

## **Piping the Herman Lateral Final Phase the End of a Seeping Era**

**Belle Fourche Irrigation District**

**209 Dartmouth Avenue**

**Newell, SD 57760**

**Project Manager: Darren Alexander**

**PO Box 225**

**Newell, SD 57760**

**[bfid1@sdplains.com](mailto:bfid1@sdplains.com)**

**605-456-2541**

**Administrative Assistants:**

**Tara Tennis or Tanya Tiff**

**PO Box 225**

**Newell, SD 57760**

**[bfid1@sdplains.com](mailto:bfid1@sdplains.com)**

**605-456-2541**

# **Table of Contents**

**Application- SF-424**

**SF-424 assurances SF-424D**

**Title Page**

**Table of Contents**

**Technical Proposal and Evaluation Criteria**

- 1. Executive Summary**
- 2. Background Data**
- 3. Project Location**
- 4. Technical Project Description**
- 5. Evaluation Criteria**

**Project Budget**

- 1. Funding Plan and letters of commitment**
- 2. Budget Proposal**
- 3. Budget Narrative**

**Environmental and Cultural Resources Compliance**

**Required Permits and Approvals**

**Letters of Project Support Appendix B**

**Official Resolution Appendix C**

**Project Budget Appendix D**

## Technical Proposal and Evaluation Criteria

**Executive Summary:** July 30, 2018 the Belle Fourche Irrigation District located in Butte County, South Dakota with district offices in Newell, South Dakota submits this Funding Opportunity (FOA) Number BOR-DO-18-F009.

The planned conservation activities for the FOA are to install approximately 3500 feet of 18" PVC pipe on the Herman Lateral. This project would replace a seeping ditch with PVC pipe and create a closed system to save water. Funds for this project would be used to pay for the 18" pipe and appurtenances (elbow, tee's, valves, type I box, pipe glue, flow meters, etc.) to finish piping the Herman Lateral. The closed system would allow for better measurement of the water deliveries and eliminate the seepage. The estimated water savings is 350 acre foot per year.

The estimated time for completion of this project is approximately 25 days. Mobilization and demobilization is estimated at 2 days. The crew will haul the equipment out and begin hauling pipe. Installation of the pipe is estimated at 23 days. They will measure and shoot the ditch for grade and install the pipe and appurtenances along with pipe bedding. The Kyle Clay is considered acceptable material for bedding, so we will use this. The estimate, to complete the project, is approximately 140-200 feet per day weather permitting. This project is scheduled to begin in the fall of 2019.

The Herman Lateral Project is located on a Federal irrigation project. The Belle Fourche Irrigation District is a Reclamation Facility owned by the United States and operated and maintained by the Belle Fourche Irrigation District (BFID).

**Background Data:** The Belle Fourche River drainage basin, (above the Belle Fourche Diversion Dam), and Owl Creek drainage is the water source for the Belle Fourche Dam. The reservoir has an average annual inflow of 116,000 acre-feet. The water right is held by the Bureau of Reclamation under the water right laws of the State of South Dakota. The water right with a priority date of 1904 is for 57,183 acres of land and a storage right for 185,170 acre-feet. The Belle Fourche Dam was built primarily for irrigation users; however, flood control, fish and wild life conservation and recreation benefits are inherently provided. In the Belle Fourche Irrigation District there are currently 504 water users for 57,183 irrigable acres. The major crops grown are corn, soy beans, alfalfa, and forages. Potential shortfalls in the water supply would be a drought. Should there be a drought and the dam not fill our landowners would receive a reduced allotment which

would negatively impact crop production. . The amount of precipitation each year dictates the amount of water allotted, which varies from year to year.

The distribution system has 94 miles of main canals approximately 2 miles of lined, 450 miles of laterals with approximately half of this piped, and 232 miles of open drains. The system is operated and maintained by the BFID. The approximate number of head gates is 2,045 at this time. We have approximately 55 automated sites with all but 3 working; however, these are being repaired this summer. We have a remote monitoring system at the office with capabilities of opening and closing the gates while checking on and monitoring the water flows.

The BFID has participated with Reclamation in water conservation for several years. The district presently has a 2016 and 2017 Water Conservation effort in place. These are through the WaterSMART. Prior to that we participated with the Reclamation for consecutive years with Water Conservation Field Service Programs of the Dakotas Area Office. Agreement Numbers R13AP60057, R14AP00066, and R15AP00179 these were successfully completed and closed out in a timely manner. In 2016 BFID applied for two WaterSMART grants to pipe a failing concrete, non-gasket Reedy Lateral. BFID was awarded the grants in September 2016 Agreement number R16AP00190 and R16AP00191. In October of 2017 they began replacing the failing concrete pipe with Plastic PVC pipe. The project is scheduled to be completed by November of 2018, weather permitting. In 2017 we submitted a grant for the Beresford Lateral (N.C. 29.2) to reclaim 2750 foot open seeping ditch and install an approximately 550 foot pipeline (siphon) while providing mitigation to an existing dam. BFID was approved in April 2018 for the grant Agreement number R17AP00177 and will begin this project in the spring and complete it prior to water run, weather permitting. BFID, by contract with the Bureau of Reclamation, operates and maintains the dam and distribution system. All operations and maintenance costs for the facilities are the responsibility of the BFID. Since the Belle Fourche Irrigation District (BFID) is responsible for all the operation and maintenance costs for Reclamation facilities funding of project improvements is a budget problem.

**Project Location:** Belle Fourche Irrigation Districts Herman Lateral is located in the state of South Dakota, Butte County, approximately 7 miles South East of the town of Newell. Starting point Latitude 44.662626'N and Longitude -103.354758'W ending point Latitude 44.659101 and Longitude -103.345721. See attached map Appendix A

**Technical Project Description:** The BFID will convert open ditch to pipeline to save seepage water and improve the distribution system. This ditch has to be checked up fairly high to provide the water to farmers causing the ditch to over flow in places. By piping this lateral we will avoid running the ditch over, flooding areas of the project. BFID will also prevent seepage and provide better water service to the farmers. The project for the 2018

agreement will be for approximately 3500 feet of pipeline installation on the Herman Lateral. There will be seven Farmer Turn Outs (FTO), seven measuring devices, and three air vents. By piping the Lateral and closing the system we will save all the seep and overflow. The estimated water savings will be approximately 350 acre-feet per year. The outcome of the final project will be a substantial amount of water savings per year with a better measurement system. It would help us to monitor the amount of water each farmer is taking and reduce the waste. This lateral is constructed in a soil type identified by NRCS as Kyle Clay Terrace. In the 1990's seepage tests (inflow-outflow) using ditch velocity and ditch area were conducted on the Young Lateral which is in the same soil type. We have a 1990 Reclamation design for the Herman pipeline we will be using.

**Project Budget:**

**Funding Plan and letter of commitment:** See Appendix

**Budget Proposal:** See Appendix D

**Budget Narrative:**

The time to construct the Herman Lateral is based on 140-200 feet per day. The estimated time for completion is 25 days. All wages and Fringe are actual for current employees and the equipment rates BFID used the US Army Corp of Engineers construction Equipment Ownership and Operating Expense Schedule November 2016 to derive the equipment expense for this portion of the budget, all equipment pages will be noted in parenthesis. BFID had assistance from Reclamation interpreting this manual. The Belle Fourche Irrigation District plans to use in-kind forces and cost of the valve wells and lids, type I boxes, 5 of the 18" X 20" pipe reducers, and the pipe glue and pipe cleaner to match FOA Number BOR-DO-18-F009. The cost of the Valve wells and lids came from a prior purchase \$389.13 per unit and we will provide 7 at a cost of \$2723.91. The Type I boxes are made at our facility at a cost of 320.66 each, 7 will be needed for a total cost of \$2244.62. Pipe glue and cleaner we buy on a regular basis this is actual cost per case \$868.20. We will purchase the 18" X 20" reducers from a local vendor \$236.00 each BFID will buy 5 for a total of \$1180.00. The foreman and two lead operators will be on site the whole job for a total of 192 hours per employee, \$14661.05 would be the wage and fringe match. The Administration would be \$1919.35 for paperwork on the grant. The rest of the labor costs would be \$13747.65 for our drivers and laborers. The peterbilt semi-truck and trailer (pg. 2-240 & 2-234) and the GMC semi-truck and trailer (pg. 2-240 & 2-234) will be used to haul equipment and PVC pipe to location. BFID estimates 72 hours combined both trucks total \$3868.56. The GMC dump truck (pg. 2-240) will be used to haul the type I structures and transport earth, estimated usage 68 hours \$3445.56. The Cat Dozer D6 (pg. 2-219) will be used to move earth it will be on location and used the entire job estimated at 192 hours or

\$9876.48. Operator will backfill the dirt over the pipe and wait for the remote trench roller (\$ 2520.00 rental for a month) to compact the earth then backfill again wait for trench roller and back fill again. This process will be repeated until proper compaction is met and the pipe is buried. The Allis Chalmers Fork lift (pg. 2-103) will be used approximately 16 hours to load the pipe onto the Semi-Trucks when they arrive at the BFID shop \$315.20. Estimated time is actual hours of use as this will be left at our location and can be used for other projects while the trucks are out. The Cat excavator (pg. 2-135) to dig the trench in a safe manner it will be on location the entire job 192 hours \$11239.68. The Case Backhoe (pg. 2-152) will also be used initially to unload the pipe from the Semi-trucks and throughout the project and place the pipe into the trench dug by the excavator 192 hours \$6990.72. The total BFID in-kind match is \$68584.25 with the purchase of \$7016.73 in materials for a total of \$75600.98. The Federal match is for 18" PVC pipe \$56980.00, 18" X 10" reducer \$170.73, 12" X 12" tee \$156.85, 12" X 10" tee \$ 136.20, 4" air vents 354.00, 18" X 12" reducers \$472.00, 18" X 4" tees \$903.00, 12" 90° elbows \$327.06, 18" 90° elbows \$949.48, and 12" series 4000 inline gate valves \$11550.00. Total Federal Funding \$75000.00.

### **Evaluation Criterion A-Project Benefits**

#### **Describe the expected benefits and outcomes of implementing the proposed project.**

Belle Fourche Irrigation District would benefit by saving water. By modernizing the gravity feed open ditch to pipeline we eliminate seepage.

What are the benefits to the applicant's water supply delivery system? The BFID would conserve about 350 Acre Feet of water per year by piping the Herman Lateral. The saved water will be used to provide additional storage in the Belle Fourche Reservoir and if needed during dry years it would provide additional water to District farmers. There would be no new uses of the water saved.

If other benefits are expected explain those as well. As discussed the water saved is held in the reservoir to be used the following year or to mitigate drought effects. Carrying the water over in the reservoir it is a direct benefit to the recreational use in this area. The Belle Fourche Reservoir is a high use reservoir and enjoyed by all in Western South Dakota. The ability to conserve water and leave it in the reservoir the last several years can be attributed to the recent rehabilitation, BFID's involvement with the Belle Fourche Watershed Partnership, pivot installations on the project, and water conservation efforts through the partnership of the BFID and Reclamation in water conservation and WaterSMART projects.

Explain how the proposed project has been determined as a priority in the existing planning effort as opposed to potential projects/measures. The BFID received a grant in 2015 FOA number R15AS00004 to begin piping the Herman Lateral. BFID used the funds

to pipe the Herman Lateral to Sta. 69+00. Our crew then piped an additional amount to Sta. 79+00. A decrease in unwanted vegetation was noticed immediately. The reduction in seepage was also noticed. This closed system would provide increased production to the adjacent fields where seepage is creating problems with increased water tables and salinity issues. The conversion of an earth or un-lined water conveyance to pipe is very important to water conservation. BFID chose this project based on the amount of water it would conserve and the increased productivity to the surrounding farmers. The farmer could apply for funding from NRCS or EQUIP to install a pivot to our closed system. This would benefit the farmer and the District in water conservation.

### **Evaluation Criterion C-Project Implementation:**

**Describe the implementation plan for the proposed project. Please include and estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.** BFID staff will mobilize at the Herman Lateral location on approximately October 14, 2019. The following day the operators and foreman will shoot the ditch for grade and begin digging and laying pipe. The first stretch of pipe from approximately Sta. 79+00 will be laid in approximately seven days. Our lead operator is very familiar with laying pipe as he has been here since the rehab in the 80's. He feels confident there will be no issues and with a skilled foreman and additional knowledgeable operators this task will be flawless. There are no farmer turnouts or air vents in this 1300' so he feels it should not be an issue and foresees no problems. The pipe bedding the crew will use is the soil that is there as it is perfect bedding material. Our first milestone will be the completion of Sta. 79+00 to Sta. 92+00 this is where they will begin with farmer turnouts (FTO). Operators and foreman will begin with site prep, which is level the ditch and create a work area, sloping of the trench for safety to avoid a cave in. They will spread stemming out, lube pipe, line it up and connect it with the prior piece. They will then, remote trench roll, backfill, and the dozer operator will backfill three times minimum per stick of pipe while it is packed to perfection. Next 2245 feet of pipe will be laid in approximately 140 feet per day as there are farmer turnouts (FTO) and inline valves to be installed along with air vents. As before the remote trench roller and dozer will pack the backfill until it is perfect after the crew places the each piece of pipe. Repeating this process for a total of approximately 3500' with the addition of the FTO's. The FTO's are installed by gluing a 10-20 foot piece of pipe to a Tee then install the valve and add an additional 10 Foot of pipe and place an elbow then install the valve well over the valve then add my type I box to my outlet install stem extension and wheel to packing. This will all be backfilled and packed to specifications. Seven of these turnouts will be done and we will install a drain at the end of the pipeline. All of this should be done by November 13, 2019.

The area should be cleaned and left as it was found. Belle Fourche Irrigation District has been in contact with NEPA and SHPO and has been cleared for this project area. We have also gotten the ROW taken care of with help of the Bureau of Reclamation. Any and all permits for this project are on file in our office and a copy at the Bureau of Reclamation office. During the Rehabilitation and Betterment Program in the 1990's the design and plans were drawn up for this project. No new policies or administrative actions are required to implement this project.

Is the proposed project connected to a Reclamation project or activity? If so, how? The Belle Fourche Irrigation District (BFID), by contract with the Bureau of Reclamation, operates and maintains the dam and distribution system. All operations and maintenance costs for the facilities are the responsibility of the BFID. The pipeline in question and the land will be receiving Reclamation water. Any water savings will be stored in the dam for the next year. This project will not benefit any tribe.

### **Creating a conservation stewardship legacy second only to Teddy Roosevelt:**

Under the Belle Fourche Irrigation Districts leadership, the BFID mitigates dams for wildlife and conserves water for storage to create more recreation in our area. The Belle Fourche Reservoir contains some of Western South Dakotas best fishing and skiing in this area. We work hand in hand with NEPA and SHPO to preserve any artifacts or history in or around our project.

### **Utilizing our Natural Resources:**

Under the Belle Fourche Irrigation Districts leadership and partnering with the Reclamation we preserve all natural resources and protect any and all endangered species that may be on our project.

### **Restoring trust with local communities:**

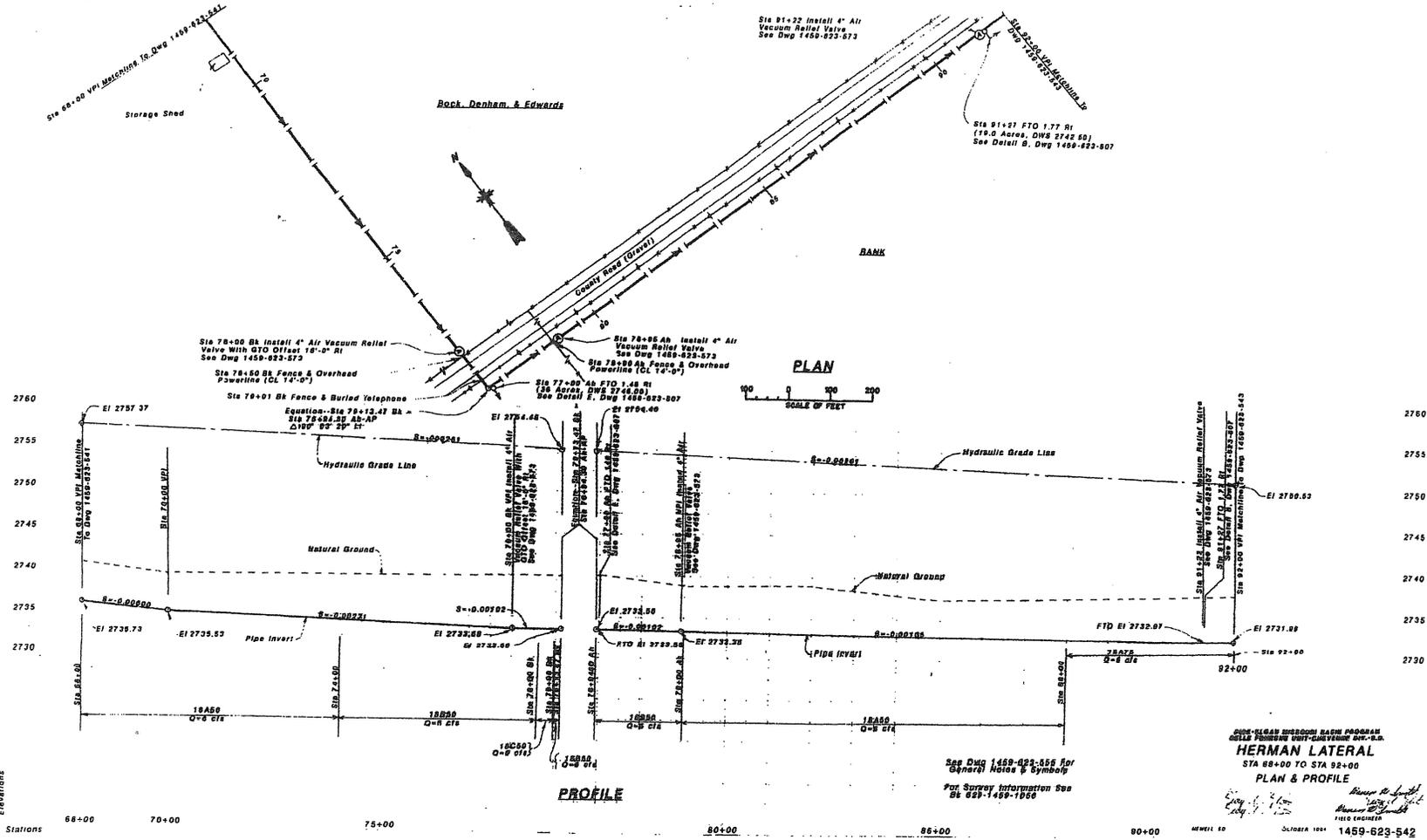
Belle Fourche Irrigation District provides Federal water to the Town of Newell. We work closely with the Town to provide Federal water and keep communication lines open. We take suggestions and assist the Town when needed. On occasion the Town assists us. We try hard to work closely with all our farmers in and out of our District to make all our lives better. We have been in contact with Fish and Wildlife offices to assist with beaver relocation and coyote issues.

### **Modernizing our infrastructure:**

Belle Fourche Irrigation District plans to repair and maintain automated sites and install new pipelines where inefficient open ditch laterals exist. These projects are completed in

conjunction with the in-kind match of the BFID, and grants the BFID qualifies for. BFID works with Reclamation to update and maintain any and all recommendations on a yearly basis. These funds for this are worked into the BFID budget on a yearly basis and a State Water Resources Management System (SWRMS) grant was acquired to address the most expensive recommendations. The BFID will start paying SWRMS grant back to the State of South Dakota in November 2019.





CONPLAN INTERIOR BACH PROGRAM  
 TITLE PROGRAM UNIT-CANAL AND I.R.  
**HERMAN LATERAL**  
 STA 68+00 TO STA 92+00  
**PLAN & PROFILE**

See Dwg 1459-623-555 for  
 General Notes & Symbols  
 For Survey Information See  
 Dg 629-1459-1956

October 1964  
 1459-623-542

## Herman Lateral Budget 2018 Actual Wages and Fringe

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	TOTAL COST
	\$/Unit	Quantity		
<b>Salaries and Wages *</b>				<b>\$24,991.70</b>
Project Manager	\$25.52	0	hours	\$ -
Administration	\$14.25	100.0	hours	\$ 1,425.00
Foreman	\$23.08	192.0	hours	\$ 4,431.36
Operator 1	\$21.60	192.0	hours	\$ 4,147.20
Operator 2	\$19.02	192.0	hours	\$ 3,651.84
Operator 3	\$18.76	180.0	hours	\$ 3,376.80
Labor (pipe Layer)	\$12.50	165.0	hours	\$ 2,062.50
Truck Driver/Labor	\$16.88	150.0	hours	\$ 2,532.00
Truck Driver 2/Laborer	\$13.25	100.0	hours	\$ 1,325.00
Labor (pipe Layer)	\$12.75	160.0	hours	\$ 2,040.00
<b>Fringe Benefits *</b>				<b>\$5,336.35</b>
Project Manager	5.36	0	hours	\$ -
Administration	4.94346	100.0	hours	\$ 494.35
Foreman	5.36376	192.0	hours	\$ 1,029.84
Operator 1	5.248788	192.0	hours	\$ 1,007.77
Operator 2	2.0471	192.0	hours	\$ 393.04
Operator 3	1.991	180.0	hours	\$ 358.38
Labor (pipe Layer)	1.405	165.0	hours	\$ 231.83
Truck Driver/ Laborer	4.592365385	150.0	hours	\$ 688.85
Truck Driver 2/Laborer	4.3805	100.0	hours	\$ 438.05
Labor (pipe Layer)	4.339028846	160.0	hours	\$ 694.24
<b>Equipment *</b>				<b>\$38,256.20</b>
Case Backhoe	\$ 36.41	192		\$ 6,990.72
Cat Excavator	\$ 58.54	192	hours	\$ 11,239.68
Allis Chalmers Fork Lift	\$ 19.70	16	hours	\$ 315.20
Peterbilt/Trailer	\$ 53.73	24	hours	\$ 1,289.52
GMC Semi/Trailer	\$ 53.73	48	hours	\$ 2,579.04
GMC Dump Truck	\$ 50.67	68	hours	\$ 3,445.56
Cat Dozer D6	\$ 51.44	192	hours	\$ 9,876.48
Rental of remote trench roller	\$ 630.00	4	Weeks	\$ 2,520.00
<b>Supplies and Materials</b>				<b>\$79,016.05</b>
18" PVC pipe	\$15.40	3700		\$ 56,980.00
18"X10" reducer	\$170.73	1		\$ 170.73
12"X12" tee	\$156.85	1		\$ 156.85
12"X10" tee	\$136.20	1		\$136.20
4" air vent	\$118.00	3		\$354.00
18"X12" reducer	\$236.00	2		\$472.00
18"X4" tee	\$301.00	3		\$903.00

12" 90° elbows	\$163.53	2		\$327.06
18" 90° elbow	\$474.74	2		\$949.48
12" series 4000 line gate valve	\$1,650.00	7		\$11,550.00
Valve Well	\$286.30	7		\$2,004.10
Valve Well Lids	\$102.83	7		\$719.81
Type I Box	\$320.66	7		\$2,244.62
Purple Pipe Cleaner	\$67.10	6		\$402.60
Grey Glue	\$77.60	6		\$465.60
18"X12" reducer	\$236.00	5		\$1,180.00
<b>Other</b>				<b>\$3,000.00</b>
Environmental compliance/review	\$3,000.00	1		\$ 3,000.00
<b>TOTAL DIRECT COSTS</b>				<b>\$150,600.30</b>
<b>TOTAL ESTIMATED PROJECT COSTS</b>				<b>\$150,600.30</b>

Table 1 Summary of Non-Federal & Federal Funding Sources

Funding Sources	Percent of Total Project Cost	Total Cost by Source
Recipient Funding *	50%	\$75,600.30
Reclamation Funding	50%	\$75,000.00
<b>TOTALS</b>	<b>100%</b>	<b>\$150,600.30</b>

**Appendix D**



**RESOLUTION FOR WATER AND ENERGY  
EFFICIENCY GRANT PROGRAM:  
WaterSMART  
Small-Scale Water Efficiency Projects FY 2018**

July 10, 2018

**WHEREAS**, the Belle Fourche Irrigation District in Newell, South Dakota is a legally organized irrigation district in the State of South Dakota, and

**WHEREAS**, the District promotes, supports and encourages water conservation, and

**WHEREAS**, the District urgently needs system improvements to maximize the utilization of a limited water supply and help sustain the viability of the project.

**THEREFORE, BE IT RESOLVED** that the Board of Directors of the Belle Fourche Irrigation District in South Dakota agrees and authorizes that:

1. The Board has reviewed and supports the application proposal to the WaterSMART: Small-Scale Water Efficiency;
2. The Board authorizes the District Secretary, Tara Tennis or Board Secretary/Treasurer Tanya Tift, the legal authority to enter into the WaterSMART: Small-Scale Water Efficiency Grants agreement;
3. The Belle Fourche Irrigation District in South Dakota is capable of providing the in-kind services and matching obligations, and
4. If selected for a Small-Scale Water Efficiency Grant, the applicant will work with Reclamation to meet established deadlines for entering into a cooperative agreement.

DATED: 7-10-2018

  
John Heisler, Board Chairman

ATTEST:

  
\_\_\_\_\_  
Tara Tennis, Secretary

*my commission expires January 5, 2022*



# United States Department of the Interior

BUREAU OF RECLAMATION

Dakotas Area Office

Rapid City Field Office

515 9th Street, Room 101

Rapid City, SD 57701-2692

IN REPLY REFER TO:

DK-4000

JUL 26 2018

John Heisler  
Belle Fourche Irrigation District  
P.O. Box 225  
Newell, South Dakota 57760

Subject: Letter of Support – Belle Fourche Irrigation District 2018 WaterSMART Application

Dear Mr. Heisler:

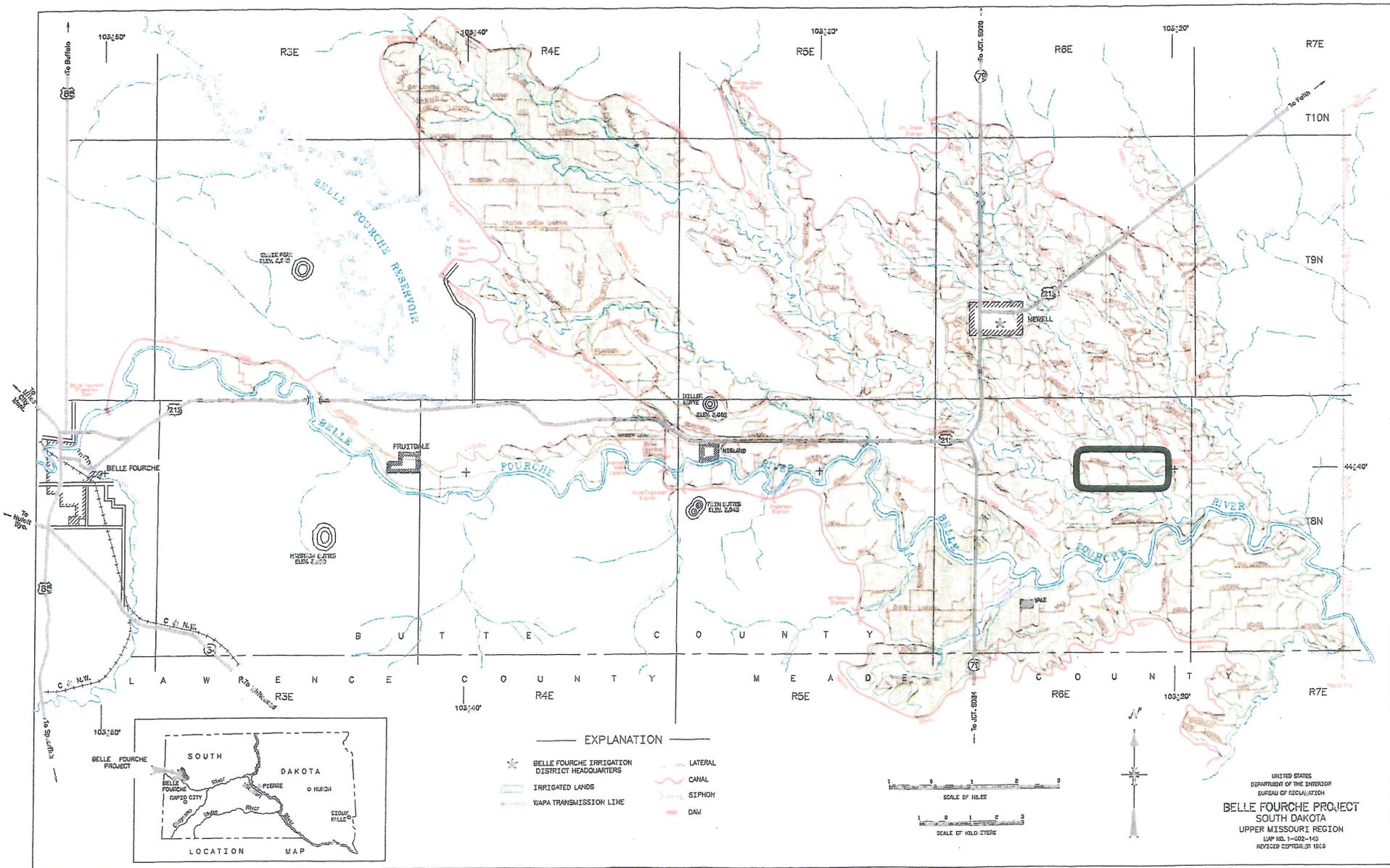
The Bureau of Reclamation Dakotas Area Office (Reclamation) is happy to provide this letter of support to the Belle Fourche Irrigation District (District) for their 2018 WaterSMART application. We understand that the District plans to convert 3,500 ft. of the Herman Lateral from open ditch to pipeline. This would create an annual water savings of over 350 acre-feet.

The District has worked cooperatively with Reclamation on many similar water conservation projects over the years. These projects have resulted in significant water savings, which has benefited District irrigators as well as the general public. Completion of the proposed project would result in additional water savings and benefit those in western South Dakota who use water from the Belle Fourche Reservoir and the Belle Fourche River.

If you have any questions, please contact George Finnegan at 605-519-5418.

Sincerely,

Crystal Lesmeister, Deputy Manager  
Facilities and Engineering



Appendix A