



February 15, 2013

**Smith Diversion Dam Fish Passage Project Final Report
OWEB Grant #212-6036**

Project Summary

The Walla Walla Basin Watershed Council completed construction of the Smith Diversion Dam Fish Passage project in September 2012. The Smith dam, a grade control sill, is located at river mile 44.9 on the Walla Walla River along the edge of Milton-Freewater. The structure was originally built by the US Army Corps of Engineers in the 1940s as part of the Milton-Freewater Levee flood protection project. Over the last few years a three foot head cut in the river bed migrated up to this structure, creating a fish passage barrier for redband trout, bull trout, juvenile steelhead, and juvenile Chinook salmon during low flows. There was also concern that if the concrete sill collapsed or was undermined, the toe of the flood protection levee could be exposed and vulnerable to erosion. The Walla Walla Basin Watershed Council worked with project partners to secure funding for design, permits, and construction. The WWBWC contracted with GeoEngineers, Inc. for design work and construction oversight, and Partney Construction, Inc. of La Grande completed this in river construction project. A passage notch was cut into the concrete dam and an engineered roughened riffle was constructed immediately below the concrete sill to ensure fish passage at low flows.

Project Narrative

There are only a few remaining fish passage problems to be corrected on the mainstem Walla Walla River. This site is one of those, and was identified by CTUIR and ODFW fisheries monitoring staff as a fish passage problem but neither agency had the staff time to pursue funding for design and construction and complete the permitting process. The WWBWC offered to work on implementing a solution and CTUIR staff and ODFW provided input on design and assisted with funding. The first cost share match was secured from the CTUIR Fish Habitat program. When it became apparent that construction costs were going to exceed initial estimates based on a brief site visit by the project engineer and a construction contractor, additional funding was pursued. The USFWS Partners for Fish and Wildlife program was able to support the project with both funding and with permitting assistance via their abbreviated ESA programmatic Biological assessment and Biological Opinion program with NOAA Fisheries.

Several alternatives were considered. These alternatives included enhancing an existing small side channel as a passage route. Another option was removing the entire concrete berm, but this would imperil the levee, and could lead to fish passage issues at a fish ladder further upstream if a headcut worked its way up to that site. There was also discussion of constructing a series of two or three concrete step pools that would tie into the concrete berm, however there was concern that the pools would quickly fill with sediment. Based on meetings with project partners and local fish biologists,

notching the concrete wall and installing a roughened riffle downstream of the concrete was agreed upon as the best alternative.

The project involved temporarily dewatering the work area, cutting an eleven foot wide, one foot deep v- notch into the channel spanning concrete grade control structure and installing a 45 foot long, 110 foot wide “u-shaped”, and downward sloping roughened riffle of boulders immediately below the structure to ensure fish passage up to and through the notch. (see the attached plan drawings) A small rock semi-circular rock structure was installed immediately upstream of the notch to reduce upstream headcutting. A secondary passage route was also improved in a smaller side channel that runs along the base of the levee, but this side channel is less likely to remain accessible for passage over time. The project construction occurred over the second and third week of September. Funding for the project was provided by the Oregon Watershed Enhancement Board, US Fish and Wildlife Service, Confederated Tribes of the Umatilla Indian Reservation’s Fish Habitat Program using Bonneville Power Administration funds, Oregon Department of Environmental Quality, and the Milton-Freewater Water Control District. Technical support was provided by Oregon Department of Fish and Wildlife and the Confederated Tribes of the Umatilla Fish Habitat Program.

A fish salvage was necessary to clear fish from the work zone in a side channel first so that a bypass channel and project access road culvert for the river and fish could be installed, then a salvage occurred in the main channel during the second phase of the project, and finally a salvage of a shorter reach of the side channel occurred prior to the removal of the culvert and stabilization of the side channel.

Fish salvages occurred on the following dates before, after, or between stages of construction: September 11, 2012, September 12, 2012, and September 18, 2012.

The dewatering, fish salvage, and Construction went smoothly. Once the concrete grade control berm was exposed, it became apparent that a vertical crack has existed for quite some time in the center of the concrete. The crack extended down at least 3 feet of the total 5 feet of the concrete beam. The Water Control District’s engineer and the US Army Corps of Engineers were contacted and they all arrived at the site. The Corps and the representatives of the MFWCD board agreed that the best way to maintain the integrity of the grade control structure was to proceed with the project as planned. The project engineer decided to offset the deepest part of the notch about 1 foot to the side of the crack in the concrete and to buttress the downstream side of the crack with larger rock than planned. Fish passage would still be able to occur, but the increased stability would reduce the chance of losing the concrete berm and increasing the chance that resulting headcutting and bed scour would expose the toe of the levee right alongside a residential portion of the town of Milton-Freewater.

During construction, the State director for USFWS, and regional USFWS staff, visited the site as part of a tour of Eastern Oregon project sites. The director was complimentary of the work being completed to address the fish passage issue for ESA- listed bull trout and other aquatic species.

There have been concerns about too much of the river seeping into the interstitial spaces of the roughened channel, potentially dewatering the 50 foot length of the structure. To avoid this, the design called for having the cobbles, gravels, and sand that had been excavated from the riverbed poured back over the roughened channel rock structure once the larger rock was installed. Based on post construction observations, this has been effective at keeping most of the flows on the surface of the structure. It is hoped that after this winter and spring, additional sediments travelling downstream in

higher flow events will infiltrate any remaining voids in the structure and further reduce any remaining seepage losses.

Project Funding

Oregon Watershed Enhancement Board (design, permitting, construction, admin)	\$20,250
US Fish and Wildlife Service (construction costs)	\$17,000
CTUIR Fish Habitat Program (construction costs)	\$25,000
Milton-Freewater Water Control District (construction costs)	\$20,000
ODEQ EPA 319 program (designs)	\$4,900
WWBWC Bonneville Power Administration funds (construction oversight)	\$13,206
Total project cost	\$100,356

A majority of the OWEB funds (\$15,000) were used to pay for construction costs. The remainder of the OWEB funds helped cover project management and staff mileage to and from the site, project administration, and post implementation reporting. OWEB funds also covered the cost of the county land use permit fee of \$375.00.

ODFW staff members were interested in seeing a longer roughened channel to reduce the steepness of the roughened channel to reduce velocities for fish moving upstream. The project was lengthened based on their input. This increased the project cost, but has led to a more stable project for withstanding higher flows.

Additional funding from the Milton-Freewater Water Control District and USFWS was very helpful in covering the increased costs of the longer project.

Lessons learned

We underestimated the time and funding needed to complete design, permitting, construction, and construction oversight.

BPA funds were used to complete the project, triggering a NEPA review of the project. The biological assessment of ESA impacts was covered fairly quickly through the USFWS Partners Program Programmatic Biological Opinion. Cultural analysis for the Archeology permitting was handled by CTUIR fairly quickly, as compared to a privately led archeology review we had completed for another project.

We included all permitting Agency fish biologists early in the process to reduce the chance of large changes to a fish passage project and to help estimate costs and increase the chance of getting the project done in less than two years.

Project photos are attached, along with project design drawings.



This pre-construction photo shows the fish passage barrier created by the Walla Walla river stream bed downcutting downstream of the Corps of Engineers' concrete grade control structure. The concrete structure was installed the late 1940s.



This photo shows a technician from A-Core, Inc. completing the concrete cutting.

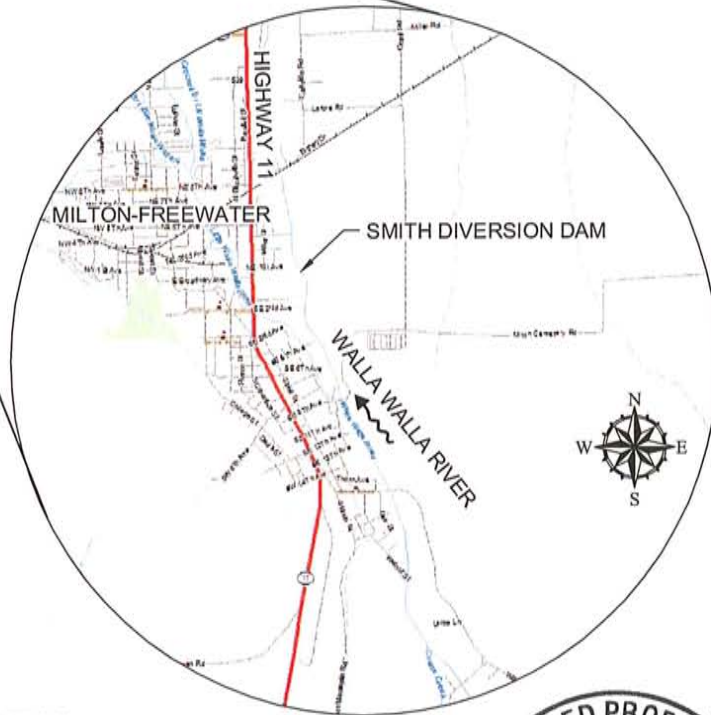


This photo shows Partney Construction's operator building the roughened channel.



This photo shows the completed project. Rock has been placed downstream of the notched concrete to maintain a sloped channel that fish can negotiate.

WALLA WALLA BASIN WATERSHED COUNCIL SMITH DIVERSION DAM FISH PASSAGE IMPROVEMENTS DESIGN DRAWINGS



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- 3 PROPOSED IMPROVEMENTS
- 4 DETAILS
- 5 DETAILS
- 6 GENERAL NOTES
- 7 GENERAL NOTES

CONTACT INFORMATION



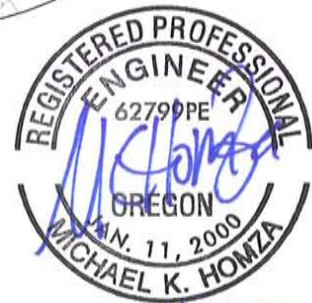
WALLA WALLA BASIN WATERSHED COUNCIL

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Expires: 6-30-13

PURPOSE:
SMITH DIVERSION FISH PASSAGE
WALLA WALLA RIVER

VERTICAL DATUM: NAVD88
ADJACENT PROPERTY OWNERS:

- 1. Bill Lewis
- 2. Frazier Farms

COVER SHEET
LATITUDE: 45.9375 N
LONGITUDE: -118.3825 W

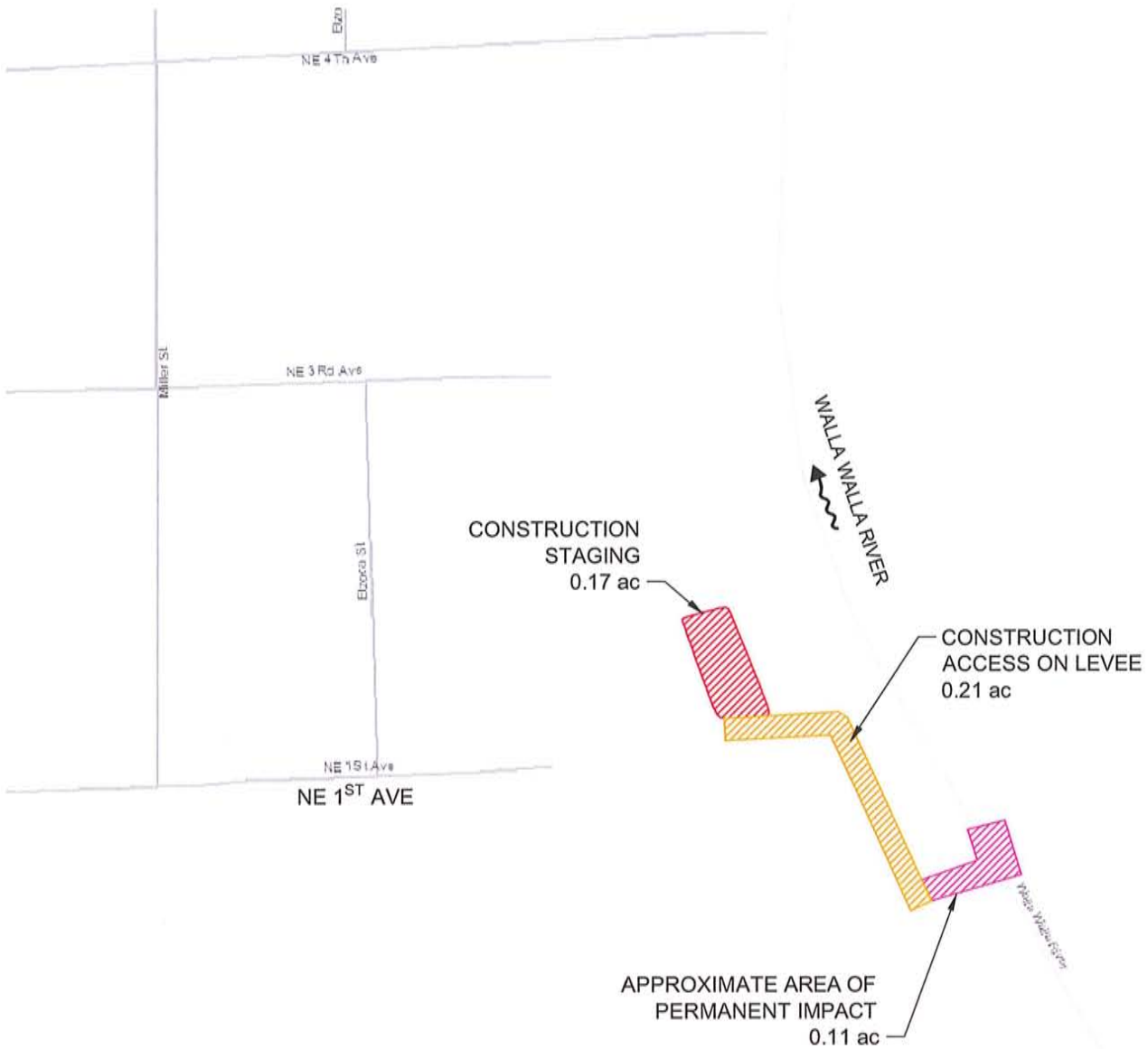
SMITH DIVERSION FISH PASSAGE
FOR THE WALLA WALLA BASIN
WATERSHED COUNCIL

NEAR: MILTON-FREEWATER
COUNTY OF: UMATILLA
STATE OF: OREGON
APPLICATION BY:
WALLA WALLA BASIN
WATERSHED COUNCIL
CREATED BY: GEOENGINEERS, INC.

SHEET: 1 OF 7 DATE: JUNE 12, 2012

MKH : MGF

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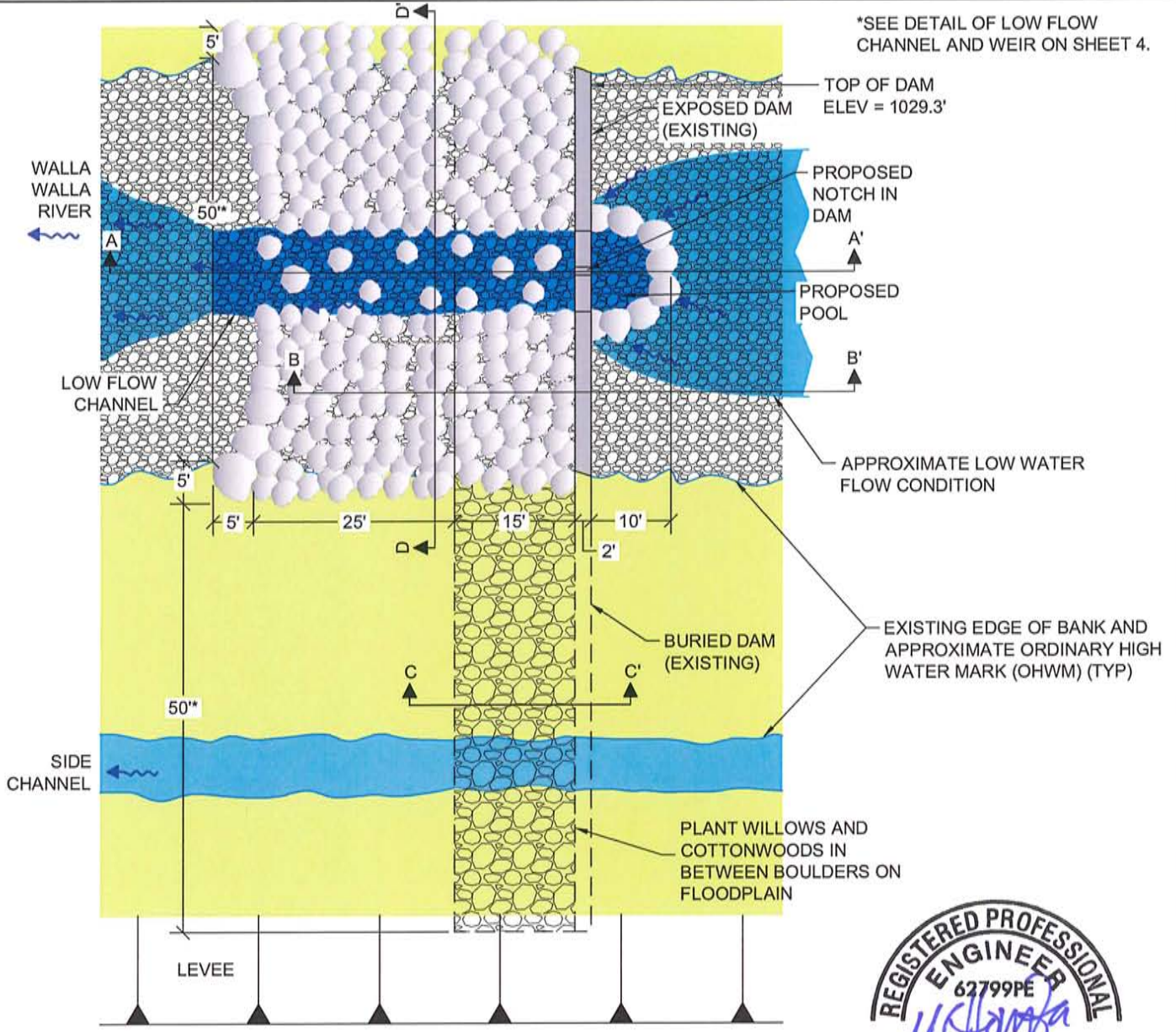
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*SEE DETAIL OF LOW FLOW CHANNEL AND WEIR ON SHEET 4.

TOP OF DAM
ELEV = 1029.3'

EXPOSED DAM
(EXISTING)

PROPOSED
NOTCH IN
DAM

PROPOSED
POOL

APPROXIMATE LOW WATER
FLOW CONDITION

EXISTING EDGE OF BANK AND
APPROXIMATE ORDINARY HIGH
WATER MARK (OHWM) (TYP)

BURIED DAM
(EXISTING)

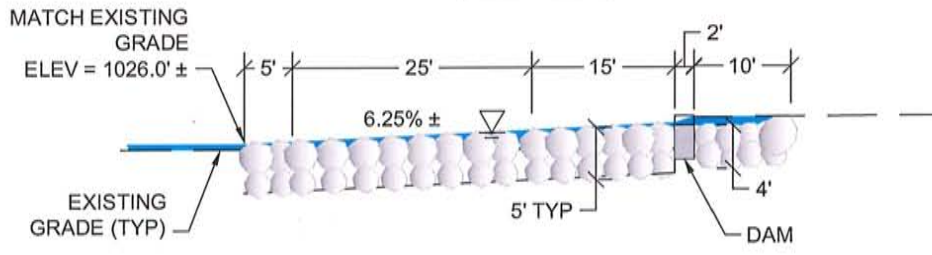
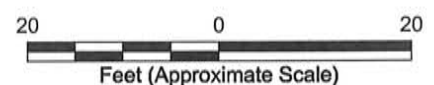
PLANT WILLOWS AND
COTTONWOODS IN
BETWEEN BOULDERS ON
FLOODPLAIN

PLAN VIEW



Expires: 6-30-13

*APPROXIMATE DIMENSIONS



SECTION A-A'

PURPOSE:
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PROPOSED IMPROVEMENTS

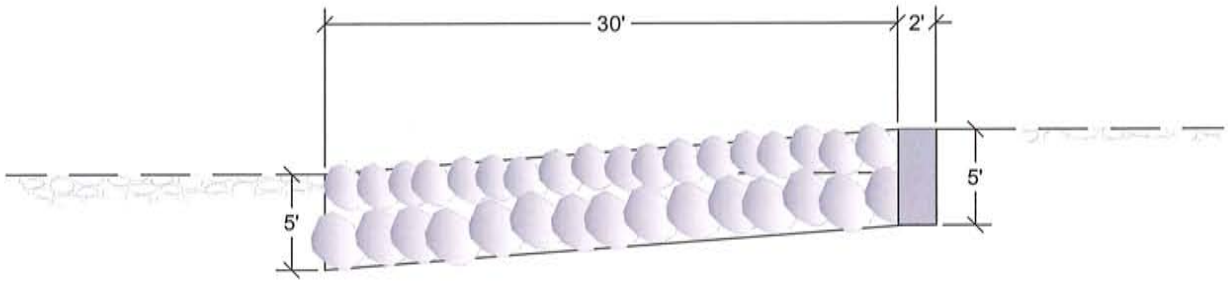
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SMITH DIVERSION FISH PASSAGE
FOR THE WALLA WALLA BASIN
WATERSHED COUNCIL

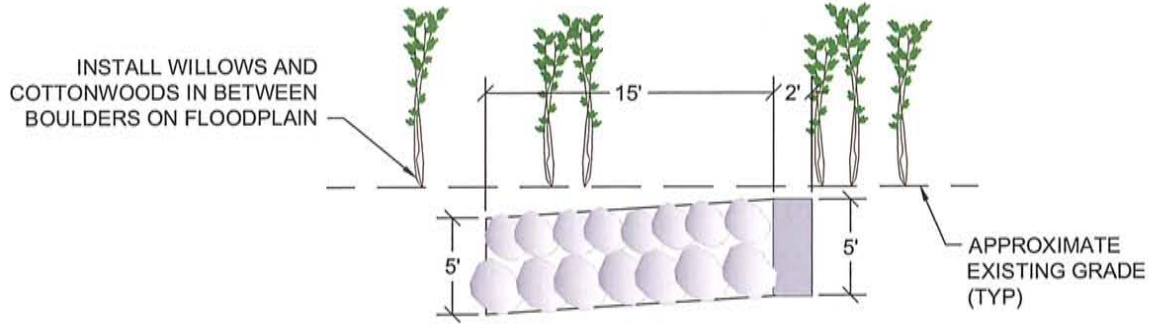
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SHEET: 3 OF 7 DATE: JUNE 12, 2012

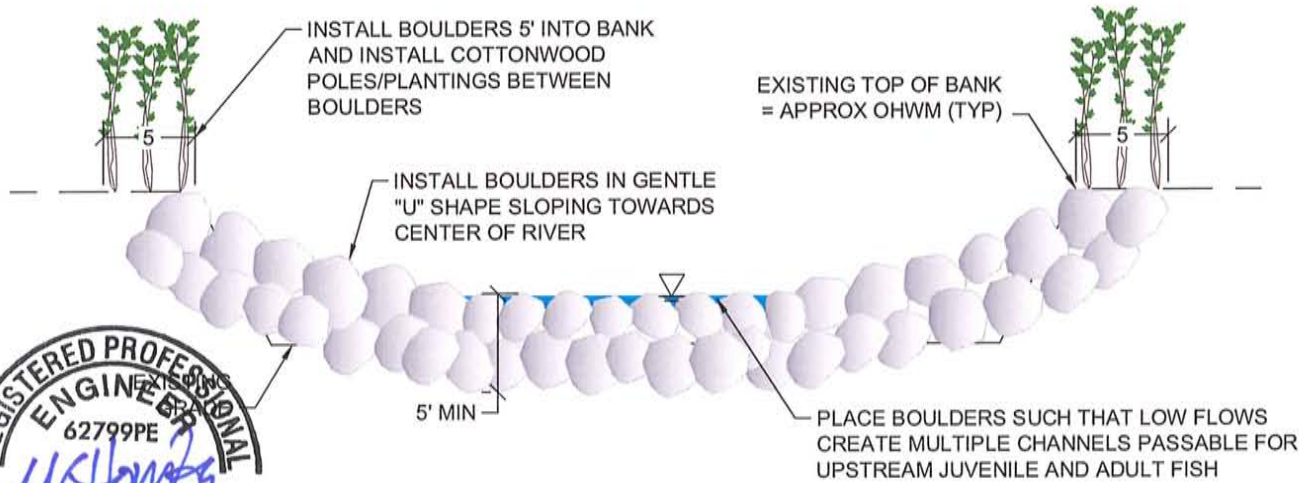
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SECTION B-B'



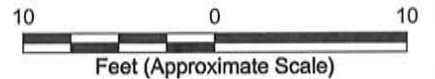
SECTION C-C'



SECTION D-D'



Expires: 6-30-13



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WALLA WALLA RIVER

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DETAILS

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SMITH DIVERSION FISH PASSAGE
FOR THE WALLA WALLA BASIN
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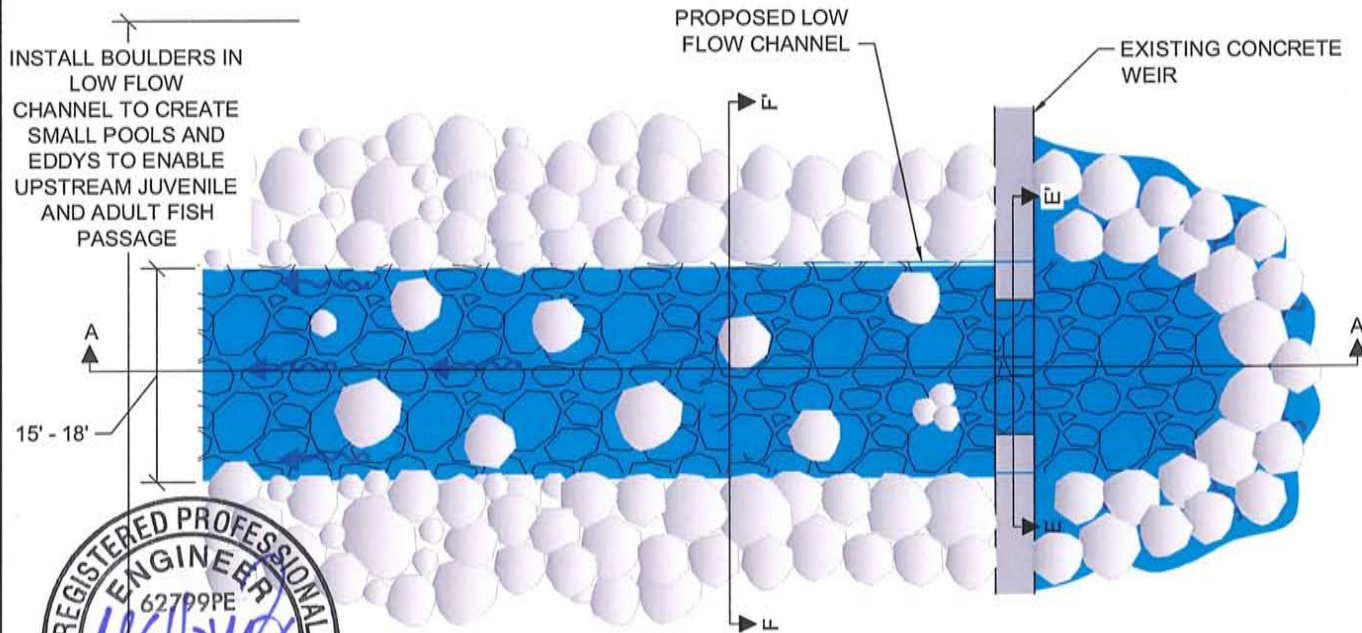
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SHEET: 4 OF 7 DATE: JUNE 12, 2012

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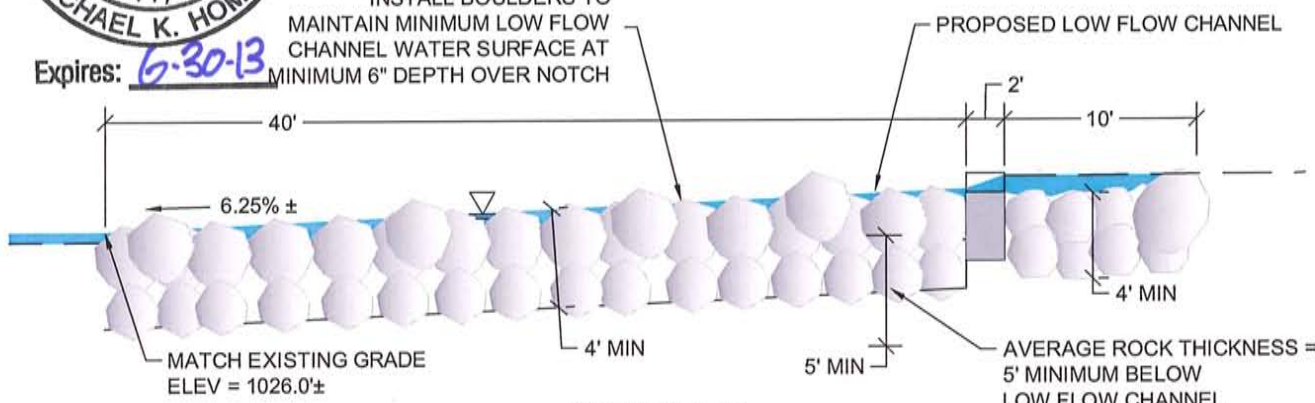


PLAN VIEW

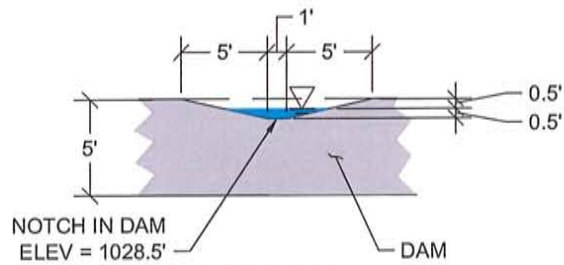


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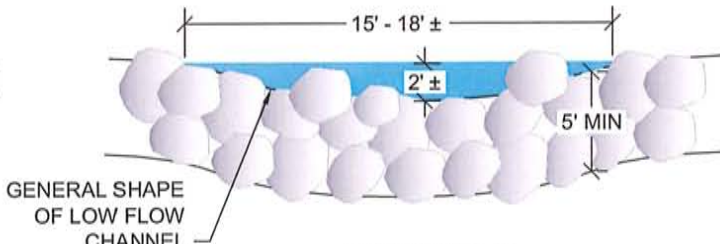
INSTALL BOULDERS TO MAINTAIN MINIMUM LOW FLOW CHANNEL WATER SURFACE AT MINIMUM 6" DEPTH OVER NOTCH



SECTION A-A'

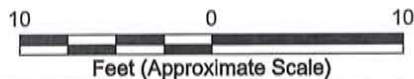


SECTION E-E'



SECTION F-F'

INSTALL BOULDERS IN LOW FLOW CHANNEL TO CREATE SMALL POOLS AND EDDYS TO ENABLE JUVENILE AND ADULT FISH PASSAGE.



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2. Frazier Farms

DETAILS

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SMITH DIVERSION FISH PASSAGE
FOR THE WALLA WALLA BASIN
WATERSHED COUNCIL

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COUNTY OF: UMATILLA
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SHEET: 5 OF 7 **DATE:** JUNE 12, 2012

GENERAL NOTES:

1. ESTIMATED VOLUME OF EXCAVATION AND REMOVAL = 225-CY.
2. ESTIMATED VOLUME OF MATERIAL EXCAVATED AND REUSED IN PLACED ROCK BED = 300-CY.
3. ESTIMATED VOLUME OF IMPORTED ROCK FILL = 300 CY.
4. DESIGNS AS SHOWN ARE APPROXIMATE AND ARE INTENDED TO BE CONSTRUCTED UNDER THE DIRECT SUPERVISION OF THE DESIGN ENGINEER AND/OR QUALIFIED REPRESENTATIVE FROM GEOENGINEERS.
5. WIDTHS OF RIVER AND FLOODPLAIN ARE APPROXIMATE AND NEED TO BE VERIFIED IN THE FIELD.
6. LOCATION OF NOTCH IN WEIR IS SHOWN AS APPROXIMATE AND SHALL BE IDENTIFIED IN THE FIELD BY THE DESIGN ENGINEER AND/OR QUALIFIED REPRESENTATIVE FROM GEOENGINEERS.
7. PROJECT SHALL BE CONSTRUCTED DURING LOW FLOW CONDITIONS AND WITHIN THE APPROPRIATE FISH WINDOW AS DICTATED BY ENVIRONMENTAL PERMITS. LOW FLOW DISCHARGES ESTIMATED TO BE ABOUT 50 CFS.
8. CONTRACTOR SHALL COMPLY WITH ALL REQUIRED PERMIT REQUIREMENTS.
9. WATER SHALL BE DIVERTED AROUND ACTIVE WORK ZONE BY DIRECTING FLOW THROUGH MAIN CHANNEL WHILE PERFORMING WORK IN FLOODPLAIN/SIDE CHANNEL AREA AND BY DIRECTING FLOW THROUGH SIDE CHANNEL WHILE WORKING IN MAIN CHANNEL. EXCAVATED AREA TO RECEIVE BOULDERS SHALL BE DEWATERED SO EXCAVATION IS DRY AND EXISTING BED IS VISIBLE TO ENABLE PROPER PLACEMENT OF BOULDERS.
10. CONTRACTOR SHALL SUBMIT TO DESIGN ENGINEER AND/OR QUALIFIED REPRESENTATIVE FROM GEOENGINEERS A DIVERSION AND DEWATERING PLAN PRIOR TO FINAL APPROVAL AND CONSTRUCTION COMMENCEMENT.
11. CONTRACTOR SHALL SUBMIT TO DESIGN ENGINEER AND/OR QUALIFIED REPRESENTATIVE FROM GEOENGINEERS PLANS TO NOTCH EXISTING WEIR PRIOR TO FINAL APPROVAL AND CONSTRUCTION COMMENCEMENT. JACK HAMMERS ARE NOT ALLOWED ON EXISTING DAM. WEIR SHALL BE SAW CUT.
12. CARE SHALL BE TAKEN WHEN EXCAVATING AND PLACING MATERIAL IN THE VICINITY OF THE EXISTING DAM TO PREVENT DAMAGE AND/OR POTENTIAL UNDERMINING OF DAM.
13. BOULDERS UPSTREAM AND DOWNSTREAM OF DAM IN VICINITY OF PLUNGE POOL SHALL BE PACED TO CREATE MULTIPLE SMALL, LOW FLOW CHANNELS THAT ENABLE UPSTREAM FISH PASSAGE OF BOTH JUVENILE AND ADULT FISH AS DIRECTED BY THE DESIGN ENGINEER.
14. IT IS SUGGESTED THAT QUALIFIED REPRESENTATIVES FROM THE OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW) BE PRESENT DURING THE CONSTRUCTION OF THE PLUNGE POOL TO ENSURE FISH PASSAGE IS ADEQUATE.
15. BOULDER SIZES SHALL CONFORM TO THE FOLLOWING GRADATION: D100 = 6-FT, D84 = 4-FT, D50 = 3-FT, D15 = 2-FT. BOULDERS SHALL BE SOUND AND RESISTANT TO BREAKAGE AND FRACTURE. LOCAL BED MATERIAL AND BOULDERS SHALL BE PLACED IN AND AROUND THE BOULDERS TO FILL ALL THE VOIDS. THIS ROCK FILL SHALL BE AUGMENTED BY IMPORTED ANGULAR ROCK, SIMILAR TO THE BOULDERS.
16. ROCK PLACEMENT SHALL START DOWNSTREAM AND CONTINUE UPSTREAM SO THE UPSTREAM ROCKS ARE SECURELY FOUNDED ON THE DOWNSTREAM ROCKS. THE MOST DOWNSTREAM ROCKS SHALL BE BURIED DEEP INTO THE EXISTING BED.
17. THE TYPICAL MINIMUM LAYER THICKNESS OF THE ROCK BED IS 5 FEET.
18. THE VOIDS IN AND AROUND THE INSTALLED ROCKS SHALL BE FILLED WITH SMALLER MATERIAL (SPALLS, COBBLES, GRAVEL, SAND, FINE SAND AND SILT) TO PREVENT SEEPAGE OF WATER THROUGH THE NEWLY PLACED ROCK MATERIAL. THE INSTALLED ROCK SHALL BE TESTED TO CHECK THAT SEEPAGE IS NEGLIGIBLE WHILE THE RIVER DIVERSION IS IN PLACE PRIOR TO FULL ACTIVATION. FINE MATERIAL (GRAVEL, SAND, FINE SAND AND SILT) SHALL BE PLACED AND/OR WASHED INTO THE INSTALLED ROCK AS DIRECTED BY THE ENGINEER



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APPLICATION BY:
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WATERSHED COUNCIL
CREATED BY: GEOENGINEERS, INC.

SHEET: 6 OF 7 DATE: JUNE 12, 2012

MKH : MGF

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GENERAL NOTES (cont'd):

19. BOULDERS AND ROCK FILL SHALL BE PLACED A MINIMUM OF 5 HORIZONTAL FEET INTO THE BANK AND BACKFILLED WITH THE AFOREMENTIONED ROCK FILL AND THE LOCAL BED AND BANK MATERIAL. LIVE COTTONWOOD POLES AND LIVE WILLOW CUTTINGS SHALL BE INSTALLED IN THE BANK ROCK AS WELL. THE BOTTOM OF THE POLES AND CUTTINGS SHALL EXTEND DOWN TO GROUNDWATER TO ENABLE GROWTH.
20. ROCKS PLACED IN THE FLOODPLAIN AREA SHALL BE SLIGHTLY HIGHER THAN THE DAM AS SHOWN IN CROSS-SECTION C-C' TO DISCOURAGE THE RIVER FROM FLOWING THROUGH THE FLOODPLAIN AREA IN THE FUTURE.
21. BACKFILL THE FLOODPLAIN ROCKS WITH LOCAL STREAM BED MATERIAL AND SOIL AND PLANT LIVE WILLOW CUTTINGS AND COTTONWOOD POLES. BOTTOMS OF CUTTINGS AND POLES SHALL EXTEND TO GROUND WATER TO ENABLE GROWTH. COTTONWOODS SHALL NOT BE PLANTED WITHIN 15 FEET OF THE LEVEE TOE.
22. THE ROCK STRUCTURE SHALL BE CONSTRUCTED IN A MANNER THAT SECURELY REINFORCES THE BED AND LOOKS AS NATURAL AS POSSIBLE
23. THE CONTRACTOR SHALL RETURN DISTURBED AREAS ON THE LEVEE AND ACCESS ROUTE BACK TO THEIR ORIGINAL CONDITION AND/OR BETTER UPON COMPLETION OF THE PROJECT.
24. ENGINEER SHALL APPROVE CONSTRUCTION PRIOR TO DEMOBILIZATION.
25. ACCESS RAMPS TO THE PROJECT SITE SHALL BE REMOVED AND THE LEVEE RESTORED TO ITS ORIGINAL CONDITION
26. TEMPORARY WATER DIVERSIONS AND/OR COFFER DAMS SHALL BE REMOVED AFTER CONSTRUCTION AND THE AREA RESTORED TO ITS ORIGINAL CONDITION.
27. CONTRACTOR SHALL MARK-UP THE DESIGN PLANS AND/OR DEVELOP NEW SKETCHES TO DEPICT THE AS-BUILT CONDITION. DIMENSIONS AND ELEVATIONS OF THE DAM AND KEY BOULDERS AND FEATURES AS REQUESTED BY THE DESIGN ENGINEER IN THE FIELD SHALL BE INCLUDED ON THE AS-BUILT DRAWINGS. DURING-CONSTRUCTION PHOTOS SHOWING THE PLACEMENT OF THE FOUNDATION BOULDERS AND OTHER KEY ASPECTS OF THE PROJECT SHALL BE TAKEN. FINAL AS-BUILT PHOTOS SHALL ALSO BE TAKEN. THE PHOTOS AND AS-BUILT DRAWINGS SHALL BE COMPLIED INTO A SINGLE DOCUMENT. A HARDCOPY OF THE DOCUMENT AND AN ELECTRONIC COPY OF THE DOCUMENT (IN PDF FORMAT) SHALL BE DELIVERED TO THE WALLA WALLA BASIN WATERSHED COUNCIL UPON PROJECT COMPLETION. THE WWBWC SHALL FORWARD AN ELECTRONIC COPY OF THE PDF TO THE ARMY CORPS OF ENGINEERS FOR THEIR RECORDS.



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