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WaterSMART Grant Application

Installation of Conservation Pipelines – Block 47

January 20, 2015

East Columbia Basin Irrigation District

55 North 8th Ave.
Othello, WA 99344

Project Manager: Nate Andreini
District Engineer
(509) 488-9671 office
(509) 488-6433 fax
nandreini@ecbid.org

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Executive Summary

January 20, 2015

The East Columbia Basin Irrigation District (District), headquartered in Othello, Washington, which is in Adams County, is proposing to replace approximately 25,783 feet of open canals with pipelines. By doing so, the District will conserve approximately 1,400 acre-feet of water each and every year. In addition, since water serving the Columbia Basin Project is pumped from Grand Coulee Dam, the Bonneville Power Administration (BPA) has calculated that an energy savings of approximately 558 busbar kilowatt-hours (kWh) per acre-foot will be saved, resulting in an annual energy savings of approximately 781,000 kWh's. Furthermore, any water that is not diverted from the Columbia River as a result of this conservation will be left in the river to assist the endangered salmon. And finally, a portion of this conserved water will be used to replace existing groundwater irrigated lands within the East District boundaries in an area commonly referred to as the "Odessa Subarea". The aquifer used to irrigate these lands is declining at a rapid and unsustainable rate; therefore, by providing them with a surface water replacement, the District will provide them with a reliable replacement water supply while generating additional revenue through new Water Service Contracts. It is estimated that this piping project will begin in July, 2015, and will be complete by July, 2017 and will be completed by District forces.

Background Data

Please see Appendix A for a general location map. The East Columbia Basin Irrigation District (District) is one of three (3) Irrigation Districts that operate the U.S. Bureau of Reclamation's Columbia Basin Project (CBP) in the state of Washington. Its source of power and water is the Grand Coulee Dam on the Columbia River. The District serves approximately 154,000 acres primarily for irrigation and has about 2,400 customers. Major crops include alfalfa, wheat, corn, potatoes, and beans. The average annual diversion from the Columbia River to serve the entire CBP is 2.65 million acre-feet, of which the East District uses approximately 895,000 acre-feet. We operate 87 miles of main canal (the East Low Canal), 30 miles of which is concrete lined and the rest is unlined, compacted earth. We operate approximately 530 miles of laterals and sublaterals, of which 25 miles are concrete lined, 38 miles are membrane lined and 80 miles are piped. We operate 62 pumping plants ranging in size from 10 Horsepower to 2,600 Horsepower.

The District began a formal water conservation program in 1986, utilizing the State of Washington's Referendum 38 water supply program which provided both grants and loans. The District began participating in Reclamation's Water Conservation Field Services Program (WCFSP) shortly after the program became available in 1996. These funds helped to update the District's Water Conservation Plan in 2007. The District has completed hundreds of water conservation projects since the inception of WCFSP. These projects included shotcrete lining, piping, automated gates for upstream level control, and polyurea crack sealing. The estimated water savings from these projects exceeds 20,000 acre feet per year.

Technical Project Description

If selected to receive a WaterSMART grant, the District plans to replace approximately 25,783 linear feet of earth lined, open ditch with PVC or HDPE pipelines ranging in size from 12" diameter to 36" diameter and carrying flows from 2 cubic feet per second (cfs) to 19 cfs. This proposal anticipates the need for approximately 17,645 lineal feet of pipe to replace the earthen laterals. Consequently, the District estimates a savings of approximately 1,400 acre-feet will be realized due to the elimination of seepage and evapotranspiration each and every year. Additional benefits achieved by piping open laterals include lower maintenance costs, decreased conveyance times, less sediment removal, less terrestrial and aquatic weed control, and many times, enabling on-farm irrigation improvements such as center pivots to be installed. Such on-farm improvements have been proven to greatly reduce the consumptive needs of agricultural croplands. These projects also address some of the District's aging infrastructure issues by replacing older open channel conveyance facilities with new efficient pipelines.

Since our canals and laterals are being used to deliver water from March 31st to October 25th, our construction season is fairly short. The District is comprised of two (2) watermaster sections, each with approximately 20 maintenance personnel. Each section is equipped with a digging excavator, long boom excavator, backhoe, Grade-all, dozers, several dump trucks, loaders, trench compactors, etc. Each watermaster section has historically been tasked with installing upwards of 15,000 linear feet of pipe in a construction season. For the two-year schedule proposed for the projects, District crews will install the entire 17,645 feet of pipe during the next two construction seasons.

Evaluation Criteria

Evaluation Criterion A: Water Conservation

Subcriterion No. A.1.—Water Conservation

Subcriterion No. A.1(a)—Quantifiable Water Savings

- The District annually diverts an average of 895,000 acre-feet of water. The District is estimating that an annual savings of 1,400 acre-feet of water will be achieved through the elimination of 25,783 feet of open canals. Appendix F contains the water balance calculations used to estimate the seepage. These calculations are based on measurements at the headgates of the subject canals and measurements at each turnout along the canals. The difference between the headgate measurement and the sum of the demand measurements is the amount lost to seepage and evaporation. The measuring devices used are original USBR construction weirs and constant head orifices. These devices typically have an accuracy of about 5% or better. Appendix B contains a comprehensive list of all of the piping projects as well as an alternate method of estimating seepage. This method relies on average seepage rates based on the underlying geology based on geographic area. The District hired the Montgomery Water Group to develop the *Phase I and Phase II Seepage Analyses, East Columbia Basin Irrigation District Water Conservation Projects* (Appendices C

and D, respectively). These were done to determine the volume of water conserved from East District lining and piping projects that were previously completed with grants and loans from Washington State Department of Ecology's Referendum 38 program. The reports estimated seepage rates by geologic unit and analyzed the fate of seepage water. The following formula was used to determine the annual seepage loss:

- Seepage Loss (acre-ft/yr) = Seepage Rate (ft/day) x Wetted Perimeter (ft) x Length (ft) x 195 (days)/43,560 (ft^3/ac-ft)

Average seepage rates for different geologic units were determined in the Phase I and Phase II reports and were accepted by Ecology and Reclamation for use in estimating water conserved in past conservation projects. The following table presents those seepage rates by geologic unit.

Geology	Seepage Rate (ft/day)		
	Unlined	Lined	Piped
Outburst flood deposits, gravel (Qfg)	2.0	0.2	0
Outburst flood deposits, sand and silt (Qfs)	1.2	0.2	0
Continental sedimentary rocks (PLMc)	0.73	0.2	0
Wanapum basalt (Mv)	0.99	0.2	0
Loess (Ql)	2.24	0.2	0
Alluvium (Qa)	1.7	0.2	0
Dune sand, stabilized dunes (Qds)	2.24	0.2	0

The District typically uses the seepage estimates based on geologic unit when looking at water conservation. However, when we have better data, such as actual measured flows, we use that data. Based on the water balance calculations shown in Appendix F, we believe that 1,400 net acre-feet of water will be saved by this proposal. The seepage estimates based on geologic unit help to confirm that significant seepage is indeed happening.

- The East District diverts approximately 895,000 acre-feet of water annually from the Columbia River. While being transported in our canal and lateral system, a small, but appreciable, percentage of that water is seeping into the ground. As described in the Phase II report, that seeping water typically flows into shallow groundwater systems, some of which terminate in the Potholes Reservoir or the Potholes East Canal. The South Columbia Basin Irrigation District relies on these facilities for a portion of its water supply; therefore, water conservation projects in the East District that eliminate seepage may result in a reduction to the South District's supply. In portions of the East District (Block 49), the seepage water flows directly to the Columbia River and does not enter the Potholes Reservoir or the Potholes East Canal. The savings realized from conservation projects in this section is a direct benefit to the South District by providing capacity in their canal.

- It is the intent of the East District to offset its losses in seepage to the Potholes Canal with the conservation projects located in Block 49; consequently, the

South District would not be harmed by our conservation. The net conserved water resulting from the WaterSMART grant funds will be used to replace existing groundwater irrigated lands located east of our East Low Canal in the Odessa Subarea. This topic is discussed further under Evaluation Criterion D: Water Marketing. Water that is not used to serve land currently served by wells will remain in the Columbia River, which benefits multiple salmonid and other fish species.

- Annual transit loss reductions have been calculated for each section of canal piped and are shown in Appendix B. The average rate of transit loss for the proposed projects is 475 acre-feet per mile per year.

- Some of the laterals to be piped may have measurement devices sensitive enough to reflect the reduction in seepage achieved by the project. In those cases, a water balance calculation will be used to account for the diversions into and out of the lateral stretch. Diversion records are kept for every lateral for each day of the irrigation season. Pre- and post-project diversion records can be compared to determine the savings achieved by the project.

- Often, the measurement devices used to record diversions into and out of the lateral are not sensitive enough to reflect the changes in flows resulting from the reduction in seepage when a lateral is piped. In these cases, we conduct ponding tests on a representative sample of the laterals before the piping project is started. The District has frequently used ponding tests as a check against the approved methodology developed in the Phase I and Phase II Seepage Analyses.

- Where ponding tests are to be conducted, the District creates an earthen dam at each end of the section being tested and fills the canal section to its normal operating level. Staff gauges are installed at appropriate points to measure water level. Measurements are recorded every few hours until the canal is dry. The resulting data is used to calculate the seepage rate.

- The materials to be used are PIP PVC pipe where the required pipe size is 27" diameter and 21" diameter and smaller. The District plans to use a corrugated polyethylene product that is rated for 5 psi where the required size is 24" diameter and 30" diameter and larger. In the past that product has been Low Head polyethylene manufactured by ADS/Hancor, although other manufacturers can provide a product meeting the requirements.

Subcriterion No. A.2.—Percentage of Total Supply

The three-year average of total diversions to the East Columbia Basin Irrigation District is 893,646 acre-feet per year. This number is based on the annual reports generated by the Bureau of Reclamation Ephrata Field Office. Based on an estimated water savings of 1,400 acre-feet per year for the proposed project, the percentage of total supply conserved is 0.157%.

Evaluation Criterion B: Energy-Water Nexus

Subcriterion No. B.2.—Increasing Energy Efficiency in Water Management

Columbia Basin Project water is pumped from Lake Roosevelt on the Columbia River into Banks Lake and flows by gravity from there to the three irrigation Districts on the project. There are 13 pumps, ranging in size from 56,000 hp to 65,000 hp. The Bonneville Power Administration has declared that each acre-foot of water pumped from Lake Roosevelt to Banks Lake requires 558 busbar kilowatt-hours. Water saved as a result of the proposed pipelines will no longer have to be pumped from Lake Roosevelt to supply the East District. Therefore, based on water savings of 1,400 acre-ft per year, the annual power savings will be approximately 781,000 kilowatt-hours.

In addition, some of the water saved by the proposed projects will be used to issue new water service contracts to farmers in the Odessa subarea. Currently, these farmers are using wells drilled deep into an aquifer that is declining. While these farmers are within the East District boundaries, project water has not been made available to them yet. Their farmland lies east of the East Low Canal (the District's main source of supply) and initial development of the Columbia Basin Project did not include service to that land. Second half development of the project, which would serve much of the land in the Odessa subarea, has not yet occurred. In anticipation of full project development, the state of Washington allowed the drilling of wells into the aquifer below them. The aquifer supplying the Odessa subarea is rapidly declining; much of the land currently supplied by the aquifer is estimated to be infeasible to irrigate by the year 2020. These farmers rely on very deep wells-in the range of 2000' to 5000' deep-to draw water from. Moving these farmers from wells to surface water from the Columbia Basin Project will accomplish significant energy savings through reduced pump horsepower needed.

Evaluation Criterion C: Benefits to Endangered Species

Chinook salmon are listed as endangered species in the Columbia River. Chum and steelhead are threatened. The three federal agencies that control Columbia River operations are required to abide by the Federal Columbia River Power System Biological Opinion (the BiOp). The BiOp sets standards and guidelines for operation of the River system, including withdrawals for irrigation of Federal irrigation projects. These standards and guidelines are intended to protect the 13 species of salmon and steelhead that are listed for protection under the Endangered Species Act. The enhancement of instream flows in the mainstem of the river is a critical component of the BiOp. Water conservation within the East District directly enhances instream flows in the Columbia River.

Water delivered to the East District is withdrawn from the Columbia River at Lake Roosevelt. Although the Columbia Basin Project diverts less than 3 percent of the flow from the River, any water savings achieved within the Project is a benefit to the salmon. Since water conserved by this Grant will be used to supply CBP lands authorized by Congress for continued development of the CBP, all water supplied as a result of conservation will reduce the amount of future diversions under Reclamation's

withdrawal permit from the Columbia River needed for project completion. This will result in more water remaining for endangered species in the Columbia River.

Evaluation Criterion D: Water Marketing

In the area known as the Odessa subarea, farmers currently use private wells to irrigate their land. The aquifer is declining rapidly and much of the land currently irrigated by these wells is projected to be infeasible to irrigate by 2020. The loss of this farmland would be a huge economic impact to the immediate area as well as the state of Washington. Much of the Odessa subarea is within East Columbia Basin Irrigation District boundaries. This land was envisioned to be served by second half development of the Columbia Basin Project. Second half development has not yet occurred. Water conserved by the proposed pipeline projects can be used to issue new water contracts to these farms currently using private wells. The full amount of the estimated savings (1,400 acre-feet) could be used as a source of supply for new water contracts. The District would issue these new contracts upon execution of a contract between the Bureau and the District. At a water duty of 3 acre-feet per acre, approximately 467 acres could be served by the water conserved under this proposal.

A Record of Decision was issued in 2013 by the Pacific Northwest Regional Director of the Bureau of Reclamation regarding the Odessa Subarea Special Study. That decision was to move forward with development of a replacement water supply for those farms on wells in the Odessa subarea. The East District has been widening the East Low Canal over the last 3 years and just awarded a contract to build two additional siphons on the East Low Canal. The District is replacing a county road bridge this winter that crosses the East Low Canal and having new radial gates fabricated for the Lind Coulee Wasteway and Lind Coulee Siphon No. 1 inlet. All of this work (and additional future work) is being done to increase capacity in the East Low Canal so the District can deliver surface water to replace groundwater in the Odessa Subarea.

Upon issuance of a new water service contract, landowners would move their existing groundwater right to a status in which it would only be used in an emergency. Past water service contracts issued by the District run for a period of 10 years and can be renewed indefinitely. It is anticipated that new contracts will be of a similar nature. This type of contract would provide a secure, long-term source of water, enhancing the viability of continued agricultural production.

It is anticipated that all of the water conserved under this proposal would be made available to serve commercial agriculture needs in the Odessa subarea through contracts between individual landowners and the East District. The District has the authority to write these contracts through a master water service contract with the Bureau of Reclamation. This contractual relationship imposes Reclamation water law with respect to the way the water is used.

Evaluation Criterion E: Other Contributions to Water Supply Sustainability

As discussed above, farmers in the Odessa subarea currently rely on an aquifer that is rapidly declining. Their water supply is not sustainable, even in the near term. They must pump from thousands of feet below ground to run their irrigation sprinkler systems. Moving these farmers to surface water from the Columbia Basin Project would significantly reduce pumping costs and result in reduced electric use. More importantly, they would obtain a long-term, reliable water supply.

The Odessa subarea contains over 100,000 acres currently irrigated by groundwater that are within the East District boundaries. The current preferred alternative to serve this area allows for about 70,000 of these acres to be served by Project water.

The Odessa subarea special study is a collaborative effort, primarily led by the Bureau of Reclamation and Washington State Department of Ecology. In April 2005, a Memorandum of Understanding (MOU) between the East District, Ecology, and Reclamation established goals on how to handle conserved water within the District. It was determined that the conserved water would be available as a replacement water supply for groundwater deliveries in the Odessa Subarea, municipal and industrial water supply, and environmental uses. Ecology funded the preparation of the Plan through the Columbia River Water Management Program.

Furthermore, in July 2006, the Washington State Legislature passed the Revised Code of Washington (RCW), Title 90, Chapter 90 (90.90) which declared that a Columbia River basin water supply development program was needed and directed the Department of Ecology to aggressively pursue the development of water supplies to benefit both instream and out-of-stream uses.

Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1.—Project Planning

The East District has a "Comprehensive Water Conservation Plan" which was developed in May, 2007 and is an update of one completed in 1995. Please see Appendix E for a photocopy of its cover.

This project meets the goals of the Comprehensive Water Conservation Plan as well as the "Columbia Basin Project, Coordinated Water Conservation Plan" developed for the three (3) CBP Irrigation Districts and the Washington State Department of Ecology.

Preliminary design work has been completed by District staff in support of the proposed projects.

The installation of conservation pipelines is a key priority identified in the District's Water Conservation Plan.

Subcriterion No. F.2.—Readiness to Proceed

To date, the District has performed all preliminary calculations to determine the size of pipe being used to replace the open canals. A final design cannot be completed until each canal is surveyed for verification of length and elevation drop.

Some of the proposed projects require the acquisition of new federal easements as a realignment of the facility is recommended. These acquisitions would be accomplished during the first year of the proposed two-year schedule, with construction occurring in both the first and second years. The District plans to install roughly half of the proposed pipeline project beginning in October 2013 and finishing by March 2014. The remaining projects will be installed between October 2014 and March 2015.

To make this happen, the first half of the projects would be surveyed this spring/summer. Purchasing of materials would occur in September and October, with installation beginning in October. The timeline for the second half of the project would match the first half's.

It should also be noted that the District will be required to have all pipelines inspected by the State Historical Preservation Office (SHPO) to determine their historical significance or non-significance. In the past this has delayed construction until later in winter. As this would be a two-year schedule, the first year can be used to achieve SHPO concurrence and easement acquisition.

Subcriterion No. F.3.—Performance Measures

Some of the laterals to be piped may have measurement devices sensitive enough to reflect the reduction in seepage achieved by the project. In those cases, a water balance calculation will be used to account for the diversions into and out of the lateral stretch. Diversion records are kept for every lateral for each day of the irrigation season. Pre- and post-project diversion records can be compared to determine the savings achieved by the project.

Often, the measurement devices used to record diversions into and out of the lateral are not sensitive enough to reflect the changes in flows resulting from the reduction in seepage when a lateral is piped. In these cases, we conduct ponding tests on a representative sample of the laterals before the piping project is started. The District has frequently used ponding tests as a check against the approved methodology developed in the Phase I and Phase II Seepage Analyses.

Where ponding tests are to be conducted, the District creates an earthen dam at each end of the section being tested and fills the canal section to its normal operating level. Staff gauges are installed at appropriate points to measure water level. Measurements are recorded every few hours until the canal is dry. The resulting data is used to calculate the seepage rate. At the end of the 2013 irrigation season, the District and Del Smith of the USBR Denver office conducted ponding tests to verify seepage estimates for projects to be done in a previous WaterSMART grant agreement. Del Smith and Mark Spears authored a report describing the results of the ponding tests and comparing those results with the seepage estimates.

Subcriterion No. F.4.—Reasonableness of Costs

The following calculation describes the reasonableness of costs:

$$\frac{\$766,000.61}{1,400 \text{ acre-feet} \times 100 \text{ years}}$$

$$= \$5.47/\text{acre-foot-yr}$$

The design life used is based on an industry-accepted life of 100 years for buried PVC and HDPE pipe. This is a conservative estimate as the pipe can be considered to last indefinitely in the proposed installation environment.

Evaluation Criterion G: Additional Non-Federal Funding

The District plans to use its own funds and in-kind contributions to fund the majority of the cost of the project. Appendix J contains cost breakdowns, showing District labor, District equipment and materials costs. The total non-federal funding is $466,000.61. This equates to 61% ot the total project costs.

Evaluation Criterion H: Connection to Reclamation Project Activities

The Columbia Basin Project was constructed by the Bureau of Reclamation beginning in the 1930s with the Grand Coulee Dam. First half development of the project was completed in the 1960s. Second half development has not been completed yet. The majority of land intended to be served by second half development is in the East Columbia Basin Irrigation District. Water conserved by the proposed pipeline projects can be used to serve some of this land.

The East District receives project water from Banks Lake, which is used as a reservoir to serve all three Columbia Basin Project Districts.

The Bureau of Reclamation holds title to all water conveyance facilities within the East District, including the facilities to be built under this proposal.

Environmental and Cultural Resources Compliance

The installation of conservation pipelines requires disturbing the existing open canal prism. The canal prism was previously constructed as part of the original system and has typically been cleaned occasionally by excavators or similar equipment. No impacts to air or water quality are anticipated. The work will be done when water is out of the canals and no discharge of stormwater from the project site will occur.

The pygmy rabbit, Columbia Basin DPS has been reported to live within the area. However, the District is not aware of any pygmy rabbits living near the proposed project sites. No effect is anticipated by construction of the proposed projects.

There are no wetlands within the proposed project sites.

The water delivery system was constructed primarily in the 1950s.

The project will eliminate existing open canals and some structures associated with those canals will be eliminated or modified. These are typically concrete structures such as drops, checks and turnouts. Most of these structures have not been modified since original construction with the exception of replacing gates.

The District's main canals, the East Low Canal and the Potholes East Canal, are eligible for listing on the National Register of Historic Places. The proposed projects do not include any modifications to the East Low Canal or Potholes East Canal.

There are no known archaeological sites within the project areas.

No adverse impact to low income or minority populations is anticipated.

No impacts to tribal lands are anticipated. There are no sacred Indian sites in the project area.

The projects will have no impact on the introduction, spread, or existence of noxious weeds or invasive species. District crews control weeds on an ongoing basis.

Required Permits or Approvals

The District will be required to obtain approval from the State Historic Preservation Office in order to complete the proposed projects. In the most recent projects where this was required, the District coordinated with the Bureau of Reclamation to contract the work to a consultant, who prepared a report describing their findings and submitted it to the State Historic Preservation Office for review and approval. The District intends to use this same process to obtain approval for the proposed projects.

The District will also need to work with the USBR Ephrata Field Office to obtain easements for the realigned facilities. The landowners who will need to grant easements for the proposed pipelines are proponents of the project and have indicated that they will voluntarily grant easements.

Official Resolution

An official resolution in support of the proposed projects is included as Appendix H.

Funding Plan and Letters of Commitment

To fund these projects, the District plans on obtaining 39% of the total cost from Reclamation through the WaterSMART program. The District is prepared to contribute in-kind labor and equipment costs as well as the remainder of the funding needed for

the project. District funds come from assessments collected annually from our landowners as well as revenue from electricity generated by District-owned hydroelectric generation facilities.

Funding Sources	Funding Amount
Non-Federal Entities:	
1. ECBID	$466,000.61
Requested Reclamation Funding:	$300,000.00
Total Project Funding:	**$766,000.61**

No project costs have been incurred. Design costs are anticipated to occur beginning in May of 2015.

Budget Narrative

Salaries and wages for engineering personnel are based on anticipated rates as of July 2015. Benefit rates are actual rates for 2014 for engineering personnel. Benefit rates include District contributions to: FICA, Medicare, employee health insurance, retirement, and industrial insurance premiums through the State of Washington.

Labor and equipment rates for construction are based on average prices for similar work done in the 2011-2014 construction seasons. The labor and equipment rates shown on the budget breakdown vary based on the size of pipe being installed. Equipment rates are based on the District's actual costs to operate and maintain District equipment. District equipment rates are shown in Appendix K.

Pipe prices are based on 2013 and 2014 District pipe bids.

Other materials incorporated into the work (such as concrete, pipe fittings, etc.) are tracked during construction. The lump sum prices shown on the budget breakdown are based on work done in the 2011-2014 construction seasons. Each reach of canal to be piped is anticipated to have a separate group of fittings and other materials.

The price shown on the budget for environmental and regulatory compliance is based on a contract with a consultant for the same type of work in 2011.

Reporting costs are based on the District Engineer's combined wage and benefit rate and the number of hours anticipated to prepare the required semi-annual and final reports to Reclamation.

The District does not have an approved indirect costs rate agreement. The District does not intend to recover indirect costs under a WaterSMART grant agreement, and no indirect costs have been included in the proposed budget.

The proposed project budget and construction budget are shown in Appendix J.

Appendix A

Location Map

Appendix B

Seepage Analysis

APPENDIX B - East Columbia Basin Irrigation District -Seepage Analysis
Installation of Conservation Pipelines - Block 47

BLOCK	LATERAL	SECTION FROM BUREAU PROFILE DRAWINGS	STATION LENGTH (FT)	BASE (FT)	DEPTH (FT)	SIDE SLOPE	WETTED PERIMETER (FT)	GEOLOGY	SEEPAGE RATE FROM PHASE II STUDY (FT/DAY)	ESTIMATED SEEPAGE (AF/YR)	TRANSIT LOSS (AF/YR/Mile)	DRAINAGE BASIN	% LOST TO PROJECT	ACTUAL SAVINGS (AF/YR)
47	EL85F	536	1646	5	2	1.75	13.1	Ql	2.24	216	692	Potholes East Canal	32	69
		532	2334	5	1.8	1.75	12.3	Ql	2.24	287	649	Potholes East Canal	32	92
		528	3618	5	1.6	1.75	11.4	Ql	2.24	415	606	Potholes East Canal	32	133
		425	2472	4	1.5	1.75	10.0	Ql	2.24	249	532	Potholes East Canal	32	80
		324	3618	3	1.3	1.75	8.2	Ql	2.24	299	436	Potholes East Canal	32	96
		320	1232	3	0.9	1.75	6.6	Ql	2.24	82	351	Potholes East Canal	32	26
	EL85F4	224	1300	2	1.1	1.75	6.4	Ql	2.24	84	341	Potholes East Canal	32	27
		220	1226	2	0.8	1.75	5.2	Ql	2.24	64	277	Potholes East Canal	32	21
	EL85H	428	180	4	1.6	1.75	10.4	Ql	2.24	19	553	Potholes East Canal	32	6
		328	1920	3	1.5	1.75	9.0	Ql	2.24	174	479	Potholes East Canal	32	56
		324	1414	3	1.4	1.75	8.6	Ql	2.24	123	458	Potholes East Canal	32	39
		320	3700	3	1	1.75	7.0	Ql	2.24	261	372	Potholes East Canal	32	83
		220	1123	2	0.7	1.75	4.8	Ql	2.24	54	255	Potholes East Canal	32	17
TOTALS			**25,783**							**2,327**	**476**			**745**

Appendix C

Cover Sheet of the Phase I Seepage Analyses

Phase I
Seepage Analyses
East Columbia Basin Irrigation District
Water Conservation Projects

Prepared for:

East Columbia Basin Irrigation District
P.O. Box E
55 North 8th
Othello, WA 99344

Submitted by:

Montgomery Water Group, Inc
803 Kirkland Avenue, Suite 100
P.O Box 2517
Kirkland, WA 98083-2517
Contact: R.A. Montgomery, P.E.
rmontgomery@mwater.com
(425) 827-3243

MONTGOMERY
WATER GROUP, INC.

August 2, 2004

Appendix D

Cover Sheet of the phase II Seepage Analyses

Phase II
Seepage Analyses
East Columbia Basin Irrigation District
Water Conservation Projects

Prepared for:

East Columbia Basin Irrigation District
P.O. Box E
55 North 8th
Othello, WA 99344

Submitted by:

Montgomery Water Group, Inc
803 Kirkland Avenue, Suite 100
P.O Box 2517
Kirkland, WA 98083-2517
Contact: R.A. Montgomery, P.E.
rmontgomery@mwater.com
(425) 827-3243

MONTGOMERY
WATER GROUP, INC.

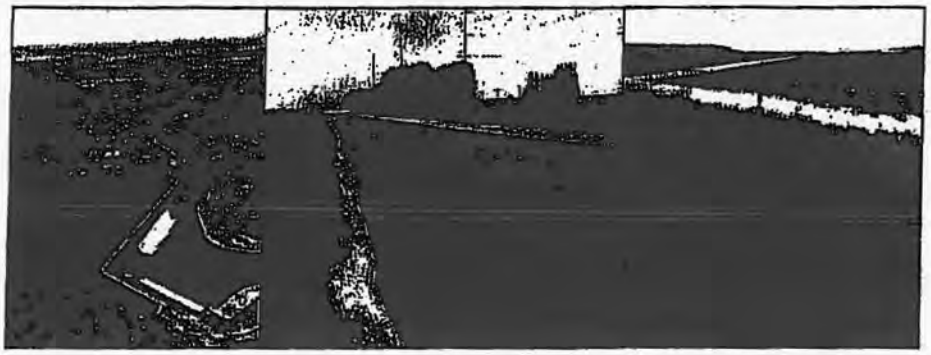
October 6, 2004

Appendix E

Cover Sheet of the Comprehensive Water Conservation Plan

EAST COLUMBIA BASIN IRRIGATION DISTRICT

COMPREHENSIVE WATER CONSERVATION PLAN



Prepared for

East Columbia Basin Irrigation District

P.O. Box E

Othello, WA 99344

Prepared by

Anchor Environmental, L.L.C.

811 Kirkland Avenue, Suite 200

P.O. Box 2517

Kirkland, WA 98083-2517

ANCHOR ENVIRONMENTAL, L.L.C.

May 2007

Appendix F

Water Balance Calculations

Installation of Conservation Pipelines-Block 47

Appendix F-Water Balance Calculations

Maximum Headgate Diversions:

EL 85F	18 cfs
EL 85H	10 cfs

Maximum Demand to Turnouts:

EL 85F system		EL 85H system	
Units 38 and 39	2.7 cfs	Units 55B and 61	2.0 cfs
Contract 805-803	2.2 cfs	Contract 806-803	2.4 cfs
Units 46 and 57	2.0 cfs	Waste to Wasteway	1.0 cfs
Units 56 and 60	2.8 cfs		
Unit 55A	0.6 cfs		
Waste to Wasteway	1.0 cfs		
Total Demand	11.3 cfs	Total Demand	5.4 cfs
Difference between diversion and total demand:	6.7 cfs	Difference between diversion and total demand:	4.6 cfs

Water loss:	11.3 cfs	total difference between diversion and demand-both laterals
	4370 ac-ft/yr	annual seepage loss based on 195 day irrigation season
	32 percent	lost to Columbia Basin Project (drainage basin: Potholes Canal)
Net Water Loss:	**1400** ac-ft/yr	lost to Columbia Basin Project

Appendix G

SF424, SF424C, and SF424D Forms

Appendix H

Official Resolution

EAST COLUMBIA BASIN IRRIGATION DISTRICT
RESOLUTION 2015-04

Authorizing WaterSMART Grant Applications for the Installation of Conservation Pipelines and Canal Lining

WHEREAS, the East Columbia Basin Irrigation District (District) has constructed water conservation projects on Columbia Basin Project facilities within the District for over 30 years; and

WHEREAS, the District developed a "Comprehensive Water Conservation Plan" in 1995 and updated that plan in May 2007; and

WHEREAS, the Columbia Basin Project Irrigation Districts entered into a December 17, 2004 Memorandum of Understanding with Washington State and the United States Bureau of Reclamation in regarding Columbia River water management; and

WHEREAS, the District, the State of Washington Department of Ecology and the United States Bureau of Reclamation entered into an April 18, 2005 Memorandum of Understanding to coordinate the allocation of District conserved water for replacement of groundwater supplies within undeveloped portions of the District; and

WHEREAS, the District, in conjunction with South and Quincy Columbia Basin Irrigation Districts and the Washington State Department of Ecology, developed a Columbia Basin Project Coordinated Water Conservation Plan in March 2007, which was revised in August 2010; and

WHEREAS, the "Comprehensive Water Conservation Plan" describes potential benefits to the District obtained by installation of conservation pipelines; and

WHEREAS, the East Columbia Basin Irrigation District Board of Directors authorize the Manager and appropriate staff to review the grant applications; and

WHEREAS, the District plans to use funding in Washington State Department of Ecology's proposed budget to provide 50% of the project costs, up to $1,000,000; and

WHEREAS, the District will work with the United States Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement;

NOW, THEREFORE, BE IT HEREBY RESOLVED by the Board of Directors of the East Columbia Basin Irrigation District that the President of the Board is hereby authorized to enter into grant agreements with the United States Bureau of Reclamation for a WaterSMART Grant program:

DULY ADOPTED in Open Meeting this 7th day of January, 2015.

BOARD OF DIRECTORS:

Attest:

Secretary

Appendix J

Proposed Project Budget

Appendix J - East Columbia Basin Irrigation District - Budget Proposal
Installation of Conservation Pipelines - Block 47

Budget Item Description	$/Unit	Quantity	Recipient & Non-federal Funding	Reclamation Funding	Total Cost
Salaries and Wages - Engineering					
District Engineer	$42.64	60	$2,558.40		$2,558.40
Assistant District Engineer	$29.60	160	$4,736.00		$4,736.00
Staff Engineer	$27.35	100	$2,735.00		$2,735.00
Employer Benefits - Engineering					
District Engineer	$12.94	60	$776.40		$776.40
Assistant District Engineer	$15.87	160	$2,539.20		$2,539.20
Staff Engineer	$15.86	100	$1,586.00		$1,586.00
Equipment and Construction Labor					
Labor	$9.82	17645	$141,882.79	$31,391.11	$173,273.90
Equipment	$3.01	17645	$53,111.45	$0.00	$53,111.45
Pickup Truck Mileage	$0.56	11745	$6,577.20	$0.00	$6,577.20
(See Attached Breakdown)					
Supplies/Materials					
Pipe (12" diameter)	$6.62	150	$496.69	$496.69	$993.37
Pipe (15" diameter)	$10.38	5425	$28,150.25	$28,150.25	$56,300.50
Pipe (18" diameter)	$15.47	2440	$18,876.06	$18,876.06	$37,752.12
Pipe (24" diameter)	$22.57	1455	$16,418.61	$16,418.61	$32,837.22
Pipe (30" diameter)	$33.04	2615	$43,201.48	$43,201.48	$86,402.96
Pipe (36" diameter)	$42.47	5560	$118,070.76	$118,070.76	$236,141.51
Fittings/Concrete/Etc.	$5,198.90	9	$23,395.05	$23,395.05	$46,790.10
(See Attached Breakdown)					
Environmental and Regulatory Compliance					
Coordination with SHPO/USBR	$20,000.00	1	0	$20,000.00	$20,000.00
Reporting					
Submitting Progress and Final Reports	$55.58	16	$889.28		$889.28
Total Project Costs			$466,000.61	$300,000.00	$766,000.61

APPENDIX J - East Columbia Basin Irrigation District - BUDGET PROPOSAL BREAKDOWN
Installation of Conservation Pipelines - Block 47

SUPPLIES AND MATERALS

BLOCK	LATERAL	LOCATION	FLOW (CFS)	PIPE SIZE (IN)	PIPE LENGTH (FT)	Pipe price incl. tax	PIPE COST	FITTINGS/ CONC./ETC.	TOTAL COST
47	EL85F, F4, AND H REALIGNMENT	HEADGATE TO FIRST T.O.	19.3	36	5560	$42.47	$236,141.51	$7,271.00	$243,412.51
		T.O. TO FU 38 AND 39	2.7	12	150	$6.62	$993.37	$3,300.00	$4,293.37
		T.O. TO FU 46 AND 57	2	15	2905	$10.38	$30,148.01	$4,420.32	$34,568.33
		T.O. TO FU38 & 39 TO T.O. TO FU46 & 57	16.6	24	1455	$22.57	$32,837.22	$6,000.00	$38,837.22
		T.O. TO FU55 TO T.O. TO FU 56 & 60 include 2 CFS op. waste	4.8	15	2520	$10.38	$26,152.49	$4,420.32	$30,572.81
		T.O. TO 46&57 TO NEW DIV BOX BEFORE EL85H	14.6	30	2615	$33.04	$86,402.96	$7,271.00	$93,673.96
		NEW DIV. BOX TO END OF EL85H	7	18	570	$15.47	$8,819.14	$4,702.50	$13,521.64
		NEW DIV. BOX TO 805-803	7.6	18	230	$15.47	$3,558.60	$4,702.50	$8,261.10
		805-803 TO 55	5.4	18	1640	$15.47	$25,374.38	$4,702.50	$30,076.88
TOTAL					**17,645**		**$450,427.68**	**$46,790.14**	**$497,217.82**

EQUIPMENT AND CONSTRUCTION LABOR

BLOCK	LATERAL	LOCATION	PIPE LENGTH (FT)	Labor (hr/ft)	Labor hours total	Average Labor Rate ($/hr)	Labor total	Average Labor Cost per linear foot of pipe	Hourly equipment (hr/ft)	Equipment hours total	Average hourly rate ($/hr)	Hourly equipment total	Average Equipment Cost per linear foot of pipe	Pickup Truck mileage (mi/ft)	Pickup Truck miles total	Mileage rate ($/mi)	Pickup Truck mileage total	TOTAL COST
47	EL85F, F4, AND H REALIGNMENT	HEADGATE TO FIRST T.O.	5560	0.38	2112.8	$ 33.21	$70,166.09		0.19	1056.4	$21.56	$22,775.98		0.85	4726	$0.56	$2,646.56	$95,588.63
		T.O. TO FU 38 AND 39	150	0.21	31.5	$ 32.35	$1,019.03		0.09	13.5	$23.11	$311.99		0.33	50	$0.56	$27.72	$1,358.73
		T.O. TO FU 46 AND 57	2905	0.22	639.1	$ 32.82	$20,975.26		0.08	232.4	$23.60	$5,484.64		0.37	1075	$0.56	$601.92	$27,061.82
		T.O. TO FU38 & 39 TO T.O. TO FU46 & 57	1455	0.4	582	$ 33.21	$19,328.22		0.19	276.45	$21.56	$5,960.26		0.92	1339	$0.56	$749.62	$26,038.10
		T.O. TO FU55 TO T.O. TO FU 56 & 60 include 2 CFS op. waste	2520	0.22	554.4	$ 32.82	$18,195.41		0.08	201.6	$23.60	$4,757.76		0.37	932	$0.56	$522.14	$23,475.31
		T.O. TO 46&57 TO NEW DIV BOX BEFORE EL85H	2615	0.24	627.6	$ 33.21	$20,842.60		0.16	418.4	$21.56	$9,020.70		0.77	2014	$0.56	$1,127.59	$30,990.89
		NEW DIV. BOX TO END OF EL85H	570	0.28	159.6	$ 33.21	$5,300.32		0.09	51.3	$21.56	$1,106.03		0.66	376	$0.56	$210.67	$6,617.01
		NEW DIV. BOX TO 805-803	230	0.28	64.4	$ 33.21	$2,138.72		0.09	20.7	$21.56	$446.29		0.66	152	$0.56	$85.01	$2,670.03
		805-803 TO 55	1640	0.28	459.2	$ 33.21	$15,250.03		0.09	147.6	$21.56	$3,182.26		0.66	1082	$0.56	$606.14	$19,038.43
TOTAL			**17,645**				**$173,215.67**	**$9.82**				**$53,045.91**	**$3.01**		**11,745**		**$6,577.37**	**$232,838.95**

Appendix K

ECBID Equipment Rates

EAST COLUMBIA BASIN IRRIGATION DISTRICT

55 North 8th OTHELLO, WASHINGTON 99344 Phone 509 488 9671
P.O. Box E Fax 509 488 6433

2012 EQUIPMENT PRICES
(Based on 2011 0peration costs)

Pickups:	1/2, 3/4 & 1 Ton	0.50	Mile
Trucks:	Class 2	1.00	Mile
	Class 6 Gas	1.00	Mile
	Class 6 Diesel	1.00	Mile
	Spray	1.00	Mile
	Water Truck	1.00	Mile

Lowboy	$ 4	Mile
Spray Truck:	$ 25	Acre
Graders:	$ 15	Hour
Backhoes:	$ 19	Hour
Loaders:	$ 35	Hour
Gradalls:	$ 8	Hour
Excavators:	$ 15	Hour
Dozers:	$ 65	Hour
Hydrocranes	$ 1	Mile
	$ 30	Hour
Concrete Pump:	$ 60	Hour
Rodder:	$ 25	Hour
HydroJet :	$ 25	Hour
Compressor	$ 10	Hour