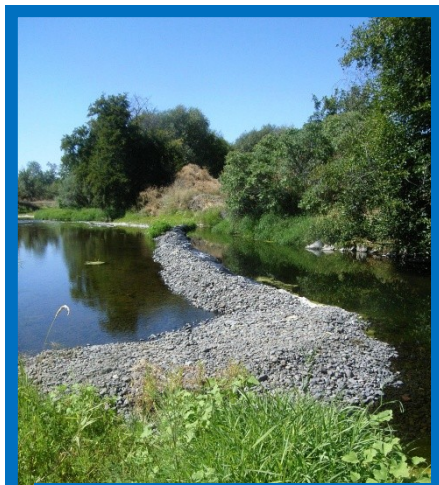


Walla Walla County Conservation District

Bergevin-Williams/Old Lowden

Diversion Consolidation & Piping



CONTACT INFORMATION:

Walla Walla County Conservation District
325 N. 13th Avenue
Walla Walla, WA 99362

Website: www.wwccd.net
Email: rick.jones@my180.net

Phone: 509-522-6340 Ext. 3
FAX: 509-343-2791

Mission of the Walla Walla County Conservation District

WWCCD is dedicated to the conservation and restoration of the natural resources of Walla Walla County, facilitated by working on a voluntary basis with landowners to identify opportunities and create solutions, while consistently providing education, information, and assistance whenever possible.

WWCCD Vision:

WWCCD believes that many complex environmental problems can be solved through voluntary cooperation rather than by regulatory mandates. We will do this by creating and then implementing proactive programs that respect both the needs of the landowners and the natural resources of the County.

Bergevin-William/Old Lowden

Diversion Consolidation & Piping

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BPA Grant No. 57872

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Walla Walla County Conservation District

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Project Overview and Historical Perspective

When early pioneers settled along the lower Walla Walla River Valley, they undoubtedly found some fairly harsh climatic conditions. Not only was the average annual precipitation low (9 to 14-inches annually) but the



soils were not conducive to growing agricultural crops other than pasture grasses without irrigation. Due to the arid nature of the region, most of the bottomland soils were highly alkaline and supported mostly stands of greasewood (*Sarcobatus vermiculatus*) and desert saltgrass (*Distichlis stricta*), a fact supported by remnant stands that can still be found in the Lowden-Touchet area today.

In order to make the land more productive, water was diverted into gravity flow canals and ditches for irrigation at various points along the Walla Walla River. And since water was more plentiful in the fall to spring period, water was often diverted for over-winter leaching of salts out of the soil profiles using flood irrigation.

The date of the earliest more formal organization of ditch groups is debatable. It is fact, however, that some of the water rights for farms served by the Bergevin-Williams and Old Lowden ditches date as far back as 1870 when Frank M. Lowden, Sr. received his first water rights. In 1939, the Old Lowden Ditch became the Old Lowden Ditch Corporation. In 2013, the Bergevin-Williams and Old Lowden Ditch were consolidated into the new Bergevin-Williams-Old Lowden

**OLD LOWDEN GRAVEL PUSH-UP DAM
ON THE WALLA WALLA RIVER
NEAR RIVER MILE 29**

Corporation (see Historylink.org and query Walla Walla irrigation, Essays 10662 & 10661).

In order to divert water from the river, farmers annually constructed gravel diversion “dams” with heavy equipment. The last two of these “push-up dams on the Walla Walla River in Washington were for diverting water into the Bergevin-William ditch system and into the Old Lowden ditch system.

After Mid-Columbia Steelhead were listed as threatened under the Endangered Species Act, the Washington Dept. of Fish & Wildlife assisted irrigators in designing the dams to accommodate fish passage. Rapid changes in flow conditions, however, often resulted in obstructions to fish passage and an imminent threat of “take” (fish mortality).



**BERGEVIN-WILLIAMS GRAVEL PUSH-UP
DAM ON THE WALLA WALLA RIVER
NEAR RIVER MILE 31.5**

With an increasing number of salmonid recovery projects being implemented in the Walla Walla Basin, it became obvious to both fish and water managers that action needed to be taken.

WHY WAS THIS PROJECT NEEDED?

The annual need to create push-up dams has, in recent years, become an obvious problem in the eyes of fish managers. An obvious solution was to create an off-channel diversion structure that would eliminate the need for the gravel dams. With the construction of the pneumatic dam and fish ladder for the Lowden 2/Garden City diversion, it seemed logical that a new consolidated diversion structure could be built at this site to utilize the benefit of the pneumatic dam. This action aligned precisely with the number one concern of basin-wide restoration efforts — the removal of barriers and the improvement of fish passage.

The strategic action of constructing a consolidated diversion was further complemented by the potential for in-stream flow enhancement through the piping of old inefficient irrigation ditches of the Bergevin-Williams Ditch Company and the Old Lowden Ditch Company. The saved water through improved conveyance efficiency could be put into the Trust Water Rights Program.

Because the removal of two potential passage barriers would greatly improve fish passage, funding was made available from the Bonneville Power Administration (BPA). And, with an estimated 4.5 cubic feet per second of potential water savings, the Washington Dept. of Ecology (WA-DOE) provided funding to pipe the Bergevin-William/Old Lowden ditches. Farmers would benefit by having an updated, reliable irrigation water delivery system that would allow them to manage their water more efficiently and the regulatory agencies would benefit from improved passage and flows. And, of course, the fisheries resource would benefit as well.

MAINTENANCE ISSUES

For a number of years, managers and irrigators served by the Bergevin-Williams and Old Lowden ditches had envisioned some needed up-grades to their open canal delivery system. The need for improvement was evident. According to irrigation water delivery efficiency studies conducted by Economic & Engineering Services (EES) in 2004, fully 1/3 of the diverted water was lost to seepage. The study identified piping the delivery system as one of the best alternatives available.

Recurring maintenance needs on the canal and laterals included:

- ◆ Annual re-shaping of the canal where needed (reinforce weakened sections of the canal, remove collected bottom debris, etc.)
- ◆ Control of weeds growing along and within the canal
- ◆ Removal of wind blown weeds that accumulate in the canal
- ◆ Maintenance of deteriorating water control structures and fish screens
- ◆ Initial construction and continual maintenance of the gravel push-up dams



TARGET SPECIES

The target species for the Walla Walla River from which Bergevin-Williams and Old Lowden water is diverted are Mid-Columbia Basin Steelhead and Bull Trout which are listed as “Threatened” under the Endangered Species Act as well as reintroduced Spring Chinook salmon. The steelhead are the primary target species with adult summer steelhead migrating upstream from September through March and juvenile steelhead out-migrating between March and July. There are increasing numbers of Spring Chinook found in the Walla Walla River; most of the spawning adults are thought to be recruits from hatchery production from other river systems. In 2000, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) started planting pre-spawning adult Spring Chinook in the Walla Walla Basin. Spring Chinook adult migration occurs between mid-April and the end of June. Bull Trout are not generally found in the lower reaches of the basin during the warmer months, however, adfluvial populations migrate downstream and forage in the river below the Gardena Farms Irrigation District #13’s diversion at RM 36.9 when temperatures permit. The water savings resulting from this project due to reduced irrigation withdrawals will help maintain stream flows critical to the recovery of these important fish stocks.



***SPAWNING STEELHEAD IN A SPRING
CREEK TRIBUTARY TO THE WALLA WALLA
RIVER***

SCOPE OF THE BERGEVIN-WILLIAMS/OLD LOWDEN (BWOL) CONSOLIDATED DIVERSION AND IRRIGATION PIPING PROJECT

The scope of this project called for two major construction phases—the consolidated diversion structure phase and the irrigation pipeline construction phase:

BWOL Consolidated Diversion

- A. A new diversion structure and automated fish screen was installed on the south side of the Walla Walla River at River Mile (RM) 31 to serve both the Bergevin-Williams and the Old Lowden ditch groups and eliminate the two gravel push-up dams. The diversion structure will utilize the existing pneumatic dam serving the Lowden 2/Garden City ditches for water level control.
- B. A 213-foot long service pipeline of 28-inch high density polyethylene (HDPE) fusion-welded pipe was installed from the new diversion structure to the north side of the Walla Walla River where it will tie in with a new piped irrigation water conveyance system.

BWOL Irrigation Piped Conveyance System

- A. Approximately 9.6 miles of piping installed to serve 1,840 acres of irrigated cropland and pasture.
- B. 18 pumping stations constructed or modified

- C. 11 metering stations for flood irrigation outlets installed.
- D. An estimated 2,404.65 acre-feet of saved water placed into trust.

THE ROAD TO IMPLEMENTATION

Although some discussions regarding a “project” in the Lowden area may have occurred as early as 2000-2002, the first formalized discussions regarding irrigation efficiency projects in the Lowden area appeared in the spring of 2006 when a conceptual statement of work for the Touchet—Lowden Area Comprehensive Irrigation District Management Plan (CIDMP) was developed. The goal of this effort was to provide a basis for an agreement between irrigators and federal regulatory agencies. While the CIDMP never progressed beyond the draft stage, a dialogue was started between the Walla Walla County Conservation District and irrigators of the Old Lowden Ditch and the Bergevin-Williams Ditch companies.

While there was local agreement as to what needed to be done, one major hurdle had to be overcome. In order for the two gravel push-up dams to be eliminated and irrigation water diverted at a new common withdrawal point, a change of point of diversion had to be approved for both ditch companies. The point of diversion for the Old Lowden Company had to be moved upstream while that for the Bergevin-Williams Company had to be moved downstream. The big job was to prove to water regulators that the benefits of the project to fish habitat quality greatly exceeded any negative impact the project might have. This proved to be a daunting task for the WWCCD and one that threatened to scuttle the entire project even though two passage barriers would be eliminated and many acre-feet of water saved through improved system efficiencies.

Finally, the District obtained the approvals needed to move forward with the project and construction started in the fall of 2012 on the new diversion structure located immediately upstream of the pneumatic dam that services both the Lowden 2 and Garden City irrigators.

BERGEVIN-WILLIAMS/OLD LOWDEN CONSOLIDATED DIVERSION STRUCTURE PROJECT SUMMARY

WWCCD awarded the construction contract for the construction of the BWOL consolidated diversion to Premier Excavation which submitted the lowest of the several bids received. The project was started in July and completed on schedule in February 2013 with a final cost of approximately **\$1,025,370**. Bonneville Power Administration’s Fish and Wildlife Program provided **98.8%** of the funding all of which was under contract with the WWCCD. WA-Department of Ecology provided **\$12,000** or **1.2%** of the project funding..



FIRST STAGES OF CONSTRUCTION



PREPARING STRUCTURE SITE

Construction of the pumping plant with its air-blast fish screens posed some interesting challenges to the Premier crews. First, the river had to be diverted to the north side of the channel in order to “dry out” the construction site. In this case, the term “dry” is relative because one or more high velocity pumps had to be used to remove water that seeped rapidly through the surrounding river gravels. Wet boots were common in the early stages of setting rebar and pouring the footings. Eventually, however, the new diversion structure began to take shape.



PUMPING EXCESS WATER FROM STRUCTURE SITE. NOTE RAPID SEEPAGE COMING THROUGH GRAVELS.



POURING THE BASE PAD AND SETTING INITIAL REBAR WAS DONE IN THE WET. AFTER THE FLOOR WAS POURED, WORK PROGRESSED AT A MORE RAPID PACE.

After the floor was poured, work on the structure progressed rapidly until the diversion structure was ready to receive plumbing and hardware. The Washington Dept. of Fish and Wildlife’s Yakima Screen Shop had the fish screen fabricated and did the screen installation. Dunning Irrigation supplied and installed the two 40-Hp turbine irrigation pumps. In addition to these items, there was a myriad of other items that were installed that were needed to make the diversion structure functional, e.g. the air compressor that provides the air blast used to periodically clean the weeds and other debris off the screen, pressure sensors, piping, electrical conduits and wiring, power panels and circuitry and more.



AIR BLAST IN OPERATION CLEANING DEBRIS OFF THE SCREEN



LEFT: PIPELINES COMING FROM NEW PUMPS AT THE DIVERSION STRUCTURE ANCHORED WITH CONCRETE THRUST BLOCKS. RIGHT: NEW 40 HP PUMPS SET TO DELIVER WATER TO THE NEW BWOL PIPED DELIVERY SYSTEM.

Concurrent with construction of the new diversion structure was installation of the pipeline that would take the water from the diversion, located on the south side of the Walla Walla River, to the new piped delivery system on the north side of the river. This was accomplished in two phases:

- Phase 1 was to fusion weld the entire length of 30-inch diameter High Density Polyethylene pipe that would be needed to deliver water to the distribution pipelines
- Phase 2 would be to place the 220 feet of HDPE in the trench under the river. This phase was done in late July.



PRE-ASSEMBLED 30-INCH FUSION WELDED HDPE READY FOR PLACEMENT



PLACEMENT OF HDPE IN THE TRENCH UNDER THE WALLA WALLA RIVER

The following businesses, agencies and their employees contributed to the construction of this project phase:

- Premier Excavation — contracted by WWCCD as primary contractor
- Dunning Irrigation — subcontractor for pipe, fittings, & pump station construction
- Moreno-Nelson — concrete subcontractor

- American Rock — concrete supplier
- Columbia REA — supplied power lines to site
- Current Electric — wiring subcontractor
- WA Dept. of Fish & Wildlife Screen Shop — installed fish screen

BERGEVIN-WILLIAMS/OLD LOWDEN IRRIGATION PIPELINE PROJECT SUMMARY

WWCCD received five bids in response to a bid request for construction on the entire Bergevin-Williams and Old Lowden pipeline projects. Premier Excavation was the lowest bidder and was selected as the contractor as a result of WWCCD's competitive bidding process. Project installation of this phase began in mid-January and the project became operational on March, 2013. The project had a final cost of approximately **\$1,744,802**. Bonneville Power Administration's Fish and Wildlife Program provided **16.3% (\$284,705)** of the funding all of which was under contract with the WWCCD. WA Dept. of Ecology's Water Resources Program provided **83.7% (\$1,460,097)** of the funding.

The piping of the new BWOL irrigation delivery system had its own set of challenges as well. According to one of the long-time landowners, the winter of 2012-2013 resulted in wettest conditions he had ever experienced. Trenching and laying pipe was often accomplished in very muddy and wet situations due to wet weather and high water table conditions. In some cases, the bearing strength of the soils were so low that additional fill (gravel) had to be brought in to properly bed the pipelines.



TRENCHING THROUGH VERY WET CONDITIONS

The project called for boring under Highway 12 so the pipeline could pass under the highway. Normally, a fairly straightforward proposition, this boring site turned out to be anything but easy. Due to obstructions, the boring could not be held on grade but had to proceed at a downward angle. As with the diversion pipeline that crossed the Walla Walla River, HDPE was fusion-welded pipe was used and was assembled (welded) on the north side of the highway prior to pulling it through the bore hole. At this point, the remainder of the pipeline installation proceeded without major complications.



THE BORE HOLE UNDER HIGHWAY 12 IS DOWN THERE SOMEWHERE! DUE TO THE HIGH WATER TABLE, PUMPS WERE UTILIZED TO LOWER THE DEPTH OF WATER IN THE BORE HOLE AND PIPELINE TRENCH

LOOKING SOUTH ALONG 26-INCH FUSION-WELDED HDPE PIPE STAGED TO BE PULLED UNDER HIGHWAY 12

The following businesses, agencies and their employees contributed to the construction of this project phase:

- Premier Excavation — contracted by WWCCD as primary contractor
- Dunning Irrigation — subcontractor for pipe, fittings, & on-farm pump station construction
- Current Electric — electrical subcontractor

SUMMARY OF ACCOMPLISHMENTS & COSTS

In summary, the WWCCD began working with the Bergevin-Williams and Old Lowden ditch groups in 2002 to lay out the groundwork for a consolidated diversion structure and piped system for delivering water to irrigators served by both ditches. Utilizing a grant from Bonneville Power Administration, the WWCCD contracted with HDR Engineering Inc. to develop a project feasibility study and consolidated structure design. This phase of the project was completed in late 2009 at a cost of **\$135,460.19**.

At about the same time, WWCCD engineers were working on the design of the piped irrigation delivery system. This portion of the project was developed in close consultation with irrigators that would be utilizing the new system and was finalized in the summer of 2012 for immediate construction. The contract with Premier was signed in October and work began in November.

The following is a summation of accomplishments resulting from the Bergevin-Williams/Old Lowden Diversion (BWOL) Consolidation and Irrigation Piping projects:

BWOL Consolidated Diversion — The final project cost was approximately **\$1,025,370**. **98.2%** of the diversion project was funded by Bonneville Power Administration through the Confederated Tribes of the Umatilla Indian Reservation’s fish passage and screening fund. The remaining **1.8%** was funded by WA-DOE. The project consisted of a high-tech automated irrigation water diversion structure that included the following:

- ◆ A new NOAA compliant fish screen to prevent ESA listed salmonids from entering the diversion pumps and pipe-line.
- ◆ An automated high pressure air blast system to keep trash/debris from entering irrigation pumps and pipe-lines.
- ◆ Elimination of the last two gravel push-up dams on the Walla Walla River in Washington that often resulted in obstructions to fish passage.



THE COMPLETED BWOL CONSOLIDATED DIVERSION STRUCTURE ON THE WALLA WALLA RIVER

BWOL Irrigation Pipeline — The final project cost of the entire BWOL Pipeline project was approximately **\$1,744,370**. This phase of the piping project had two funding partners; one federal agency and one state agency. The federal Bonneville Power Administration provided **\$284,705 (16.3%)**. The state WA Department of Ecology provided **\$1,460,097 (83.7%)**.



ALIGNMENT OF NEW BURIED PIPE-LINE WHERE OLD LOWDEN DITCH USED TO RUN



NEW PUMPING STATION

The total project costs, therefore, were:

Project feasibility study and consolidated structure design	\$135,460
BWOL Consolidated diversion structure	\$1,025,370
BWOL Irrigation Pipeline	\$1,744,802
<i>Total Cost</i>	\$2,905,632

What was accomplished:

- ◆ 9.6 miles of buried irrigation pipeline (over 50,000 feet) serving 1,840 acres of cropland and pastureland
- ◆ Construction or modification of 18 pumping stations
- ◆ Installation of 11 metering stations for flood outlets
- ◆ An estimated 2,404.65 acre-feet of water saved through improved delivery efficiencies will be placed into trust