

**Funding Opportunity Announcement No. BOR-PN-17-F001**

**15.530 Water Conservation Field Services Program**

**Title: Conveyance System Optimization Review via Mass Balance Modeling**

**Date:** February 15, 2017

**Applicant:**

South Columbia Basin Irrigation District  
P.O. Box 1006  
1135 E Hillsboro, Suite A  
Pasco, WA  
99301-1006

**Project Manager:**

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**Type of Project:**

System Optimization Review *(As per section 5.4.3 of instructions)*

## Scope of Work

The South Columbia Basin Irrigation District (District) is one of three irrigation districts that operate and maintain the Columbia Basin Project owned by the U. S. Bureau of Reclamation. The Columbia Basin Project is located in central Washington State. Water for the project is pumped from the Columbia River at Grand Coulee Dam and travels through a system of canals and reservoirs to the Potholes Reservoir where it is stored and diverted for use by the District. The District serves about 7,215 customers with a total of approximately 233,600 acres, primarily with water for agricultural irrigation. Major crops served include corn, potatoes, wheat, alfalfa, apples, stone fruit, wine grapes, asparagus, livestock and pasture. The District does provide water for some municipal and domestic applications but these are a very small percentage of overall water used. Average water diversions into District facilities over the last ten years have been approximately 1,013,000 acre-feet.

The district operates and maintains nearly 150 miles of main canal (Potholes East Canal, Wahluke Branch Canal, and Eltopia Branch Canal). Approximately 600 miles of laterals and sub-laterals are fed by the main canals. The district operates nearly 100 pumping plants with close to 20,000 total horsepower.

The proposed activity is to adapt and further develop an existing RiverWare mass balance model of the Columbia Basin Project to specific use within the SCBID. Financial assistance is requested to fund labor, computer hardware and software license acquisition, and training with associated travel. While the model and data are freely available from Reclamation, the software system it was developed in is licensed software. The outcome of this activity will be a modeling tool for use in system efficiency studies, water operations, infrastructure improvements, water supply rationing, aquatic herbicide application optimization, and other applications.

The existing mass balance model of the Columbia Basin Project was developed between 2005 and 2010. To utilize this model for purposes of system optimizations within the District, the model needs to be adapted and evaluated against system changes that have taken place since initial model development. This involves: developing, reducing, analyzing, and assembling data; verifying conveyance system layout and representation in the model; developing and programming rulesets that govern the behavior of the model to match system behavior; conducting model runs; and output data analysis and reporting. This process is time consuming and iterative in nature.

To accomplish these tasks, the District is in the process of hiring a Hydrologist who will undergo formal training in the RiverWare modeling software, as required. Working with the original Columbia Basin Project model, the District Hydrologist will identify deficiencies, make improvements, verify and evaluate, and generally prepare the model for application to problems such as, but not limited to, the following:

- Determine rationing or pro-rating of water supply on capacity-limited delivery systems
- Determine operational impacts on delivery systems due to return flows, flood backs and dead end laterals
- Provide a proven framework for planning and study activities such as:
  - Wheeling ground water through surface conveyance systems
  - Re-regulating reservoir operations
  - Conveyance system efficiency and system improvement analysis
  - Additional lands
  - Conservation studies and analysis
  - Hydro power development
  - Aquatic herbicide management

**Schedule**

<b>Task</b>	<b>Summer 2017</b>	<b>Fall 2017</b>	<b>Winter 2017/2018</b>	<b>Spring 2017</b>
Procure software license and required hardware	X			
Hydrologist attends software training		X	X	
Data acquisition	X	X	X	X
Model adaptation and development	X	X	X	X

**Criteria for System Optimization Review**

**Sub-Criterion No. 1: Association with Reclamation project water supplies**

All aspects of the proposed activity take place on the Columbia Basin Project, a congressionally authorized Reclamation project fully contained within the Columbia River basin.

The Columbia Basin Project authorizing legislation: Reclamation Act, 1902 and as amended; Rivers and Harbors Act, 1935; Columbia Basin Project Act, 1943.

South Columbia Basin Irrigation District contract with Reclamation: *Amendatory, Supplemental, and Replacement Contract Between the United States of America and the South Columbia Basin Irrigation District, Contract Number 14-06-100-6420, December 18, 1968.*

**Sub-Criterion No. 2: Extent to which SOR is likely to contribute to a more sustainable water supply**

The proposed activity will result in a tool with which to analyze the limitations within the conveyance facilities the District operates. By identifying and understanding operational

limitations, the District will be able to provide a more reliable water supply during critical peak use periods to the irrigated lands it serves.

**Sub-Criterion No. 3: Extent to which the proposed analysis is expected to result in an action plan that will improve water conservation and water use efficiency**

Opportunities exist within the District to implement various water conservation and water-use efficiency projects. Such projects are often complex and expensive. The ability to effectively model the benefits of such infrastructure improvements will allow the District to identify and prioritize conservation actions.

**Sub-Criterion No. 4: Extent to which the Federal funding would promote completion of an activity that might otherwise be delayed or postponed**

Cost is a barrier to modeling and planning activities. Grant opportunities allow the District to leverage available funds to accomplish implementation of a system mass balance model.

**Sub-Criterion No. 5: Reasonableness of costs**

Principal costs associated with this activity are labor costs. The labor costs estimated assume an employee of moderate experience with a bachelor or master degree in engineering, hydrology or related field. Actual labor costs may be higher or lower depending on the qualifications of the employee hired to conduct the activity.

Software, hardware and training costs are fixed costs.

**Sub-Criterion No. 6: Extent to which applicants water management plan is complete and updated**

In 2010 the District completed a Coordinated Conservation Plan in conjunction with the two other Columbia Basin Project irrigation districts (Quincy and East), the Bureau of Reclamation and the Washington State Department of Ecology. This plan identified many different pipeline projects wherein open laterals would be piped in order to reduce water losses due to evaporation and seepage. Identified as a future need, but not developed in the conservation plan, was the need to analyze reregulation reservoirs, recapture projects and the effects of conservation projects on District operational spill.

The proposed mass balance model development will provide the necessary framework to update and expand the 2010 Coordinated Conservation Plan and guide conservation efforts in the District for the next decade.

**Sub-Criterion No. 7: Amount and sources of non-Federal funding**

Non-Federal funding for this activity is entirely made up of District funds in the amount of \$103,502.

**Budget and Funding Plan**

<b>Budget Item Description</b>	<b>Computation</b>	<b>Quantity</b>	<b>Total Cost</b>
<b>Salaries and Wages</b>			
Hydrologist	\$29.00/hr	2080 hours	\$60,320
<b>Overhead and Benefits</b>			
Hydrologist – FICA, Health Insurance, Retirement, Leave, etc.	78.17%	2080 hours	\$47,152
<b>Software License</b>			
First year license package			\$6,530
<b>Equipment</b>			
Computer System, Xenon processor, 64GB RAM			\$6,000
<b>Training</b>			
RiverWare Course Tuition	\$1,200/class	3	\$3,600
Travel for RiverWare Courses	\$1,200/class	3	\$3,600
RiverWare User Group Conference Registration	\$100	1	\$100
Travel for User Group Conference	\$1,200	1	\$1,200
<b>Total Estimated Project Costs, 1 Year Effort</b>			<b>\$128,502</b>

## Overhead and Benefits Explanation

Calculation assumes a work year of 2080 hours, an employee with family for insurance purposes, FICA rate, Washington State Public Employees Retirement System rate, Washington State Labor and Industries rate, sick leave assessment, annual leave assessment and paid holidays assessment.

<b>Benefit</b>	<b>Rate or Assessment</b>	<b>\$/hour</b>
Health Insurance	\$1,936.00 per month	\$11.17/hour
FICA	7.65%	\$2.22/hour
PERS	11.18%	\$3.24/hour
L&I	\$1.19/hour	\$1.19/hour
Annual Leave	7.51%	\$2.18/hour
Sick Leave	5%	\$1.45/hour
Paid Holidays	4.19%	\$1.22/hour
<b>Total</b>	<b>78.17%</b>	<b>\$22.67/hour</b>

### Funding Plan

20% Water Conservation and Field Services Grant in the amount of \$25,000

80% District cash funds in the amount of \$103,502

### Point of Contact for District Funds:

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# ATTACHMENTS FORM

**Instructions:** On this form, you will attach the various files that make up your grant application. Please consult with the appropriate Agency Guidelines for more information about each needed file. Please remember that any files you attach must be in the document format and named as specified in the Guidelines.

**Important:** Please attach your files in the proper sequence. See the appropriate Agency Guidelines for details.

1) Please attach Attachment 1	<input type="text" value="1234-BOR-PN-17-F001.pdf"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
2) Please attach Attachment 2	<input type="text" value="1235-S-17-6 - Grant BOR-PN-17"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
3) Please attach Attachment 3	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
4) Please attach Attachment 4	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
5) Please attach Attachment 5	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
6) Please attach Attachment 6	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
7) Please attach Attachment 7	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
8) Please attach Attachment 8	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
9) Please attach Attachment 9	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
10) Please attach Attachment 10	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
11) Please attach Attachment 11	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
12) Please attach Attachment 12	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
13) Please attach Attachment 13	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
14) Please attach Attachment 14	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>
15) Please attach Attachment 15	<input type="text"/>	<a href="#">Add Attachment</a>	<a href="#">Delete Attachment</a>	<a href="#">View Attachment</a>

"The Green Spot of the Columbia Basin"



# South Columbia Basin Irrigation District

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## RESOLUTION NO. S-17-6

### U.S. BUREAU OF RECLAMATION GRANT BOR-PN-17-F001

WHEREAS, the South Columbia Basin Irrigation District is in receipt of the U.S. Bureau of Reclamation Funding Opportunity Announcement No. BOR-PN-17-F001, *PNR WCSFP FY17*; and

WHEREAS, the South Columbia Basin Irrigation District has legal authority to enter into a grant agreement with the U.S. Bureau of Reclamation; and

WHEREAS, the Board of Directors of the South Columbia Basin Irrigation District supports the application submitted; and

WHEREAS, the South Columbia Basin Irrigation District is capable of providing the amount of funding and/or in-kind contributions specified in the funding plan; and

WHEREAS, the South Columbia Basin Irrigation District will work with the U.S. Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement; and

WHEREAS, receiving financial assistance through a U.S. Bureau of Reclamation grant does not subject the South Columbia Basin Irrigation District to the discretionary provisions of the Reclamation Reform Act of 1982;

NOW, THEREFORE, BE IT HEREBY RESOLVED by the Board of Directors that the South Columbia Basin Irrigation District is committed to the financial and legal obligations associated with receipt of U.S. Bureau of Reclamation grant financial assistance.

DULY ADOPTED during the regular meeting of the Board of Directors this 12<sup>th</sup> day of January 2017.



(SEAL)

ATTEST:

  
Secretary

BOARD OF DIRECTORS

