen will go and talk to Bryce and ask that he not divert the water any more or there will be a lawsuit filed.
- **Kyle DeVaney, Franson Civil Engineers** revisited pipeline alignment to follow the canal to west, then follow the property line between Wheeler and Compton property. 2.77 miles.
    - Pipeline size 15"
- James Gillespie moved to adjourn meeting, Mary Lynne York seconded.
- Meeting adjourned at 8:15 p.m.

Appendix B

Signed Official Resolution

OFFICIAL RESOLUTION
OF THE
WEST MILBURN IRRIGATION COMPANY

RESOLUTION NO. 2019 - 01

WHEREAS, the United States Department of the Interior, Bureau of Reclamation has announced the *WaterSMART Water and Energy Efficiency Grants* in order to prevent water supply crises and ease conflict in the western United States, and has requested proposals from eligible entities to be included in the WaterSMART Program, and

WHEREAS, the West Milburn Irrigation Company has need for funding to complete an irrigation pipeline project that involves replacing a section of their transmission system with a pipeline. The project is intended to conserve water, reduce the impact of drought, and provide irrigation company shareholders with a more reliable source of water.

NOW, THEREFORE, BE IT RESOLVED that the West Milburn Irrigation Company Board agrees and authorizes that

1. The West Milburn Irrigation Company has reviewed and supports the proposal submitted;

2. The applicant is capable of providing the amount of funding and/or in-kind contributions, specified in the funding plan; and

3. If selected for a WaterSMART Grant, the applicant will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

DATED: 2/23/2019

Printed Name: James R Gillespie
Title: President
Company: West Milburn Irrigation Company

ATTEST:

Signature

Calvin V Crandall

Printed Name

Appendix C

Probable Cost for Engineering Services

(Engineering Design and Construction Management)

Milburn West Irrigation Company

Probable Cost Opinion for Engineering Services

(Rate Table Attached)

Task Description	Hours By Personnel Category						Total Labor Charges	Other Direct Costs	Total Fee
	1	2	3	4	5	7			
	Principal	Senior Manager	Senior Engineer	Staff Engineer	Field Manager	Designer			
Engineering Design/Planning/Permitting									
Task 1. Design Team Management	8			10			$2,522	$0	$2,522
Task 2. Client Meetings & Coordination	12			16			$3,896	$0	$3,896
Task 3. Coordination with Division of Water Resources	4						$696	$0	$696
Task 4. Coordination on Environmental Clearance	2			12			$1,704	$0	$1,704
Task 5. Coordination with Reclamation	4			16			$2,504	$48	$2,552
Task 6. Coordination with MWIC	6			4			$1,496	$0	$1,496
Task 7. Preliminary Analysis/Pipe Alignment/Easements	4			10			$1,826	$0	$1,826
Task 8. Site Visits/Surveying				8		8	$1,720	$1,200	$2,920
Task 9. Design Criteria Contract	4			4			$1,768	$0	$1,768
Task 10. Preliminary Analysis/Pipe Alignment/Easements	4		2	6			$2,260	$0	$2,260
Task 11. Hydraulic Analysis and Model			2	6		8	$1,760	$0	$1,760
Task 12. Surge Analysis and Protection			2	6			$944	$0	$944
Task 13. Air-Valves Sizing			2	4			$718	$0	$718
Task 14. Sedimentation Basin Design	1		6	18			$3,006	$0	$3,006
Task 16. Road Crossing Design and Coordination			4	12			$1,888	$0	$1,888
Task 17. Construction Drawings Draft			4	8		30	$4,496	$350	$4,846
Task 18. Construction Drawings Final	4		4	8		30	$5,812	$400	$6,212
Task 19. Construction Specifications	4		4	20			$4,108	$300	$4,408
Task 20. Bid & Award Coordination	4			4			$2,078	$500	$2,578
SUBTOTAL	**61**	**0**	**30**	**172**	**0**	**76**	**$45,202**	**$2,798**	**$48,000**
Construction Management									
Task 1. Construction Team Management/Meetings	3		4	4	4		$2,002	$0	$2,002
Task 2. On-Site Observation and Documentation	3				43		$5,854	$1,500	$7,354
Task 3. Submittal Reviews	3		5	10			$2,317	$0	$2,317
Task 4. Contractor Coordination	2		3	8	13		$3,263	$0	$3,263
Task 5. Record Drawings Preparation	2		3	7		20	$4,508	$0	$4,508
Task 6. O&M Manual	2		3	12		5	$2,985	$67	$3,052
Task 7. Project Closeout	2			2			$1,504	$0	$1,504
SUBTOTAL	**17**	**0**	**18**	**43**	**60**	**25**	**$22,433**	**$1,567**	**$24,000**
Project Totals	**78**	**0**	**48**	**215**	**60**	**101**	**$67,635**	**$4,365**	**$72,000**

Appendix D

Probable Cost for Construction Services

Milburn West Irrigation Company

Probable Cost Opinion for Construction Services

Item	Description	Unit	Quantity	Unit Cost	Total Cost	
1	Mobilization	LS	1	$ 23,000.00	$ 23,000	5%
2	Construction Surveying	LS	1	$ 5,000.00	$ 5,000	From 2018 Benson Pipeline, Milburn Much Smaller
3	Site Preparation	LS	1	$ 7,000.00	$ 7,000	From 2018 Benson Pipeline
4	Furnish and Install 15" PIP DR 64	LF	7,390	$ 18.94	$ 140,000	From 2018 Benson Pipeline
5	Furnish and Install 12" PIP DR 51	LF	3,170	$ 16.88	$ 53,600	From 2018 Benson Pipeline
6	Furnish and Install 10" PIP DR 51	LF	2,110	$ 15.41	$ 32,600	From 2018 Benson Pipeline
7	Furnish and Install 8" PIP DR 41	LF	2,060	$ 10.92	$ 22,500	From 2018 Benson Pipeline
8	Furnish and Install 15" PIP 90° bend	EA	1	$ 848.00	$ 848	From 2018 Benson Pipeline
9	Furnish and Install 8" PIP 90° bend	EA	2	$ 428.00	$ 856	Interpolation From 2018 Benson Pipeline
10	Furnish and Install 15" PIP 45° bend	EA	4	$ 769.00	$ 3,076	From 2018 Benson Pipeline
11	Furnish and Install 12" PIP 45° bend	EA	2	$ 609.00	$ 1,218	Interpolation From 2018 Benson Pipeline
12	Furnish and Install 15" PIP 22.5° bend	EA	5	$ 674.00	$ 3,370	From 2018 Benson Pipeline
13	Furnish and Install 12" PIP 22.5° bend	EA	1	$ 533.00	$ 533	Interpolation From 2018 Benson Pipeline
14	Furnish and Install 8" PIP 22.5° bend	EA	1	$ 422.00	$ 422	Interpolation From 2018 Benson Pipeline
15	Furnish and Install 15" PIP 11.25° bend	EA	7	$ 644.00	$ 4,508	From 2018 Benson Pipeline
16	Furnish and Install 12" PIP 11.25° bend	EA	2	$ 510.00	$ 1,020	Interpolation From 2018 Benson Pipeline
17	Furnish and Install 8" PIP 11.25° bend	EA	1	$ 403.00	$ 403	Interpolation From 2018 Benson Pipeline
18	Sedimentation Basin	LS	1	$ 58,576.00	$ 58,600	From Moroni Bid
19	Install 8" Turnout/Connection/Meter	EA	2	$ 9,150.00	$ 18,300	From 2018 Benson Pipeline
20	Install 4" Turnout/Connection/Meter	EA	11	$ 5,950.00	$ 65,500	From 2018 Benson Pipeline
21	Install Pipeline Sump Drain	EA	3	$ 3,750.00	$ 11,300	From 2017 Scipio Pipeline
22	Hill Top Road Crossing	EA	1	$ 3,550.00	$ 3,600	From 2016 Gobblefield Bids
				Construction Subtotal	**$ 457,254**	

	Construction Subtotal	**$**	**458,000**
	Engineering	**$**	**48,000**
	Construction Management	**$**	**24,000**
	Reclamation Administration	**$**	**15,000**
	Legal	**$**	**3,000**
	Environmental and Regulatory Compliance	**$**	**20,000**
	Total	**$**	**568,000**

10% of Construction Cost. *Edit on Engineering Sheet.
*Edit on Engineering Sheet
Typical Reclamation Fee
Easement, recording, other.
Simplified EA

Benson Canal Enclosure (#5929633)
Owner: Benson Irrigation Company
Solicitor: Franson Civil Engineers
09/28/2018 11:00 AM MDT

Iten	Item Description	UofM	Quantity	The Sprinkler Shop Inc.		BSC EXCAVATION INC.		Whitaker Construction		Rupp Trucking & Ex		Ormond Construction Inc	
				Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension
					$2,618,167.90		$2,947,092.70		$3,597,535.00		$5,128,164.00		$5,748,359.63
1	Mobilization	LS	1	$112,700.00	$112,700.00	$89,000.00	$89,000.00	$145,000.00	$145,000.00	$82,828.64	$82,828.64	$264,715.00	$264,715.00
2	Furnish and Install 27" PVC P.I.P. DR 41 Irrigation Pipe	LF	2420	$39.53	$95,662.60	$39.08	$94,573.60	$46.00	$111,320.00	$53.90	$130,438.00	$63.27	$153,113.40
3	Furnish and Install 24" PVC P.I.P. DR 41 Irrigation Pipe	LF	5130	$32.09	$164,621.70	$31.98	$164,057.40	$44.00	$225,720.00	$44.82	$229,926.60	$48.38	$248,189.40
4	Furnish and Install 21" PVC P.I.P. DR 41 Irrigation Pipe	LF	9670	$27.17	$262,733.90	$25.17	$243,393.90	$27.00	$261,090.00	$37.82	$365,719.40	$39.60	$382,932.00
5	Furnish and Install 18" PVC P.I.P. DR 41 Irrigation Pipe	LF	1530	$20.20	$30,906.00	$19.66	$30,079.80	$21.50	$32,895.00	$32.52	$49,755.60	$36.19	$55,370.70
6	Furnish and Install 15" PVC P.I.P. DR 41 Irrigation Pipe	LF	18150	$14.69	$266,623.50	$13.97	$253,555.50	$15.00	$272,250.00	$25.17	$456,835.50	$28.77	$522,175.50
7	Furnish and Install 12" PVC P.I.P. DR 41 Irrigation Pipe	LF	15520	$10.58	$164,201.60	$9.76	$151,475.20	$11.00	$170,720.00	$19.27	$299,070.40	$24.30	$377,136.00
8	Furnish and Install 10" PVC P.I.P. DR 41 Irrigation Pipe	LF	8320	$7.76	$64,563.20	$7.96	$66,227.20	$9.20	$76,544.00	$17.10	$142,272.00	$21.34	$177,548.80
9	Furnish and Install 8" PVC P.I.P. DR 41 Irrigation Pipe	LF	890	$7.28	$6,479.20	$5.83	$5,188.70	$7.80	$6,942.00	$15.78	$14,044.20	$17.93	$15,957.70
10	Furnish and Install 6" PVC P.I.P. DR 41 Irrigation Pipe	LF	2470	$5.82	$14,375.40	$4.62	$11,411.40	$6.50	$16,055.00	$13.27	$32,776.90	$11.16	$27,565.20
11	Furnish and Install 27" x 27" x 21" Tee	EA	1	$1,356.00	$1,356.00	$1,805.00	$1,805.00	$1,980.00	$1,980.00	$2,227.69	$2,227.69	$3,389.14	$3,389.14
12	Furnish and Install 24" x 24" x 12" Tee	EA	1	$1,152.00	$1,152.00	$1,374.00	$1,374.00	$1,360.00	$1,360.00	$1,635.06	$1,635.06	$3,183.36	$3,183.36
13	Furnish and Install 21" x 21" x 12" Tee	EA	3	$572.00	$1,716.00	$946.00	$2,838.00	$775.00	$2,325.00	$1,042.55	$3,127.65	$1,927.39	$5,782.17
14	Furnish and Install 21" x 21" x 10" Tee	EA	2	$572.00	$1,144.00	$924.00	$1,848.00	$750.00	$1,500.00	$1,016.63	$2,033.26	$1,655.27	$3,310.54
15	Furnish and Install 21" x 21" x 6" Tee	EA	1	$572.00	$572.00	$904.00	$904.00	$725.00	$725.00	$990.37	$990.37	$1,533.14	$1,533.14
16	Furnish and Install 18" x 18" x 18" Tee	EA	1	$572.00	$572.00	$904.00	$904.00	$705.00	$705.00	$990.37	$990.37	$1,683.14	$1,683.14
17	Furnish and Install 15" x 15" x 15" Tee	EA	1	$426.80	$426.80	$813.00	$813.00	$560.00	$560.00	$810.46	$810.46	$1,772.28	$1,772.28
18	Furnish and Install 15" x 15" x 12" Tee	EA	1	$426.80	$426.80	$782.00	$782.00	$520.00	$520.00	$767.05	$767.05	$1,585.24	$1,585.24
19	Furnish and Install 15" x 15" x 6" Tee	EA	1	$400.00	$400.00	$763.00	$763.00	$495.00	$495.00	$741.20	$741.20	$1,113.16	$1,113.16
20	Furnish and Install 12" x 12" x 12" Tee	EA	2	$388.00	$776.00	$602.00	$1,204.00	$405.00	$810.00	$694.02	$1,388.04	$1,381.72	$2,763.44
21	Furnish and Install 24" Isolation Valve	EA	1	$3,766.00	$3,766.00	$5,893.00	$5,893.00	$8,430.00	$8,430.00	$9,186.19	$9,186.19	$11,686.23	$11,686.23
22	Furnish and Install 21" Isolation Valve	EA	2	$2,845.00	$5,690.00	$4,316.00	$8,632.00	$10,700.00	$21,400.00	$11,705.89	$23,411.78	$8,796.51	$17,593.02
23	Furnish and Install 18" Isolation Valve	EA	1	$2,607.00	$2,607.00	$3,373.00	$3,373.00	$5,960.00	$5,960.00	$6,598.58	$6,598.58	$7,245.90	$7,245.90
24	Furnish and Install 15" Isolation Valve	EA	4	$2,417.00	$9,668.00	$2,436.00	$9,744.00	$4,270.00	$17,080.00	$4,784.75	$19,139.00	$5,142.70	$20,570.80
25	Furnish and Install 12" Isolation Valve	EA	9	$1,520.00	$13,680.00	$2,410.00	$21,690.00	$3,210.00	$28,890.00	$3,706.86	$33,361.74	$3,703.12	$33,328.08
26	Furnish and Install 10" Isolation Valve	EA	2	$1,240.00	$2,480.00	$1,712.00	$3,424.00	$2,670.00	$5,340.00	$3,151.42	$6,302.84	$3,041.89	$6,083.78
27	Furnish and Install 6" Isolation Valve	EA	2	$1,012.00	$2,024.00	$1,070.00	$2,140.00	$1,330.00	$2,660.00	$2,013.34	$4,026.68	$2,455.56	$4,911.12
28	Furnish and Install PVC 27" - 45 Degree Bend	EA	1	$1,104.00	$1,104.00	$1,357.00	$1,357.00	$1,410.00	$1,410.00	$1,604.14	$1,604.14	$2,306.97	$2,306.97
29	Furnish and Install PVC 27" - 11.25 Degree Bend	EA	1	$915.00	$915.00	$1,277.00	$1,277.00	$1,300.00	$1,300.00	$1,490.88	$1,490.88	$1,810.31	$1,810.31
30	Furnish and Install PVC 24" - 22.5 Degree Bend	EA	3	$850.00	$2,550.00	$1,137.00	$3,411.00	$1,050.00	$3,150.00	$1,291.86	$3,875.58	$1,640.45	$4,921.35
31	Furnish and Install PVC 24" - 11.25 Degree Bend	EA	3	$850.00	$2,550.00	$1,137.00	$3,411.00	$1,050.00	$3,150.00	$1,291.86	$3,875.58	$1,640.45	$4,921.35
32	Furnish and Install PVC 21" - 22.5 Degree Bend	EA	3	$566.00	$1,698.00	$934.00	$2,802.00	$730.00	$2,190.00	$995.76	$2,987.28	$1,387.76	$4,163.28
33	Furnish and Install PVC 21"- 11.25 Degree Bend	EA	3	$566.00	$1,698.00	$934.00	$2,802.00	$730.00	$2,190.00	$995.76	$2,987.28	$1,337.76	$4,013.28
34	Furnish and Install PVC 15"- 90 Degree Bend	EA	4	$475.00	$1,900.00	$872.00	$3,488.00	$610.00	$2,440.00	$813.64	$3,254.56	$1,467.68	$5,870.72
35	Furnish and Install PVC 15" - 45 Degree Bend	EA	4	$537.00	$2,148.00	$810.00	$3,240.00	$530.00	$2,120.00	$726.82	$2,907.28	$1,243.57	$4,974.28
36	Furnish and Install PVC 15" - 22.5 Degree Bend	EA	5	$397.00	$1,985.00	$772.00	$3,860.00	$480.00	$2,400.00	$672.33	$3,361.65	$1,047.07	$5,235.35
37	Furnish and Install PVC 15" - 11.25 Degree Bend	EA	1	$397.00	$397.00	$772.00	$772.00	$480.00	$480.00	$672.33	$672.33	$897.07	$897.07
38	Furnish and Install PVC 12" - 90 Degree Bend	EA	2	$310.00	$620.00	$610.00	$1,220.00	$415.00	$830.00	$603.48	$1,206.96	$1,130.98	$2,261.96
39	Furnish and Install PVC 12" - 22.5 Degree Bend	EA	3	$278.00	$834.00	$575.00	$1,725.00	$370.00	$1,110.00	$554.35	$1,663.05	$889.05	$2,667.15
40	Furnish and Install PVC 10" - 90 Degree Bend	EA	1	$278.00	$278.00	$577.00	$577.00	$350.00	$350.00	$558.03	$558.03	$842.19	$842.19
41	Furnish and Install PVC 10" - 45 Degree Bend	EA	2	$225.60	$451.20	$557.00	$1,114.00	$325.00	$650.00	$528.74	$1,057.48	$667.20	$1,334.40
42	Furnish and Install PVC 10" - 11.25 Degree Bend	EA	1	$225.00	$225.00	$552.00	$552.00	$320.00	$320.00	$522.36	$522.36	$661.75	$661.75
43	Furnish and Install PVC 6" - 90 Degree Bend	EA	2	$172.00	$344.00	$282.00	$564.00	$245.00	$490.00	$493.74	$987.48	$437.32	$874.64
44	Furnish and Install 27" x 18" Reducer	EA	1	$1,061.00	$1,061.00	$1,246.00	$1,246.00	$1,260.00	$1,260.00	$1,447.26	$1,447.26	$2,023.08	$2,023.08
45	Furnish and Install 24" x 21" Reducer	EA	1	$820.00	$820.00	$1,101.00	$1,101.00	$1,000.00	$1,000.00	$1,240.37	$1,240.37	$1,996.51	$1,996.51
46	Furnish and Install 24" x 18" Reducer	EA	1	$926.00	$926.00	$1,146.00	$1,146.00	$1,060.00	$1,060.00	$1,304.42	$1,304.42	$2,051.18	$2,051.18
47	Furnish and Install 24" x 15" Reducer	EA	1	$902.00	$902.00	$991.00	$991.00	$860.00	$860.00	$1,084.31	$1,084.31	$1,863.32	$1,863.32
48	Furnish and Install 18" x 15" Reducer	EA	2	$518.00	$1,036.00	$824.00	$1,648.00	$570.00	$1,140.00	$742.96	$1,485.92	$1,207.36	$2,414.72
49	Furnish and Install 15" x 12" Reducer	EA	2	$480.00	$960.00	$747.00	$1,494.00	$450.00	$900.00	$638.99	$1,277.98	$1,018.62	$2,037.24
50	Furnish and Install 15" x 10" Reducer	EA	1	$480.00	$480.00	$770.00	$770.00	$480.00	$480.00	$670.56	$670.56	$1,145.56	$1,145.56
51	Furnish and Install 12" x 6" Reducer	EA	1	$232.00	$232.00	$578.00	$578.00	$445.00	$445.00	$683.81	$683.81	$856.86	$856.86
52	Furnish and Install 10" x 8" Reducer	EA	2	$180.00	$360.00	$551.00	$1,102.00	$315.00	$630.00	$569.66	$1,139.32	$609.45	$1,218.90

Benson Canal Enclosure (#5929633)
Owner: Benson Irrigation Company
Solicitor: Franson Civil Engineers
09/28/2018 11:00 AM MDT

				The Sprinkler Shop Inc.		BSC EXCAVATION INC.		Whitaker Construction		Rupp Trucking & Ex		Ormond Construction Inc	
Iten	Item Description	UofM	Quantity	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension
53	Furnish and Install 15" End Cap	EA	1	$340.00	$340.00	$535.00	$535.00	$365.00	$365.00	$547.83	$547.83	$874.46	$874.46
54	Furnish and Install 12" End Cap	EA	6	$300.00	$1,800.00	$524.00	$3,144.00	$305.00	$1,830.00	$483.43	$2,900.58	$636.69	$3,820.14
55	Furnish and Install 10" End Cap	EA	2	$280.00	$560.00	$272.00	$544.00	$280.00	$560.00	$478.08	$956.16	$514.71	$1,029.42
56	Furnish and Install 8" End Cap	EA	1	$275.00	$275.00	$264.00	$264.00	$245.00	$245.00	$467.64	$467.64	$390.10	$390.10
57	Furnish and Install 6" End Cap	EA	2	$220.00	$440.00	$260.00	$520.00	$215.00	$430.00	$462.63	$925.26	$654.52	$1,309.04
58	Deleted	LF	0	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
59	Furnish and Install Pump Station	LS	1	$279,000.00	$279,000.00	$630,842.00	$630,842.00	$680,000.00	$680,000.00	$821,112.27	$821,112.27	$814,960.31	$814,960.31
60	Furnish and Install Traveling Screen	LS	1	$65,700.00	$65,700.00	$138,969.00	$138,969.00	$86,000.00	$86,000.00	$83,188.39	$83,188.39	$139,554.25	$139,554.25
61	Furnish and Install Intake Structure	LS	1	$99,800.00	$99,800.00	$57,875.00	$57,875.00	$100,000.00	$100,000.00	$181,662.86	$181,662.86	$53,161.44	$53,161.44
62	Furnish and Install Electrical Conduit to Pump Station	LF	2250	$5.72	$12,870.00	$6.36	$14,310.00	$8.20	$18,450.00	$46.48	$104,580.00	$17.17	$38,632.50
63	Furnish and Install 1" Turnout Assembly	EA	14	$2,945.00	$41,230.00	$2,316.00	$32,424.00	$3,950.00	$55,300.00	$3,405.98	$47,683.72	$2,512.57	$35,175.98
64	Furnish and Install 4" Turnout Assembly	EA	31	$4,465.00	$138,415.00	$2,182.00	$67,642.00	$3,810.00	$118,110.00	$9,639.46	$298,823.26	$9,584.77	$297,127.87
65	Furnish and Install 6" Turnout Assembly	EA	15	$4,738.00	$71,070.00	$4,033.00	$60,495.00	$5,880.00	$88,200.00	$11,434.17	$171,512.55	$11,372.34	$170,585.10
66	Furnish and Install 8" Turnout Assembly	EA	10	$5,000.00	$50,000.00	$4,830.00	$48,300.00	$7,320.00	$73,200.00	$14,371.08	$143,710.80	$14,182.58	$141,825.80
67	Furnish and Install 10" Turnout Assembly	EA	2	$5,550.00	$11,100.00	$6,624.00	$13,248.00	$9,560.00	$19,120.00	$19,974.62	$39,949.24	$17,784.08	$35,568.16
68	Furnish and Install 12" Turnout Assembly	EA	1	$6,500.00	$6,500.00	$8,484.00	$8,484.00	$11,600.00	$11,600.00	$25,128.70	$25,128.70	$22,633.02	$22,633.02
69	Furnish and Install 12" Flood Turnout Assembly	EA	12	$8,800.00	$105,600.00	$11,438.00	$137,256.00	$16,200.00	$194,400.00	$42,605.31	$511,263.72	$38,312.24	$459,746.88
70	Furnish and Install 3" Air Vac	EA	28	$2,500.00	$70,000.00	$1,472.00	$41,216.00	$3,180.00	$89,040.00	$3,965.41	$111,031.48	$3,068.00	$85,904.00
71	Remove Existing Culvert	LF	200	$3.50	$700.00	$4.00	$800.00	$17.00	$3,400.00	$15.00	$3,000.00	$6.50	$1,300.00
72	Use Existing Culvert	LF	150	$26.00	$3,900.00	$4.00	$600.00	$60.50	$9,075.00	$69.03	$10,354.50	$77.25	$11,587.50
73	Connect to Existing 8" Pipe	EA	4	$400.00	$1,600.00	$1,038.00	$4,152.00	$955.00	$3,820.00	$1,578.67	$6,314.68	$594.57	$2,378.28
74	Furnish and Install Drain to Daylight	EA	4	$1,050.00	$4,200.00	$1,700.00	$6,800.00	$1,490.00	$5,960.00	$1,589.19	$6,356.76	$2,451.29	$9,805.16
75	Furnish and Install Sump Drain	EA	10	$3,350.00	$33,500.00	$2,500.00	$25,000.00	$6,530.00	$65,300.00	$2,954.92	$29,549.20	$6,878.23	$68,782.30
76	Excavate and Construct Pond	LS	1	$66,000.00	$66,000.00	$75,000.00	$75,000.00	$136,500.00	$136,500.00	$67,816.24	$67,816.24	$297,272.00	$297,272.00
77	Furnish and Install Concrete Pond Overflow Structure	LS	1	$37,500.00	$37,500.00	$45,000.00	$45,000.00	$80,000.00	$80,000.00	$89,733.99	$89,733.99	$84,784.66	$84,784.66
78	Deleted	AC	0	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
79	Furnish and Install 24-ft of 14' x 4' Concrete Box Culvert	EA	2	$53,000.00	$106,000.00	$45,583.00	$91,166.00	$62,900.00	$125,800.00	$68,786.80	$137,573.60	$65,168.24	$130,336.48
80	Furnish and Install Concrete Plug in Canal	CY	10	$240.00	$2,400.00	$350.00	$3,500.00	$465.00	$4,650.00	$300.00	$3,000.00	$664.00	$6,640.00
81	Furnish and Install Rip-Rap	CY	850	$52.00	$44,200.00	$50.00	$42,500.00	$56.50	$48,025.00	$38.58	$32,793.00	$55.28	$46,988.00
82	Provide Construction Surveying	LS	1	$6,000.00	$6,000.00	$15,000.00	$15,000.00	$28,400.00	$28,400.00	$27,500.00	$27,500.00	$31,675.12	$31,675.12
83	Repair Asphalt Road	LF	2350	$18.00	$42,300.00	$21.50	$50,525.00	$26.00	$61,100.00	$45.00	$105,750.00	$59.43	$139,660.50
84	Repair Gravel Road	LF	350	$8.00	$2,800.00	$26.00	$9,100.00	$7.10	$2,485.00	$8.25	$2,887.50	$33.75	$11,812.50
85	Repair Road Shoulder	LF	1590	$8.00	$12,720.00	$6.00	$9,540.00	$7.10	$11,289.00	$2.10	$3,339.00	$24.30	$38,637.00
86	Remove Existing Concrete Channel	LF	9300	$4.50	$41,850.00	$10.00	$93,000.00	$2.50	$23,250.00	$10.00	$93,000.00	$16.00	$148,800.00
					$2,618,167.90		$2,947,092.70		$3,597,535.00		$5,128,164.00		$5,748,359.63

Moroni Pipe Project Bid Abstract				Terry Brotherson Ex		Barton Excavating		Terry Larson Ex		COP Construction		Harward and Rees	
Bid Item	Item Description	Qty	Unit	Unit Price	Total Item Price	Unit Price	Total Item Price	Unit Price	Total Item Price	Unit Price	Total Item Price	Unit Price	Total Item Price
1.0	**Mobilization**												
1.1	Mobilization	1	LS	$ 68,865.44	$ 68,865.44	$ 70,000.00	$ 70,000.00	$ 20,188.54	$ 20,188.54	$ 73,000.00	$ 73,000.00	$ 150,000.00	$ 150,000.00
1.2	Surveying	1	LS	$ 10,493.75	$ 10,493.75	$ 11,000.00	$ 11,000.00	$ 10,854.08	$ 10,854.08	$ 12,000.00	$ 12,000.00	$ 12,000.00	$ 12,000.00
2.0	**Sediment De-silting Structure**												
2.1	Furnish and install sediment de-silting structure	1	LS	$ 68,913.78	$ 68,913.78	$ 52,650.00	$ 52,650.00	$ 60,705.94	$ 60,705.94	$ 58,000.00	$ 58,000.00	$ 66,750.00	$ 66,750.00
3.0	**Pipe**												
3.1	Furnish and install 36-inch PVC C905 Pipe DR 51 rated for 80 psi	3,865	LF	$ 66.97	$ 258,839.05	$ 64.95	$ 251,031.75	$ 69.74	$ 269,545.10	$ 70.00	$ 270,550.00	$ 68.50	$ 264,752.50
3.2	Furnish and install 30-inch PVC C905 Pipe DR 51 rated for 80 psi	3,945	LF	$ 48.93	$ 193,028.85	$ 47.64	$ 187,939.80	$ 51.76	$ 204,193.20	$ 50.00	$ 197,250.00	$ 50.00	$ 197,250.00
3.3	Furnish and install 27-inch PVC PIP Pipe DR 51 rated for 80 psi	22,895	LF	$ 37.88	$ 867,262.60	$ 37.13	$ 850,091.35	$ 42.07	$ 963,192.65	$ 45.00	$ 1,030,275.00	$ 51.00	$ 1,167,645.00
3.4	Furnish and install 24-inch PVC PIP Pipe DR 51 rated for 80 psi	5,975	LF	$ 32.10	$ 191,797.50	$ 31.07	$ 185,643.25	$ 33.91	$ 202,612.25	$ 32.00	$ 191,200.00	$ 33.00	$ 197,175.00
3.5	Furnish and install 21-inch PVC PIP Pipe DR 51 rated for 80 psi	410	LF	$ 28.50	$ 11,685.00	$ 26.78	$ 10,979.80	$ 29.40	$ 12,054.00	$ 27.00	$ 11,070.00	$ 27.00	$ 11,070.00
3.6	Furnish and install 18-inch PVC PIP Pipe DR 51 rated for 80 psi	858	LF	$ 23.42	$ 20,094.36	$ 21.46	$ 18,412.68	$ 24.39	$ 20,926.62	$ 22.00	$ 18,876.00	$ 22.00	$ 18,876.00
4.0	**Turnout Assemblies**												
4.1	Furnish and Install 10-inch turnout assembly with 27"x10" tee and no reducer	5	EA	$ 10,160.47	$ 50,802.35	$ 10,801.00	$ 54,005.00	$ 10,682.40	$ 53,412.00	$ 11,000.00	$ 55,000.00	$ 10,900.00	$ 54,500.00
4.2	Furnish and Install 8-inch turnout assembly with 27"x8" tee and 10"-8" reducer	5	EA	$ 9,264.82	$ 46,324.10	$ 9,862.00	$ 49,310.00	$ 10,430.24	$ 52,151.20	$ 11,000.00	$ 55,000.00	$ 10,200.00	$ 51,000.00
4.3	Furnish and Install 8-inch turnout assembly with 24"x8" tee and 10"-8" reducer	9	EA	$ 9,114.05	$ 82,026.45	$ 9,705.00	$ 87,345.00	$ 9,386.93	$ 84,482.37	$ 10,000.00	$ 90,000.00	$ 10,000.00	$ 90,000.00
4.4	Furnish and Install 10-inch turnout assembly with 36"x10" tee and no reducer	4	EA	$ 10,773.82	$ 43,095.28	$ 11,541.00	$ 46,164.00	$ 11,212.72	$ 44,850.88	$ 16,000.00	$ 64,000.00	$ 10,750.00	$ 43,000.00
4.5	Furnish and Install 12-inch turnout assembly with 30"x12" tee and no reducer	4	EA	$ 12,067.37	$ 48,269.48	$ 12,896.00	$ 51,584.00	$ 12,709.70	$ 50,838.80	$ 19,000.00	$ 76,000.00	$ 14,250.00	$ 57,000.00
4.6	Furnish and Install 10-inch turnout assembly with 27"x10" tee and 12"-10" reducer	8	EA	$ 10,021.60	$ 80,172.80	$ 10,865.00	$ 86,920.00	$ 10,552.61	$ 84,420.88	$ 14,000.00	$ 112,000.00	$ 11,000.00	$ 88,000.00

Scipio Irrigation Ivie Creek Pipeline (#S450230)
Owner: Scipio Irrigation Company
Solicitor: Franson Civil Engineers
12/14/2017 04:00 PM MST

				Mesquite Utah		Feller Enterprises		MC Contractors		Barton Excavating Inc		Terry R Brotherson Exc.		Taurus Plumbing & Exc.		Johansen Construction		Condie Construction	
Item	Item Description	UofM	Qty	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension
1	Mobilization	LS	1	$69,000.00	$69,000.00	$34,009.20	$34,009.20	$75,000.00	$75,000.00	$68,000.00	$68,000.00	$31,750.00	$31,750.00	$33,250.00	$33,250.00	$75,000.00	$75,000.00	$84,000.00	$84,000.00
2	Surveying	LS	1	$30,000.00	$30,000.00	$19,596.00	$19,596.00	$15,000.00	$15,000.00	$15,400.00	$15,400.00	$42,660.00	$42,660.00	$17,000.00	$17,000.00	$22,500.00	$22,500.00	$15,500.00	$15,500.00
3	Install 36-inch HDPE Pipe DR 32.5 (63 psi)	Ln Ft	17700	$21.00	$371,700.00	$13.20	$233,640.00	$17.58	$311,166.00	$19.50	$345,150.00	$20.64	$365,328.00	$22.62	$400,374.00	$22.18	$392,586.00	$22.00	$389,400.00
4	Install 36-inch HDPE Pipe DR 26 (80 psi)	Ln Ft	1150	$22.00	$25,300.00	$15.60	$17,940.00	$17.58	$20,217.00	$20.00	$23,000.00	$23.24	$26,726.00	$23.37	$26,875.50	$23.24	$26,726.00	$26.00	$29,900.00
5	Install 36-inch HDPE 45-degree Elbow	Ea	1	$1,000.00	$1,000.00	$4,512.00	$4,512.00	$450.00	$450.00	$1,000.00	$1,000.00	$2,952.72	$2,952.72	$3,060.00	$3,060.00	$1,500.00	$1,500.00	$2,250.00	$2,250.00
6	Install 36-inch x 18-Inch Tee with Blind Flange	Ea	1	$1,000.00	$1,000.00	$6,168.00	$6,168.00	$450.00	$450.00	$1,000.00	$1,000.00	$5,717.78	$5,717.78	$7,215.00	$7,215.00	$1,500.00	$1,500.00	$9,750.00	$9,750.00
7	Screen or Import Pipe Zone Backfill Material	Ln Ft	19000	$2.00	$38,000.00	$6.00	$114,000.00	$1.00	$19,000.00	$4.00	$76,000.00	$1.50	$28,500.00	$3.00	$57,000.00	$1.00	$19,000.00	$0.01	$190.00
8	Rock Excavation	Cu Yd	500	$10.00	$5,000.00	$20.40	$10,200.00	$45.00	$22,500.00	$20.00	$10,000.00	$15.00	$7,500.00	$16.25	$8,125.00	$37.63	$18,815.00	$27.60	$13,800.00
9	Furnish and Install 8-inch Gooseneck Air Vent	Ea	1	$2,000.00	$2,000.00	$5,910.00	$5,910.00	$5,700.00	$5,700.00	$4,396.00	$4,396.00	$4,731.34	$4,731.34	$2,896.00	$2,896.00	$4,748.77	$4,748.77	$3,360.00	$3,360.00
10	Furnish and Install 3-inch Combination Air Valve	Ea	2	$4,000.00	$8,000.00	$5,392.80	$10,785.60	$3,900.00	$7,800.00	$3,719.00	$7,438.00	$4,204.39	$8,408.78	$4,525.00	$9,050.00	$3,717.03	$7,434.06	$5,300.00	$10,600.00
11	Furnish and Install 6-inch Combination Air Valve	Ea	2	$4,000.00	$8,000.00	$6,722.40	$13,444.80	$5,870.00	$11,740.00	$5,423.00	$10,846.00	$6,074.11	$12,148.22	$5,646.00	$11,292.00	$5,594.31	$11,188.62	$7,650.00	$15,300.00
12	Furnish and Install 8-inch Combination Air Valve (Condition 1)	Ea	6	$5,000.00	$30,000.00	$7,420.80	$44,524.80	$6,713.00	$40,278.00	$6,290.00	$37,740.00	$7,057.78	$42,346.68	$6,770.00	$40,620.00	$6,581.45	$39,488.70	$7,900.00	$47,400.00
13	Furnish and Install 8-inch Combination Air Valve (Condition 2)	Ea	1	$5,000.00	$5,000.00	$8,262.00	$8,262.00	$8,317.00	$8,317.00	$6,630.00	$6,630.00	$7,786.29	$7,786.29	$7,714.00	$7,714.00	$12,010.99	$12,010.99	$8,000.00	$8,000.00
14	Furnish and Install 2-inch Turnout Assembly	Ea	4	$1,000.00	$4,000.00	$3,363.60	$13,454.40	$2,937.00	$11,748.00	$2,505.00	$10,020.00	$2,880.26	$11,521.04	$1,342.00	$5,368.00	$2,387.87	$9,551.48	$3,300.00	$13,200.00
15	Furnish and Install Sump Drain	Ea	2	$1,000.00	$2,000.00	$4,344.00	$8,688.00	$3,530.00	$7,060.00	$3,332.00	$6,664.00	$3,933.94	$7,867.88	$2,273.00	$4,546.00	$2,893.92	$5,787.84	$3,500.00	$7,000.00
16	Furnish and Install Drain to Daylight	Ea	1	$1,000.00	$1,000.00	$3,504.00	$3,504.00	$3,300.00	$3,300.00	$3,240.00	$3,240.00	$2,959.59	$2,959.59	$2,440.00	$2,440.00	$2,522.12	$2,522.12	$2,800.00	$2,800.00
17	Furnish and Install Creek Sump Drain	Ea	1	$1,000.00	$1,000.00	$4,552.80	$4,552.80	$3,650.00	$3,650.00	$4,100.00	$4,100.00	$4,481.99	$4,481.99	$2,482.00	$2,482.00	$3,243.59	$3,243.59	$3,500.00	$3,500.00
18	Creek Crossing	LS	1	$10,000.00	$10,000.00	$18,241.20	$18,241.20	$15,000.00	$15,000.00	$23,445.00	$23,445.00	$17,959.70	$17,959.70	$8,090.00	$8,090.00	$18,023.50	$18,023.50	$9,500.00	$9,500.00
19	Furnish and Install Insertion Meter and Manhole	Ea	1	$11,000.00	$11,000.00	$13,725.60	$13,725.60	$10,400.00	$10,400.00	$9,292.00	$9,292.00	$10,831.42	$10,831.42	$14,370.00	$14,370.00	$8,868.01	$8,868.01	$25,000.00	$25,000.00
20	Furnish and Install Diversion Structure	LS	1	$35,000.00	$35,000.00	$56,774.40	$56,774.40	$75,000.00	$75,000.00	$45,100.00	$45,100.00	$44,967.60	$44,967.60	$49,572.00	$49,572.00	$45,940.00	$45,940.00	$48,000.00	$48,000.00
21	Furnish and Install Termination Structure	LS	1	$9,000.00	$9,000.00	$13,113.60	$13,113.60	$15,000.00	$15,000.00	$6,700.00	$6,700.00	$19,487.80	$19,487.80	$13,672.00	$13,672.00	$10,258.75	$10,258.75	$23,000.00	$23,000.00
22	Site Restoration	LS	1	$20,000.00	$20,000.00	$14,071.20	$14,071.20	$26,000.00	$26,000.00	$8,000.00	$8,000.00	$5,000.00	$5,000.00	$10,150.00	$10,150.00	$2,075.00	$2,075.00	$6,000.00	$6,000.00
23	Creek Crossing Downstream Bank Grading	LS	1	$2,000.00	$2,000.00	$4,893.60	$4,893.60	$4,250.00	$4,250.00	$5,000.00	$5,000.00	$3,000.00	$3,000.00	$2,590.00	$2,590.00	$2,500.00	$2,500.00	$2,500.00	$2,500.00
24	Seeding	LS	1	$7,000.00	$7,000.00	$41,990.40	$41,990.40	$40,000.00	$40,000.00	$41,000.00	$41,000.00	$42,705.93	$42,705.93	$37,022.75	$37,022.75	$46,500.00	$46,500.00	$30,000.00	$30,000.00
25	Fence Repair	Ea	7	$200.00	$1,400.00	$1,390.80	$9,735.60	$250.00	$1,750.00	$300.00	$2,100.00	$2,070.00	$14,490.00	$280.00	$1,960.00	$518.75	$3,631.25	$250.00	$1,750.00
					$697,400.00		$725,737.20		$750,776.00		$771,261.00		$771,828.76		$776,734.25		$791,399.68		$801,700.00

				Madsen Excavation		VanCon Inc.		Harrison Field Services		A&D Jensen Contractors		COP Construction		Carlisle Excavating		Knife River Corporation		Stapp Construction	
Item	**Item Description**	**UofM**	**Qty**	**Unit Price**	**Extension**	**Unit Price**	**Extension**	**Unit Price**	**Extension**	**Unit Price**	**Extension**	**Unit Price**	**Extension**	**Unit Price**	**Extension**	**Unit Price**	**Extension**	**Unit Price**	**Extension**
1	Mobilization	LS	1	$52,308.00	$52,308.00	$55,000.00	$55,000.00	$119,682.00	$119,682.00	$52,200.00	$52,200.00	$156,000.00	$156,000.00	$30,000.00	$30,000.00	$68,450.00	$68,450.00	$116,000.00	$116,000.00
2	Surveying	LS	1	$14,500.00	$14,500.00	$13,500.00	$13,500.00	$46,238.00	$46,238.00	$27,000.00	$27,000.00	$14,000.00	$14,000.00	$23,000.00	$23,000.00	$15,000.00	$15,000.00	$9,200.00	$9,200.00
3	Install 36-inch HDPE Pipe DR 32.5 (63 psi)	Ln Ft	17700	$25.10	$444,270.00	$25.00	$442,500.00	$18.80	$332,760.00	$25.50	$451,350.00	$24.25	$429,225.00	$34.00	$601,800.00	$28.00	$495,600.00	$21.00	$371,700.00
4	Install 36-inch HDPE Pipe DR 26 (80 psi)	Ln Ft	1150	$28.85	$33,177.50	$25.00	$28,750.00	$20.00	$23,000.00	$27.00	$31,050.00	$26.00	$29,900.00	$32.00	$36,800.00	$30.00	$34,500.00	$27.00	$31,050.00
5	Install 36-inch HDPE 45-degree Elbow	Ea	1	$1,855.00	$1,855.00	$2,000.00	$2,000.00	$1,500.00	$1,500.00	$5,440.00	$5,440.00	$900.00	$900.00	$2,500.00	$2,500.00	$1,500.00	$1,500.00	$1,350.00	$1,350.00
6	Install 36-inch x 18-inch Tee with Blind Flange	Ea	1	$1,855.00	$1,855.00	$2,100.00	$2,100.00	$2,330.00	$2,330.00	$5,440.00	$5,440.00	$1,775.00	$1,775.00	$3,800.00	$3,800.00	$1,800.00	$1,800.00	$2,650.00	$2,650.00
7	Screen or Import Pipe Zone Backfill Material	Ln Ft	19000	$3.71	$70,490.00	$1.50	$28,500.00	$1.85	$35,150.00	$2.50	$47,500.00	$0.01	$190.00	$1.00	$19,000.00	$2.50	$47,500.00	$5.00	$95,000.00
8	Rock Excavation	Cu Yd	500	$25.00	$12,500.00	$23.00	$11,500.00	$25.00	$12,500.00	$40.00	$20,000.00	$30.00	$15,000.00	$25.00	$12,500.00	$25.00	$12,500.00	$92.00	$46,000.00
9	Furnish and Install 8-inch Gooseneck Air Vent	Ea	1	$4,436.00	$4,436.00	$3,100.00	$3,100.00	$4,604.00	$4,604.00	$5,487.23	$5,487.23	$4,100.00	$4,100.00	$2,500.00	$2,500.00	$6,500.00	$6,500.00	$4,600.00	$4,600.00
10	Furnish and Install 3-inch Combination Air Valve	Ea	2	$3,540.00	$7,080.00	$2,400.00	$4,800.00	$3,333.50	$6,667.00	$3,527.47	$7,054.94	$5,500.00	$11,000.00	$3,500.00	$7,000.00	$4,300.00	$8,600.00	$5,900.00	$11,800.00
11	Furnish and Install 6-inch Combination Air Valve	Ea	2	$5,205.50	$10,411.00	$3,200.00	$6,400.00	$5,680.50	$11,361.00	$5,041.22	$10,082.44	$6,200.00	$12,400.00	$5,500.00	$11,000.00	$6,600.00	$13,200.00	$8,300.00	$16,600.00
12	Furnish and Install 8-inch Combination Air Valve (Condition 1)	Ea	6	$6,000.00	$36,000.00	$8,100.00	$48,600.00	$6,567.00	$39,402.00	$5,726.93	$34,361.58	$7,100.00	$42,600.00	$5,600.00	$33,600.00	$7,600.00	$45,600.00	$8,500.00	$51,000.00
13	Furnish and Install 8-inch Combination Air Valve (Condition 2)	Ea	1	$6,435.00	$6,435.00	$8,900.00	$8,900.00	$7,128.00	$7,128.00	$6,940.46	$6,940.46	$8,000.00	$8,000.00	$6,000.00	$6,000.00	$8,100.00	$8,100.00	$8,400.00	$8,400.00
14	Furnish and Install 2-inch Turnout Assembly	Ea	4	$2,676.00	$10,704.00	$1,800.00	$7,200.00	$2,458.75	$9,835.00	$2,523.60	$10,094.40	$2,400.00	$9,600.00	$2,200.00	$8,800.00	$2,500.00	$10,000.00	$2,500.00	$10,000.00
15	Furnish and Install Sump Drain	Ea	2	$3,831.00	$7,662.00	$2,500.00	$5,000.00	$3,533.00	$7,066.00	$3,994.34	$7,988.68	$2,400.00	$4,800.00	$3,200.00	$6,400.00	$4,100.00	$8,200.00	$4,300.00	$8,600.00
16	Furnish and Install Drain to Daylight	Ea	1	$3,198.00	$3,198.00	$3,900.00	$3,900.00	$3,296.00	$3,296.00	$3,644.48	$3,644.48	$2,400.00	$2,400.00	$2,800.00	$2,800.00	$4,200.00	$4,200.00	$4,300.00	$4,300.00
17	Furnish and Install Creek Sump Drain	Ea	1	$4,190.00	$4,190.00	$4,000.00	$4,000.00	$4,830.00	$4,830.00	$4,319.62	$4,319.62	$2,400.00	$2,400.00	$3,200.00	$3,200.00	$4,100.00	$4,100.00	$4,400.00	$4,400.00
18	Creek Crossing	LS	1	$12,500.00	$12,500.00	$12,000.00	$12,000.00	$31,074.00	$31,074.00	$22,000.00	$22,000.00	$19,000.00	$19,000.00	$15,000.00	$15,000.00	$18,000.00	$18,000.00	$8,600.00	$8,600.00
19	Furnish and Install Insertion Meter and Manhole	Ea	1	$9,151.00	$9,151.00	$17,500.00	$17,500.00	$10,549.00	$10,549.00	$10,319.08	$10,319.08	$15,000.00	$15,000.00	$14,000.00	$14,000.00	$12,500.00	$12,500.00	$15,400.00	$15,400.00
20	Furnish and Install Diversion Structure	LS	1	$25,154.00	$25,154.00	$63,000.00	$63,000.00	$33,369.00	$33,369.00	$26,706.25	$26,706.25	$35,000.00	$35,000.00	$16,000.00	$16,000.00	$70,000.00	$70,000.00	$60,600.00	$60,600.00
21	Furnish and Install Termination Structure	LS	1	$29,170.00	$29,170.00	$17,000.00	$17,000.00	$27,193.00	$27,193.00	$8,116.36	$8,116.36	$7,500.00	$7,500.00	$8,600.00	$8,600.00	$16,500.00	$16,500.00	$23,500.00	$23,500.00
22	Site Restoration	LS	1	$5,400.00	$5,400.00	$27,000.00	$27,000.00	$32,900.00	$32,900.00	$10,000.00	$10,000.00	$26,000.00	$26,000.00	$10,000.00	$10,000.00	$18,000.00	$18,000.00	$41,800.00	$41,800.00
23	Creek Crossing Downstream Bank Grading	LS	1	$3,100.00	$3,100.00	$2,700.00	$2,700.00	$1,500.00	$1,500.00	$5,000.48	$5,000.48	$1,500.00	$1,500.00	$3,500.00	$3,500.00	$1,500.00	$1,500.00	$9,600.00	$9,600.00
24	Seeding	LS	1	$20,000.00	$20,000.00	$27,000.00	$27,000.00	$40,000.00	$40,000.00	$42,900.00	$42,900.00	$28,000.00	$28,000.00	$40,000.00	$40,000.00	$42,000.00	$42,000.00	$54,700.00	$54,700.00
25	Fence Repair	Ea	7	$250.00	$1,750.00	$250.00	$1,750.00	$600.00	$4,200.00	$2,000.00	$14,000.00	$525.00	$3,675.00	$550.00	$3,850.00	$450.00	$3,150.00	$490.00	$3,430.00
					$827,296.50		$843,700.00		$848,134.00		$868,996.00		$879,965.00		$921,650.00		$967,000.00		$1,010,280.00

GOBBLEFIELD DITCH ENCLOSURE PROJECT
Overall Bid Abstract

				CONDIE CONSTRUCTION		TERRY R BROTHERSON		HUBE'S CONSTRUCTION		STAPP CONSTRUCTION		KNIFE RIVER CORP		COUNTERPOINT CONST.		BARTON EXCAVATING		JOHANSEN CONSTRUCTION	
Bid Item	Description	Unit	Est. Qty	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price
	Main Bid - HDPE Transmission Line																		
1	Mobilization	LS	1	$32,800.00	$32,800.00	$34,552.00	$34,552.00	$63,700.00	$63,700.00	$107,000.00	$107,000.00	$36,530.00	$36,530.00	$30,900.00	$30,900.00	$50,000.00	$50,000.00	$40,000.00	$40,000.00
2	Surveying	LS	1	$6,225.00	$6,225.00	$15,950.00	$15,950.00	$20,000.00	$20,000.00	$8,500.00	$8,500.00	$9,390.00	$9,390.00	$17,100.00	$17,100.00	$16,000.00	$16,000.00	$6,200.00	$6,200.00
3	Install 34" HDPE Pipe DR 32.5 (63 psi)	LF	5,710	$11.40	$65,094.00	$27.26	$155,654.60	$28.00	$159,880.00	$8.00	$45,680.00	$28.35	$161,878.50	$33.30	$190,143.00	$44.15	$252,096.50	$18.29	$104,435.90
4	Install 32" HDPE Pipe DR 32.5 (63 psi)	LF	1,650	$11.40	$18,810.00	$27.24	$44,946.00	$25.00	$41,250.00	$7.50	$12,375.00	$28.00	$46,200.00	$34.80	$57,420.00	$32.00	$52,800.00	$18.33	$30,244.50
5	Install 30" HDPE Pipe 32.5 (63 psi)	LF	2,710	$11.40	$30,894.00	$27.27	$73,901.70	$24.00	$65,040.00	$7.50	$20,325.00	$26.80	$72,628.00	$34.10	$92,411.00	$32.00	$86,720.00	$18.30	$49,593.00
6	Install 30" HDPE Pipe DR 26 (80 psi)	LF	2,050	$11.60	$23,780.00	$28.00	$57,400.00	$22.00	$45,100.00	$7.50	$15,375.00	$27.25	$55,862.50	$33.40	$68,470.00	$32.00	$65,600.00	$18.27	$37,453.50
7	Screen or Import Pipe Zone Backfill Material	LF	12,120	$1.40	$16,968.00	$1.61	$19,513.20	$3.00	$36,360.00	$8.50	$103,020.00	$2.05	$24,846.00	$5.70	$69,084.00	$5.00	$60,600.00	$3.23	$39,147.60
8	Install 30" Butterfly Valve	EA	1	$5,640.00	$5,640.00	$6,465.11	$6,465.11	$5,000.00	$5,000.00	$200.00	$200.00	$6,950.00	$6,950.00	$4,100.00	$4,100.00	$7,200.00	$7,200.00	$6,590.62	$6,590.62
9	Furnish and Install 4" Combination Air Valves	EA	3	$5,165.00	$15,495.00	$4,889.45	$14,668.35	$4,000.00	$12,000.00	$5,900.00	$17,700.00	$5,120.00	$15,360.00	$1,900.00	$5,700.00	$4,208.00	$12,624.00	$4,981.73	$14,945.19
10	Furnish and Install 6" Combination Air Valves (Condition 1)	EA	2	$6,930.00	$13,860.00	$5,570.95	$11,141.90	$5,000.00	$10,000.00	$7,800.00	$15,600.00	$5,760.00	$11,520.00	$3,200.00	$6,400.00	$5,531.00	$11,062.00	$6,546.11	$13,092.22
11	Furnish and Install 8" Combination Air Valves (Condition 1)	EA	1	$7,825.00	$7,825.00	$6,099.44	$6,099.44	$6,000.00	$6,000.00	$8,700.00	$8,700.00	$6,220.00	$6,220.00	$7,100.00	$7,100.00	$6,191.00	$6,191.00	$8,088.15	$8,088.15
12	Furnish and Install 8" Combination Air Valves (Condition 2)	EA	1	$7,280.00	$7,280.00	$6,511.30	$6,511.30	$5,000.00	$5,000.00	$8,200.00	$8,200.00	$6,480.00	$6,480.00	$7,200.00	$7,200.00	$5,549.00	$5,549.00	$7,605.91	$7,605.91
13	Furnish and Install 8" Gooseneck Air Vent	LS	1	$3,615.00	$3,615.00	$3,533.76	$3,533.76	$4,000.00	$4,000.00	$4,200.00	$4,200.00	$4,360.00	$4,360.00	$3,200.00	$3,200.00	$4,313.00	$4,313.00	$3,605.18	$3,605.18
14	Furnish and Install 4" PVC or HDPE Turnout to Existing Ditch	EA	1	$13,110.00	$13,110.00	$9,361.96	$9,361.96	$7,000.00	$7,000.00	$10,150.00	$10,150.00	$12,780.00	$12,780.00	$9,800.00	$9,800.00	$14,318.00	$14,318.00	$8,774.25	$8,774.25
15	Furnish and Install 8" PVC or HDPE Turnout to Existing Ditch	EA	1	$17,000.00	$17,000.00	$10,752.96	$10,752.96	$8,000.00	$8,000.00	$14,300.00	$14,300.00	$14,470.00	$14,470.00	$11,800.00	$11,800.00	$16,575.00	$16,575.00	$12,192.99	$12,192.99
16	Furnish and Install 8" PVC or HDPE Turnout	EA	1	$15,800.00	$15,800.00	$9,224.33	$9,224.33	$8,000.00	$8,000.00	$13,000.00	$13,000.00	$11,360.00	$11,360.00	$9,600.00	$9,600.00	$12,779.00	$12,779.00	$11,671.08	$11,671.08
17	Furnish and Install 10" PVC or HDPE Turnout to Existing Splitting Structure	EA	1	$17,000.00	$17,000.00	$12,966.74	$12,966.74	$10,000.00	$10,000.00	$14,900.00	$14,900.00	$17,110.00	$17,110.00	$16,900.00	$16,900.00	$16,262.00	$16,262.00	$13,125.30	$13,125.30
18	Cottonwood Creek Crossing	LS	1	$4,500.00	$4,500.00	$4,407.50	$4,407.50	$6,000.00	$6,000.00	$5,550.00	$5,550.00	$5,620.00	$5,620.00	$5,400.00	$5,400.00	$5,000.00	$5,000.00	$2,537.50	$2,537.50
19	Mill Road Crossing	LS	1	$3,450.00	$3,450.00	$3,506.56	$3,506.56	$5,000.00	$5,000.00	$5,100.00	$5,100.00	$4,160.00	$4,160.00	$980.00	$980.00	$4,000.00	$4,000.00	$2,037.50	$2,037.50
20	Bridge Crossing on 100 North	LS	1	$12,400.00	$12,400.00	$5,210.00	$5,210.00	$5,000.00	$5,000.00	$5,800.00	$5,800.00	$8,720.00	$8,720.00	$11,500.00	$11,500.00	$40,000.00	$40,000.00	$56,925.00	$56,925.00
21	Splitting Structure 1 Crossing	LS	1	$8,800.00	$8,800.00	$4,477.50	$4,477.50	$6,000.00	$6,000.00	$6,000.00	$6,000.00	$5,370.00	$5,370.00	$3,800.00	$3,800.00	$3,000.00	$3,000.00	$3,575.00	$3,575.00
22	Splitting Structure 2 Crossing	LS	1	$7,300.00	$7,300.00	$5,387.00	$5,387.00	$6,000.00	$6,000.00	$4,000.00	$4,000.00	$6,860.00	$6,860.00	$3,800.00	$3,800.00	$4,000.00	$4,000.00	$4,575.00	$4,575.00
23	Furnish and Install Anti-Seep Collars	EA	4	$500.00	$2,000.00	$1,623.50	$6,494.00	$3,000.00	$12,000.00	$175.00	$700.00	$1,110.00	$4,440.00	$1,900.00	$7,600.00	$700.00	$2,800.00	$4,700.00	$18,800.00
24	Connect Existing 12" or 15" PVC Pipeline to New 34" HDPE Pipeline	LS	1	$3,850.00	$3,850.00	$3,453.82	$3,453.82	$5,000.00	$5,000.00	$3,350.00	$3,350.00	$6,490.00	$6,490.00	$5,100.00	$5,100.00	$5,870.00	$5,870.00	$4,833.52	$4,833.52
25	Furnish and Install Yard Hydrant	EA	1	$840.00	$840.00	$633.84	$633.84	$1,000.00	$1,000.00	$1,325.00	$1,325.00	$1,460.00	$1,460.00	$2,700.00	$2,700.00	$1,365.00	$1,365.00	$980.01	$980.01
26	Construct Pond Outlet Structure	LS	1	$17,000.00	$17,000.00	$19,162.52	$19,162.52	$25,000.00	$25,000.00	$16,400.00	$16,400.00	$20,880.00	$20,880.00	$20,400.00	$20,400.00	$25,000.00	$25,000.00	$18,732.41	$18,732.41
27	Furnish and Install Trash Rack	LS	1	$8,700.00	$8,700.00	$7,171.00	$7,171.00	$5,000.00	$5,000.00	$9,800.00	$9,800.00	$8,980.00	$8,980.00	$4,200.00	$4,200.00	$3,300.00	$3,300.00	$8,377.73	$8,377.73
28	Furnish and Install Sump Drain	EA	1	$3,050.00	$3,050.00	$2,275.53	$2,275.53	$3,000.00	$3,000.00	$2,000.00	$2,000.00	$4,630.00	$4,630.00	$3,400.00	$3,400.00	$3,688.00	$3,688.00	$3,116.35	$3,116.35
	Alternate Bid 1 - PVC Transmission Line																		
A1	Mobilization	LS	1	$27,850.00	$27,850.00	$10,350.00	$10,350.00	$33,000.00	$33,000.00	$23,500.00	$23,500.00	$34,460.00	$34,460.00	$10,500.00	$10,500.00	$15,000.00	$15,000.00	$25,000.00	$25,000.00
A2	Surveying	LS	1	$1,870.00	$1,870.00	$8,000.00	$8,000.00	$20,000.00	$20,000.00	$5,700.00	$5,700.00	$2,820.00	$2,820.00	$16,200.00	$16,200.00	$15,000.00	$15,000.00	$2,000.00	$2,000.00
A3	Install 27" Plastic Irrigation Pipe (PIP) DR 51 (80 psi)	LF	4,150	$5.30	$21,995.00	$14.24	$59,096.00	$9.00	$37,350.00	$22.00	$91,300.00	$20.30	$84,245.00	$21.00	$87,150.00	$6.30	$26,145.00	$14.61	$60,631.50
A4	Install 21" Plastic Irrigation Pipe (PIP) DR 51 (80 psi)	LF	1,260	$5.00	$6,300.00	$13.30	$16,758.00	$9.00	$11,340.00	$21.00	$26,460.00	$19.90	$25,074.00	$18.80	$23,688.00	$6.30	$7,938.00	$14.31	$18,030.60
A5	Install 15" Plastic Irrigation Pipe (PIP) DR 51 (80 psi)	LF	1,200	$5.00	$6,000.00	$11.31	$13,572.00	$9.00	$10,800.00	$20.00	$24,000.00	$19.70	$23,640.00	$20.00	$24,000.00	$6.30	$7,560.00	$12.32	$14,784.00
A6	Screen or Import Pipe Zone Backfill Material	LF	6,610	$1.10	$7,271.00	$1.61	$10,642.10	$2.00	$13,220.00	$8.50	$56,185.00	$1.60	$10,576.00	$4.60	$30,406.00	$5.00	$33,050.00	$2.00	$13,220.00
A7	Furnish and Install 4" Combination Air Valves	EA	1	$4,960.00	$4,960.00	$4,166.31	$4,166.31	$4.00	$4.00	$5,900.00	$5,900.00	$4,900.00	$4,900.00	$3,500.00	$3,500.00	$4,917.00	$4,917.00	$4,914.69	$4,914.69
A8	Furnish and Install 6" Combination Air Valves (Condition 2)	EA	2	$6,625.00	$13,250.00	$4,874.07	$9,748.14	$5,000.00	$10,000.00	$7,400.00	$14,800.00	$5,700.00	$11,400.00	$2,300.00	$4,600.00	$6,085.00	$12,170.00	$6,277.26	$12,554.52
A9	Furnish and Install 8" Combination Air Valves (Condition 2)	EA	1	$6,800.00	$6,800.00	$5,369.97	$5,369.97	$6,000.00	$6,000.00	$8,700.00	$8,700.00	$6,240.00	$6,240.00	$5,200.00	$5,200.00	$7,019.00	$7,019.00	$6,589.47	$6,589.47
A10	Furnish and Install 10" PVC or HDPE Turnout	EA	1	$17,265.00	$17,265.00	$9,319.25	$9,319.25	$8,500.00	$8,500.00	$14,800.00	$14,800.00	$13,130.00	$13,130.00	$11,200.00	$11,200.00	$14,137.00	$14,137.00	$13,290.17	$13,290.17
A11	Furnish and Install 12" PVC or 14" HDPE Turnout	EA	1	$30,000.00	$30,000.00	$12,566.61	$12,566.61	$8,500.00	$8,500.00	$30,200.00	$30,200.00	$16,720.00	$16,720.00	$12,900.00	$12,900.00	$18,485.00	$18,485.00	$24,583.82	$24,583.82
A12	Furnish and Install 14" PVC or 16" HDPE Turnout	EA	2	$24,000.00	$48,000.00	$14,385.52	$28,771.04	$8,500.00	$17,000.00	$23,800.00	$47,600.00	$19,230.00	$38,460.00	$8,100.00	$16,200.00	$21,264.00	$42,528.00	$37,545.10	$75,090.20
A13	Furnish and Install Sump Drain	EA	2	$2,300.00	$4,600.00	$2,005.89	$4,011.78	$4,000.00	$8,000.00	$2,100.00	$4,200.00	$4,630.00	$9,260.00	$2,400.00	$4,800.00	$5,647.00	$11,294.00	$2,866.35	$5,732.70
	Alternate Bid 1 - Regulating Pond																		

GOBBLEFIELD DITCH ENCLOSURE PROJECT
Overall Bid Abstract

Bid Item	Description	Unit	Est. Qty	CONDIE CONSTRUCTION		TERRY R BROTHERSON		HUBE'S CONSTRUCTION		STAPP CONSTRUCTION		KNIFE RIVER CORP		COUNTERPOINT CONST.		BARTON EXCAVATING		JOHANSEN CONSTRUCTION	
				Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price	Unit Price	Bid Item Price
A14	Mobilization	LS	1	$ 23,000.00	$23,000.00	$ 4,140.00	$4,140.00	$ 36,800.00	$36,800.00	$ 21,300.00	$21,300.00	$ 14,640.00	$14,640.00	##########	$106,000.00	$ 9,000.00	$9,000.00	$ -	$0.00
A15	Surveying	LS	1	$ 3,900.00	$3,900.00	$ 5,350.00	$5,350.00	$ 16,500.00	$16,500.00	$ 10,000.00	$10,000.00	$ 5,940.00	$5,940.00	$ 12,800.00	$12,800.00	$ 5,000.00	$5,000.00	$ -	$0.00
A16	Clear, Grub, and Strip Work Areas	LS	1	$ 3,220.00	$3,220.00	$ 8,500.00	$8,500.00	$ 2,500.00	$2,500.00	$ 4,700.00	$4,700.00	$ 11,870.00	$11,870.00	$ 5,300.00	$5,300.00	$ 10,000.00	$10,000.00	$ -	$0.00
A17	Pond Excavation	CY	24,000	$ 2.70	$64,800.00	$ 2.50	$60,000.00	$ 3.00	$72,000.00	$ 4.00	$96,000.00	$ 3.45	$82,800.00	$ 1.50	$36,000.00	$ 5.00	$120,000.00	$ -	$0.00
A18	Place and Compact Soil to Build Embankment	CY	1,813	$ 4.65	$8,430.45	$ 4.00	$7,252.00	$ 5.00	$9,065.00	$ 5.00	$9,065.00	$ 1.25	$2,266.25	$ 4.00	$7,252.00	$ 9.00	$16,317.00	$ -	$0.00
A19	Construct Spillway Channel	LS	1	$ 6,500.00	$6,500.00	$ 6,000.00	$6,000.00	$ 24,000.00	$24,000.00	$ 4,400.00	$4,400.00	$ 8,240.00	$8,240.00	$ 4,800.00	$4,800.00	$ 6,000.00	$6,000.00	$ -	$0.00
A20	Construct Pond Inlet Channel	LS	1	$ 515.00	$515.00	$ 6,000.00	$6,000.00	$ 5,000.00	$5,000.00	$ 3,200.00	$3,200.00	$ 3,980.00	$3,980.00	$ 4,200.00	$4,200.00	$ 10,000.00	$10,000.00	$ -	$0.00
A21	Furnish and Install Cutthroat Flume in Inlet Channel	LS	1	$ 8,200.00	$8,200.00	$ 11,025.00	$11,025.00	$ 14,300.00	$14,300.00	$ 6,700.00	$6,700.00	$ 11,590.00	$11,590.00	$ 8,400.00	$8,400.00	$ 12,053.00	$12,053.00	$ -	$0.00
	Alternate Bid 2 - Debris Basin Spillway Rehabilitation																		
B1	Mobilization	LS	1	$ 5,800.00	$5,800.00	$ 2,070.00	$2,070.00	$ 2,000.00	$2,000.00	$ 8,400.00	$8,400.00	$ 8,820.00	$8,820.00	$ 9,500.00	$9,500.00	$ 3,000.00	$3,000.00	$ -	$0.00
B2	Excavation	LS	1	$ 2,400.00	$2,400.00	$ 8,000.00	$8,000.00	$ 3,000.00	$3,000.00	$ 3,200.00	$3,200.00	$ 4,010.00	$4,010.00	$ 1,600.00	$1,600.00	$ 5,000.00	$5,000.00	$ -	$0.00
B3	Fill Voids Below Existing Structure with Concrete	LS	1	$ 3,400.00	$3,400.00	$ 3,300.00	$3,300.00	$ 3,180.00	$3,180.00	$ 2,800.00	$2,800.00	$ 4,140.00	$4,140.00	$ 2,300.00	$2,300.00	$ 8,000.00	$8,000.00	$ -	$0.00
B4	Furnish and Install Reinforced Concrete	CY	44	$ 965.00	$42,460.00	$ 935.00	$41,140.00	$ 901.00	$39,644.00	$ 600.00	$26,400.00	$ 961.00	$42,284.00	$ 900.00	$39,600.00	$ 935.00	$41,140.00	$ -	$0.00
B5	Furnish and Install Riprap	CY	14	$ 86.00	$1,204.00	$ 60.00	$840.00	$ 112.00	$1,568.00	$ 65.00	$910.00	$ 254.00	$3,556.00	$ 105.00	$1,470.00	$ 40.00	$560.00	$ -	$0.00
	OVERALL TOTAL				**$753,076.45**		**$910,810.82**		**$998,601.00**		**$1,029,670.00**		**$1,076,616.25**		**$1,165,774.00**		**$1,250,025.50**		**$807,677.08**

Appendix E

Probable Cost for Environmental Services

(Environmental and Cultural Resources Compliance)

Milburn West Irrigation Company

Probable Cost Estimate for Environmental Services

ITEM DESCRIPTION	HOURS	UNIT COST	TOTAL COST
Fieldwork - Archaeological Inventory			
Project Manager	10	$90.00	$900
Staff Archaeologist	40	$70.00	$2,800
		Subtotal	**$3,700**
Report Production, Site Forms & Maps			
Principal Investigator/Engineer	64	$129.00	$8,256
Staff Engineer	64	$110.00	$7,040
		Subtotal	**$15,296**
Direct Costs			
SHPO - Division of State History File Search	1	$120.00	$120
Mileage	900	$0.68	$612
Field Equipment	5	$40.00	$200
Reproduction and Postage	2	$36.00	$72
		Subtotal	**$1,004**
		Total	**$20,000**

Appendix F

Supporting Documentation

Commissioner's Summary

For the 2018 irrigation season, the upper Sanpitch River experienced severe drought conditions. The winter snowpack was the worst it had been for several years and this was reflected in the water diversion totals, which were only about 60% of what they have been in other recent years, which were themselves significantly below average.

There was not sufficient snowpack to provide much of a snowmelt runoff. Water flows were best from mid-April to about mid-May, depending on the diversion.

Spring and Summer precipitation was also sparse although the few rainstorms we had were of some help to the situation.

Toward the end of July and the first week of August, work was done on the Olsen-Seely diversion to install a meter on the pump, and to also install two V notch weirs on the North and South Springs. We can now measure the total flow going into the river from these springs, and the outflow with the meter reading on the pump. I will check these installations as part of my regular routine throughout the irrigation season. I will also work with the water users to make sure the water use is proper and accounted for.

We also had MKJ Construction remove some beaver dams. I am now seeing beaver dams in new places downriver and they are becoming more of a problem. I will work with the system Chairman on this issue for the coming irrigation season.

Maintenance and repair work was done on the M&M diversion during the week of Nov. 12 -17.

I know this was a very difficult year for the water users. With that in mind I spent extra time and effort in trying to make sure the system was administered in a fair and equitable manner. With such low water flows, this was especially difficult to accomplish. I appreciate the patience and cooperation of the water users and let's hope we have a better year in 2019.

Upper San Pitch River		Acre Feet Delivered				
Diversion Name	**Period of Use**	**2018**	**2017**	**2016**	**2015**	**2014**
West Milburn	4/1-10/15	17.77	375.13	156.85	85.94	139.28
East Milburn	4/1-10/15	42.05	505.11	187.46	88.62	103.14
Milburn Meadow Ditch	4/1-10/15	21.77	604.82	156.40	121.98	156.75
Devils Pass (Sheep Ditch)	4/1-10/15	100.97	601.67	220.48	79.64	102.53
Mower Ditch	4/1-10/15	7.53	458.64	26.88	5.06	15.91
Brady Ditch	4/1-10/15	319.42	873.86	566.64	568.90	443.17
Graveyard Ditch	4/1-10/15	157.21	551.05	368.57	335.54	350.42
Meadow Irrigation (Larsen Ditch)	4/1-10/15	127.14	375.87	211.32	268.22	251.82
Fairview City Ditch	4/1-10/15	213.36	770.32	468.24	432.38	449.67
Miner Turpin	4/1-10/15	133.96	418.79	316.28	312.48	269.83
Moroni - Mt Pleasant (M&M)	3/1-12/1	1523.62	4696.18	2866.04	3128.03	2881.67
Olsen-Seely	4/1-10/15	154.31	95.50	214.43	137.26	159.13
Frandsen McArthur	4/1-10/15	778.81	1571.27	1404.89	1318.53	1382.32
Moroni City Ditch	3/15-11/15	1469.04	2900.31	2155.64	2035.08	2457.86
Moroni Spring Ditch	3/15-11/15	898.65	1586.04	1133.02	1201.69	1362.98
Moroni Canal	3/15-11/15	2347.78	3762.64	3667.48	4126.35	4113.46
Moroni Subtotal		**4715.47**	**8248.99**	**6956.14**	**7363.12**	**7934.30**
Rock Dam	3/1-11/15	511.10	2303.94	1290.66	1273.41	1480.52
Bagnal	2/24-7/1;11/16-12/1	1458.51	4463.40	1969.80	1131.75	1232.01
West Point	3/1-12/1	1387.97	4810.63	2043.09	1169.49	1669.65
Total		**11671.0**	**31725.2**	**19424.2**	**17820.4**	**19022.1**

UPPER SAN PITCH ANNUAL AF DELIVERED

Upper San Pitch River	Acre Feet Delivered				
Diversion Name	**2013**	**2012**	**2011**	**2010**	**2009**
West Milburn	132.24	170.8	639.7	401.6	423.5
East Milburn	99.83	145.3	526.0	216.9	432.0
Milburn Meadow Ditch	114.17	199.8	646.8	246.5	487.3
Devils Pass (Sheep Ditch)	219.79	333.2	549.4	539.7	483.9
Mower Ditch	0	134.4	1109.1	466.0	668.5
Brady Ditch	530.62	794.2	1425.2	1243.4	1220.3
Graveyard Ditch	332.35	428.4	496.4	553.4	538.6
Meadow Irrigation (Larsen Ditch)	266.16	260.8	465.4	432.2	352.3
Fairview City Ditch	452.95	634.0	1439.2	875.5	875.2
Miner Turpin	256.64	280.1	537.6	398.4	481.9
Moroni - Mt Pleasant (M&M)	2663.86	2788.3	3922.3	3366.2	4237.5
Olsen-Seely	105.12	147.8	321.3	362.9	376.9
Frandsen McArthur	1151.7	1363.4	2277.2	1522.1	1909.4
Moroni City Ditch	1907.13	2449.2	3995.0	2760.1	3415.4
Moroni Spring Ditch	639.53	1037.0	1151.5	1234.5	1112.0
Moroni Canal	3700.03	3474.2	4428.9	4271.4	4621.2
Moroni Subtotal	**6246.69**	**6960.4**	**9575.4**	**8266.0**	**9148.6**
Rock Dam	1465.9	1108.1	1787.5	1605.6	2331.4
Bagnal	1438.91	2057.6	3601.7	3162.1	4187.0
West Point	1871.21	2357.4	4445.6	3078.8	4492.1
Total	**17348.1**	**20164.0**	**33765.8**	**26737.3**	**32646.4**

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2018 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					0.290	0.130						
02					0.260	0.130						
03					0.260	0.100						
04					0.260	0.100						
05					0.260	0.100						
06					0.230							
07					0.230							
08					0.200							
09					0.200							
10					0.200							
11					0.200							
12					0.200							
13					0.200							
14					0.200							
15					0.200							
16					0.160							
17					0.160							
18					0.200							
19					0.230							
20					0.230							
21				0.160	0.200							
22				0.160	0.200							
23				0.160	0.160							
24				0.160	0.160							
25				0.160	0.160							
26				0.290	0.160							
27				0.290	0.160							
28				0.290	0.160							
29				0.290	0.160							
30				0.290	0.130							
31					0.130							
Mean				0.225	0.198	0.112						
Min				0.160	0.130	0.100						
Max				0.290	0.290	0.130						
Acft				4.463	12.198	1.111						

Annual ACFT Total: 17.772

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

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MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2017 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					3.17	2.32	0.52					
02				0.46	2.32	2.73	0.52					
03				0.46	2.32	2.50	0.52					
04				0.46	2.32	2.00	0.46					
05				0.46	2.32	1.64	0.46					
06				0.52	2.32	1.64	0.40					
07				0.66	3.44	1.64	0.30					
08				0.66	3.44	1.64	0.16					
09				0.99	3.44	1.79	0.16					
10				1.30	3.44	1.79	0.10					
11				1.30	3.17	1.50	0.10					
12				1.79	2.32	1.50						
13				1.79	0.66	1.25						
14				1.79	0.66	1.25						
15				1.79	3.44	0.99						
16				1.93	0.66	0.99						
17				1.93	0.66	0.93						
18				2.32	4.10	0.93						
19				2.32	4.10	0.93						
20				2.90	4.10	0.93						
21				3.44	3.44	0.93						
22				3.44	3.44	0.93						
23				3.44	3.44	0.88						
24				3.26	3.44	0.88						
25				3.26	3.44	0.66						
26				3.17	3.44	0.66						
27				3.17	3.44	0.66						
28				3.17	3.44	0.66						
29				3.17	3.17	0.66						
30				3.17	3.17	0.52						
31					2.32							
Mean				2.02	2.86	1.28	0.34					
Min				0.46	0.66	0.52	0.10					
Max				3.44	4.10	2.73	0.52					
Acft				116.07	175.70	76.03	7.34					

Annual ACFT Total: 375.13

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2016 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					0.59	0.93	0.10					
02					0.59	0.93	0.10					
03					0.59	0.93	0.10					
04					1.00	0.93	0.10					
05					1.25	0.93	0.10					
06					1.50	0.93						
07					1.75	0.66						
08					2.00	0.66						
09				0.33	2.40	0.66						
10				0.33	2.30	0.66						
11				0.33	2.20	0.66						
12				0.33	2.09	0.66						
13				0.33	2.09	0.59						
14				0.33	2.09	0.59						
15				0.33	2.09	0.59						
16				0.49	2.09	0.59						
17				0.49	0.88	0.46						
18				0.49	0.88	0.46						
19				0.43	2.90	0.33						
20				0.43	2.82	0.33						
21				0.43	2.50	0.33						
22				0.43	2.25	0.23						
23				0.43	2.00	0.23						
24				0.43	2.00	0.23						
25				0.43	1.71	0.23						
26				0.71	1.71	0.16						
27				0.71	1.50	0.16						
28				0.71	1.50	0.16						
29				0.71	1.25	0.13						
30				0.71	1.25	0.13						
31					1.00							
Mean				0.47	1.70	0.52	0.10					
Min				0.33	0.59	0.13	0.10					
Max				0.71	2.90	0.93	0.10					
Acft				20.51	104.67	30.68	0.99					

Annual ACFT Total: 156.85

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2015 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					0.26	0.93	0.16					
02					0.26	0.93	0.16					
03					0.26	0.93	0.16					
04					0.26	0.93	0.12					
05					0.26	0.93	0.12					
06					0.26	0.93	0.10					
07					0.26	0.66	0.10					
08					1.05	0.66						
09					1.05	0.66						
10					1.05	0.66						
11					0.93	0.66						
12					0.88	0.66						
13					0.88	0.66						
14					0.88	0.66						
15					0.88	0.66						
16					0.88	0.66						
17					0.88	0.66						
18					0.88	0.66						
19					0.99	0.49						
20					0.99	0.49						
21					0.99	0.39						
22					0.99	0.39						
23					0.99	0.33						
24					0.99	0.33						
25					1.05	0.19						
26					1.05	0.19						
27					1.05	0.19						
28					1.05	0.19						
29					1.05	0.19						
30					1.05	0.19						
31					1.05							
Mean					0.82	0.57	0.13					
Min					0.26	0.19	0.10					
Max					1.05	0.93	0.16					
Acft					50.28	33.84	1.82					

Annual ACFT Total: 85.94

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2014 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					0.62	1.86						
02					0.62	1.86						
03					0.62	1.86						
04					0.62	1.86						
05					0.62	1.11						
06					0.62	1.11						
07					0.62	1.11						
08					1.79	0.59						
09					1.79	0.59						
10					1.79	0.49						
11					1.79	0.49						
12				0.16	1.79	0.49						
13				0.16	1.79	0.49						
14				0.16	1.44	0.49						
15				0.16	1.44	0.49						
16				0.16	1.44	0.23						
17				0.16	1.44	0.23						
18				0.16	1.44	0.23						
19				0.52	1.44	0.10						
20				0.52	1.44	0.10						
21				0.52	1.93	0.00						
22				0.62	1.93	0.00						
23				0.62	1.93	0.00						
24				0.62	1.93	0.00						
25				0.62	1.93	0.00						
26				0.62	1.93	0.00						
27				0.62	1.93	0.00						
28				0.62	1.93	0.00						
29				0.62	1.86	0.00						
30				0.62	1.86	0.00						
31					1.86							
Mean				0.43	1.49	0.53						
Min				0.16	0.62	0.00						
Max				0.62	1.93	1.86						
Acft				16.38	91.60	31.30						

Annual ACFT Total: 139.28

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2013 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					0.33	0.99						
02					0.33	0.99						
03					0.49	0.99						
04					0.49	0.93						
05					0.49	0.93						
06					0.49	0.93						
07					1.37	0.93						
08					1.37	0.93						
09					1.37	0.93						
10					1.37	0.93						
11					1.37	0.66						
12					1.37	0.66						
13					2.09	0.66						
14					2.09	0.66						
15					2.09	0.66						
16					2.09	0.66						
17					2.09	0.66						
18					2.09	0.33						
19					2.57	0.33						
20					2.57	0.33						
21					2.48	0.33						
22				0.33	2.48	0.16						
23				0.33	2.48	0.16						
24				0.33	2.48	0.16						
25				0.33	1.64	0.16						
26				0.33	1.64	0.16						
27				0.33	1.64	0.16						
28				0.33	0.99	0.00						
29				0.33	0.99	0.00						
30				0.33	0.99	0.00						
31					0.99							
Mean				0.33	1.53	0.55						
Min				0.33	0.33	0.00						
Max				0.33	2.57	0.99						
Acft				5.89	93.86	32.49						

Annual ACFT Total: 132.24

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2012 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					2.73	0.33						
02					2.73	0.16						
03					2.73	0.16						
04					2.73	0.16						
05					2.48	0.00						
06					2.48	0.00						
07					2.48	0.00						
08					2.48	0.00						
09					2.48	0.00						
10					2.48	0.00						
11					1.93	0.00						
12					1.93	0.00						
13					1.93	0.00						
14					1.93	0.00						
15				1.79	1.93	0.00						
16				1.79	1.93	0.00						
17				1.79	1.93	0.00						
18				1.86	1.17	0.00						
19				1.86	1.17	0.00						
20				1.86	1.17	0.00						
21				1.86	1.17	0.00						
22				1.86	1.17	0.00						
23				1.86	1.17	0.00						
24				2.57	1.17	0.00						
25				2.57	0.46	0.00						
26				2.57	0.46	0.00						
27				2.57	0.46	0.00						
28				2.57	0.46	0.00						
29				2.73	0.46	0.00						
30				2.73	0.33	0.00						
31					0.33							
Mean				2.18	1.63	0.03						
Min				1.79	0.33	0.00						
Max				2.73	2.73	0.33						
Acft				69.10	100.09	1.61						

Annual ACFT Total: 170.80

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2011 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01						1.93	3.17	2.32	0.77	0.46		
02						1.93	3.17	2.32	0.88	0.46		
03						1.93	3.17	2.32	0.88	0.46		
04						1.93	3.17	2.32	0.88	1.06		
05						1.93	3.17	2.32	0.88	1.06		
06					1.24	1.93	3.17	2.32	0.88	1.06		
07					1.24	2.48	3.17	1.57	0.88	1.06		
08					1.24	2.48	3.17	1.57	0.88	1.50		
09					1.24	2.48	3.91	1.57	0.88	1.50		
10					1.24	2.48	3.91	1.86	0.66	1.50		
11					1.24	2.48	3.91	1.86	0.66	1.50		
12					1.24	2.48	3.91	1.86	0.66	1.50		
13					1.24	2.48	3.91	1.86	0.62	1.44		
14					1.93	3.17	3.91	1.86	0.62	1.44		
15					1.93	3.17	3.91	1.86	0.62	1.44		
16					1.93	3.17	3.35	1.86	0.62			
17					1.86	4.10	3.35	1.86	0.62			
18					1.86	4.10	3.35	1.24	0.62			
19					1.86	4.10	3.35	1.24	0.62			
20					1.86	4.10	2.99	1.24	0.56			
21					1.86	4.10	2.99	1.24	0.56			
22					1.86	4.10	2.99	0.59	0.56			
23					1.86	4.10	2.99	0.59	0.56			
24					1.64	4.10	2.99	0.59	0.56			
25					1.64	3.53	2.99	0.93	0.56			
26					1.64	3.53	3.35	0.93	0.56			
27					1.64	3.53	3.35	0.93	0.46			
28					1.64	3.53	3.35	0.88	0.46			
29					1.64	3.53	3.35	0.88	0.46			
30					1.64	3.53	3.35	0.88	0.46			
31					1.93		3.35	0.77				
Mean					1.62	3.08	3.36	1.50	0.66	1.16		
Min					1.24	1.93	2.99	0.59	0.46	0.46		
Max					1.93	4.10	3.91	2.32	0.88	1.50		
Acft					83.58	183.33	206.62	92.11	39.45	34.59		

Annual ACFT Total: 639.69

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2010 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					2.73	4.10	0.88					
02					2.73	4.10	0.88					
03					2.82	4.10	0.88					
04					2.82	2.57	0.88					
05					2.82	2.57	0.88					
06					2.82	3.17	0.77					
07					2.82	3.17	0.77					
08					2.82	3.17	0.59					
09					2.82	3.17	0.59					
10					3.62	3.17	0.59					
11					3.62	3.17	0.59					
12					3.62	3.08	0.59					
13					3.62	3.08	0.52					
14					3.62	3.08	0.52					
15					4.01	2.48	0.50					
16					4.01	2.48	0.50					
17					3.17	2.48	0.50					
18					3.17	2.48	0.50					
19					3.17	2.48	0.42					
20					2.16	1.93	0.42					
21					2.16	1.93	0.33					
22					3.62	1.50	0.33					
23					3.62	1.50	0.33					
24					3.62	1.50	0.33					
25					3.62	1.50	0.33					
26					3.62	1.24	0.33					
27				2.73	3.62	1.24	0.16					
28				2.73	3.62	0.93	0.16					
29				2.73	4.10	0.93	0.16					
30				2.73	4.10	0.93	0.16					
31					4.10		0.16					
Mean				2.73	3.32	2.44	0.50					
Min				2.73	2.16	0.93	0.16					
Max				2.73	4.10	4.10	0.88					
Acft				21.66	203.88	145.25	30.84					

Annual ACFT Total: 401.63

Utah Division of Water Rights
Distribution System Daily Records

SAN PITCH RIVER WEST MILBURN

COMMON DESCRIPTION:
DIVERTING WORKS: DIVERSION DAM AND GATE STRUCTURE
MEASURING DEVICE: 24" PARSHALL FLUME
RECORDS RATING: Unrated

THIS DIVERSION WAS INSPECTED ON JUNE 26, 1995. THE FLUME WAS TILTED FROM SIDE TO SIDE. THE COMMISSIONER CALCULATE THE FLOW DIVERTED BY AVERAGING READINGS TAKEN AT EACH SIDE.

CALENDAR YEAR 2009 Mean daily discharge in CFS

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
01					4.20	4.10	1.50	0.49				
02					4.20	4.10	1.44	0.49				
03					4.20	2.73	1.44	0.49				
04					4.20	2.73	1.44	0.49				
05					4.20	2.73	1.44	0.49				
06					4.20	2.73	1.44	0.49				
07					3.62	2.73	1.44	0.49				
08					3.62	2.73	1.24	0.49				
09					3.62	2.73	1.24	0.36				
10					3.62	2.73	1.24	0.36				
11					3.62	2.73	1.24	0.36				
12					3.62	2.73	1.24	0.36				
13					2.32	1.79	1.24	0.36				
14					2.32	1.79	1.17	0.36				
15					2.32	1.79	1.17	0.36				
16					2.32	1.79	1.17	0.00				
17					2.32	1.79	1.17	0.00				
18					2.32	1.79	1.17	0.00				
19					3.44	2.73	1.17	0.00				
20					3.44	2.09	0.93	0.00				
21					3.44	2.09	0.93	0.00				
22					2.73	2.09	0.93	0.00				
23					2.73	2.09	0.93	0.00				
24					2.73	2.01	0.93	0.00				
25					3.44	2.01	0.93	0.00				
26					3.44	1.50	0.66	0.00				
27					3.44	1.50	0.66	0.00				
28					3.44	1.50	0.66	0.00				
29					3.44	1.50	0.66	0.00				
30					3.44	1.50	0.66	0.00				
31					4.10		0.66	0.00				
Mean					3.36	2.29	1.10	0.21				
Min					2.32	1.50	0.66	0.00				
Max					4.20	4.10	1.50	0.49				
Acft					206.46	136.56	67.72	12.77				

Annual ACFT Total: 423.51

SPRINKLERS, CROP WATER USE, AND IRRIGATION TIME
SEVIER COUNTY

Robert W. Hill, Extension Specialist - Irrigation
David R. Drake, County Agent - Sevier County

June 2002 ENGR/BIE/WM/32

Sprinkler irrigation has been an important part of Utah's agricultural production since the early 1950s. About 40% of Utah's 1.3 million irrigated acres are watered with sprinklers, including hand move, wheel move, center pivot and other types. Sprinklers can be a good investment when properly designed, installed, maintained and managed. For every acre-foot of water supplied to an efficient sprinkler system, a farmer can expect to harvest about 1 3/4 tons of alfalfa and 46 bushels of wheat. In contrast, the expected harvest with a typical surface irrigation system (flood or furrow) is less than 1 1/4 tons of alfalfa or about 30 bushels of wheat for each acre-foot of water applied. Sprinklers apply water more efficiently and uniformly than typical surface irrigation systems, thus they produce more yield for each acre-foot of water

Not all water applied by an irrigation system is used by the crop. Some water is lost to deep percolation, evaporation, or runoff. Application efficiency (Ea) is a term that tells how much of the water applied by the system is actually stored in the root zone for crop use. In Utah a typical sprinkler system has an Ea of 70% which means that 70% of the water applied by the sprinkler heads is actually stored in the soil for crop use. The actual Ea depends on how evenly the sprinklers distribute water as well as other factors such as operating pressure, nozzle size and spacing, sprinkler maintenance condition, wind, air temperature and humidity (day versus night), and irrigation scheduling. In Utah, the average efficiency of surface irrigation is less than 50% as compared to the higher sprinkler efficiency values of more than 65% for well managed systems.

SPRINKLER IRRIGATION MANAGEMENT

An efficient sprinkler system is the result of good system design, proper irrigation scheduling and careful operation and timely maintenance.

COLORADO EXPERIENCE WITH DISCHARGE MEASUREMENTS AT PARSHALL FLUMES AND ASSESSMENT OF PARSHALL FLUME PERFORMANCE

T. Ley, R. Stroud, B. Tyner, S. Veneman, G. Thrush, C. Bruner, D. Meyer, B. Boughton, L. Cunning, P. Tyler, M. Wild, B. Erosky, D. Ridnour, T. Arnett, M. Rusch, A. Gutierrez, C. Hart, G. Markus, S. Ditmars, L. Conner, J. Jaminet, A. Taillacq, J. Miller, B. Leavesley, P. DeArcos, D. Hutchens[1]

ABSTRACT

The collective experience of the Colorado Division of Water Resources (CDWR) Hydrographic and Satellite Monitoring Branch with operational performance of Parshall flumes installed across Colorado during the last 10-12 years is summarized. Hundreds of discharge measurements have been made at Parshall flumes, ranging in size from 6-inch to 40-ft throat widths during this period. The purpose of these measurements is to continually assess Parshall flume measurement performance in order to provide accurate discharge data for water rights administration. Discharge measurements, along with systematic assessment of flume levelness, flow approach and exit conditions at the flume installation, and other factors, provide quantifiable checks on flume stage-discharge relationship (rating) performance. Causes of any significant departures of measured flow from the flume rating indicated flow and solutions for improved flow accuracy are presented. Several special case studies of flume performance issues are discussed.

BACKGROUND

Colorado water law is based on the concept of "first in time, first in right". As mining went through its boom and bust cycles in the mid to late 19th century, homesteading and development of agriculture followed closely behind. Prior to Colorado statehood in 1876, territorial laws were enacted allowing water to be taken from streams and rivers to lands "not adjoining the waterway", as well as recognition of rights of way to transport water across lands not owned by the owners of the water right.

The Colorado Doctrine, or the Doctrine of Prior Appropriation, recognizes: a) those that put the water to use first are entitled to get their water first during periods of water shortage, and b) water is a separate property right that can be sold separately from the land. This is opposed to the Riparian Doctrine that ties water use rights to the ownership of lands adjacent to the river or stream. The codification of fundamental Colorado water law is found in Colorado's 1876 Constitution, Article XVI, Sections 5, 6 and 7. These basically state: water within the State of Colorado is a public resource belonging to the citizens of the State; the right is recognized to divert unappropriated waters of any natural

[1] The authors are all employees of the Colorado Division of Water Resources (CDWR) Hydrography and Satellite Monitoring Branch.
Corresponding author: Thomas W. Ley, PhD, PE, Chief, Hydrography and Satellite Monitoring Branch, Colorado Division of Water Resources, 310 E. Abriendo, Suite B, Pueblo CO, 81004.
thomas.ley@state.co.us

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IRT Water Meters are ideal for moderate to dirty water conditions. The specially designed paddle wheel measuring device provides a free water passage resulting in low head loss and the ability to accurately measure water with high levels of impurities or debris. Accuracy is achieved over a wide range of flows. Available in 3", 4", 6", 8" and 10" sizes.

Product Advantages

- Ideal for moderate to dirty water conditions.
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- Low headloss with the ability to accurately measure water with high levels of impurities or debris.
- Bearings are constantly flushed during operation to eliminate deposits of solids.
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- Simple maintenance with field replaceable calibrated measuring unit.
- High level of accuracy (±2%) is achieved over a wide range of flows.
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Flow Characteristics

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Flow Characteristics

Parshall Flume Accuracy

nder laboratory conditions, Parshall flumes have been observed to be accurate to within +/-2%. However,

Upractical considerations such as approach flow, installation, and dimensional tolerances normally result in free-flow accuracies of +/-5% (per ASTM D1941).

Installations where the upstream / downstream / installation conditions are less than optimal or where the flume is out of dimension will exhibit accuracies less than above and may require field calibration.

For Parshall flume that have settled (or been installed at a slope) corrections have been developed and can be applied.

The above holds true for Parshall flumes experiencing free-flow. For installations where downstream conditions restrict the flow out of the flume, submergence may become a factor. Submerged flumes should not use free-flow discharge equations, as they will over-indicate the flow rate.

Parshall Flow Equations

For free-flow conditions, the level-to-flow equation for the Parshall flume can be expressed as:

$$Q = KH_a^{\,n}$$

Q = free flow rate (cfs / m3/s)
K = flume discharge constant (varies by flume size / units)
H_a = depth at the point of measurement (feet / meters)
n = discharge exponent (depends upon flume size)

Per ASTM D1941:

Throat Width	K (Imperial)	K (SI)	n

1”	0.338	0.0479	1.55
2”	0.676	0.0959	1.55
3”	0.992	0.141	1.55
6”	2.06	0.264	1.58
9”	3.07	0.393	1.53
1’	4	0.624	1.522
1’-6”	6	0.887	1.538
2’	8	1.135	1.55
3’	12	1.612	1.566
4’	16	2.062	1.578
5’	20	2.5	1.587
6’	24	2.919	1.595
7’	28	3.337	1.601
8’	32	3.736	1.607
10’	39.38	4.709	1.6

12’	46.75	5.590	1.6
15’	57.81	6.912	1.6
20’	76.25	9.117	1.6
25’	94.69	11.32	1.6
30’	113.13	13.53	1.6
40’	150	17.94	1.6
50’	186.88	22.35	1.6

Parshall Flume Flow Tables

Free-flow discharge tables for Parshall flumes can be found in the Discharge Tables section.