Horsefly Irrigation District

Dairy Canal Piping and Nobel Section Well Installation Project

WaterSMART Water and Energy Efficiency Grants for Fiscal Year 2017

Funding Opportunity Announcement No. BOR-DO-17-F012

By

Horsefly Irrigation District
Klamath Basin, Oregon

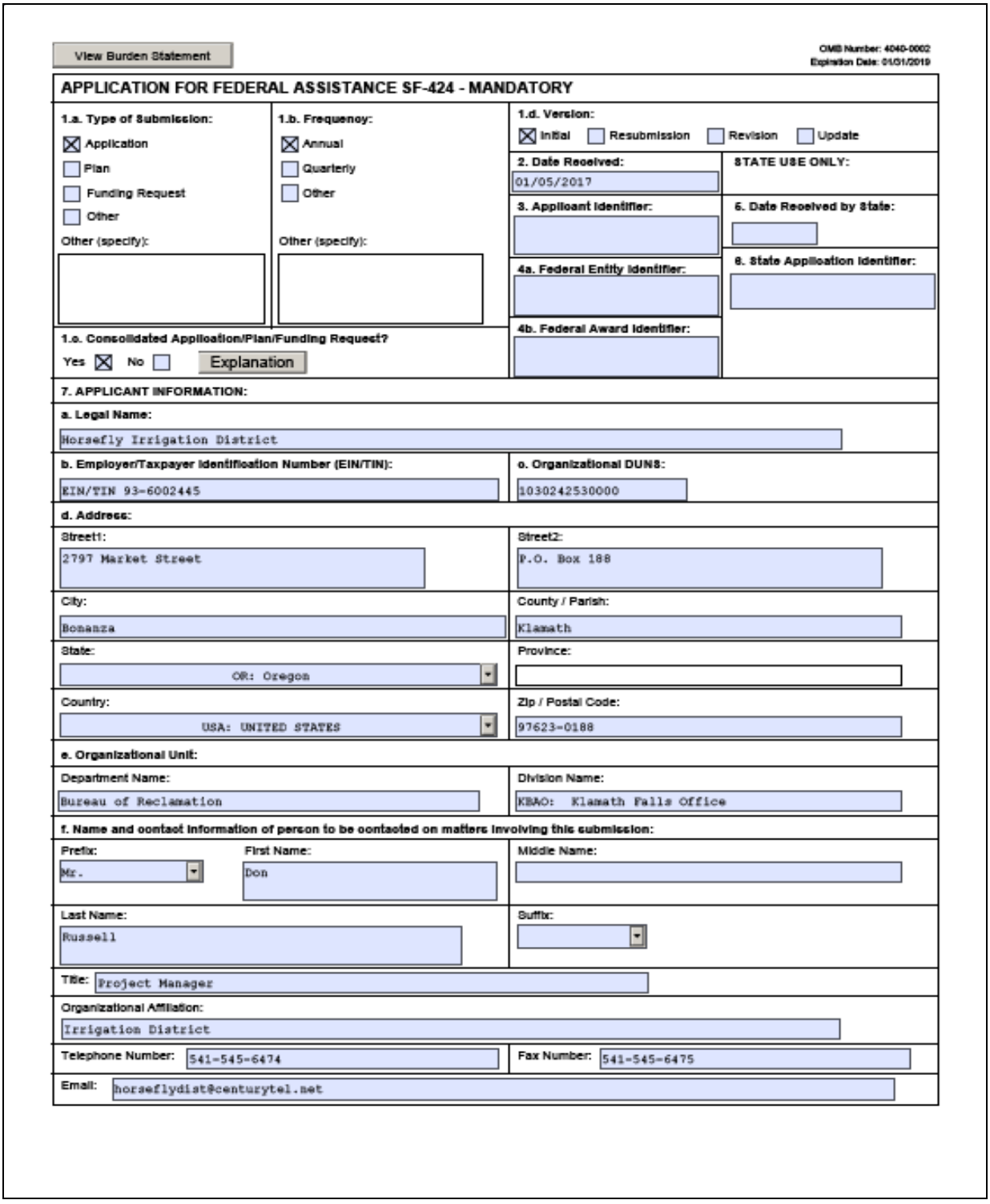
Don Russell, Project Manager
P.O. Box 188
Bonanza, Oregon 97623
Phone: Cell (541) 281-1946 Office (541) 545-6474
Fax: (541) 545-6475
E-Mail: Horseflydist@centurytel.net
Penny Pickett
Phone: Cell (541) 892-3915
E-Mail: penter04@gmail.com

Horsefly Irrigation District
Klamath Basin, Oregon

Table of Contents

Mandatory Federal Forms

SF-424



View Burden Statement

OMB Number: 4040-0002
Expiration Date: 01/31/2019

APPLICATION FOR FEDERAL ASSISTANCE SF-424 - MANDATORY

1.a. Type of Submission:
- [X] Application
- [ ] Plan
- [ ] Funding Request
- [ ] Other

Other (specify):

1.b. Frequency:
- [X] Annual
- [ ] Quarterly
- [ ] Other

Other (specify):

1.c. Consolidated Application/Plan/Funding Request?
Yes [X] No [ ] Explanation

1.d. Version:
[X] Initial [ ] Resubmission [ ] Revision [ ] Update

2. Date Received: 01/05/2017

STATE USE ONLY:

3. Applicant Identifier:

6. Date Received by State:

4a. Federal Entity Identifier:

8. State Application Identifier:

4b. Federal Award Identifier:

7. APPLICANT INFORMATION:

a. Legal Name: Horsefly Irrigation District

b. Employer/Taxpayer Identification Number (EIN/TIN): EIN/TIN 93-6002445

c. Organizational DUNS: 1030242530000

d. Address:

Street1: 2797 Market Street

Street2: P.O. Box 188

City: Bonanza

County / Parish: Klamath

State: OR: Oregon

Province:

Country: USA: UNITED STATES

Zip / Postal Code: 97623-0188

e. Organizational Unit:

Department Name: Bureau of Reclamation

Division Name: KBAO: Klamath Falls Office

f. Name and contact information of person to be contacted on matters involving this submission:

Prefix: Mr.

First Name: Don

Middle Name:

Last Name: Russell

Suffix:

Title: Project Manager

Organizational Affiliation: Irrigation District

Telephone Number: 541-545-6474

Fax Number: 541-545-6475

Email: horseflydist@centurytel.net

APPLICATION FOR FEDERAL ASSISTANCE SF-424 - MANDATORY

8a. TYPE OF APPLICANT:

D: Special District Government

Other (specify):

b. Additional Description:

9. Name of Federal Agency:

Bureau of Reclamation

10. Catalog of Federal Domestic Assistance Number:

15.507

CFDA Title:

WaterSMART - Water and Energy Efficiency Grants for Fiscal Year 2017; FOA#: BOR-DO-17-F012

11. Descriptive Title of Applicant's Project:

Dairy Canal Piping and Nobel Section Well Installation Project

12. Areas Affected by Funding:

13. CONGRESSIONAL DISTRICTS OF:

a. Applicant: Oregon

b. Program/Project: 002

Attach an additional list of Program/Project Congressional Districts if needed.

Add Attachment | Delete Attachment | View Attachment

14. FUNDING PERIOD:

a. Start Date: 10/01/2017

b. End Date: 11/30/2020

15. ESTIMATED FUNDING:

a. Federal ($): 366,541.50

b. Match ($): 366,541.50

16. IS SUBMISSION SUBJECT TO REVIEW BY STATE UNDER EXECUTIVE ORDER 12372 PROCESS?

☐ a. This submission was made available to the State under the Executive Order 12372 Process for review on:

☐ b. Program is subject to E.O. 12372 but has not been selected by State for review.

☒ c. Program is not covered by E.O. 12372.

APPLICATION FOR FEDERAL ASSISTANCE SF-424 - MANDATORY

17. Is The Applicant Delinquent On Any Federal Debt?

Yes ☐ No ☒ Explanation

18. By signing this application, I certify (1) to the statements contained in the list of certifications and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)**

** I Agree ☒

** This list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix:	First Name:
Mr.	Don

Middle Name:

Last Name: Russell

Suffix:	Title:
	Project Manager

Organizational Affiliation: Horsefly Irrigation District

Telephone Number: 541-545-6474

Fax Number: 541-545-6475

Email: horseflydist@centurytel.net

Signature of Authorized Representative: Don Russell

Date Signed: Jan 10 / 2017

Attach supporting documents as specified in agency instructions.

Add Attachments | Delete Attachments | View Attachments

APPLICATION FOR FEDERAL ASSISTANCE SF-424 - MANDATORY

Consolidated Application/Plan/Funding Request Explanation:

Horsefly Irrigation District (HID), located in Klamath County, Oregon, is submitting a grant proposal under the WaterSMART Water and Energy Efficiency Grant Program for Fiscal Year 2017 (FOA #: BOR-DO-17-F012). Within this proposal, entitled the Dairy Canal Piping and Nobel Section Well Installation Project, HID is requesting $366,541.50 in Federal funds to convert roughly 7,200 feet of open canal to a buried pipe system and to install an energy efficient well.

SF-424C

View Burden Statement

OMB Number: 4040-0008
Expiration Date: 01/31/2019

BUDGET INFORMATION - Construction Programs

NOTE: Certain Federal assistance programs require additional computations to arrive at the Federal share of project costs eligible for participation. If such is the case, you will be notified.

COST CLASSIFICATION	a. Total Cost	b. Costs Not Allowable for Participation	c. Total Allowable Costs (Columns a-b)
1. Administrative and legal expenses	$ 38,000.00	$	$ 38,000.00
2. Land, structures, rights-of-way, appraisals, etc.	$	$	$
3. Relocation expenses and payments	$	$	$
4. Architectural and engineering fees	$	$	$
5. Other architectural and engineering fees	$	$	$
6. Project inspection fees	$	$	$
7. Site work	$	$	$
8. Demolition and removal	$	$	$
9. Construction	$ 456,750.00	$	$ 456,750.00
10. Equipment	$ 116,152.50	$	$ 116,152.50
11. Miscellaneous	$ 61,090.25	$	$ 61,090.25
12. SUBTOTAL *(sum of lines 1-11)*	$ 671,992.75	$	$ 671,992.75
13. Contingencies	$ 61,090.25	$	$ 61,090.25
14. SUBTOTAL	$ 733,083.00	$	$ 733,083.00
15. Project (program) income	$	$	$
16. TOTAL PROJECT COSTS *(subtract #15 from #14)*	$ 733,083.00	$	$ 733,083.00
FEDERAL FUNDING			
17. Federal assistance requested, calculate as follows: (Consult Federal agency for Federal percentage share.) Enter the resulting Federal share.	Enter eligible costs from line 16c Multiply X 50 %		$ 366,541.50

SF-424D

View Burden Statement

ASSURANCES - CONSTRUCTION PROGRAMS

OMB Number: 4040-0009
Expiration Date: 01/31/2019

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0042), Washington, DC 20503.

PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.

NOTE: Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the Awarding Agency. Further, certain Federal assistance awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant:, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project costs) to ensure proper planning, management and completion of project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, the right to examine all records, books, papers, or documents related to the assistance; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will not dispose of, modify the use of, or change the terms of the real property title or other interest in the site and facilities without permission and instructions from the awarding agency. Will record the Federal awarding agency directives and will include a covenant in the title of real property acquired in whole or in part with Federal assistance funds to assure non-discrimination during the useful life of the project.
4. Will comply with the requirements of the assistance awarding agency with regard to the drafting, review and approval of construction plans and specifications.
5. Will provide and maintain competent and adequate engineering supervision at the construction site to ensure that the complete work conforms with the approved plans and specifications and will furnish progressive reports and such other information as may be required by the assistance awarding agency or State.
6. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
7. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
8. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards of merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
9. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
10. Will comply with all Federal statutes relating to non-discrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681 1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29) U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statue(s) under which application for Federal assistance is being made; and (j) the requirements of any other nondiscrimination statue(s) which may apply to the application.

Previous Edition Usable

Authorized for Local Reproduction

Standard Form 424D (Rev. 7-97)
Prescribed by OMB Circular A-102

11. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal and federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.

12. Will comply with the provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

13. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333) regarding labor standards for federally-assisted construction subagreements.

14. Will comply with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

15. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).

16. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.

17. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq).

18. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

19. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.

20. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL	TITLE
Lon Russell	Project Manager
APPLICANT ORGANIZATION	**DATE SUBMITTED**
Horsefly Irrigation District	Jan 10/2017

SF-424D (Rev. 7-97) Back

Technical Proposal and Evaluation Criteria

Executive Summary

Date:	January 5, 2017
Applicant Name:	Horsefly Irrigation District (HID)
City, County, State:	Bonanza, Klamath County, Oregon
Contact:	Don Russell / Penny Pickett
Title:	Project Manager / Contact
Address:	P.O. Box 188
Office Phone:	(541) 545-6474
Cell Phone:	(541) 281-1946 / (541) 892-3915
E-mail:	Horseflydist@centurytel.net
Project Name:	Dairy Canal Piping and Nobel Section Well Installation Project

- **A one paragraph project summary that specifies the work proposed, including how project funds will be used to accomplish specific project activities and briefly identifies how the proposed project contributes to accomplishing the goals of this FOA (see *Section C.3.1. Eligible Projects*).**

  This project is being submitted under Tasks A and B of the funding announcement. Funding would be utilized for the conversion of approximately 7,200 feet of open canal to a buried pipe system and the installation of a well with energy efficient components to access groundwater sources during water short years. If funded, the completed project is anticipated to conserve approximately 700 acre-feet of water. Water savings resulting from this project would aide in conserving water resources in the reservoirs and rivers of the Klamath Project, an area that has experienced much controversy over water availability in the previous decades.

- **State the length of time and estimated completion date for the project.**

  Upon receiving confirmation of Reclamation funding, and completion of NEPA and NHPA compliance, the District anticipates they will complete the project within roughly two years. The following schedule assumes that both the NEPA and the NHPA process would require approximately six months for completion, and thus, construction would be delayed until after the following irrigation season in 2018. Construction would begin approximately October 2018 and would be completed in November 2020.

  Project Schedule (dependent on NEPA/NHPA compliance)
  January 2017 – Submit grant application
  September 2017 – Anticipated Grant is awarded
  October 2017 – Begin NEPA and cultural resources process
  March 2018 – Anticipated finalization of NEPA and NHPA compliance
  March 2018 – HID requests final bids for pipe and materials
  September 2018 – Purchase pipe and materials
  October 2018 – March 2019 – (weather dependent) – Phase 1 construction

October 2019 – March 2020 – (weather dependent) – Phase 2 construction
November 2020 – Any final construction completed

- **Whether or not the project is located on a Federal facility.**

  The proposed project location is on HID privately owned lands, and all facilities affected by the project are both owned and maintained by HID.

Background Data

- **Provide a map of the area showing the geographic location (include the State, county, and direction from the nearest town).**

  The proposed project includes the piping of two distinct sections of Dairy Canal; both sections are located in Klamath County, Oregon. See a project location map in Appendix A of this application.

  The northern Dairy Canal section (known also as the Nobel section of the Dairy Canal) will include the conversion of roughly 3,500 feet of canal into subterranean piping. It is located about four miles west-northwest of the town of Bonanza, Oregon in Section 36 of Township 38S, Range 11.5E. Coordinates for the southern tip of the section are 42° 13' 26.67" N and 121° 28' 25.14" W, and coordinates for the northern tip of the section are 42° 13' 48.68" N and 121° 28' 54.40" W. This section will also include the installation of a 400 foot deep, 18 inch diameter well at approximately 42° 13' 38.21" N and 121° 28' 35.10" W.

  The southern Dairy Canal section will include the conversion of approximately 3,700 feet of canal into subterranean piping. It is located roughly two miles west-northwest of the town of Bonanza, Oregon in Sections 6 and 8 of Township 39S, Range 11E. Coordinates for the southern tip of the section are 42° 12' 23.25" N and 121° 26' 26.99" W, and coordinates for the northern tip of the section are 42° 12' 48.42" N and 121° 27' 1.46" W.

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

  HID receives its water supply from several different sources under a number of contracts with Reclamation and the Oregon Department of Water Resources. HID obtains pre-project water from Lost River, flowing from the tributaries and sources of the Lost River watershed, with a priority right of 1903. In addition, HID holds a water right from the Big Springs, originating from Lost River in Bonanza, Oregon. Lastly, HID is in contract with the Bureau of Reclamation to 4,200 acre-feet from storage of Clear Lake Reservoir, as well as 3,800 acre-feet of natural flow from the Lost River.

There are approximately 90 landowners served by HID over an area of approximately 10,000 acres. Crops grown on these acres include alfalfa (approximately 5,000 acres), grain (approximately 2,000 acres), irrigated pasture (approximately 2,971 acres), and potatoes

The Klamath Basin sits at 4,100 feet in elevation, with average annual moisture of 12" to 14" per year, the majority being winter snowpack. Klamath County is currently experiencing a major shortage in snowpack, however, with below annual snowfall recorded in many of the previous years. As such, water supply in the Klamath Project can become very limited in certain years, and it is extremely important to conserve as much water as possible.

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

  The district is composed of a system of canals, constructed between 1915 and 1950. These facilities are solely dedicated for agricultural purposes. The original delivery system consisted of 25 miles of open canals. Through previous grants with Reclamation, approximately 5 miles of open canal has been converted to a piped system. It is HID's goal to have the entire system piped in the future years.

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

  HID has installed three Variable Frequency Drives (VFD) within the District. Through these improvements, and as outlined in reports by CH2M Hill (see Appendix B), HID has experienced approximately 15% in energy savings. Due to the fact that the contracts between Reclamation and Pacific Power expired in 2006, the entire Klamath Project has seen a huge increase in power costs. Any activities which reduce energy consumption, and therefore cost, are essential to this area.

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

  HID has been working with Reclamation for over one hundred years in every aspect involving irrigated agriculture in the Klamath Basin. Our piping program began in 2004 through grants with Reclamation under both the WaterSMART and Water Conservation Field Services Programs. Below is a breakdown of the previous grants that HID was awarded by Reclamation.

  - Bonanza Town pipe project in 2004,
  - Dairy Project in 2005,
  - Continuation of the Dairy Project in 2006, 2007, 2008, 2009, 2010, and 2011.
  - Yonna Project in 2008,

- Horsley Project in 2009
- Somers Project in 2009
- Armstrong Projects in 2009
- Dairy and Yonna Canal Piping Project in 2014
- Horsley and Somers Canal Piping Project in 2016

Throughout all of these projects, HID has had a good working relationship with Reclamation and has been successful in all projects. Most of these projects were managed out of the Klamath Basin Area Office.

Project Description

- **The project description should describe the work in detail, including project milestones and specific activities that will be accomplished as a result of this project. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal.**

HID proposes to convert approximately 7,200 feet of the opened, unlined Dairy Canal to a piped system (3,500 feet of 30 inch HDPE in the northern section (or Nobel section of Dairy Canal) and 3,700 feet of 30 inch HDPE in the southern section) and install an 18 inch diameter, 400 foot deep well within the District right of way of the Nobel section for groundwater access. If this proposal is awarded, HID would procure the necessary supplies and materials for the pipe and well installations. HID would provide the labor and equipment for the pipe installation; however, HID would utilize a contractor(s) for the well construction component of this proposal.

To start the piping project, the first step will be to haul the equipment and materials from the District headquarters to the project sites as needed. Any existing turnouts, drop structures, or checks within the canal that would impede the placement of the pipe would be removed; fencing in and near the project sites that would prohibit construction would also be removed. HID would utilize an excavator and D-4 Caterpillar to laser level the existing canal bed. The canal bed will be leveled to allow the pipe to lay properly at grade, and allow for gravity flow through the piping system; no excavation beyond the depth of the existing canal bed is anticipated. Once the ground is leveled, HID employees will begin installing pipe in the ground. Fabricated HDPE control structures, or cleanouts, which will allow for flow measurement and pump and maintenance access, would be installed at roughly 700 to 1,000 foot intervals along the installed piping. Once the pipe and cleanout boxes are installed, the pipe will be backfilled with soil from the existing canal banks. Once backfilled, the new pipe will have minimum cover of two feet and will be approximately four feet in ground. In an effort to not distort the underlying pipe, compaction above the piping would be minimal. The disturbed areas on and neighboring the buried pipe would be revegetated with drought tolerant pasture grass.

Depending on weather and completion of the necessary NEPA and NHPA compliance, it is anticipated that construction for each of the two sections of canal (i.e., the northern and

southern Dairy Canal sections) would be carried out in two separate phases. It has not been determined at this time which canal section would be constructed first; however, it is projected that Phase 1 construction would occur between October 2018 and March 2019, and Phase 2 construction would occur between October 2019 and March 2020.

Evaluation Criteria

Evaluation Criterion A: Quantifiable Water Savings

Describe the amount of water saved. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations.

HID anticipates an estimated water savings of about 700 acre-feet per year as a result of the piping component of the proposed project. This data was derived from reports produced by CH2M Hill, who has completed similar projects. As a result of past programs with Reclamation HID has reduced the usage of a 75 horsepower pump by 50%. This pump represents a consumption of approximately 3,000 gallons per minute as indicated by CH2M Hill. HID also uses rectangular weirs to determine how much water is being lost through seepage and evaporation in a given open canal section. After repeated measurements, HID has determined that through its existing open canal system, the District loses approximately 30% of the total amount of water diverted.

Additionally, HID has performed water measurement activities and calculations from previous piping projects. HID has discovered that after piping 5 miles of their open canal system, they have conserved approximately 30% of the water which is delivered through these systems. The district continues to reduce their water demand through these piping projects. Due to the 5 miles of piped system, HID has reduced their water diversion demands from 35,000 acre-feet in 2006, to 25,000 acre-feet in 2012.

Reclamation identified HID's 2014 WaterSMART project (Dairy and Yonna Canals Piping Project) as a good candidate for a water savings verification. An analysis was performed in April of 2015, and the results of the study indicated that HID's water saving estimate of 720 acre-feet, as stated in the associated grant proposal, was reasonable. As this currently proposed project is located along the same canal as the 2014 project, with relatively uniform soils, geology, and hydrologic characteristics, and the length of open canal to pipe conversion is similar between the two projects, HID predicts that a comparable water savings would result from this proposed project. See Reclamation's report in Appendix C of this application.

The well installation component of the proposal is also expected to yield significant water savings. HID is currently involved with the Oregon Water Resources Department and Adkins Engineering to develop a well in harmony with an existing well that would afford HID the ability to efficiently use the certificated water right that HID holds in its name. In

order to serve the lands that are listed under the certificate, the existing design requires that a large amount of water be deposited from the existing well into the Dairy Canal, which backs up the water roughly one mile to lands upstream. By doing this, HID loses 30 to 35% of the water via seepage and evaporation; the well installation project, in conjunction with the piping project, will help eliminate those losses as its proposed location will be very near the lands that are to be served. An established well at this location is particularly important during water short years when no water is available from the Lost River, and HID will have the capability to access groundwater in order to save the current harvests.

- **Where is the water that will be conserved currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?**

  Roughly 700 acre-feet of water per year is lost through evaporation and seepage. Water that is applied to cultivated fields is recycled through the systems and drained back into the Lost River.

(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.

The District anticipates an estimated water savings of 700 acre-feet per year, as a result of the proposed project. This data was derived from reports produced by CH2M Hill, who has completed similar projects. Additionally, HID has performed water measurement activities and calculations from previous piping projects. HID has discovered that after piping 5 miles of their open canal system, they have conserved approximately 30% of the water which is delivered through these systems.

As a result of past programs with Reclamation HID has reduced the usage of a 75 horsepower pump by 50%. This pump represents a consumption of approximately 3,000 gallons per minute, as indicated by CH2M Hill. HID also uses rectangular weirs to determine how much water we are losing in a given open canal section. After repeated measurements, HID has determined that through an open canal system, the District loses approximately 30% of the total amount of water diverted. A water savings verification was performed by Reclamation in 2015, and the results of that analysis indicated that HID's water loss estimate of 30% (as stated in HID's 2014 WaterSMART proposal) was reasonable (see report in Appendix C).

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.

30% of the water that is pumped from Lost River into HID's system is lost to seepage, evaporation and weeds. Based on PacifiCorp technical data for pump testing, HID knows how much a given pump consumes in water. Further down in the system, HID takes water measurements through the use of weirs and calculates the water lost in that particular section. (See graphic in Appendix D.)

Reclamation identified HID's 2014 WaterSMART project (Dairy and Yonna Canals Piping Project) as a good candidate for a water savings verification. An analysis was performed in April of 2015, and the results of the study indicated that HID's water saving estimate of 720 acre-feet, as stated in the associated grant proposal, was reasonable. As this currently proposed project is located along the same canal as the 2014 project, with relatively uniform soils, geology, and hydrologic characteristics, and the length of open canal to pipe conversion is similar between the two projects, HID predicts that a comparable water savings would result from this proposed project.

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

The post-project seepage losses are expected to be 0%. Converting an open ditch to buried HDPE pipe will eliminate seepage and improve management practices.

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

The anticipated annual transit loss reductions form the conversion of open ditches to buried pipe should be the estimated seepage loss (i.e., 700 acre-feet per year) and the reductions from increased management opportunities, which are difficult to quantify.

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

The actual canal loss seepage reductions can be easily verified by measuring the diversion to a lateral and the delivery from the lateral. Similar projects in the past have yielded an approximate 100 % delivery rate.

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

HID intends to use 30" HDPE pipe and HDPE control structures for controlling and measuring water flow and for maintenance access.

(2) Municipal Metering:

Not applicable.

(3) 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 municipal metering projects should address the following:

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

The District anticipates an estimated water savings of 700 acre-feet per year, as a result of the proposed project. This data was derived from reports produced by CH2M Hill, who has completed similar projects. Additionally, HID has performed water measurement activities and calculations from previous piping projects. HID has discovered that after piping 5 miles of their open canal system, they have conserved approximately 30% of the water which is delivered through these systems.

As a result of past programs with Reclamation HID has reduced the usage of a 75 horsepower pump by 50%. This pump represents a consumption of approximately 3,000 gallons per minute, as indicated by CH2M Hill. HID also uses rectangular weirs to determine how much water we are losing in a given open canal section. After repeated measurements, HID has determined that through an open canal system, the District loses approximately 30% of the total amount of water diverted. A water savings verification was performed by Reclamation in 2015, and the results of that analysis indicated that HID's water loss estimate of 30% (as stated in HID's 2014 WaterSMART proposal) was reasonable (see report in Appendix C).

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.

Current losses, as the result of evaporation and seepage, have been determined by prior analyses by Reclamation and CH2M Hill; no losses are occurring as the result of spillage.

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?

Not all flows are measured at all sites. Given the age of some of the structures it is not possible to accurately measure some of the early farm turnouts. However, the District uses the nearest rectangular weir to determine total volume in the canal to that point as established by Reclamation Standards. (See graphic in Appendix D.)

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

If awarded, HID will use the installed HDPE cleanout/access structures and the nearest existing rectangular weirs for flow measurement.

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

Yes, converting open canal to pipe will ensure that delivery volumes to the farms will be reduced as seepage and evaporation processes are eliminated. Prior studies by Reclamation and CH2M Hill have supported HID's estimations that the current infrastructure can be improved as it loses 30% of its incoming water allowance to seepage and evaporation.

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

Water savings will be measured using the HDPE cleanout/access structures that will be installed throughout the pipe.

(4) Supervisory Control and Data Acquisition and Automation: SCADA and automation components can provide water savings when irrigation delivery system operational efficiency is improved to reduce spills, over-deliveries, and seepage. Applicants proposing SCADA and automation projects should address the following:

HID is not currently involved with SCADA or Automation given the serious financial constraints.

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

Not applicable.

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.

Not applicable.

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

Not applicable.

d) Will canal seepage be reduced through improved system management? If so, what is the estimated amount and how was it calculated?

By piping the canal, seepage would be eliminated.

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

The HDPE structures that will be installed will allow for better measurement of flow.

(5) Landscape Irrigation Measures:

Not applicable.

(6) Turf Removal:

Not applicable.

(7) Smart Irrigation Controllers and High-Efficiency Nozzles:

Not applicable.

(8) High-Efficiency Indoor Appliances and Fixtures:

Not applicable.

(9) Groundwater Recharge:

Not applicable.

(10) Small Water Recycling and Water Reuse Improvements:

Not applicable.

(11) Other Project Types Not Listed Above:

Not applicable.

Evaluation Criterion B: Water Sustainability Benefits Expected to Result from the Project

Please describe in detail where the conserved water will go and how the conserved water is expected to increase water sustainability. Consider the following:

- **Will the project commit conserved water to instream flows? If so, please address the following:**

  - **Provide a detailed description of the mechanism that will be used (e.g., collaboration with a state agency or nonprofit organization, or other mechanisms allowable under state law) and the roles of any partners in the process. Please attach any relevant supporting documents.**

    This proposed project is a coordinated effort between HID and Reclamation and will benefit District water users and the Klamath Project as the effort will result in improved delivery systems. All water that will be conserved as a result of this project would directly remain instream (in the Lost River) for wildlife benefits and downstream users. A surplus of water would allow greater flexibility in Reclamation's management of the Klamath Project, and, dependent on annual precipitation levels within the Klamath Basin, the water may be diverted on to the neighboring refuges to support the Fish and Wildlife Service's mission and the greater Klamath River system.

  - **Indicate the quantity of conserved water that will be committed to instream flows. Describe where conserved water will be committed to increase instream flows (indicate specific stream reaches if applicable).**

    It is anticipated that the implemented project will result in 700 acre-feet of water saved per year. This water will: 1) remain in the Lost River system; 2) become carryover in Clear Lake (which is a rarity); 3) be available for diversion into the nearby wildlife refuges and the Klamath River; and 4) be used to benefit downstream users.

- **Describe the benefits that are expected to result from increased instream flows. Will the increased instream flows result in benefits to fish and wildlife? If so, please describe the species and expected benefit of the project.**

  As Klamath Project Irrigation Districts find themselves with the responsibility of addressing the needs of endangered species within the Klamath Basin, it has become important to make District water operations more efficient. Conserved water resulting from this project would remain available within the Lost River system, and thus would support both the Lost River Sucker and the Short Nosed Sucker fish species. The water quantity within the River would increase, and the water quality within the River would improve as the proposed project would result in an enclosed system that would eliminate the leaching of agricultural and ranch land nutrients and chemicals into those sections that are to be piped. Surplus water would also have the potential to be diverted to the neighboring wildlife refuges that supports populations of white pelicans and other waterfowl.

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

  The two species that will benefit largely as a result of this project are the Lost River Sucker and the Short Nosed Sucker; both are listed as federally endangered species. As many of the previous years in Klamath County have yielded below average precipitation, these species are significantly impacted by Klamath Project operations.

- **Will the increased instream flows result in benefits to habitat or other ecological benefits? If so, describe these benefits. Will the flows specifically benefit federally designated critical habitat?**

  Enclosing water conveyances will eliminate seepage and evaporation and also eliminate the leaching of chemicals into the water supply. The increase flow resulting from this project would improve both water quantity and quality in the Lost River and thus improve habitat for the instream Sucker species.

- **Will the increased instream flows result in other benefits not discussed above, including recreational, social, or economic benefits? If so, please explain.**

  The Lost River would realize a direct benefit from this proposed project. If weather conditions and Klamath Project operations allow, the increased water flow resulting from this project would also be available for nearby wildlife refuges and diversion into the Klamath River system that would better support salmon species that are focal points in the history and livelihood of native Tribes.

- **Some projects may address water supply sustainability in ways other than committing water for instream flows. If the questions listed above are not applicable to your project, please address the following to explain how the water savings from the project are expected to result in a public benefit:**

- **Is there a specific water supply sustainability concern in the region? What factors are contributing to the concern? Please include a description of the impacted geographic area and stakeholders, the partners that are collaborating to resolve the concern, and any other applicable information.**

  The Klamath Basin sits at a 4,100 foot elevation and its average annual moisture is about 12 to 14 inches per year, in which the majority is winter snowpack. Klamath County, however, has seen decreasing levels of snowpack for many of the previous years. As such, water supply in the Klamath Project can become very limited in certain years, and it is extremely important to conserve as much water as possible.

- **How will the proposed project help to address that concern? Will water conserved through the project result in reduced diversions or be made available to help alleviate water supply shortages due to drought, climate variation, or over-allocation?**

  This project will conserve water within the Klamath Project as it would reduce diversions to HID, and water would remain within the Lost River system that would support federally listed species and other wildlife.

- **Will the project make additional water available to Indian Tribes, and/or rural or economically disadvantaged communities)? If so, please explain.**

  It has not been documented that conserved water resulting from HID's prior efficiency projects has been made available for Tribes; however, all water saved has the potential to tie back into the greater Klamath River system that could prove useful to other communities including Tribal societies.

- **Will water conserved through the project help to address water supply sustainability in a way not listed above?**

  The well installation component of the project, in addition with the piping component, would allow HID to draw from groundwater sources rather than push water up through a porous canal to the necessary field needing irrigation. The well is an extremely important aspect to HID's operations particularly during drought years when no water is available from the Lost River.

Evaluation Criterion C: Energy-Water Nexus

For projects that include construction or installation of renewable energy components, please respond to Subcriterion No. C.1: Implementing Renewable Energy Projects Related to Water Management and Delivery. If the project does not implement a renewable energy project but will increase energy efficiency, please respond to Subcriterion No. C.2. Increasing Energy Efficiency in Water Management. If the project has separate components that will result in both implementing a renewable energy project and increasing energy efficiency, an applicant may respond to both.

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

Not applicable.

AND/OR

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

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project (e.g., reduced pumping). Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.

- **Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?**

  HID pumps water from the Lost River from ten pumping stations using 20 pumps. The total horsepower for all pumps is 1200 horsepower. The above pumps are essential to pump the necessary water for the entire District for a season.

  The proposed project will reduce the amount of water pumped and electricity consumed because the open canal will have been converted to pipe. Through the measured results of the past piping programs with Reclamation, HID is now seeing positive proof of conservation.

  As a result of past programs with Reclamation, HID has reduced the usage of a 75 horsepower pump by 50%. This pump represents a consumption of approximately 3000 gallons per minute, as indicated by CH2M Hill. Converting canal to pipeline reduces the need for pumping, and pumps can be retired which ultimately will reduce kilowatt consumption. HID also uses rectangular weirs to determine how much water we are losing in a given open canal section. After repeated measurements, HID has determined that through an open canal system, the District loses approximately 30% of the total amount of water diverted.

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

  All energy savings estimates originate at the current point of diversion.

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

  No. All water is used by agriculture; therefore, treating the water is not necessary.

- **Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations. Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).**

Yes, converting open canal to subterranean pipe will greatly reduce maintenance needs along the water conveyance, and, thus, the need for ditch rider vehicles and other machinery would be reduced.

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

Proposals that provide a detailed description of how a project is addressing an adaptation strategy specifically identified in a completed Basin Study (e.g., a strategy to mitigate the impacts of water shortages resulting from climate change, drought, increased demands, or other causes) may receive maximum points under this criterion. Applicants should provide as much detail as possible about the relationship of the proposed project to the adaptation strategy identified in the Basin Study, including, but not limited to, the following:

- **Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project and how the proposed WaterSMART Grant project would help implement the adaptation strategy.**

  The Klamath River Basin Study completed in August 2016 by Reclamation in partnership with the Oregon Water Resources Department and the California Department of Water Resources explored the decreasing of water demand as an adaptation strategy category. Agricultural water conservation was one concept within that category, and it includes canal lining and piping projects as an activity to obtain water conservation goals.

  HID's proposed project would support this effort as seepage would be eliminated along a 7,200 foot section of canal and approximately 700 acre-feet of water would be saved annually. All conserved water would remain instream within the Lost River; however, if Klamath Project operations and other conditions allow, the conserved water could be routed into the Klamath River system to support further agricultural water uses, environmental needs, Tribal treaty rights, and other interests that were identified in the Study.

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

  The Klamath River Basin Study stated that climate change has already impacted water resources and that the trend will continue in the future. Because of this, it is imperative that measures are identified that would reduce water supply and demand imbalances. The Study indicated that agricultural water conservation techniques, which reduce water demand, would assist in addressing this imbalance by allowing increased flow downstream in the Klamath Basin. This proposed piping project is expected to result in a savings of 700 acre-feet of water per year that would support that goal.

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

  HID is a participating stakeholder in the Klamath Project, and as such, was invited to provide input throughout the Basin Study process.

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

  Although it cannot be guaranteed that other Klamath Project/Basin partners will collaborate in implementing adaptation strategies in the future, HID is hopeful that this and its other prior successful conservation projects will serve as a model for other water districts.

Evaluation Criterion E: Expediting Future On-Farm Irrigation Improvements

Note: Scoring under this sub-criterion is based on an overall assessment of the extent to which the WaterSMART Grant project will facilitate future on-farm improvements. Applicants should describe any proposal made to NRCS, or any plans to seek funding from NRCS in the future, and how an NRCS-funded activity would complement the WaterSMART Grant project. Applicants may receive maximum points under this sub-criterion by addressing the types of information described in the bullet points below. Applicants are not required to have assurances of NRCS funding by the application deadline to be awarded the maximum number of points under this sub-criterion. Reclamation may contact applicants during the review process to gather additional information about pending applications for NRCS funding if necessary.

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

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

  The District, and irrigators therein, are experiencing an ongoing improvement in irrigation methods that includes pivots, linears, and updated wheel lines. Piping provides a consistent and improved supply of water to the water user. The water is cleaner than supplied by open canals and the discharge constant. This also allows HID management to provide water to users in a more timely and efficient fashion.

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

  The on-farm improvements initiated by the water users will convert current practices of gated and flood irrigated pastures to pivot irrigated.

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

Modern technology allows the water user to install a quarter mile pivot supplied by a 30 horsepower motor. A 30 horsepower motor and pivot will result in less energy consumption, minimal water consumption (i.e., ¼ mile pivot will use 400 gallons per minute), and reduced labor costs. Whereas the previous application required a 50 to 60 horsepower motor.

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

  For example, flood irrigating 160 acres that requires 4 sec ft / acre minimum would result in 640 acre-feet per year plus labor. A pivot will reduce the demand for water by 50% per year by covering 100% of the land with less water. A reduction from 4 cfs to 1 cfs would be achieved.

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

  No specific commitments have been arranged with NRCS at this time; however, HID is exploring on-farm improvement options and is in discussion with NRCS and other organizations involved in that effort.

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

  Not applicable.

Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1: Project Planning

Does the project 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, or other planning efforts done to determine the priority of this project in relation to other potential projects.

HID has a water conservation plan with the support of Reclamation and technical research conducted by CH2M Hill.

(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).

HID is not aware of and state or regional water plan. This project will be an asset to plans developed in the future by the state or otherwise.

Subcriterion No. F.2: Support and Collaboration

Describe the extent to which the project garners support and promotes collaboration. Does the project promote and encourage collaboration among parties? Consider the following:

Yes. The project is a coordinated effort with HID and Reclamation and will have a positive impact to the District and to other water users. This water conservation project is meant to increase the available surface supply through improved delivery systems. This increased supply will be truly beneficial to District water users and the Klamath Project. Also, this project includes a benefit to endangered species (Lost River and Short Nose Suckers) and other wildlife in the Klamath Basin including waterfowl populations in nearby refuges and Clear Lake.

- **Is there widespread support for the project?**

  Yes.

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

  Water users within HID are seeing the benefits of the piping program. We are at the point of making necessary and serious savings, which will be of great benefit during the dry years and the challenges to come. As HID has now converted about 20% of its water delivery system to pipe, a great deal of support and encouragement has been generated not only within the District but also within the larger Klamath Project

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

  Managing water resources wisely and being proactive is important to preserving agriculture in the Klamath Basin. Reclamation, through its funding, is a positive avenue to help individuals and districts get above the line and make the necessary improvements that lead to wise resource management. Beginning in 2001 the Klamath Project has become the poster child of water conflict and crisis. The Klamath Basin has been under pressure to provide limited water to many groups in addition to the water users under the original Klamath Reclamation project. During these times of extreme weather conditions, including drought and low snow pack, these demands are increasingly threatening to the livelihoods of the agricultural community. It is the responsibility of all in the area to conserve and use our precious resources to the best use we can.

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

  Yes.

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

  Yes, as HID continues to make its delivery system more efficient, District water users have been open to finding other efficient means for on-farm operations. Moreover, as HID continues to make these improvements (i.e., roughly 20% of open canal has been converted to pipe), it is becoming a conservation model within the Klamath Basin in which other irrigation districts are beginning to notice and take interest.

Subcriterion No. F.3: Performance Measures

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved). For more information calculating performance measure, see Section *D.2.2.5 Performance Measures*.

Historically and currently, HID does not divert water prior to the demand of the irrigation season so that conservation is maximized. The performance measure for the project will be an average historic loss rate (inflow – outflow) compared to the completed project. A piped system will have nearly 100% delivery rate, which is a great motivator for the project. Actual conservation will likely be adjusted in any reporting due to the actual length of the irrigation season.

The District will continue to use performance measures based on past experience of historic inflows and outflows. Any piped canal provides that section with 100% water savings.

Evaluation Criterion G: 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:

$$\frac{\text{Non-Federal Funding}}{\text{Total Project Cost}}$$

Currently, the amount of non-federal funding equals 50% of the total project cost.

366,541.50 / 733,083.00 = 50%

Evaluation Criterion H: Connection 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.

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

The average annual water supply to HID is 25,000 acre-feet of surface water. The District surface water supply comes from stored water at Clear Lake (4,200 acre-feet), some residual water from Gerber Reservoir, and 59 sec ft from Bonanza Springs. All the above is water supplied by contracts with Reclamation.

(2) Does the applicant receive Reclamation project water?

Yes.

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

HID is situated within the Klamath Reclamation Project boundaries. There are no Reclamation facilities (i.e., reserved works) within the District.

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

Yes.

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

Yes. The conserved water will remain in the Lost River System to benefit downstream users, federally listed endangered species, and the Klamath Basin wildlife refuges. There is also a possible potential that water could be diverted into the Klamath River.

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

It has not been documented that conserved water from HID's prior projects has been made available for Tribes, and HID suspects that surplus water from this proposal will yield little direct benefits for Tribes because much of the water will remain in the Lost River system. If conditions allow, however, there is potential to divert conserved water from the Lost River into the Klamath River system that could prove beneficial to be Tribes.

Performance Measures

Performance Measure No. A: Projects with Quantifiable Water Savings

Performance Measure No. A.1: Canal Lining/Piping

The performance measure for the project will be an average historic loss rate (inflow – outflow) compared to the completed project. HID is expecting the piped system to have a nearly 100% delivery rate. Actual conservation will be likely adjusted in any reporting due to the actual length of the irrigation season. The District will continue to use performance measures based on past experience of historic inflows and outflows.

Performance Measure No. B: Projects with Quantifiable Energy Savings

Performance Measure No. B.2: Increasing Energy Efficiency in Water Management

As this project will significantly improve the efficiency of HID's water conveyances, HID predicts that pumping usage will drop dramatically as well. Converting open canal to pipeline reduces the need for pumping, and pumps can be retired which ultimately reduces kilowatt consumption. As a result of past piping programs, HID has achieved up to 50% reductions in pump usage. The above performance measure for the canal piping along with utility statements will prove as useful indicators of this metric.

Environmental and Cultural Resources Compliance

So that Reclamation can assess the probable environmental and cultural resources impacts and costs associated with each application, all applicants must respond to the following list of questions focusing on the National Environmental Policy Act (NEPA), Endangered Species Act (ESA), and National Historic Preservation Act (NHPA) requirements. Please answer the following questions to the best of your knowledge. If any question is not applicable to the project, please explain why. The application should include the answers to:

- **Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.**

  The proposed project is expected to have a minimal impact on the surrounding environment. The temporary disturbance of the soil caused by profiling or trenching existing canal and drilling for the well will be minimal to the extent possible in preparation for pipe and well installation. It is the intent of HID to keep all soil movement to a minimum and perform construction during the non-irrigation season to protect water resources. The District also intends to plant native grasses on the disturbed areas after construction.

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

  HID is not aware of any critical habitat or threatened or endangered species occurring in the project area.

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

  No.

- **When was the water delivery system constructed?**

1915 through 1950.

- **Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.**

  It is the District's intent to replace open canals with buried pipe and replace all necessary control structures.

- **Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?**

  There are no buildings, structures, or features listed in the National Register of Historic places in the area.

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

  No sites are known at this time.

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

  No.

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

  No.

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

  No, from observation of past projects of this type, the implementation of this project will reduce the impacts and spread of non-native and native invasive species by eliminating the open canal system. The District also intends to plant native grasses on the disturbed areas thereby not providing a seedbed for noxious weeds.

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.

Although HID has not obtained official letters of support from state or local agencies, patrons within the District are fully supportive of the efforts of this project and previous similar projects. The savings of water and the reduced maintenance needs that occurs as result of implementing these projects has proven quite beneficial.

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.

For the pipe installation component of the project, HID will require Reclamation's approval which includes completion of NEPA and NHPA compliance. HID has been in discussion with and has requested that Reclamation conduct the necessary cultural and environmental requirements if possible.

The well installation component of the project will include the above requirements as well as permitting through the Oregon Water Resources Department. If possible, HID would likely allow the private contractor to obtain the approvals on HID's behalf.

Official Resolution

Include an official resolution adopted by the applicant's board of directors or governing body, or, for state government entities, a signed statement from 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**

Please see HID's Board Resolution and Statement of Net Assets in Appendix I and J.

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. This is a mandatory requirement. Letters of commitment shall identify the following elements:

- **The amount of funding commitment.**

  HID will commit $366,541.50 to this project. The greater portion of this amount is in-kind contributions of labor, management, and equipment. The total amount of the project is $733,083.00 with $366,541.50 requested under the WaterSMART opportunity.

- **The date the funds will be available to the applicant.**

  HID anticipates of having its cost share available at the time of signing the financial assistance agreement.

- **Any time constraints on the availability of funds.**

  None known by HID at this time.

- **Any other contingencies associated with the funding commitment.**

  N/A

Commitment letters from third party funding sources should be submitted with your project application. The funding plan must include all project costs, as follows:

- **How you will make your contribution to the cost-share requirement, such as monetary and/or in-kind contributions and source funds contributed by the applicant (e.g., reserve account, tax revenue, and/or assessments).**

  HID is not seeking funds from third parties; thus, no commitment letters are required. HID will provide its cost share through in-kind contributions of labor, management, and equipment.

- **Describe any costs incurred before the anticipated Project start date that you seek to include as project costs. For each cost, identify:**

  N/A

  - **The project expenditure and amount**

    N/A

  - **Whether the expenditure is or will be in the form of in-kind services or donations**

N/A

- **The date of cost incurrence**

  N/A

- **How the expenditure benefits the Project**

  N/A

- **Provide the identity and amount of funding to be provided by funding partners, as well as the required letters of commitment.**

  N/A

- **Describe any funding requested or received from other Federal partners. Note: other sources of Federal funding may not be counted towards the required cost share unless otherwise allowed by statute.**

  No other Federal partners are involved.

- **Describe any pending funding requests that have not yet been approved, and explain how the project will be affected if such funding is denied.**

  N/A

Summary of Non-Federal and Federal Funding Sources

* Denotes in-kind contributions

FUNDING SOURCES	AMOUNT
NON-FEDERAL	
Horsefly Irrigation District Funding*	**$ 366,541.50**
Non-Federal Subtotal	**$ 366,541.50**
FEDERAL	
Requested Reclamation Funding	**$ 366,541.50**
Federal Subtotal	**$ 366,541.50**
TOTAL PROJECT FUNDING	**$ 733,083.00**

Budget Proposal

The budget proposal should include detailed information on the categories listed below and must clearly identify all project costs. Unit costs shall be provided for all budget items including the cost of work to be provided by contractors. The budget proposal should also include any in-kind contributions of goods and services provided to complete the Project.

Budget Item Description	$ per Unit	Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Salaries and wages						
Engineering/Consultant	30.00	Hour	1,300	19,500.00	19,500.00	39,000.00
Manager	20.00	Hour	1,300	13,000.00	13,000.00	26,000.00
Labor/Helper	15.00	Hour	1,300	9,750.00	9,750.00	19,500.00
Fringe Benefits (avg/employee)						
Included in the total hourly wage						
Travel (incl. equipment & labor)						
N/A						
Equipment						
CAT 312 Excavator	37.18	Hour	1300	24,167.00	24,167.00	48,334.00
CAT D4 Dozer	38.65	Hour	300	5,797.50	5,797.50	11,595.00
John Deer 580 Backhoe	30.00	Hour	300	4,500.00	4,500.00	9,000.00
D 4 Cat	85.00	Hour	320	13,600.00	13,600.00	27,200.00
Pickup and pipe trailer	16.66	Hour	50	416.50	416.50	833.00
Semi Tractor	63.48	Hour	100	3,174.00	3,174.00	6,348.00
Low Boy – Haul Truck	26.11	Hour	100	1,305.50	1,305.50	2,611.00
Dump Truck	48.36	Hour	50	1,209.00	1,209.00	2,418.00
Vibrahammer (Backhoe attachment)	6.27	Hour	50	156.75	156.75	313.50
Misc. (generator, etc.)				3,750.00	3,750.00	7,500.00
Supplies and Materials						
HDPE Control Structures	1,008.00	Each	10	5,040.00	5,040.00	10,080.00
30" HDPE Pipe	23.00	Foot	7200	82,800.00	82,800.00	165,600.00
Well Pump & Motor Installation				16,735.00	16,735.00	33,470.00
Well Drilling				75,000.00	75,000.00	150,000.00
VFD (parts and labor)				6,350.00	6,350.00	12,700.00
Seed	1.00	Lb	400	200.00	200.00	400.00
Environmental, Regulatory, Permitting						
Legal				2,500.00	2,500.00	5,000.00
OWRD Permits (well)				1,500.00	1,500.00	3,000.00
PacifiCorp (electrical service)				1,000.00	1,000.00	2,000.00
NHPA Private Consultant	12,000	LS	1	6,000.00	6,000.00	12,000.00
Reclamation NEPA/NHPA	11,000	LS	1	5,500.00	5,500.00	11,000.00
Reporting				2,500.00	2,500.00	5,000.00
Contingency						
10% Contingency				30,545.13	30,545.13	61,090.25
Indirect Costs						
10% IDC				30,545.13	30,545.13	61,090.25
	Total			**$ 366,541.50**	**$ 366,541.50**	**$ 733,083.00**

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. Include the value of in-kind contributions or donations of goods and services and sources of funds provided to complete the project. 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 in-kind contributions and donations, must comply with the applicable cost principles contained in 2 CFR Part §200, available at the Electronic Code of Federal Regulations.

The project budget consists of six major components: 1) Salaries/Wages, 2) Equipment, 3) Materials/Supplies, 4) Environmental/Regulatory/Permitting, 5) Contingency, and 6) Indirect Costs. Based on previous similar projects, pricing quotes from local vendors, and the Army Corps of Engineers Operating Expense Schedule, HID has budgeted for all related tasks, labor, and materials necessary for this project. An itemized breakdown of these costs is included in this report. The cost estimate for each line item has been divided equally between HID and Reclamation.

Salaries and Wages

Indicate program manager and other key personnel by name and title. Other personnel may 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 should identify the direct labor rate separate from the fringe rate or fringe cost for each category. All labor estimates, including any proposed subcontractors, shall be allocated to specific tasks as outlined in the recipient's technical project description. Labor rates and proposed hours shall be displayed for each task.

The wages of the employees are not separated as indirect costs because of the direct nature of the project; their time is essential for material and labor coordination as well as other necessary functions of the project. No wage increases are anticipated at this time.

Budget Item Description	$ per Unit	Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Salaries and wages						
Engineering/Consultant	30.00	Hour	1,300	19,500.00	19,500.00	39,000.00
Manager	20.00	Hour	1,300	13,000.00	13,000.00	26,000.00
Labor/Helper	15.00	Hour	1,300	9,750.00	9,750.00	19,500.00
	Total			**$ 42,250.00**	**$ 42,250.00**	**$ 84,500.00**

Fringe Benefits

Indicate rates/amounts, what costs are included in this category, and the basis of the rate computations. Indicate whether these rates are used for application purposes only

or whether they are fixed or provisional rates for billing purposes. Federally approved rate agreements are acceptable for compliance with this item.

Fringe benefits are included in the hourly wage of each employee.

Travel

Include purpose of 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.

No travel expenses are anticipated.

Equipment

Itemize costs of all equipment having a value of over $5,000 and include information as to the need for this equipment, as well as how the equipment was priced if being purchased for the agreement. 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 for the project. If equipment currently owned by the applicant is proposed for use under the proposed project, and the cost to use that equipment is being included in the budget as in-kind cost share, provide the rates and hours for each piece of equipment owned and budgeted. These should be ownership rates developed by the recipient for each piece of equipment. If these rates are not available, the U.S. Army Corp of Engineer's (USACE) recommended equipment rates for the region are acceptable. Blue book, Federal Emergency Management Agency (FEMA), and other data bases cannot be used.

The below listed equipment that is to be used during construction of this project is owned by HID. The rates in the table are based on local contractor rates and the Army Corps of Engineers Operating Expense Schedule.

Budget Item Description	$ per Unit	Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Equipment						
CAT 312 Excavator	37.18	Hour	1300	24,167.00	24,167.00	48,334.00
CAT D4 Dozer	38.65	Hour	300	5,797.50	5,797.50	11,595.00
John Deer 580 Backhoe	30.00	Hour	300	4,500.00	4,500.00	9,000.00
D 4 Cat	85.00	Hour	320	13,600.00	13,600.00	27,200.00
Pickup and pipe trailer	16.66	Hour	50	416.50	416.50	833.00
Semi Tractor	63.48	Hour	100	3,174.00	3,174.00	6,348.00
Low Boy – Haul Truck	26.11	Hour	100	1,305.50	1,305.50	2,611.00
Dump Truck	48.36	Hour	50	1,209.00	1,209.00	2,418.00
Vibrahammer (Backhoe attachment)	6.27	Hour	50	156.75	156.75	313.50
Misc. (generator, etc.)				3,750.00	3,750.00	7,500.00
	Total			**$ 58,076.25**	**$ 58,076.25**	**$ 116,152.50**

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, past experience, engineering estimates, or other methodology).

Costs associated with supplies and materials are based on previous similar projects and pricing quotes from local vendors. Estimates for the HDPE control structures and seed are taken from HID's 2016 WaterSMART project (Horsley and Somers Canal Piping Project). The estimate for the well drilling, labor, and associated material has been obtained from Chancellor Drilling and Pump (see Appendix E). Estimates for the HDPE pipe, as well as the materials and labor needed to install the well pump and VFD, have been obtained from J.W. Kerns, Inc. (see Appendix F and G for estimate and HDPE pipe material information).

Budget Item Description	$ per Unit	Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Supplies and Materials						
HDPE Control Structures	1,008.00	Each	10	5,040.00	5,040.00	10,080.00
30" HDPE Pipe	23.00	Foot	7200	82,800.00	82,800.00	165,600.00
Well Pump & Motor Installation				16,735.00	16,735.00	33,470.00
Well Drilling				75,000.00	75,000.00	150,000.00
VFD (parts and labor)				6,350.00	6,350.00	12,700.00
Seed	1.00	Lb	400	200.00	200.00	400.00
	Total			**$ 186,125.00**	**$ 186,125.00**	**$ 372,250.00**

Contractual

Identify all work that will be accomplished by subrecipients, 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. If a subrecipient, consultant, or contractor is proposed and approved at the time of award, no other approvals will be required. Any changes or additions will require a request for approval. Identify how the budgeted costs for subrecipients, consultants, or contractors were determined to be fair and reasonable.

Installation of the HDPE pipe and control structures will be performed by HID employees. Construction of the proposed well, to include well drilling and installation of the pump and VFD, will be performed by local contractors. These line items are listed in the materials and supplies category as the obtained estimates include materials and labor costs. See Appendices E and F for cost estimates associated with the well installation.

HID anticipates the need for securing a consultant to perform the necessary NHPA compliance for this project; this expenditure is addressed in the environmental and regulatory compliance costs category.

Environmental and Regulatory Compliance Costs

Applicants must include a line item in their budget to cover environmental compliance costs. "Environmental compliance costs" refer to costs incurred by Reclamation and the recipient in complying with environmental regulations applicable to an award under this FOA, including 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.

It is anticipated Reclamation will conduct the environmental (i.e., NEPA) compliance. However, based on prior experiences, the NHPA requirement will necessitate the hiring of a private cultural consultant where Reclamation will assume a review role. The costs listed below for the NHPA private consultant and the Reclamation NEPA/NHPA line items are based on HID's previously awarded WaterSMART project from 2014 (Dairy and Yonna Canals Piping Project) as it is similar in scope to this proposed project (see Appendix H for prior invoice from Rabe Consulting).

HID has budgeted a total of $10,000.00 for associated legal, state, and utility expenditures involved in the installation of the new well. A line item for reporting ($5,000.00) has been included to cover costs associated with the WaterSMART grant reporting requirement and other reporting obligations from the state or local level.

Budget Item Description	$ per Unit	Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Environmental, Regulatory, Legal, Permit						
Legal				2,500.00	2,500.00	5,000.00
OWRD Permits (well)				1,500.00	1,500.00	3,000.00
PacifiCorp (electrical service)				1,000.00	1,000.00	2,000.00
NHPA Private Consultant	12,000	LS	1	6,000.00	6,000.00	12,000.00
Reclamation NEPA/NHPA	11,000	LS	1	5,500.00	5,500.00	11,000.00
Reporting				2,500.00	2,500.00	5,000.00
	Total			**$ 19,000.00**	**$ 19,000.00**	**$ 38,000.00**

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.

None anticipated.

Contingency Costs

The contingency category has been included to support any unforeseen inflation involved in cost estimates for any of the above budgeted line items that total $610,902.50. HID does not intend to purchase any materials or supplies until NEPA and NHPA requirements have been met; however, given the timeframe that may be involved, the current estimates may change by the time the necessary compliances have been completed.

Budget Item Description	$ per Unit	Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Contingency						
10% Contingency				30,545.13	30,545.13	$ 61,090.25

Indirect Costs

Indirect costs that will be incurred in performance of Project activities, which will not otherwise be recovered, may be included as part of the budget proposal. Show the proposed rate, cost base, and proposed amount for allowable indirect costs based on the applicable cost principles for the recipient's organization. Applicants must not incorporate indirect rates within other direct cost line items.

A line item for indirect costs has been included to cover any overhead and general costs. HID has budgeted for the de minimis rate of 10% of the total direct costs minus the contingency line item (i.e., $610,902.50)

Budget Item Description	$ per Unit	Unit	Quantity	Recipient Funding	Reclamation Funding	Total Cost
Indirect Costs						
10% IDC				30,545.13	30,545.13	$ 61,090.25

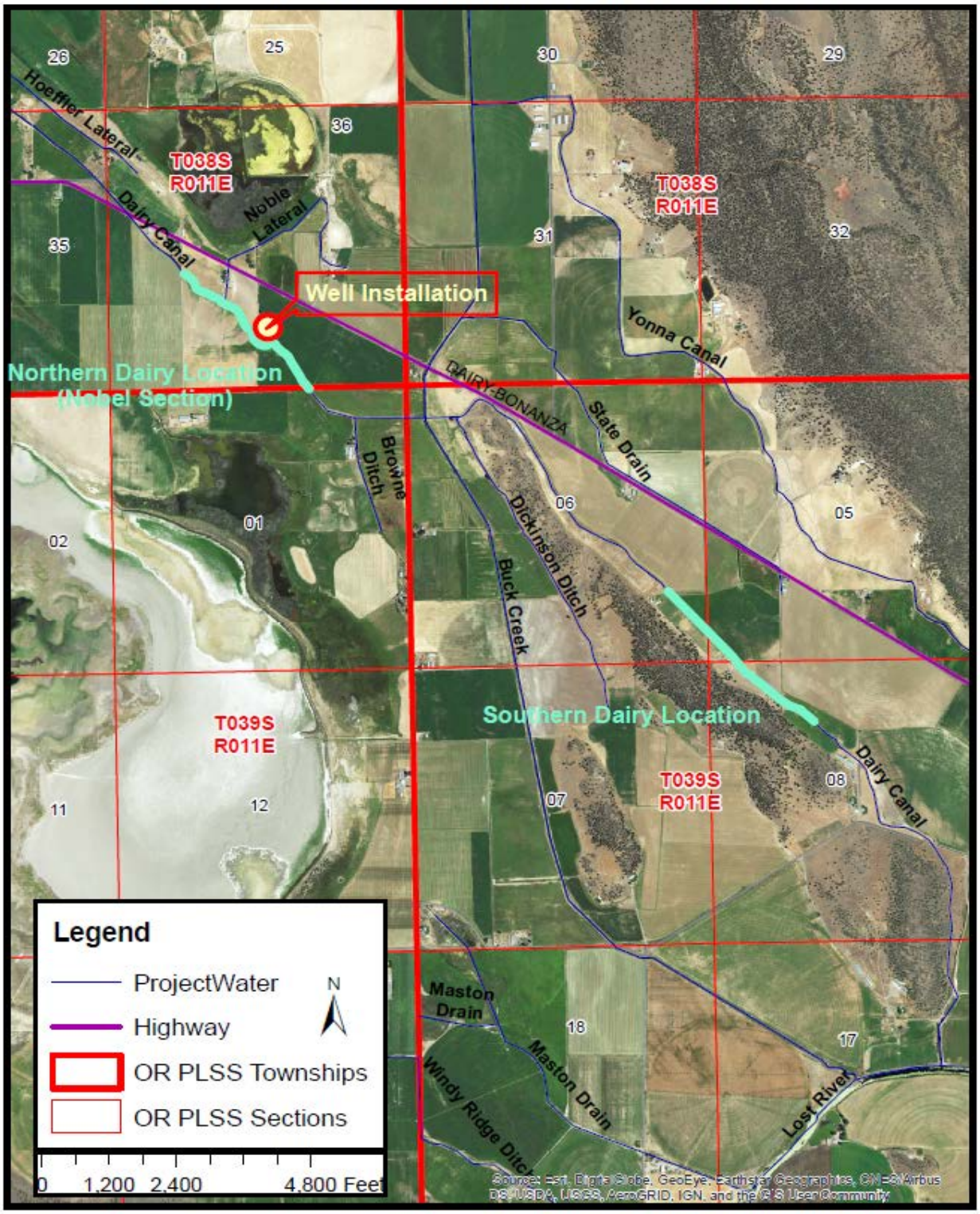
Total Costs

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

The total project cost is $733,083.00 in which $366,541.50 is being requested from Reclamation and the balance of $366,541.50 will be supplied by HID.

APPENDIX A

HID FY 17 WaterSMART Project Locations



APPENDIX B

REPORT

Water Conservation Assessment of Horsefly Irrigation District

A project funded by

Klamath Soil & Water Conservation District

for

Horsefly Irrigation District

April 1998

Revised August 2006

Completed by

FloSonics, Inc.

CH2MHILL

PDX17DOC.DOC

APPENDIX C

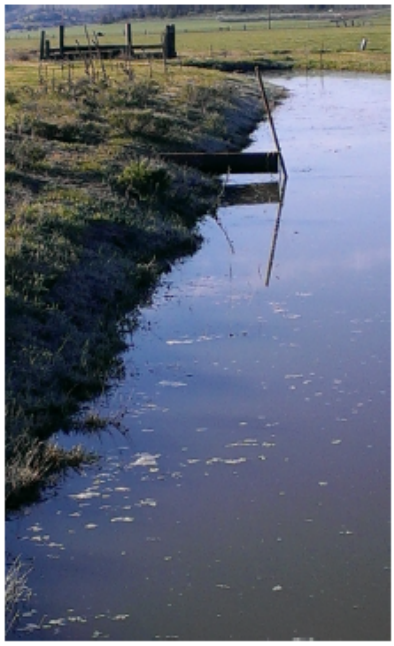
RECLAMATION

Managing Water in the West

Horsefly Irrigation District Yonna Canal WaterSMART Ponding Test

Summary of Findings Report

Mid-Pacific Region



U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center

January 2016

Horsefly Irrigation District Yonna Canal WaterSMART Ponding Test

Summary of Findings Report

Mid-Pacific Region

Prepared by Merlynn D. Bender

Technical Service Center
Project Management
Mark Spears, Hydraulic Engineer

U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center

January 2016

Acronyms and Abbreviations

AFY	acre-feet per year
cfs	cubic feet per second
HID	Horsefly Irrigation District
Reclamation	Bureau of Reclamation
SMART	Sustain and Manage America's Resources for Tomorrow
TSC	Technical Service Center
WEEG	WaterSMART Water and Energy Efficiency Grant

Contents

Figures

Background

The Horsefly Irrigation District (HID) applied for and received a Reclamation WaterSMART Water and Energy Efficiency Grant during 2014 (WEEG-14-082). Reclamation's Technical Service Center (TSC) staff identified this HID piping project as a good candidate for water savings verification. This project will replace one Yonna Canal section and two Dairy Canal sections with plastic pipe to reduce seepage. HID staff (Eric Mockridge and Nicholas Mockridge) provided equipment and performed the ponding test. TSC staff (Merlynn Bender) and Reclamation's Klamath Basin Area Office staff (Tyler Hammersmith) observed and facilitated the ponding test.

During April 9, 2015 through April 13, 2015, HID conducted a ponding test on Yonna Canal because the Dairy Canal pumps were not operable. Because those pumps were not operable, the reach for the ponding test was changed that morning to an open channel canal section just downstream of the Yonna Canal reach to be piped. The Yonna Canal reach to be piped was too steep for a ponding test. However, the reach downstream was flat enough for a ponding test. The purpose of the ponding test was to provide pre-project estimates of seepage losses that could be used to compare against the estimates given in HID's original proposal for the grant. The bottom of the earthen canal ditch used for the ponding test appeared to be hard-packed clay loam soil. Soil density was observed by driving a metal bar into the soil near the downstream temporary ponding test dam on Yonna Canal.

HID was provided a ponding test guidance document prior to the test.[1] After a beginning safety meeting, HID constructed the downstream dam with a tarp placed over the upstream culvert opening of a road crossing and then with excavated soil placed over and in front of the culvert opening using HID's backhoe (figure 1). Preparation for the ponding test occurred the same day as the beginning of the ponding test which began at 9 p.m. April 9. The backhoe was also used to cut an overflow key in the road crossing at the temporary downstream ponding test dam to prevent flooding fields. The backhoe and hand shovels were used to fill the downstream dam site culvert opening with soil to eliminate dam pond leakage. Three staff gauges were installed in Yonna Canal near the downstream dam, 0.3 miles upstream of the downstream dam, and about 0.3 miles upstream of the upstream end of the pond test section. The upstream gauge was used to show passage of the water draining off the steeper upstream reach and was not used for measurements after recordings for the ponding test period were initiated. Water was pumped slowly into Yonna Canal over a six hour period so as to not wash out the earthen dam while filling. Unfortunately, water seeped through the downstream closed-off dam culvert during filling. Repairing the

[1] Guidance document: "Measuring Seepage Losses from Canals Using the Ponding Test Method," by Eric Leigh and Guy Fipps, AgriLIFE EXTENSION, Texas A&M System, B-6218, 1-09 (January 2009).

downstream dam required the addition of a stiff plywood cover and additional soil over the culvert opening. The pond banks were allowed to saturate and the pond water surface to level off for three hours before beginning the ponding test. Gauge readings were initially taken every hour at each of the measuring stations just upstream of the downstream dam as the water surface elevation stabilized to a flat pool and calm pool condition at 9 p.m. on April 9. No wind or waves in the pond were observed and no precipitation occurred overnight.

Figure 1. Downstream dam on Yonna Canal for HID ponding test.

As shown by the report cover figure, the water surface elevation dropped 0.42 feet over a 12-hour period indicating considerable seepage from the canal which had been saturated for six hours before beginning the ponding test at 9 p.m. on April 9. Because no temporary upstream dam was constructed, slight drainage from the upper portion of Yonna Canal may have seeped into the ponded section during the early part of the ponding test period. Before ponding the reach and during the ponding test, canal bottom and top widths were measured using a tape line. These field measurements were performed at the test site to determine wetted perimeter and top width of the ponded section. Staff gauge measurements were initiated at each of the two pond test measurement locations three hours after it was determined that the inflow was complete and the downstream dam was water tight. The two measurement locations, at a distance of 0.3 miles apart, indicated a still calm pond condition without waves about two hours before starting the pond seepage drawdown measurements. The pond test consisted of recording the date,

time of day, and water level on the staff gauges as well as the distance of water level drop from a baseline maximum pool datum on stationary objects. Those stationary objects were a rust-colored culvert pipe (see report cover) over the pond near the downstream dam and a turnout headgate about 0.3 miles upstream of the downstream dam.

The drawdown rate of the pond test determined how long the measurements were taken as well as the extent of the pool length to use for seepage calculations. A pond reach length of one mile (excluding road-crossing culvert sections) allowed potentially 18 inches of water surface drop at the upstream end of the pond section chosen for seepage calculations over a three day period if needed. The ponding test was completed within 72 hours. Based on drawdown measurements from the rust-colored culvert pipe by TSC and HID, the ponded section lost forty percent of the initial ponded section water volume during the ponding test period of three days. The ponding test period extended 72 hours from 9 p.m. April 9 to 9 p.m. April 12.

Results

The initial observed seepage rate of 10 inches per day (0.83 feet/day or 0.83 cubic feet per foot of canal per day) was used for canal seepage calculations. It was assumed that the canals to-be-piped would run continuously for 180 days during the irrigation season. An assumed rectangular upper canal volume loss and an average canal width of 18 feet, based on field measurements, was used for seepage calculations resulting in a loss of 15 cubic feet per day per foot of canal to be piped. Multiplying the seepage loss rate by the total 1.26 mile length (6,653 feet) of canal to be piped in the three reaches resulted in 412 acre-feet per year (AFY) seepage loss based on the ponding test located just downstream of the to-be-piped reach of the Yonna Canal. HID estimated 720 AFY total seepage loss for the three canal reaches to-be-piped. The applicants estimate was based on the difference between the amount pumped and amount diverted. HID estimated that 30 percent of the water diverted is lost.

The unlined canal section tested during the ponding test is a flat reach with ten road-crossing culverts that dam as well as restrict the flow. Fine sediments observed in the canal bottom (figure 1) drop out of the water column and partially seal the canal bottom upstream of the road-crossing culverts potentially reducing the amount of canal seepage. Each road-crossing culvert constricts flow and dams water thereby reducing velocities causing fine sediments to settle to the canal bottom upstream of the culverts. Fine sediments were observed by TSC staff before and during the ponding test while walking the dry canal and wading the saturated canal. The apparent sediment sealing is suspected to have partially sealed the canal in the ponding test reach, thereby reducing the amount of seepage

observed in the ponding test relative to the more typical canal sections. With no temporary upstream dam, slight upstream drainage from rainfall, bank drainage, and groundwater seepage may have entered the ponding test section after the beginning of the ponding test which would decrease the ponding test seepage rate calculated. After saturating the unlined canal for six hours, the HID Yonna Canal ponding test for one mile of unlined channel was considered successful.

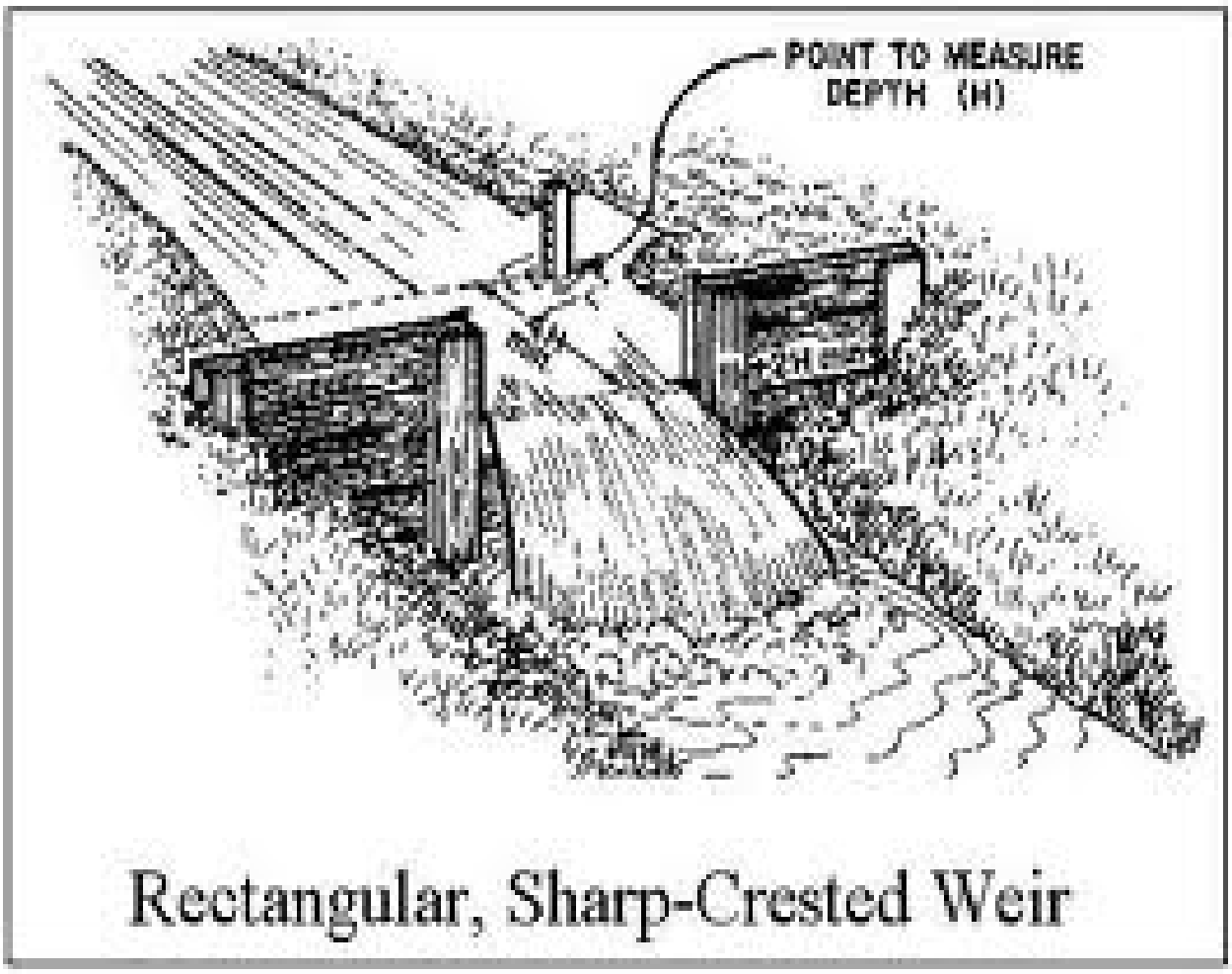
Conclusions

The Yonna Canal ponding test indicated seepage water loss from the unlined earthen canal was 57 percent of that estimated by the applicant. However without an upstream dam on the ponded section, the actual amount of seepage may be more due to previous precipitation or pump drainage entering the ponded section after the start of the ponding test. The ponded section is located in a flat wetland area which is expected to experience less seepage than a more typical reach with better drainage pathways to the groundwater table. There may be more seepage on the Dairy Canal and Yonna Canal reaches to be piped where there are less road crossings with culverts and more rodent burrows. The many variables affecting net seepage into the hard-packed soils where the ponding test occurred reduces the certainty of testing and subsequent interpretation of data. A post-project test is typically not required for a piping project which should not leak.

Although the ponding test of the earthen Yonna Canal in flat terrain downstream of the reaches to be piped provided useful information in regards to seepage reduction, additional information would be required to potentially better estimate pre-project seepage in other reaches. Overall, the grant applicant's water saving estimate appears to be reasonable based on the information provided in the grant application and based on the Yonna Canal ponding test observations; however without additional data, the larger seepage rate estimated by the applicant on the three canal sections to be piped was not verified on the flatter Yonna Canal ponding test reach located downstream of the steeper reach to be piped.

C:\1wordDP\WaterSmart2015wp\MeasurementDreportsWEEG2014\Horsefly082\PondTestResults\Horsefly Ponding Test Final Report2015c17.docx

APPENDIX D



Rectangular, Sharp-Crested Weir

APPENDIX E

ESTIMATE

CHANCELLOR DRILLING & PUMP

5437 ALTAMONT DRIVE
KLAMATH FALLS, OR 97603
CCB#194815

BILL TO
Horsefly Irrigation District 2797 Market St, Bonanza, OR 97623

DATE	INVOICE #
12/22/2016	3312

Phone #	Fax #	E-mail	TERMS
(541)884-7907	(541)882-5791	chancellordrilling@gmail.com	

DESCRIPTION	# of FEET	RATE	AMOUNT
Move Rig in and out of job	1	5,000.00	5,000.00
STATE WELL PERMIT FEE	1	225.00	225.00
22" DRILLING	400	220.00	88,000.00
18" .375 WALL CASING	400	90.00	36,000.00
Surface Seal	400	30.00	12,000.00
17-1/2" Drilling (400' - 450')	50	175.00	8,750.00
Bergdorf Rd. & Highway 70 Bonanza,OR			
90 day pricing			
NOTE; PRICE MAY VARY WITH DEPTH AND MATERIALS		**Total**	$149,975.00

APPENDIX F

J.W. KERNS, INC
IRRIGATION EQUIPMENT SALES AND SERVICE
ESTIMATE

4360 HIGHWAY 39
KLAMATH FALLS, OR 97603
JWKERNSINC@JWKERNSINC.COM
C.C.B. 155281

(800) 598-6205
(541) 884-4129
FAX (541) 884-0995

SHEET NO. _____

NAME Horse Fly Irrigation Don Russell 541-281-1946
ADDRESS _____
SALESMAN Hector Garcia

PROJECT Horse Fly Irrigation
DATE 12-16-16

NO.	ITEM	PRICE EACH	TOTAL
	75 HP 4000gpm @ 50' Pumpset 60'		
1	16RGLC / Stage - WL 14" x Case		8,635 20
1	14" x 16.5 Fab Steel Head WL x 1½ Stuffing Box		7,560 00
6	10' x 14" Water Lube Column Pipe	714 80 ea	4,284 00
6	10' x 1.5 SS Water Lube Shaft	308 00 ea	1848 00
6	Bronze Retainer 14" x 1.5	308 00 ea	1848 00
1	14" Cono Strainer		630 00
1	US 75HP 1800 WP-1 460V Inv Duty w/VFD		5,950 00
		TOTAL	30,755 20
	Labor		
4	Hi's Threament Turbine Truck + Service R's	265 00 hr	1060 00
1.5	Hi's Threament Turbine Truck + Service R's	265 00 hr	397 50
		TOTAL	32,212 70
1	Shipping & Handling		1250 00
		TOTAL	33,462 70

THIS QUOTATION IS SUBJECT TO THE FOLLOWING CONDITIONS: (a) Errors are subject to correction. (b) All prices are subject to change without notice. (c) Prices FOB point of origin unless specified otherwise. (d) Quotations are made for immediate acceptance unless stated otherwise. (e) All orders are subject to approval by our credit dept. (f) Claims for corrections, reductions or shortage must be made within 10 days after receipt of goods.

FORWARD OR TOTAL

J.W. KERNS, INC

IRRIGATION EQUIPMENT SALES AND SERVICE

ESTIMATE

4360 HIGHWAY 39
KLAMATH FALLS, OR 97603
JWKERNSINC@JWKERNSINC.COM
C.C.B. 155281

(800) 598-6205
(541) 884-4129
FAX (541) 884-0995

SHEET NO. _____

NAME Horse Fly Irrigation Don Russell 541-281-1946

PROJECT Horse Fly Irrigation

ADDRESS _____

SALESMAN Hector Garcia

DATE 12-16-16

NO.	ITEM	PRICE EACH	TOTAL
	75Hp VFD		
1	75Hp 480v 3pH 3Ø 106A		8,669 70
1	Speed potentiometer		156 00
1	Strike Sorb SPD 60K AIC		650 00
1	75HP 480v A-T-L bypass Adder		2,364 70
1	Programming		500 00
1	Shipping & Handling		350 00
		Total	12,690 40

THIS QUOTATION IS SUBJECT TO THE FOLLOWING CONDITIONS: (a) Errors are subject to correction. (b) All prices are subject to change without notice. (c) Prices FOB point of origin unless specified otherwise. (d) Quotations are made for immediate acceptance unless stated otherwise. (e) All orders are subject to approval by our credit dept. (f) Claims for corrections, reductions or shortage must be made within 10 days after receipt of goods.

FORWARD OR TOTAL

J.W. Kerns, Inc.

4360 Highway 39 - Klamath Falls, OR 97603 - CCB# 155281

Office: 541-884-4129
: 800-598-6205
Fax: 541-884-0995
Email: jwkernsinc@jwkernsinc.com

ESTIMATE

Purchaser	Horsefly Irrigation	Date	12/16/2016
		Deliver To	Bonanza
		Salesman	Bill Garriott
Address	Bonanza, OR	How Ship	Direct
Project		When	Soon
Phone #	Don 541-281-1946	Credit	Charge

DEL. DATE	QUAN.	DESCRIPTION	PRICE EACH	TOTAL
		EQUIPMENT		
	3000	30" Double Wall Corrgated Water Tight HDPE	$ 23.00	$ 69,000.00
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
				$ -
			GRAND TOTAL	$ 69,000.00

This Quotation Subject To The Following Conditions: (a) Errors are subject to correction. (b) All prices are subject to change without notice. (c) Prices FOB point of origin unless specified otherwise. (d) Quotations are made for immediate acceptance unless stated otherwise. (e) All orders are subject to approval by our credit department. (f) Claims for corrections, reductions or shortage must be made within 10 days after receipt of goods.

Purchaser Signature		Date		Order #	

APPENDIX G

The new standard in drainage pipe

Every day for more than 30 years, Advanced Drainage Systems corrugated high density polyethylene (HDPE) pipe has been building its reputation for economy, durability, and superior performance in gravity-flow drainage applications. During the 1970's and 1980's, ADS single wall pipe became the preferred product for agricultural, mining, turf/recreation, and residential drainage markets.

N-12® Pipe (4" - 42")

The hydraulic capabilities of the product were significantly improved in 1987 when ADS introduced the first HDPE drainage pipe to combine an annular corrugated exterior for strength with a smooth inner wall for maximum flow capacity. Named for its excellent Manning's "n" rating of 0.012, N-12 pipe was designed specifically for storm sewers, highways, airports, and other engineered construction. Through extensive field and university testing, ADS engineers were able to refine the corrugated wall design for successfully larger diameters without compromising the pipe's excellent strength-to-weight ratio. Its performance and economy have led to rapid acceptance by contractors and engineers, and official approval by most state and municipal agencies.

N-12 ProLink *Ultra*® Pipe (12" - 42")

In 1997, ADS incorporated a flush gasketed bell-and-spigot joint into each section of the popular storm sewer sizes of N-12 pipe. This design eliminates the need for separate couplings and the excavation of bell holes in the trench. The joint is silt-tight, and its quick and easy installation has led to instant acceptance by contractors across the country.

N-12 HC® Pipe (42" thru 60")

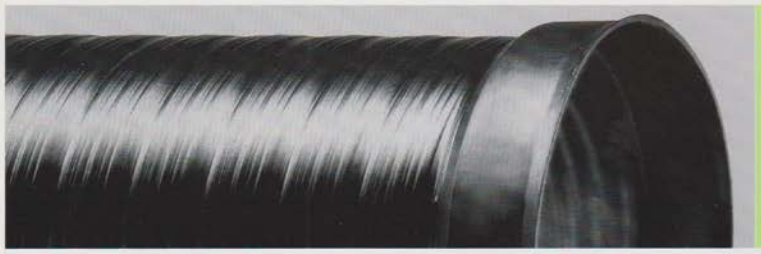
Soon after the introduction of N-12 pipe, ADS engineers began a major program to develop an alternative wall profile that would provide superior strength, stiffness, and production efficiencies. An 8-year development and testing program produced a revolutionary pipe design called N-12 HC. The pipe features smooth inner and outer walls, and a unique "honeycomb" wall section using closely spaced circular ribs that brace the pipe circumferentially for added ring stiffness and structural strength. Soil loading tests at Utah State University indicate that N-12 HC pipe may have the most stable wall profile ever manufactured for large diameter flexible pipe.

Applications

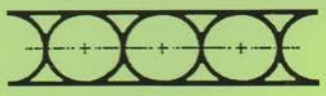
N-12 and N-12 ProLink Ultra pipe meet the requirements for Type S pipe under AASHTO M 294, and N-12 HC qualifies as Type D pipe. All products can be specified for culverts, cross drains, storm sewers, landfills, and other public and private construction.

N-12® Pipe (4" – 42")
The first corrugated High Density Polyethylene drainage pipe with a smooth inner wall for superior hydraulics and maximum flow capacity.

N-12® ProLink *Ultra*™ Pipe (12" – 42")
Integral Bell Coupler covers two corrugations
Rubber Gasket
Two reduced diameter corrugations form the spigot

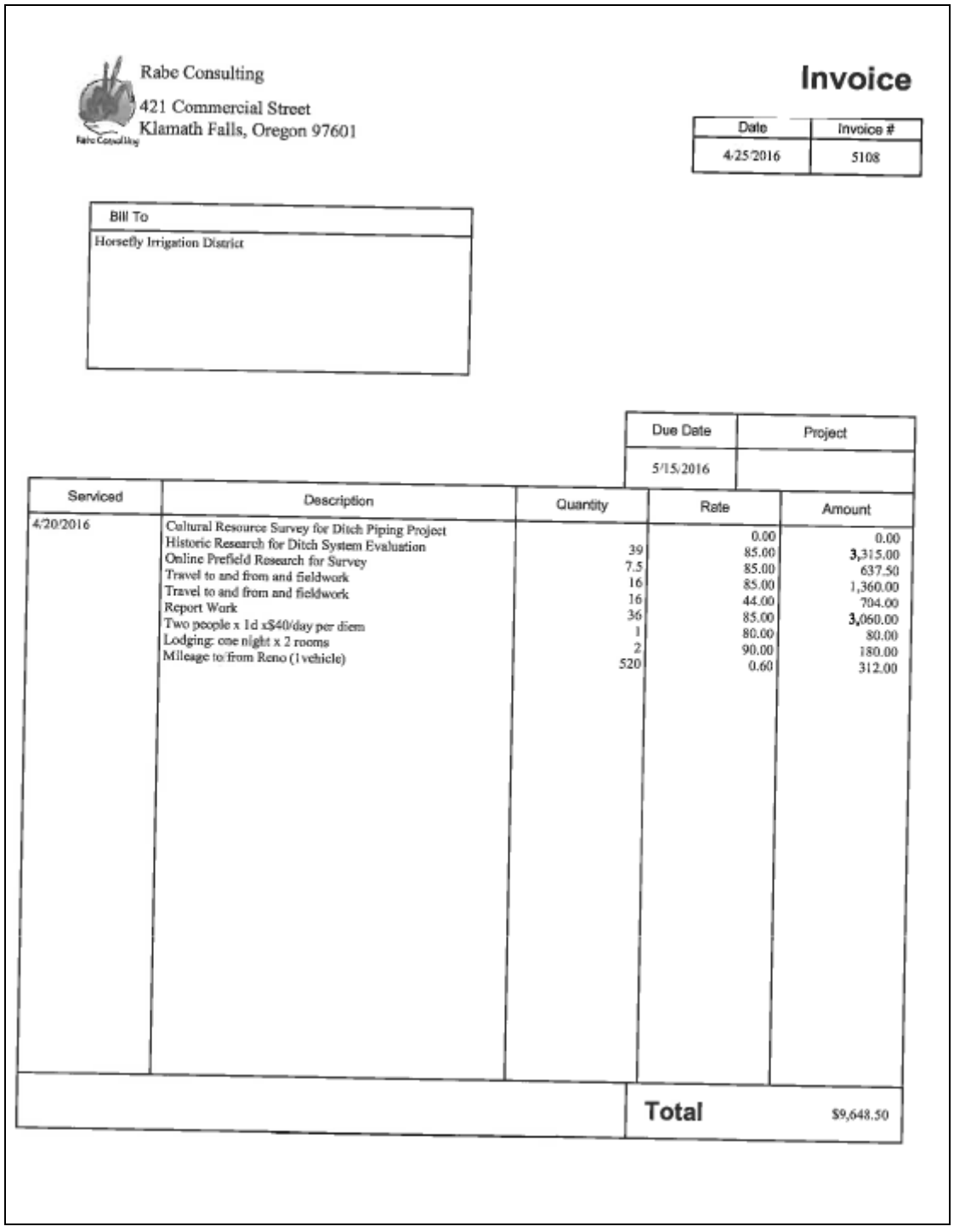


N-12 HC® Pipe (42" thru 60")
N-12 HC's innovative "honeycomb" wall section draws on the structural strengths of the circle, the I-beam, and the classic arch.



2

APPENDIX H



Rabe Consulting
421 Commercial Street
Klamath Falls, Oregon 97601

Invoice

Date	Invoice #
4/25/2016	5108

Bill To
Horsefly Irrigation District

Due Date	Project
5/15/2016	

Serviced	Description	Quantity	Rate	Amount
4/20/2016	Cultural Resource Survey for Ditch Piping Project		0.00	0.00
	Historic Research for Ditch System Evaluation	39	85.00	3,315.00
	Online Prefield Research for Survey	7.5	85.00	637.50
	Travel to and from and fieldwork	16	85.00	1,360.00
	Travel to and from and fieldwork	16	44.00	704.00
	Report Work	36	85.00	3,060.00
	Two people x 1d x$40/day per diem	1	80.00	80.00
	Lodging: one night x 2 rooms	2	90.00	180.00
	Mileage to/from Reno (1 vehicle)	520	0.60	312.00
			Total	$9,648.50

Rabe Consulting
421 Commercial Street
Klamath Falls, Oregon 97601

Invoice

Date	Invoice #
8.9.2016	5140

Bill To
Horsefly Irrigation District

Due Date	Project
8/9/2016	

Serviced	Description	Quantity	Rate	Amount
	Final Report: Addressed comments from draft review	23	85.00	1,955.00
			Total	$1,955.00

APPENDIX I

RESOLUTION 1.13.16

Whereas the directors of Horsefly Irrigation District on January adopt the following resolution:

Whereas Horsefly Irrigation District being a legal district under Oregon Statute organized in 1911, hereby resolve to continue our participation with the Bureau of Reclamation in regards to conservation efforts within the district.

Whereas the district maintains adequate reserve funding to participate with in kind funding plans.

Whereas the district goal is to maintain our relationship with the Bureau of Reclamation in a fashion that allows the district to meet established guidelines set forth by USBR.

Therefore be it resolved by the board or directors of Horsefly Irrigation District that Don Russell is instructed to carry out any and all such activities.

Eric Mockridge, Chairman

Dave Noble, Vice-Chairman

Earl Wiersma

Nancy Hammerich

Penny Pickett

APPENDIX J

9:18 AM
01/12/16
Accrual Basis

Horsefly Irrigation District
Balance Sheet
As of January 12, 2016

	Jan 12, 16
ASSETS	
Current Assets	
Checking/Savings	
KPEFCU Savings-01	
16-17 Savings	5,844.07
15-16 Savings	13,183.33
KPEFCU Savings-01 - Other	108,634.52
Total KPEFCU Savings-01	127,661.92
KPEFCU Checking	2,869.89
KPEFCU Savings	38,608.20
KPEFCU Savings 00	18.35
Petty Cash	29.42
Total Checking/Savings	169,187.78
Accounts Receivable	
1200 · Accounts Receivable	60,296.19
Total Accounts Receivable	60,296.19
Other Current Assets	
1499 · Undeposited Funds	34,480.55
Total Other Current Assets	34,480.55
Total Current Assets	263,964.52
TOTAL ASSETS	**263,964.52**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
2000 · Accounts Payable	14,280.00
Total Accounts Payable	14,280.00
Other Current Liabilities	
2100 · Payroll Liabilities	-343.67
Total Other Current Liabilities	-343.67
Total Current Liabilities	13,936.33
Total Liabilities	13,936.33
Equity	
owner	2,115.83
3900 · Retained Earnings	134,040.09
Net Income	113,872.27
Total Equity	250,028.19
TOTAL LIABILITIES & EQUITY	**263,964.52**