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Project Title: Diversion 45 Irrigation System SOR for the WRVID 45 and TID

Funding Project Category: SOR

Applicant:

Name: Board of Control for Wood River Valley Irrigation District No. 45 and Triangle Irrigation District

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Background

The Wood River Valley Irrigation District was founded around 1915 to deliver Big Wood River irrigation surface water rights to the northern section of the Bellevue Triangle, located just south of the City of Bellevue, Idaho. The Big Wood River flows south out of the central mountains of Idaho and is most widely known for the surrounding local communities of Ketchum, Sun Valley, Hailey, and Bellevue, in the Wood River Valley; with access to all types of outdoor recreation, most notably skiing and fishing. There are several nature preserves and eight to ten irrigation canals serving over 300 users, including large multi-generation farms and the four municipalities just mentioned. The area is currently experiencing unprecedented population growth.

In 2015, legislation led to the division of the original Wood River Valley Irrigation District into two sub-districts: the Wood River Valley Irrigation District No. 45 (WRVID45) and the Triangle Irrigation District (TID). With some exceptions, the WRVID45 now includes the smaller acreage properties generally located in the northern section of the Bellevue Triangle, while the TID includes the larger acreage properties generally located in the southern section. Both districts jointly utilize a portion of the original water delivery infrastructure made up of a low-head dam in the Big Wood River, an adjacent take-out structure (Diversion 45), and other various diversion works. It also includes control gates and canals to divert up to 380 cfs to serve approximately 9,000 acres of land and roughly 200 users.

The same legislation that allowed the WRVID to be partitioned into two sub-districts also created a third entity: the Board of Control (BOC). The BOC facilitates the operation and management of the mutually owned infrastructure (Diversion 45). The BOC Board is comprised of members from both irrigation districts and operates and maintains the structures and personnel to deliver water through the canals to each private diversion.

All water rights in the State of Idaho have origination or priority date and are activated together at the beginning of the irrigation season. Water rights are then “cut” as water available in the River diminishes, typically in mid-summer. One of these irrigation canals, known as the Baseline Bypass Canal, serves more senior water right holders than other water delivery systems upstream, including the Diversion 45, so its water delivery requirement holds precedence. Based on water availability, smaller and more junior water rights are reduced, and during dry years, they might not be activated at all.

Idaho Water District 37 manages water delivery from the Big Wood River into the user delivery systems; therefore, District 37 is responsible for determining when and which water rights are “cut” or turned off. Whenever a more senior water right user has to make a call for water, water delivery to Diversion 45 and all other users is reduced or shut off.

Originally, these surface water delivery systems were designed with only gravity flow and flood irrigation practices in mind. As a result, excessively large quantities of water were spread out over relatively small areas, resulting in a significant level of water infiltration down into natural underground systems. With the increase in groundwater pumping and efficient sprinkler systems, modern irrigation practices have resulted in more areas being watered with less surface water. The unintended effect of this shift is that the underground aquifers are being slowly depleted while less water is infiltrating down from the surface. In recent years, as the connection between surface water and groundwater has become better understood, we have begun to recognize where this incidental “ditch loss” provides benefits to underground water sources in some areas and, in nearby areas, seems to provide little to no known benefit. Efforts to line these ditches need to be carefully understood to not damage beneficial recharge, and to limit water loss where no incidental benefit is occurring.

There are many significant water delivery issues that need to be addressed. Water loss in delivery systems, antiquated and crumbling diversion structures with little or no maintenance, and water conflicts in the water basin bring the need to work together with other water users and other impacted stakeholders. Cottonwood trees, known to consume large quantities of water, have overgrown the canals along some lengths. Efforts to eliminate older Cottonwoods have diminished in recent years due to resistance from many in the nearby communities, which resulted in significant rifts within the communities themselves. Developing solutions where more water can be delivered through the canals while at the same time saving many of the trees need to be explored.

The following information is on two of the significant water delivery issues that need to be addressed. They include 60-year-old concrete low-head dam that crosses the Big Wood River at the Diversion 45 take-out, and the 100-year-old, 6-mile long gravel-bottomed Bypass Canal that is suspected to lose 80% or more of its water along various lengths which impacts all water deliveries above it.

The Dam at Diversion 45: In the case of the dam, regular maintenance is required to divert allocated water rights. The adjacent Diversion 45 headgate, which is responsible for diverting flows from the Big Wood River into the BOC irrigation reach, does not provide enough head to control and deliver water to users in the WRVID45 and TID. Temporary gravel diversion dams are strategically placed to manually divert water in the Big Wood River towards Diversion 45 and create enough head to serve the BOC water rights. Working in the River with heavy equipment is required at least two times a year to put in or take out these unsustainable gravel diversion dams. The old low-head dam has the necessary function of stabilizing the stream bed above the headgates so that incising and the resultant lowering of the streambed doesn't take place, making it possible to divert water with small temporary gravel manipulations. However, the dam's existence has destabilized the stream bed below, resulting in significant erosion starting right up against and even underneath the old structure, itself. All water flows over the structure in an ever-lengthening fall, which makes it impossible for fish to migrate above the dam and has created a significant hazard for recreationists in its vicinity. Some possible solutions for this problem have already been put forth. The results of those efforts will be provided and evaluated.

The Bypass Canal: The Bypass Canal is situated just north of the natural geophysical divide between the Wood River Valley and the Central Snake River Plains. It is just downstream from the Diversion 45 structures and was an old attempt to convey water around a length of the natural riverbed that is so porous the River dries up soon after the early-season high flows, but long before users are finished with their crop production. This Canal is an earthen and unlined canal with seepage losses estimated to be, in some sections, as much as 80 percent. Water lost between the River and the user through seepage or evaporation, referred to as ditch loss, increases as the irrigation season progresses; and any water delivered later in the season requires a larger percentage of the volume of water to accomplish delivery. A systematic review would reveal if strategic efforts to reduce ditch loss could lead to water being delivered more efficiently while saving water for recharge efforts in other, more beneficial locations.

Relationship to Reclamation

The Wood River Valley Irrigation District (WRVID) is one of many delivery systems within Water District 37. Along with the WRVID is the American Falls Reservoir District #2 (AFRD#2) which is a Bureau of Reclamation project. The AFRD#2 delivers water from the Snake River system to Water District 37 via the Milner/Gooding canal. Some of the Snake River water is used to supplement junior decrees on both the Little Wood and Big Wood Rivers. When the WRVID is more efficient, the water savings from those efficiencies become available to users downstream in the Little and Big Wood Rivers. If junior decrees on those two rivers last longer, less supplemental water from the Snake River is required, so more can be stored in the American Falls/Snake River system.

Also, State Water District 37 has recently been the recipient of a BOR grant to install modern flow recording devices throughout the Diversion 45 system and neighboring systems to better monitor and manage available water. Water District 37, Watermaster, Kevin Lakey, has provided more information regarding that effort along with a letter of support for this SOR grant. In addition, Keri York, Director for the Wood River Water Collaborative has also secured a Water Smart Cooperative Watershed Management Program Phase 1 Grant in 2018 to support the Wood River Water Collaborative planning in partnership with Trout Unlimited. (*See Attachment A – Letters of Support*)

Technical Description

Proposed Activity: BOC, and other interested stakeholders will provide a list of infrastructure elements and canal reaches that are either known to be, or suspected of being, an obstacle to efficient water delivery. Many of these infrastructure and canal elements include outdated, decades-old concrete structures that need either repair or complete replacement. Others are just old infrastructure that was perhaps temporary and never adequately finished, leading to significant ditch leakage and inefficient water delivery. Different solutions or scenarios will be evaluated as to their importance or rationale, and costs for solutions considered for water delivery throughout the Big Wood River. Stakeholder collaboration will help guide the BOC as they develop the types of scenarios they need to evaluate. During this development period, scenarios will be identified, assessed, and ranked; the SOR will contain solutions that have been vetted and ranked based on the extent that they would: improve water management and reliability; reduce negative impacts from flooding; reduce sediment loading within canals; eliminate the need to manually divert the water with temporary gravel dams; decrease maintenance costs; reduce safety hazards for both the surrounding natural environment and the surrounding communities; reduce water conflicts throughout the area; cost to implement the solution; enhance fish passage.

Available reports, maps, and drawings will be referenced during the SOR development process. One key report that will be used is the "Diversion Dam Remediation Report" (DDRReport) developed by Trout Unlimited. This report was a collaboration

between water users, diversion operators, Trout Unlimited, the Wood River Land Trust, the City of Bellevue, and private property owners and citizens with interests in the subject reach of the River. The project is specific to maintaining the ability to divert irrigation water while counteracting the adverse fluvial, ecological, and fisheries impacts that result from the configuration of the concrete low-head dam associated with the Diversion 45 diversion works. The “Diversion Dam Remediation Report” documents the ecological needs of this section of the River. The vertical drop associated with the Diversion 45 low-head dam creates a barrier to fish migration. The drop also results in a channel incision downstream of the diversion. Channel incision, or lowering, results in a disconnection between the River and the floodplain that impairs floodplain function, riparian vegetation conditions, and river function.

Preliminary design concepts will be developed to enable an engineer’s opinion of probable cost for priority projects based on identified scenarios. The information will be compiled in the SOR report and be used to communicate the evaluated scenarios and facilitate the selection of the preferred solutions for the BOC and its stakeholders to implement. Project management, closeout, and QC will be completed throughout the duration of the SOR.

Benefits of the Project

- **Identify and Prioritize Projects:** The SOR will help to identify ways to improve water delivery, reliability, and efficiency within the Diversion 45 service area and neighboring Big Wood River surface water delivery systems as well as identify infrastructure weaknesses or deficiencies. As projects are identified and prioritized, this will help to unite the goals of the WRVID45 and TID to meet water right demands and serve irrigation users as efficiently as possible.
- **Communication and Collaboration with Stakeholders to Help Reduce Conflicts:** Collaboration between the two irrigation districts and other stakeholders will help the BOC evaluate the delivery system water losses and possible diversion dam failure and their impacts on the agriculture economic viability of the area.
- **Understanding Best Solution and Costs to Implement Solutions:** Based on the DDRReport the suggested alternatives would help to ensure that: riverbed and riverbank erosion are minimized; high water flows would have access to floodplains to reduce flood risks; a large variety of fish species would be able to migrate upstream; most of the risk to recreationists and animals that exist would be reduced; the continual need to enter into the riverbed with heavy machinery to access irrigation water rights would be eliminated.
- **Water Reliability:** Determining where the high-loss areas of the Bypass Canal are located will allow for increasing water reliability throughout the Big Wood River System. Currently, the Bypass Canal system diverts 200-250 cfs from the Big Wood River and serves the most senior water right holders. This is easily accomplished in the early season when the river flow is high. In mid-season, when river flow is dropping naturally and demand is increasing, all users upstream from the Bypass are in danger of being cut off so the Bypass can get the required flow. It is assumed that along some stretches of the Bypass, ditch loss is minimal, while on other stretches, ditch loss may be as high as 80%. In addition, there are numerous other sites, along with other delivery systems in the area that could be repaired or modified to deliver water more efficiently to benefit all neighboring users and communities.
- **Extending the Irrigation Season:** Reducing ditch loss in strategic places along the Bypass Canal could extend the irrigation seasons for almost all users upstream for significant periods. At the same time, water available to be delivered upstream can also be made available for recharge efforts where there are known benefits to the aquifer. Building upon existing knowledge regarding the most beneficial areas for recharge efforts is a major goal of the SOR.
- **Develop a Funding Plan:** Develop costs to implement projects and identify possible funding opportunities.

Outcomes: The SOR will provide a written document of possible projects and sites to be considered, projects chosen for further review, and an explanation of how and why they were chosen. Performance measures will include the development of a plan of action to move forward with priority projects and collaboration with stakeholders, and to understand their priorities. WRVID45, TID, and stakeholders will evaluate the results and begin working through the action plan that, when implemented, will increase water reliability and improve water management in the Big Wood River.

Water Management Plan: A water management plan is not required by individual irrigation districts but is covered by the Idaho Water Resource Board Water Management Plan that is developed for the State of Idaho; Chapter 17 of Title 42, Idaho Code, as amended in 1988 to designate the Plan as the Comprehensive State Water Plan Part A. Plans developed for specific geographic areas became components of the Comprehensive State Water Plan Part B.

“The board may develop a comprehensive state water plan in stages based upon waterways, river basins, drainage areas, river reaches, groundwater aquifers, or other geographic considerations.”

Proposed Analysis Expected to Result in an Action Plan: The SOR report will identify irrigation infrastructure and water delivery improvements that will increase water efficiency. The two examples listed above – the deteriorating low-head dam

and the Baseline delivery system – along with numerous relic structures throughout the systems, provide adequate opportunities to be analyzed for solutions to address pressure head limitations and to improve water transport and application. In addition, the SOR will develop canal treatment options that are expected to address ditch loss along strategic lengths; thereby extending water availability for junior water right holders over a large area, including BOR, further into the summer.

Reasonableness of Cost

- Task 1. Project Management and Gather Information (\$4,498)
- Task 2. Situational Review (\$6,001)
- Task 3. System Analysis and Efficiency Evaluation (\$7,057)
- Task 4. Establish Water Use and Conservation Goals (\$1,243)
- Task 5. Identify and Prioritize Potential Improvement Projects (\$18,051)
- Task 6. SOR Final Report (\$13,142)

How SOR will Address Water Resources Challenges: The BOC is one of several water users supplied solely by the Big Wood River. Improvements to the BOC dam and associated delivery system infrastructure would help address current water resource challenges that exist within the Big Wood River. As Idaho continues to experience unprecedented growth, the tensions between residential and irrigation users, both served by the Big Wood River delivery systems, will intensify if water management concerns go unresolved. The BOC is forward-thinking in preparing this SOR, not only for their system but to collaborate and communicate with other stakeholders to reduce and solve water reliability challenges. Changing climate patterns and groundwater depletion have impacted surface water reliability, contributing to the over-allocation of water resources and local water sufficiency concerns. Increased demand from all water users on Big Wood River delivery systems has resulted in early water calls by senior water right holders. When these early water calls are made, tensions throughout the river system intensify if junior water right holders cannot supply water to their crops. This has an economic and environmental impact up and down River.

The Idaho Department of Water Resources has also implemented additional administrative oversight and conjunctive management of groundwater and surface water within the project area. The USGS has completed several large-scale studies addressing the insufficiency of water, water reliability, water balances, and a sophisticated groundwater model that correlates the impacts and use of surface and groundwater sources.

Federal funding promote completion of an activity that might otherwise be delayed or postponed: The BOC must balance the demands placed on its systems by the two irrigation districts it serves. A SOR will encourage cooperation between the WRVID45, TID, and other stakeholders to create a cohesive action plan for water management practice implementation that benefits BOC users and others in the farther reaches of the Big Wood River. Without Federal funding, the BOC would not be able to incorporate stakeholder collaboration into their efforts, nor would they have the ability or funds to do a complete evaluation of the scenarios and complete the preliminary work needed to make improvements and improve water reliability in the Wood River Valley.

Project Schedule

Milestones & Schedule

Task	2021						2022					
	June	July/ Aug	Sept/ Oct	Nov/ Dec	Jan/ Feb	Mar/ Apr	May/ June	July/ Aug	Sept/ Oct	Nov/ Dec		
Evaluate Scenarios	█											
Prepare Draft Report	█											
Comment Period				█								
Revise Report							█					
Final Draft									█			
Final Report											█	
BOR Final Report											█	

Budget Narrative

Budget Item Description	Computation Price/Unit	Quantity	Total Cost (\$)
Salaries and Wages			
Fringe Benefits			
Contractual			
Task 1. Project Management and Gather Information			\$4,498
Task 2. Situational Review			\$6,001
Task 3. System Analysis and Efficiency Evaluation			\$7,057
Task 5. Identify and Prioritize Potential Improvement Projects			\$18,051
Task 6. SOR Final Report			\$13,142
Total Direct Costs (Rounded to Nearest \$)			\$50,000
Indirect Costs			
None			
Total Estimated Project Cost (Total Costs Rounded to Nearest \$)			\$50,000

Salary/Wages: No BOC salaries or wages are included in the cost estimate; all services will be contracted.

Fringe Benefits: No fringe benefits will be required.

Equipment: No equipment will be necessary for the project.

Material and Supplies: No material and supplies will be needed for this planning project.

Travel/Mileage: No travel will be needed.

Subcontracts: BOC will go through a procurement process to procure a consultant engineer to complete the six tasks detailed above in the budget proposal under the “Contractual” section.

Environmental and Regulatory Compliance: This is a planning project; there will be no NEPA compliance requirement.

Indirect Costs: No indirect costs will be included in the proposed project.

Other: No other costs will be included in the proposed project.

Funding Plan

The BOC, WRVID and TID have submitted letters of commitment for a cash contribution of \$25,000 and committed based on a portion related to their ownership of the system: *(See Attachment B – Funding Commitment Letters)*

- **Board of Control**, John Stevenson, Chairman of the Board, PO Box 736, Bellevue, ID 83313
- **Wood River Valley Irrigation District #45**, David Johnson, Chairperson, PO Box 2223, Hailey, ID 83333
- **Triangle Irrigation District**, Sarah Gardner, Chair of the Board, PO Box 424, Bellevue, ID 83313

ENTITY	AMOUNT	Percent (%)
Board of Controls, TID, and WRVID (Cash) <i>BOC – \$11,000 -----44% of the \$25,000</i> <i>TID – \$12,040-----48% of the \$25,000</i> <i>WRVID – \$1,960-----8% of the \$25,000</i>	\$25,000	50%
Bureau of Reclamation	\$25,000	50%
Total	\$50,000	100%

Official Resolution

The Official Resolution can be found in Attachment C BOC Signed Resolution.