Joint Permit Application

This is a joint application, and must be sent to all agencies (Corps, DSL, and DEQ). Alternative forms of permit applications may be acceptable; contact the Corps and DSL for more information.

RECEIVED
MAY 17 2024
DEPARTMENT OF STATE LANDS
Date Stamp

U.S. Army Corps of Engineers Portland District	Oregon Department of State Lands	Oregon Department of Environmental Quality
Action ID Number	Number 64909RF-Revised	

(1) TYPE OF PERMIT(S) IF KNOWN (check all that apply)

Corps: ☐Individual ☐Nationwide No.: _____ ☐Regional General Permit _____ ☒Other (specify): Reporting-only USACE NWP 27 via USFWS as applicant

DSL: ☒Individual ☐GP Trans ☐GP Min Wet ☐GP Maint Dredge ☐GP Ocean Energy ☐No Permit Waiver

(2) APPLICANT AND LANDOWNER CONTACT INFORMATION

	Applicant	Property Owner 1 (if different)	Property Owner 2	Authorized Agent (if applicable) ☒ Consultant ☐ Contractor
Name (Required) Business Name Mailing Address 1 Mailing Address 2 City, State, Zip	Janine M. Pfohl PO Box 3210 Kerby, OR 97531		Pomeroy Park HOA (Stacey Grabarz) 233 Pomeroy View Drive Cave Junction, OR 97523	Scott Wright River Design Group, Inc. 311 SW Jefferson Avenue Corvallis, OR 97333
Business Phone Cell Phone Fax Email	541-592-3382		541-592-3509	541-738-2920 541-602-2343 swright@riverdesigngroup.net

(3) PROJECT INFORMATION

A. Provide the project location.

Project Name	**Latitude & Longitude* (in DD.DDDD format)**
Pomeroy Dam Removal on the Illinois River	42.16300750617266, -123.66701026585511

Project Address / Location	**City (nearest)**	**County**
No street address – the dam is approximately 2 miles south of Finch Rd along West Side Rd. The intakes are approximately 1.5 miles north and south of Finch Rd along West Side Rd (A and B, respectively).	Cave Junction	Josephine

Township	Range	Section	Quarter / Quarter	Tax Lot
39S	08W	20	SW / NE	000200
39S	08W	04	NW / NW	000300
39S	08W	16	NW / NW	001000
39S	08W	08	SW / SW	000101
39S	08W	20	SW / NE	000160

Brief Directions to the Site:
Dam: from Cave Junction, drive North on US199 (2.1 miles), turn left on Finch Rd, drive west on Finch Rd 0.8 miles, turn left on West Side Rd, locked gate at access to dam will be on left at 2.4 miles just after sharp turn in West Side Rd.

Intake A: from Finch Rd, approximately 800 ft after crossing the Illinois River bridge, turn left and enter a gate onto a dirt road through the field. The intake is approximately ¾ mile down the road on the riverbank (see design drawing 2.0).
Intake B: from intersection of Finch Rd with West Side Rd, drive 1.3 miles north on West Side Rd to intake B.
Intakes are along Illinois River bank across fenced agricultural fields (potentially with grazing cattle).

B. What types of waterbodies or wetlands are present in your project area? (Check all that apply.)

☒ River / Stream ☐ Non-Tidal Wetland ☐ Lake / Reservoir / Pond

☐ Estuary or Tidal Wetland ☐ Other ☐ Pacific Ocean

Waterbody or Wetland Name**	River Mile	6th Field HUC Name	6th Field HUC (12 digits)
Illinois River	57	Town of Kerby – Illinois River	171003110601

* In decimal format (e.g., 44.9399, -123.0283)

** If there is no official name for the wetland or waterbody, create a unique name (such as “Wetland 1” or “Tributary A”).

C. Indicate the project category. (Check all that apply.)		
☐ Commercial Development	☐ Industrial Development	☐ Residential Development
☐ Institutional Development	☐ Agricultural	☐ Recreational
☐ Transportation	☒ Restoration	☐ Bridge
☐ Dredging	☐ Utility lines	☐ Survey or Sampling
☐ In- or Over-Water Structure	☐ Maintenance	☐ Other:

(4) PROJECT DESCRIPTION

A. Summarize the overall project including work in areas both in and outside of waters or wetlands.

The project entails three areas of work below ordinary high water: dam removal (within the Illinois River), canal abandonment-restoration and floodplain reclamation, and placement of new screened diversion pump intakes. The new screened water intakes require installation of pumps and buried irrigation pipe outside of ordinary high water. The pipeline trench will be restored to pre-project contours after pipe placement. The dam removal and restoration footprint is on the order of 2.0± acres, all below ordinary high water (OHW). The water intakes with buried pipe have a linear footprint of approximately 2.0± acres, all outside of OHW and in agricultural fields with no wetlands. All areas outside of the active channel which are disturbed during construction will be restored to contours capable of supporting native vegetation, stabilized with erosion control seed and weed-free straw mulch, and planted with native species for long-term stability and ecological function.

No impervious surfaces will be created or modified by the project.

B. Describe work within waters and wetlands.

Work within the ordinary high water mark of the Illinois River includes placement of temporary fill (bulk bags) for work area isolation, installation of a temporary access bridge across the bypass channel (approximately 30-ft span and 20-ft width), fish capture from the isolated work area and release outside of the project area, turbidity and erosion control measures, removal of the existing concrete dam and shaping reservoir sediments into a fish passage pilot channel. Concrete and streambed material will be placed in the abandoned diversion canal to help restore natural grades and hillslope and covered with topsoil to establish long-term revegetation in the abandoned canal. The installation of the screened pump intakes will require some clearing of existing vegetation, bank shaping, and revegetation with native species. No excavation or placement of fill is anticipated at the screened pump intakes as the pipe and intake screen below OHW are removable when not in use and will not be permanent features in the channel, only during irrigation.

Dam removal, canal reclamation, and water intake construction will follow the general conservation measures of the PROJECTS programmatic biological opinion, USACE NWP 27 conditions, ODFW fish passage requirements, and the Josephine County floodplain development permit conditions. See sections 4 and 5 of the design report for details of the dam removal, water management, fish passage, and fish capture and release plans. The project sequencing is also included in the design drawings.

C. Construction Methods. Describe how the removal and/or fill activities will be accomplished to minimize impacts to waters and wetlands.

The project involves the removal of a 6 to 10 ft tall concrete dam (~ 200 CY). The dam removal will occur during the in-water work period in two phases with work area isolation, turbidity control, and fish salvage and exclusion for each phase. Concrete will broken into pieces less than two feet in diameter with all rebar removed. Concrete rubble will be placed in the abandoned diversion canal and covered with gravels, topsoil, and native vegetation to restore floodplain topography to pre-dam conditions. A fish passage pilot channel will be shaped in the reservoir sediment to provide immediate passage at the end of construction. Sediment upstream of the dam will be allowed to disperse naturally during high flow events.

Construction will comply with the general conservation measures in the PROJECTS programmatic biological opinion and the conditions of the USACE NWP 27. These measures include site layout and flagging to protect sensitive areas from unnecessary disturbance, staging and stockpiles areas at least 150 ft away from the river, erosion control best management practices, spill prevention and control, use of biodegradable fluids in all machinery, and minimizing the number and size of temporary access paths. See sections 4 and 5 of the design report for details of the plans for water

management, fish passage and fish salvage/exclusion during dam removal. All temporary access paths and temporary structures will be fully removed and all disturbed areas will be restored to natural grades. Disturbed areas will be stabilized with a combination of erosion control seed and weed-free straw mulch for short-term stabilization and native plant species for long-term recovery and ecological function (see section 6.4 in the design report). Seed and mulch will be applied at the end of the active construction period (anticipated to be September 2024) and native vegetation will be planted before or at the beginning of the first growing season after construction (anticipated to be November 2024).

(4) PROJECT DESCRIPTION (continued)

D. Describe source of fill material and disposal locations if known.

Concrete from the dam will be reused on-site to restore the natural grades and hillslope in the obsolete canal. All rebar will be removed and recycled and concrete will be broken into pieces smaller than 2-ft diameter (similar to boulders and bedrock naturally occurring in the system). The concrete rubble will be placed in the abandoned canal and covered with rounded streambed gravels and cobbles to restore pre-dam floodplain conditions and reduce risk of aquatic organisms being stranded in the canal. Topsoil will be added to help establish native vegetation in the abandoned canal and restore the natural ground contours where the canal was created.

The only imported fill material is topsoil to support native vegetation in the abandoned canal.

E. Construction timeline.

What is the estimated project start date? June 15, 2024

What is the estimated project completion date? September 15, 2024

Is any of the work underway or already complete? ☐ **Yes** ☒ **No**

If yes, please describe.

F. Removal Volumes and Dimensions (if more than 7 impact sites, include a summary table as an attachment)

Wetland / Waterbody Name *	Removal Dimensions					Time Removal is to remain**	Material***
	Length (ft.)	Width (ft.)	Depth (ft.)	Area (sq.ft. or ac.)	Volume (c.y.)		
Illinois River	340	6.6	2.4	2,250 sq. ft.	200	Permanent	Concrete dam
Illinois River	160	26.4	1.3	4,220 sq. ft.	200	Permanent	Streambed material in fish passage pilot channel

G. Total Removal Volumes and Dimensions

Total Removal to Wetlands and Other Waters	Length (ft.)	Area (sq. ft or ac.)	Volume (c.y.)
Total Removal to Wetlands			
Total Removal Below Ordinary High Water	500	6,470 sq. ft.	400
Total Removal Below Highest Measured Tide			
Total Removal Below High Tide Line			
Total Removal Below Mean High Water Tidal Elevation			

H. Fill Volumes and Dimensions (if more than 7 impact sites, include a summary table as an attachment)							
Wetland / Waterbody Name*	**Fill Dimensions**					**Time Fill is to remain****	**Material*****
	Length (ft.)	**Width (ft.)**	**Depth (ft.)**	**Area (sq. ft. or ac.)**	**Volume (c.y.)**		
Pomeroy Dam Abandoned Canal	450	15	2.6	6,750 sq. ft.	650	Permanent	Concrete, streambed material, topsoil
Illinois River	200	9	4.5	1,800 sq. ft.	300	3 months	Bulk bags with streambed material and sand
Illinois River	30	20	2	600 sq. ft.	44	3 months	Temporary Bridge and Abutments

(4) PROJECT DESCRIPTION (CONTINUED)

I. Total Fill Volumes and Dimensions

Total Fill to Wetlands and Other Waters	**Length (ft.)**	**Area (sq. ft or ac.)**	**Volume (c.y.)**
Total Fill to Wetlands			
Total Fill Below Ordinary High Water	680	9,150 sq. ft	994
Total Fill Below Highest Measured Tide			
Total Fill Below High Tide Line			
Total Fill Below Mean High Water Tidal Elevation			

*If there is no official name for the wetland or waterbody, create a unique name (such as “Wetland 1” or “Tributary A”).
**Indicate whether the proposed area of removal or fill is permanent or, if you are proposing temporary impacts, specify the days, months or years the fill or removal is to remain.
*** Example: soil, gravel, wood, concrete, pilings, rock etc.

(5) PROJECT PURPOSE AND NEED

Provide a statement of the purpose and need for the overall project.

Pomeroy Dam is an ODFW Group 1 statewide fish passage barrier priority (2019). The purpose of this project is to remove the existing fish passage barrier (Pomeroy Dam) and restore volitional fish passage and natural river processes in the Illinois River. Restoration of volitional fish passage will benefit multiple aquatic species including threatened and endangered species. Leaving the dam in place would create economic harm through lost recreational and commercial fishing opportunities and not support the recovery of listed species.

The existing surface water irrigation diversion canal will be abandoned and two new seasonal water intakes will be used for legal water rights. The pumped water intakes will be screened to meet state and federal fish passage guidelines and will route water to the irrigation system via new pipes.

(6) DESCRIPTION OF RESOURCES IN PROJECT AREA

A. Describe the existing physical, chemical, and biological characteristics of each wetland or waterbody. Reference the wetland and waters delineation report if one is available. Include the list of items provided in the instructions.

The Illinois River in the project area is a slightly sinuous single-thread channel with extensive bedrock exposures in the bed and banks with occasional gravel bars primarily at the interior of bends in the channel. No Aquatic Resources of Special Concern are present at the site. The existing irrigation diversion canal does not function as a side channel and will be abandoned after dam removal as required by the PROJECTS programmatic biological opinion (project design criterion 33(f)vii: Abandoned ditches and other similar structures will be plugged or backfilled, as appropriate, to prevent fish from swimming or being entrained in them).

Streamflow is perennial and the majority of the precipitation occurs between October and June. The Illinois River is a flashy system in which stream flows increase rapidly in response to precipitation events and quickly recede when the storm ends. Flows are very low in the summer months with lowest flows typically occurring in early to mid-September. See section 2.3 in design report for more information on peak flows and fish passage flows. The Ordinary High Water Mark was identified using the area inundated during a 1.5-year recurrence interval flood from a hydraulic model calibrated to the observed

water surface elevation (see section 2.4 in the design report) and checked against field indicators of break in slope, exposed roots below an intact soil layer, change in vegetation from sparse/no vegetation to riparian vegetation, bent/matted vegetation, and weathered bedrock. The existing vegetation community is composed of grasses, shrubs and trees growing on the banks and in bars along the channel. Some grasses and shrubs are growing directly on the bedrock in the channel (see section 6.4 in the design report).

Anadromous fish species reported by ODFW to be present in the Illinois River include winter steelhead, Pacific lamprey, fall chinook salmon, and Coho salmon (state and federally listed). All of the species migrate through the area and use it for spawning and rearing (see section 3.4 of the design report). Resident fish species likely have a similar use of the site. Based on verifiable iNaturalist observation data in the nearby Illinois River Forks State Park, 34 species of dragonflies, moths, birds, reptiles, and beetles are likely present in the project area. Mammalian species are likely present at the site though not reported in iNaturalist.

The Illinois River from Briggs Creek to the confluence of the East Fork and West Fork is mapped as an impaired waterbody on the 303(d) list based on the 2022 assessment by Oregon DEQ. The impaired parameters for Fish and Aquatic Life use include temperature and flow regime modification. The temperature parameters is also listed as impaired for the Fish and Aquatic Life – Spawning use. A total maximum daily load (TMDL) plan is not in place for these parameters.

A professional judgment stream function assessment is included in the attached design report (appendix B). Under the proposed action, assessed functions show increased or similar function relative to the existing condition, although the existing function group scores do not change rating under the proposed condition. The Pomeroy Dam is located in a bedrock-controlled river valley, which exerts a first order influence on channel form, behavior, and function, and, as a result, the impacts of removing the Pomeroy Dam will have only minor local impacts, primarily on sediment-related characteristics and water levels immediately upstream of the former dam. Biological and water quality functions are largely unaffected by the Project, except for in relation to the increased migratory fish access to pre-European settlement extents, which is valuable for both the survival of the fish species and the trophic health of the watershed.

B. Describe the existing navigation, fishing and recreational use of the waterbody or wetland.

The Illinois River is not mapped as navigable waterway by DSL. The Illinois River Forks State Park is approximately one quarter mile upstream of the project area. The channel geometry would support recreational watersports and people likely access the river to fish from the community on the right (north) bank. The Pomeroy Dam is a safety hazard to current recreational water users and impairs fish passage.

The Illinois River in the project area is not mapped as a Wild & Scenic River; the Wild & Scenic designation begins west of US199 near when the river enters the Rogue River-Siskiyou National Forest. The river is **NOT** a State Scenic Waterway.

The river is designated as essential salmonid habitat (ESH) by DSL and essential fish habitat (EFH) by NOAA. The Illinois River is **NOT** mapped as critical habitat (CH) by NOAA.

Pomeroy Dam is located in a FEMA “Zone AE” area as designated on the flood insurance rate map (FIRM) panel 41033C-0791E with an effective date of December 3, 2009.

The dam has diversion water rights which are being transferred to two pumped intake locations downstream. No storage rights are associated with Pomeroy Dam.

(7) PROJECT SPECIFIC CRITERIA AND ALTERNATIVES ANALYSIS

Describe project-specific criteria necessary to achieve the project purpose. Describe alternative sites and project designs that were considered to avoid or minimize impacts to the waterbody or wetland.*

The project-specific criteria are based on the NOAA Restoration Center Programmatic Environmental Impact Statement for habitat restoration activities implemented throughout the coastal United States, PROJECTS programmatic biological opinion activity category 1 (fish passage restoration including irrigation diversion relocation) and 3 (dam and legacy structure removal), ODFW fish passage criteria, NMFS fish passage criteria, USACE NWP 27 conditions, and Josephine County Development Code floodplain development and riparian landscape criteria.

Removal of the dam while meeting these criteria requires a sequenced construction plan to isolate in-water work areas from active flow and aquatic life, manage turbidity, and reduce impacts to native vegetation. See Sections 4 and 5 of the design report for details on the plans for dam removal, water management, fish passage and capture/release. The PROJECTS design criteria are included in the design drawings and the other permits will be included in the construction contract.

The location of the Pomeroy dam is pre-existing and alternative sites were not considered for its removal. It is not possible to avoid impacts to the Illinois River while removing the channel-spanning dam. We considered partial dam removal as an alternative design and chose to fully remove the dam as required by the PROJECTS programmatic biological opinion design criterion 35 (Dam and Legacy Structure Removal) to restore more natural channel and flow conditions. The existing dam does not have a fish ladder and the addition of a ladder would require fill in a regulatory floodway which is not allowed by Josephine County floodplain development code.

The project design minimizes impacts to the Illinois River by shaping a fish passage pilot channel in the reservoir sediments after dam removal rather than excavating the full channel width. Areas disturbed by access during the dam removal will be restored to grades supporting native vegetation and revegetated (see section 6.4 of the design report).

The dam is ranked as a Group 1 fish passage barrier on ODFW's statewide priorities database (2019).

The dam removal lowers the base flood (100-year) water surface elevation and is compliant with Josephine County floodplain development code (see section 3.6 in the design report). We will obtain a floodplain development permit from the County for this project.

(8) ADDITIONAL INFORMATION

Are there state or federally listed species on the project site? ☒ **Yes** ☐ **No** ☐ **Unknown**

Is the project site within designated or proposed critical habitat? ☐ **Yes** ☒ **No** ☐ **Unknown**

Is the project site within a national Wild and Scenic River? ☐ **Yes** ☒ **No** ☐ **Unknown**

Is the project site within a State Scenic Waterway? ☐ **Yes** ☒ **No** ☐ **Unknown**

Is the project site within the100-year floodplain? ☒ **Yes** ☐ **No** ☐ **Unknown**

If yes to any above, explain in Block 6 and describe measures to minimize adverse effects to those resources in Block 7.

Is the project site within the Territorial Sea Plan (TSP) Area? ☐ **Yes** ☒ **No** ☐ **Unknown**

If yes, attach TSP review as a separate document for DSL.

Is the project site within a designated Marine Reserve? ☐ **Yes** ☒ **No** ☐ **Unknown**

If yes, certain additional DSL restrictions will apply.

Will the overall project involve ground disturbance of one acre or more? ☒ **Yes** ☐ **No** ☐ **Unknown**

If yes, you may need a 1200-C permit from the Oregon Department of Environmental Quality (DEQ).

Is the fill or dredged material a carrier of contaminants from on-site or off-site spills? ☐ **Yes** ☒ **No** ☐ **Unknown**

Has the fill or dredged material been physically and/or chemically tested? ☐ **Yes** ☒ **No** ☐ **Unknown**

If yes, explain in Block 6 and provide references to any physical/chemical testing report(s).

Has a cultural resource (archaeological and/or built environment) survey been performed on the project area? ☒ **Yes** ☐ **No** ☐ **Unknown**

Do you have any additional archaeological or built environment documentation, or correspondence from tribes or the State Historic Preservation Office? ☐ **Yes** ☒ **No** ☐ **Unknown**

If yes, provide a copy of the survey and/or documentation of correspondence with this application to the Corps only. Do not describe any resources in this document. Do not provide the survey or documentation to DSL.

* Not required by the Corps for a complete application but is necessary for individual permits before a permit decision can be rendered.

Is the project part of a DEQ Cleanup Site? ☒ No ☐ Yes Permit Number: _____

DEQ contact _____

Will the project result in new impervious surfaces or the redevelopment of existing surfaces? ☐ **Yes** ☒ **No**

If yes, the applicant must submit a post-construction stormwater management plan as part of this application to DEQ's 401 WQC program for review and approval, see https://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf

Identify any other federal agency that is funding, authorizing or implementing the project.

Agency Name	Contact Name	Phone Number	Most Recent Date of Contact
United States Fish and Wildlife Service	CalLee Davenport	Office 503-231-6924 Mobile 503-307-6224	January 24, 2024

List other certificates or approvals/denials required or received from other federal, state or local agencies for work described in this application.

Agency	Certificate / approval / denial description	Date Applied
1. USFWS	1. NEPA Inclusion Letter, PROJECTS BiOp coverage confirmation	1.
2. USACE	2. SEF no-test determination, NWP 27 reporting-only confirmation of coverage (USFWS Applicant)	2.
3. NMFS	3. PROJECTS BiOp coverage confirmation	3.
4. ODFW	4. Fish Passage Plan approval	4.
5. DEQ	5. 401 Water Quality Certification	5.
6. OWRD	6. Point of Diversion Transfer	6. April 6, 2023
7. SHPO	7. NHPA Section 106 Approval	7.
8. Josephine County	8. Riparian Landscape Plan and (Floodplain) Development Permit, Landuse Compatibility Statement	8. January 29, 2024

Other DSL and/or Corps Actions Associated with this Site (Check all that apply.)

☐ Work proposed on or over lands owned by or leased from the Corps (may require authorization pursuant to 33 USC 408). These could include the federal navigation channel, structures, levees, real estate, dikes, dams, and other Corps projects.

☐ State owned waterway DSL Waterway Lease #:

☐ Other Corps or DSL Permits Corps # DSL #

☐ Violation for Unauthorized Activity Corps # DSL #

☐ Wetland and Waters Delineation Corps # DSL #

Submit the entire delineation report to the Corps; submit only the concurrence letter (if complete) and approved maps to DSL. If not previously submitted to DSL, send under a separate cover letter

(9) IMPACTS, RESTORATION/REHABILITATION, AND COMPENSATORY MITIGATION

A. Describe unavoidable environmental impacts that are likely to result from the proposed project. Include permanent, temporary, direct, and indirect impacts.

Permanent and direct – River channel will depart from existing riparian vegetation in portions of the reservoir and existing riparian vegetation is likely to become stressed following dam removal and associated artificially high water table.

Riparian vegetation planted for site restoration (see section 6.4 of the design report) will establish within the new riparian zone (within the former reservoir). Current riparian vegetation that is disassociated from the new river channel will convert to upland forest from adjacent seed sources.

Temporary and direct – Sediment bedload transport immediately following dam removal and during higher flow events (period and likely to persist for several years). Increased turbidity during higher flow events for several seasons following dam removal.

Turbidity levels should not be at levels that will impact aquatic resources due to the low amount of fine sediments in the sediment stored behind Pomeroy Dam. Bedload movement will replenish spawning gravels downstream of the dam. See Section 6 of the design report for more discussion of post dam removal conditions.

The project is designed in compliance with Josephine County floodplain development code. Removal of the dam decreases the base flood (100-year) water surface elevation in the reservoir and does not diminish the flood-carrying capacity of the river. The Pomeroy Dam is run-of-the-river (does not provide flood storage) and regularly overtopped during flood events. Removal of the dam does not increase potential flooding or erosion downstream of the project.

B. For temporary removal or fill or disturbance of vegetation in waterbodies, wetlands or riparian (i.e., streamside) areas, discuss how the site will be restored after construction to include the timeline for restoration.

Site restoration will begin by minimizing riparian and bank disturbance to the maximum extent possible. Site restoration plans are provided in the plan set for final stabilization and restoration of the site after dam removal. Disturbed areas will be stabilized with a combination of erosion control seed and weed-free straw mulch for short-term stabilization and native plant species for long-term recovery and ecological function (see section 6.4 in the design report). Seed and mulch will be applied at the end of the active construction period (anticipated to be September 2024) and native vegetation will be planted before or at the beginning of the first growing season after construction (anticipated to be November 2024). The project will also have a Riparian Landscape Plan (approved by ODFW) included in the Josephine County development permit with requirements for vegetation monitoring and maintenance during the establishment period (typically three years).

Compensatory Mitigation

C. Proposed mitigation approach. Check all that apply:

Permittee responsible Permittee responsible Mitigation Bank or Payment In-Lieu

☐ Onsite Mitigation ☐ Offsite Mitigation ☐ In-Lieu Fee Program ☐ (Not approved for use with Corps permits)

C. Provide a brief description of proposed mitigation approach and the rationale for choosing that approach. If you believe mitigation should not be required, explain why.

Mitigation should not be required because this project restores natural river processes resulting in a complex river channel which will provide improved habitat quality and quantity for native species. The project will improve water quality by decreasing heat loading from the reservoir. Riparian areas along the banks and adjacent to the former reservoir will be planted with native species to facilitate the establishment of healthy streamside conditions. The dam is a Group 1 ODFW fish passage barrier priority for removal and restoration of volitional fish passage.

USACE regulatory guide letter number 18-01 (Determination of Compensatory Mitigation Credits for the Removal of Obsolete Dams and Other Structures from Rivers and Streams) states that “removing dams and other obstructions can, to a substantial degree, reverse the impacts of those structures on riverine systems, including the structure, functions, and dynamics of streams and their riparian areas/ floodplains” and that “most of the adverse effects from removing dams and other obstructions are short-term, and are eventually supplanted by the long-term restoration of stream structure, function, and dynamics.” It further states that “losses of wetlands that occur as a result of stream restoration through the removal of obsolete dams and other structures should not require compensatory mitigation.”

Mitigation Bank / In-Lieu Fee Information:

Name of mitigation bank or in-lieu fee project:

Type and amount of credits to be purchased:

If you are proposing permittee-responsible mitigation, have you prepared a compensatory mitigation plan?

☐ Yes. Submit the plan with this application and complete the remainder of this section.

☐ No. A mitigation plan will need to be submitted (for DSL, this plan is required for a complete application).

Mitigation Location Information (Fill out only if permittee-responsible mitigation is proposed)

Mitigation Site Name/Legal Description	Mitigation Site Address	Tax Lot #
County	City	Latitude & Longitude* (in DD.DDDD format)

Township	Range	Section	Quarter/Quarter

(10) ADJACENT PROPERTY OWNERS FOR PROJECT AND MITIGATION SITE		
☐ **Pre-printed mailing labels of adjacent property owners attached separately (if more than 30).**	**Project Site Adjacent Property Owners**	**Mitigation Site Adjacent Property Owners**
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Carl O Wood PO Box 2315 Cave Junction, OR 97523	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	US BLM 3040 Biddle Rd Medford, OR 97504	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Nancy Groth and Michael Swaine PO Box 492 Cave Junction, OR 97523	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	State Of Oregon C/O Parks & Recreation Dept 725 Summer St NE Ste C Salem, OR 97301	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Spirit Weavers LLC PO Box 628 Kilauea, HI 96754	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Ronald W Rorison 947 SW Harvest Dr Grants Pass, OR 97527	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Riverside Family Farm Trust C/O David Atkin PO Box 10008 Eugene, OR 97440	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Gary R Palmer 200 Latin Ln Crescent City, CA 95531	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Josephine County C/O Public Works Dept 201 River Heights Way Grants Pass, OR 97527	

Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Shelley M Jones 6495 Loma Ave Eureka, CA 95503	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Jewell E (Est of) Fincher C/O Nina Beth Mickey PO Box 1783 Cave Junction, OR 97523	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Cheryl Ann Winters and Donald Joe Clark 1205 Deer Creek Rd Selma, OR 97538	
Contact Name **Address 1** **Address 2** **City, ST ZIP Code**	Shahoma McAlister and Gary D Boudreaux PO Box 1881 Cave Junction, OR 97523	

(11) CITY/COUNTY PLANNING DEPARTMENT LAND USE AFFIDAVIT (TO BE COMPLETED BY LOCAL PLANNING OFFICIAL)

I have reviewed the project described in this application and have determined that:

- ☐ This project is not regulated by the comprehensive plan and land use regulations
- ☐ This project is consistent with the comprehensive plan and land use regulations
- ☒ This project is consistent with the comprehensive plan and land use regulations with the following:
  - ☐ Conditional Use Approval
  - ☒ Development Permit
  - ☒ Other Permit (explain in comment section below)
- ☐ This project is not currently consistent with the comprehensive plan and land use regulations. To be consistent requires:
  - ☐ Plan
  - ☐ Amendment
  - ☐ Zone Change
  - ☐ Other Approval or Review (explain in comment section below)

An application or variance request has☐ has not☒ been filed for the above required above.

Local planning official name (print)	Title	City / County
James Black	Deputy Director	Josephine
Signature	**Date**	
	2-5-2024	

Comments: Applicant is required to submit a Tech Plan Review application for riparian and flood review.

Josephine County Planning
700 NW Dimmick Street
Suite C
Grants Pass, OR 97526

(12) COASTAL ZONE CERTIFICATION

If the proposed activity described in your permit application is within the Oregon Coastal Zone, the following certification is required before your application can be processed. The signed statement will be forwarded to the Oregon Department of Land Conservation and Development (DLCD) for its concurrence or objection. For additional information on the Oregon Coastal Zone Management Program and consistency reviews of federally permitted projects, contact DLCD at 635 Capitol Street NE, Suite 150, Salem, Oregon 97301 or call 503-373-0050 or click here.

CERTIFICATION STATEMENT

I certify that, to the best of my knowledge and belief, the proposed activity described in this application complies with the approved Oregon Coastal Zone Management Program and will be completed in a manner consistent with the program.

Print /Type Applicant Name	**Title**
Applicant Signature	**Date**

Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and, to the best of my knowledge and belief, this information is true, complete and accurate. I further certify that I possess the authority to undertake the proposed activities. By signing this application I consent to allow Corps or DSL staff to enter into the above-described property to inspect the project location and to determine compliance with an authorization, if granted. I hereby authorize the person identified in the authorized agent block below to act in my behalf as my agent in the processing of this application and to furnish supplemental information in support of this permit application. I understand that the granting of other permits by local, county, state or federal agencies does not release me from the requirement of obtaining the permits requested before commencing the project. I understand that payment of the required state processing fee does not guarantee permit issuance.

To be considered complete, the fee must accompany the application to DSL. The fee is not required for submittal of an application to the Corps.

Fee Amount Enclosed	$

Applicant Signature (required) must match the name in Block 2

Print Name	Title
JANINE M. PFOHL	Partner Q-X Ranch
Signature Janine M. Pfohl	**Date** MAY 16, 2024

Authorized Agent Signature

Print Name	Title
Scott Wright	Principal Engineer, River Design Group
Signature Scott Wright	**Date** May 16, 2024

Landowner Signature(s)
Landowner of the Project Site (if different from applicant)

Print Name	Title
JANINE M. PFOHL	PARTNER Q-X RANCH
Signature Janine M. Pfohl	**Date** 1-29-24
Print Name	Title
Signature	Date
Print Name	Title
Signature	Date
Print Name	Title
Signature	Date

Application is hereby made for the activities described herein. I certify that I am familiar with the information contained in the application, and, to the best of my knowledge and belief, this information is true, complete and accurate. I further certify that I possess the authority to undertake the proposed activities. By signing this application I consent to allow Corps or DSL staff to enter into the above-described property to inspect the project location and to determine compliance with an authorization, if granted. I hereby authorize the person identified in the authorized agent block below to act in my behalf as my agent in the processing of this application and to furnish supplemental information in support of this permit application. I understand that the granting of other permits by local, county, state or federal agencies does not release me from the requirement of obtaining the permits requested before commencing the project. I understand that payment of the required state processing fee does not guarantee permit issuance.

To be considered complete, the fee must accompany the application to DSL. The fee is not required for submittal of an application to the Corps.

Fee Amount Enclosed	$

Applicant Signature (required) must match the name in Block 2	
Print Name	Title
Signature	Date
Authorized Agent Signature	
Print Name Scott Wright	Title Principal Engineer, River Design Group
Signature	Date

Landowner Signature(s)*	
Landowner of the Project Site (if different from applicant)	
Print Name	Title
Signature	Date
Print Name STACEY GRABARZ	Title PRESIDENT
Signature Stacey Grabarz	Date JANUARY 31, 2024
Print Name	Title
Signature	Date
Print Name	Title
Signature	Date

Print Name	Title
Signature	Date
Print Name	Title
Signature	Date
Landowner of the Mitigation Site (if different from applicant)	
Print Name	Title
Signature	Date
Department of State Lands, Property Manager (to be completed by DSL)	
If the project is located on state-owned submerged and submersible lands, DSL staff will obtain a signature from the Land Management Division of DSL. A signature by DSL for activities proposed on state-owned submerged/submersible lands only grants the applicant consent to apply for a removal-fill permit. A signature for activities on state-owned submerged and submersible lands grants no other authority, express or implied and a separate proprietary authorization may be required.	
Print Name	Title
Signature	Date

* Not required by the Corps.

(14) ATTACHMENTS

☒Drawings

☒Location map with roads identified

☒U.S.G.S topographic map

☒Tax lot map

☒Site plan(s)

☒Plan view and cross section drawing(s)

☒Recent aerial photo

☒Project photos – **see design report**

☒Erosion and Pollution Control Plan(s), if applicable – **included in project site plans**

☐~~DSL / Corps Wetland Concurrence letter and map, if approved and applicable~~

☐Pre-printed labels for adjacent property owners (Required if more than 30)

☐~~Incumbency Certificate if applicant is a partnership or corporation~~

☒Restoration plan or rehabilitation plan for temporary impacts – **included in design drawings**

☐~~Mitigation plan~~

☐~~Wetland functional assessments, if applicable~~

☐~~Cover Page~~

☐~~Score Sheets~~

☐~~ORWAP OR, F, T, & S forms~~

☐~~ORWAP Reports~~

☐~~Assessment Maps~~

☐~~ORWAP Reports: Soils, Topo, Assessment area, Contributing area~~

☒Stream Functional Assessments, if applicable – **best professional judgement SFAM included in Appendix B of the design report**

☐~~Cover Page~~

☐~~Score~~

☐~~Sheets~~

☐~~SFAM PA, PAA, & EAA forms~~

☐~~SFAM Report~~

☐~~Assessment Maps~~

☐~~Aerial Photo Site Map and Topo Site Map (Both maps should document the PA, PAA, & EAA)~~

☐~~Compensatory Mitigation (CM) Eligibility & Accounting~~ ~~Worksheet~~

☐~~Matching Quickguide sheet(s)~~

☐~~CM Eligibility & Accounting sheet~~

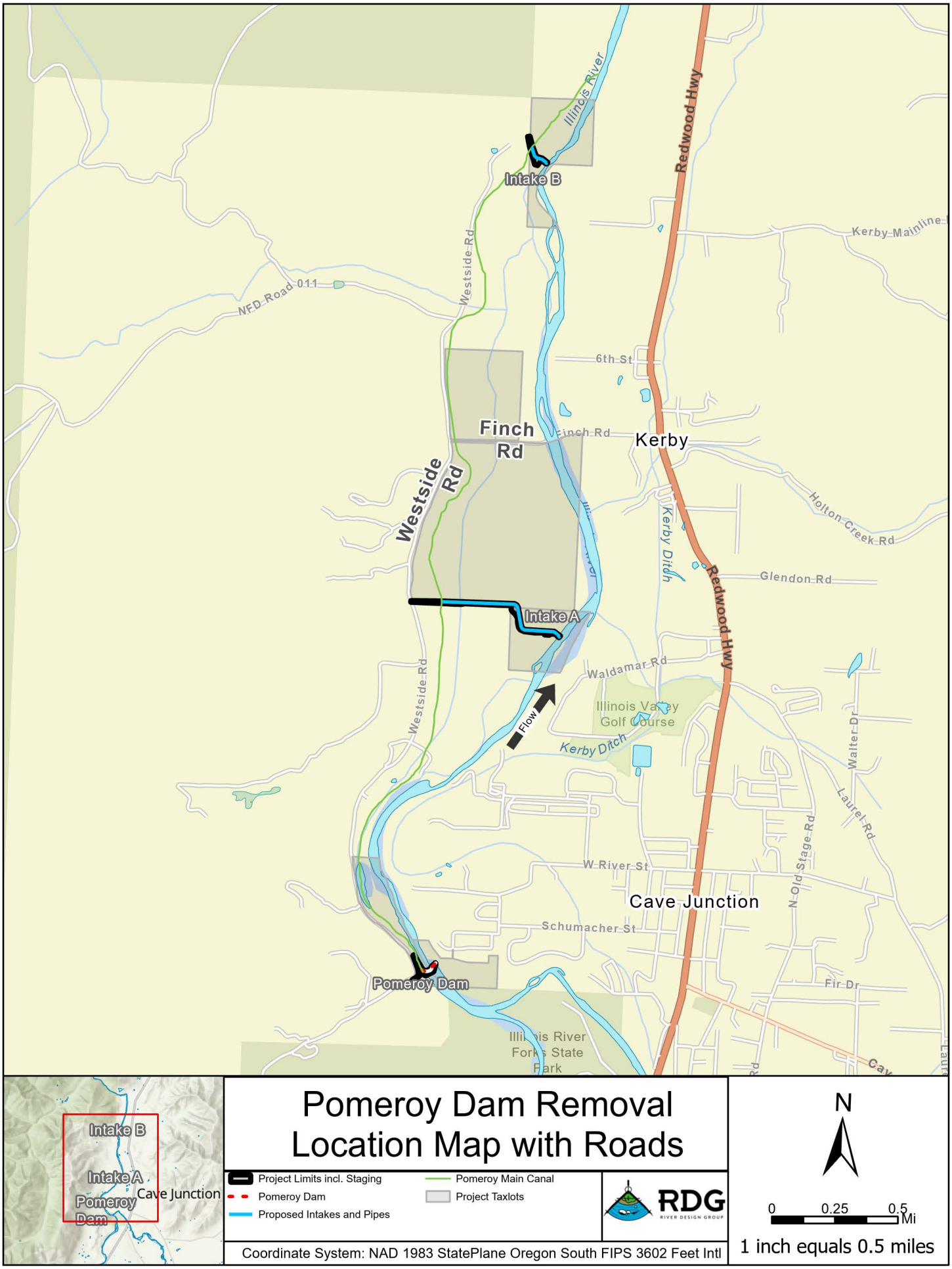
☒Alternatives analysis – **see design report**

☐~~Biological assessment (if requested by the Corps project manager during pre-application coordination)~~

☐~~Stormwater management plan (may be required by the Corps or DEQ)~~

☒Other

☒ Please describe: **Design Report including site assessment and design, dam removal plan, water management plan, fish passage plan, fish capture and release plan, site restoration plan, and post dam removal conditions evaluation**



Pomeroy Dam Removal Location Map with Roads

Project Limits incl. Staging
Pomeroy Dam
Proposed Intakes and Pipes
Pomeroy Main Canal
Project Taxlots

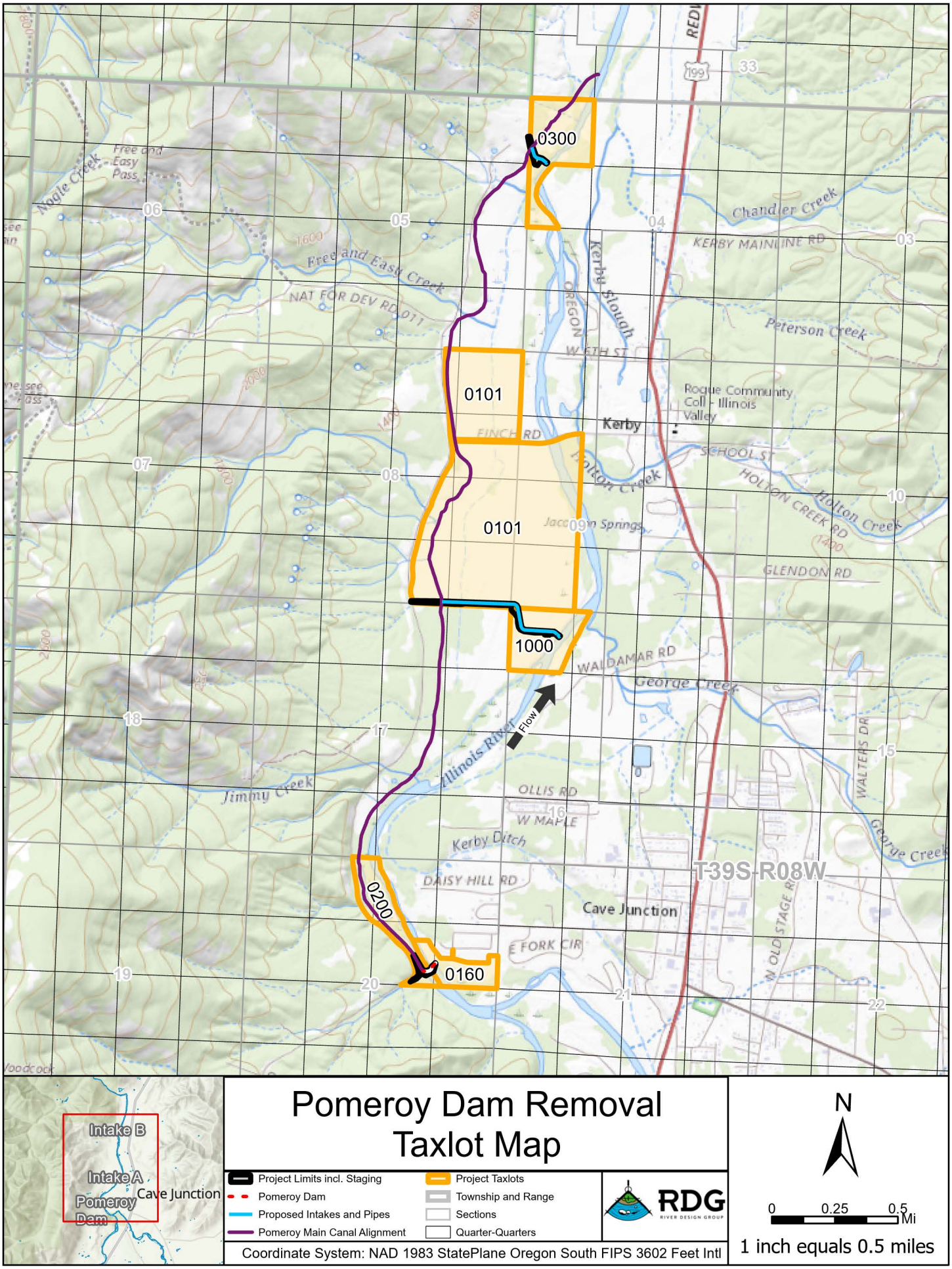
RDG RIVER DESIGN GROUP

N

0 0.25 0.5 Mi

1 inch equals 0.5 miles

Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl



Pomeroy Dam Removal Taxlot Map

- Project Limits incl. Staging
- Pomeroy Dam
- Proposed Intakes and Pipes
- Pomeroy Main Canal Alignment
- Project Taxlots
- Township and Range
- Sections
- Quarter-Quarters

RDG RIVER DESIGN GROUP

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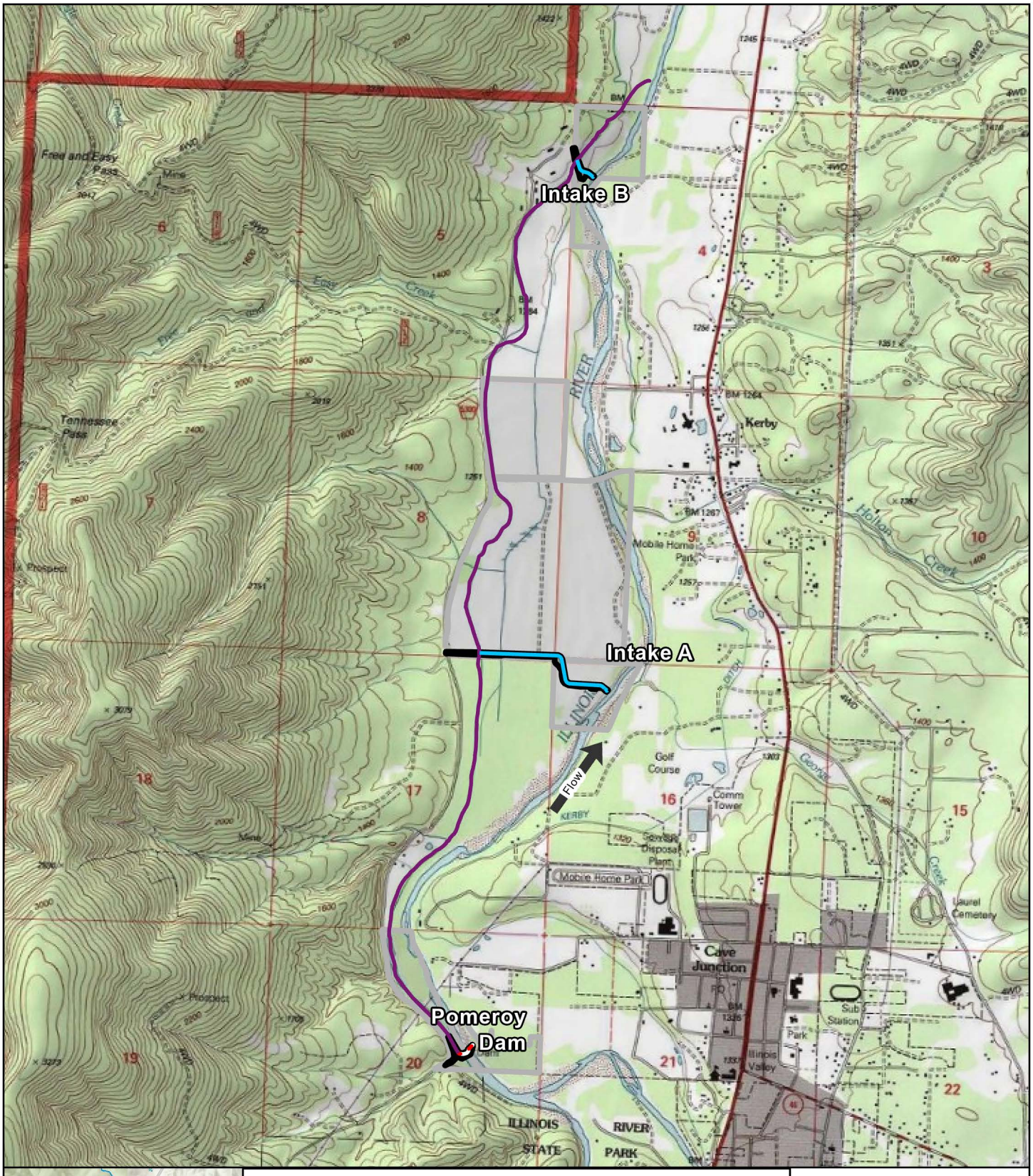
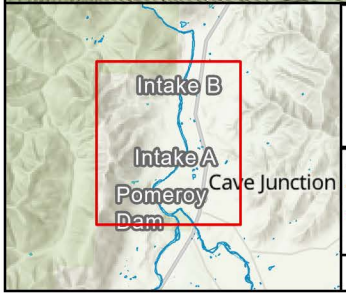
1 inch equals 0.5 miles

Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl





Pomeroy Dam Removal Topographic Map

Project Limits incl. Staging
Pomeroy Dam
Pomeroy Main Canal Alignment
Project Taxlots
Proposed Intakes and Pipes

RDG RIVER DESIGN GROUP

Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl

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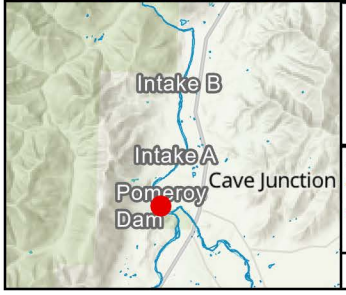
1 inch equals 0.5 miles



Pomeroy Dam
Aerial Photo Map

Project Limits incl. Staging
Project Taxlots
Pomeroy Dam
Pomeroy Main Canal Alignment

Site imagery by RDG (August 2023).
Background imagery by USDA (July 2020).

RDG RIVER DESIGN GROUP

Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl

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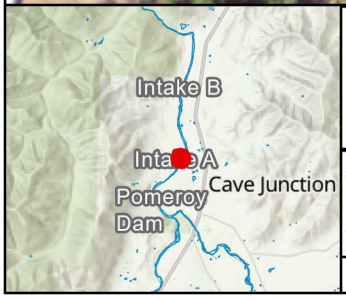
0 100 200 Feet

1 inch equals 200 feet



Intake A
Aerial Photo Map

Project Limits incl. Staging
Proposed Intakes and Pipes
Project Taxlots

Site imagery by RDG (August 2023).
Background imagery by USDA (July 2020).

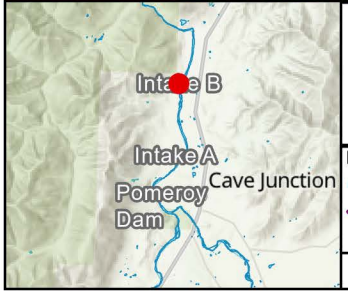
RDG RIVER DESIGN GROUP

Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl

N

0 100 200 Feet

1 inch equals 200 feet



Intake B
Aerial Photo Map

Project Limits incl. Staging
Proposed Intakes and Pipes
Pomeroy Main Canal Alignment
Project Taxlots

Site imagery by RDG (August 2023).
Background imagery by USDA (July 2020).

RDG RIVER DESIGN GROUP

Coordinate System: NAD 1983 StatePlane Oregon South FIPS 3602 Feet Intl

N

0 100 200 Feet

1 inch equals 200 feet

Professional Design Report for

Pomeroy Dam Removal and Fish Passage Plan

Prepared for

Jim McCarthy
Project Sponsor
WaterWatch of Oregon

WATERWATCH

Prepared by

RDG
RIVER DESIGN GROUP

February 5, 2024

www.riverdesigngroup.com

Pomeroy Dam Removal
Design Report and Fish Passage Plan

Prepared for

WaterWatch of Oregon

Jim McCarthy
Southern Oregon Program Director
PO Box 261
Ashland, Oregon 97520

Prepared by

River Design Group, Inc.

Contact: Scott Wright, PE, PMP, BC.WRE
Melanie Klym, RG, PE, Env SP
Jack Zunka, PhD, RG
311 SW Jefferson Avenue
Corvallis, Oregon 97333
Phone 541.738.2920
www.riverdesigngroup.com

February 5, 2024

EXECUTIVE SUMMARY

River Design Group, Inc. (RDG) was retained by WaterWatch of Oregon (WW) to perform environmental studies, dam removal design and permitting, and construction oversight of Pomeroy Dam Removal Project in Josephine County near Cave Junction, Oregon. The Pomeroy Dam is a 10-ft tall by 340-ft wide concrete structure spanning the Illinois River which is a tributary to the Rogue River. It is estimated that the original diversion dam was built in the early 1900s and the concrete dam was built in the 1940s. The dam supports irrigation water rights for Q Bar X Ranch (landowner) and the point of diversion is being transferred from the dam to two pumped and screened water intakes downstream of the dam (transfer application T-14209). The dam has no fish ladder and is a partial fish passage barrier until it is overtopped during high flow. A methodical dam removal plan is put forth to maximize protection of fish and aquatic resources to fully remove the relic dam in an environmentally sensitive manner.

The complete dam removal will be executed during the 2024 in-water work period in two stages: in stage one, part of the dam will be isolated from active flow and removed to create a bypass channel. In stage two, the Illinois River will be routed through the bypass channel and a temporary bridge will span the bypass channel while the rest of the dam is removed. Fish salvage will take place in the isolated work area as reservoir water levels are gradually lowered. Lowering of the reservoir water will be done in a controlled manner that maximizes opportunities for fish to be captured and relocated.

The dam will be removed from the isolated work area, and the reservoir sediments will be shaped into a fish passage pilot channel. The pilot channel connects existing bedrock exposed in the reservoir footprint and downstream of the dam and will facilitate low-flow fish passage. Flow will be gradually reintroduced into the pilot channel and work area isolation measures will be removed. A detailed fish passage and salvage plan has been developed in consultation with the Oregon Department of Fish and Wildlife (ODFW) and the National Marine Fisheries Service (NMFS).

Short-term and long-term changes are expected locally in the vicinity of the dam after its removal from the Illinois River and natural stream processes are restored to an unimpeded condition. Fish passage will be similar to historical conditions in Illinois River once the sediment is transported downstream. A fish passage monitoring plan is provided for the dam site and will be executed by Greg Bennett (contracted with WaterWatch) with assistance from ODFW over the course of three years. This monitoring plan will specifically look at the physical stream conditions to ensure volitional fish passage.

The new irrigation diversion intakes will include passive fish screens to protect aquatic life from entrainment into the irrigation system. Pump vaults and new irrigation pipe will be installed to work with the existing gravity irrigation system. Flow control valves will be installed to measure and regulate diversion rates to legal water rights as approved by the Oregon Water Resources Department (OWRD).

Table of Contents

1 Introduction

WaterWatch retained River Design Group, Inc. (RDG) to design, permit, and facilitate the removal of the Pomeroy Dam in Josephine County near Cave Junction, Oregon (Figure 1-1). The dam is located on private property and owned by Q Bar X Ranch. The Pomeroy Dam is a 10-ft tall concrete structure that spans the Illinois River, which is a tributary to the Rogue River. The primary purpose of the dam is to divert water from the Illinois River and this function will be replaced with points of diversion downstream (Figure 1-1) and a water rights transfer (see Section 7).

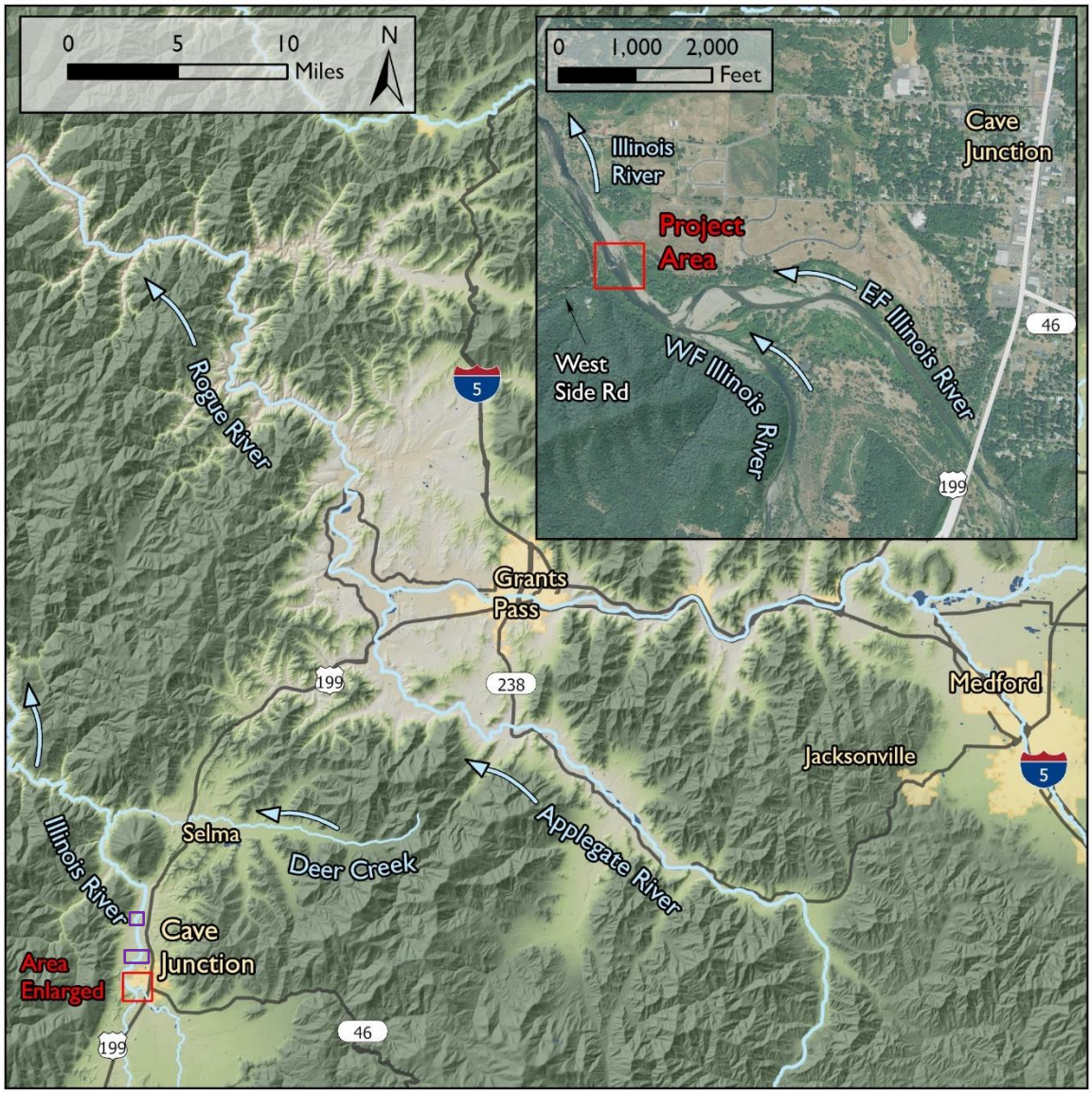


Figure 1-1. Project vicinity map for the Pomeroy Dam removal project. Dam removal areas outlined in red. Intake/points of diversion project areas outlined in purple.

This report provides a description of existing site conditions, analytical methods, predicted outcomes, and plans for the Pomeroy Dam removal project (Project). The plans include reservoir sediment management, dam removal and water management, fish passage, irrigation diversion screening and conveyance, and restoration. This report is a summary of the information that was used to make decisions and develop the project design to comply with applicable environmental protections and improve the ecological condition of the site. The design drawings are included in Appendix A.

1.1 Standard of Practice

RDG employs the most current and accepted practices available for planning and design of river restoration and channel enhancement projects. The analysis for the Pomeroy Dam removal project relied on current fish passage criteria from the Oregon Department of Fish and Wildlife (ODFW), National Marine Fisheries Service (NMFS), and hydraulic modeling of existing and proposed conditions. All work was performed or directed by an Oregon registered professional engineer with past experience in the design and implementation of dam removals and fish passage analysis. Figure 1-2 shows an overview of the Pomeroy Dam and existing irrigation diversion.

Figure 1-2. Aerial view looking across Pomeroy Dam and the existing irrigation diversion ditch (blue arrow) at the dam on the Illinois River. Photo taken August 22, 2023.

1.2 Regulatory Roadmap

The Project will require Federal, State, and County environmental regulatory permits prior to implementation. Figure 1-3 provides an overview of the proposed regulatory roadmap for compliance with environmental permitting requirements and each permit is discussed in the rest of this section.

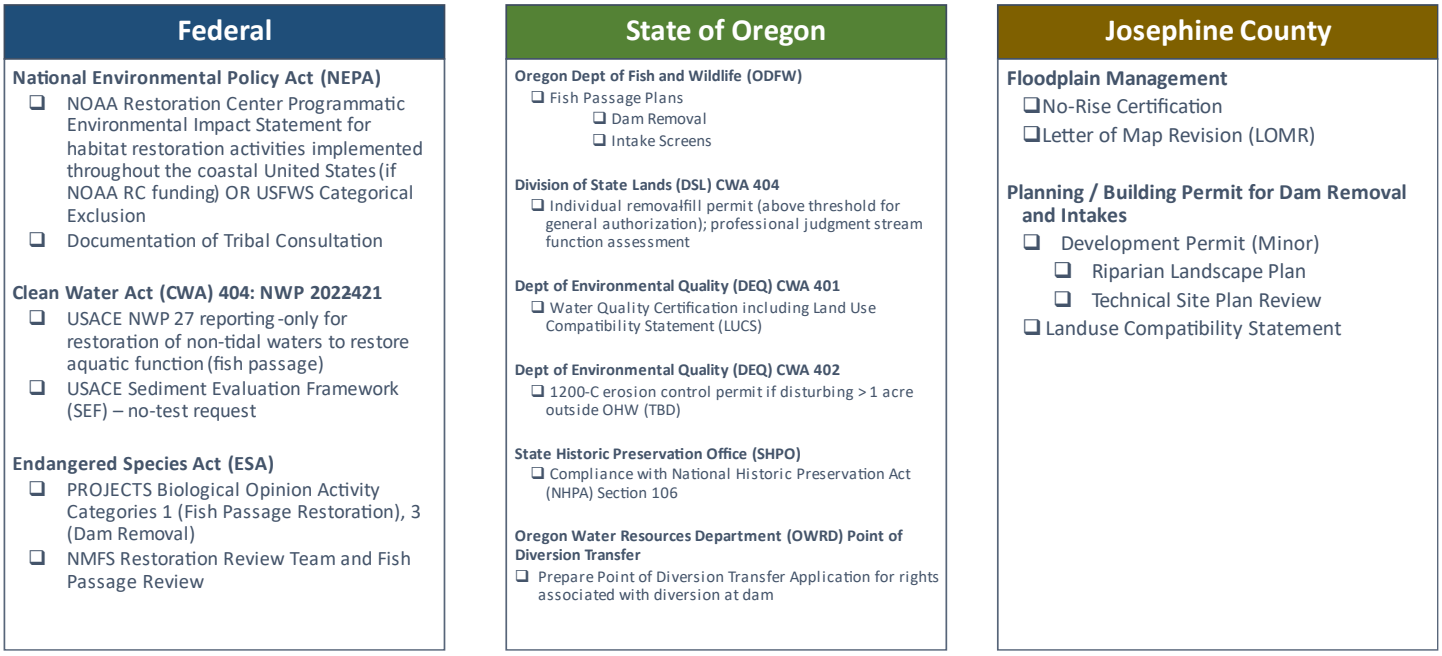


Figure 1-3. Pomeroy dam removal regulatory roadmap.

1.2.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) requires that federal agencies implementing actions with potential to impact the environment evaluate the impacts of any actions (including a no-action alternative). The U.S. Fish and Wildlife Service (USFWS) will be the federal nexus for compliance with NEPA. USFWS has access to a programmatic ecological impact statement (EIS) covering restoration activities, including fish passage and dam removal. They will conduct an analysis of the project scope and document the findings in an inclusion analysis form.

1.2.2 National Historic Preservation Act

The State Historic Preservation Office (SHPO) administers Section 106 of the National Historic Preservation Act within Oregon to determine if a project will have impacts on properties of historic significance. Archaeologists will survey the area of potential effects for prehistoric or historic districts, sites, buildings, structures, objects, artifacts, records, material remains, and traditional, religious, spiritual, storied, or legendary places and submit their findings to SHPO for review and concurrence. Local tribes will be notified and consulted during the SHPO review process.

1.2.3 Endangered Species Act

The Endangered Species Act (ESA) prevents actions that would harm listed species. ESA coverage is through the Programmatic Restoration Opinion for Joint Ecosystem Conservation by the Services (PROJECTS) by the U.S. Fish and Wildlife Service Using the Partners for Fish and Wildlife, Fisheries, Coastal, and Recovery Programs and

NOAA Restoration Center Using the Damage Assessment, Remediation and Restoration Program (DARRP), and Community-Based Restoration Program (CRP) in the States of Oregon, Washington, and Idaho. PROJECTS identifies 18 project categories. The Pomeroy dam removal project incorporates work within Category 1 (Fish Passage Restoration including Irrigation Diversion Replacement/Relocation and Screen Installation/Replacement) and Category 3 (Dam and Legacy Structure Removal).

The project will require review and confirmation of coverage by the restoration review team composed of staff from the National Marine Fisheries Service (NMFS) USFWS in addition to fish passage review by NMFS.

1.2.4 Clean Water Act (CWA)

The CWA protects water quality in the waters of the United States through regulating the removal and fill of materials below OHW and in wetlands (Section 404), limiting in-channel turbidity (Section 401) and erosion and sediment control during construction activities (Section 402). The USACE and Oregon Department of State Lands (DSL) jointly administer the CWA section 404 permits. The Oregon Department of Environmental Quality (ODEQ) administers the CWA section 401 and 402 permits.

1.2.4.1 Section 404 – United States Army Corps of Engineers (USACE)

Nationwide permit (NWP) 27 covers aquatic habitat restoration, enhancement and establishment activities. It authorizes the relocation of non-tidal waters, including non-tidal wetlands and streams, on the project site provided there are net increases in aquatic resource functions and services. Removal of the dam and restoration of the channel and floodplain will increase fish passage and in-stream aquatic resources. The NWP has general conditions related to construction and erosion control which must be incorporated into the final project design. Coverage by NWP 27 will be initiated by a reporting-only project notification from USFWS to USACE with USFWS as the applicant.

In addition to NWP 27 guidance, USACE Regulatory Guidance Letter No. 18-01 states that losses of wetlands that occur from removal of obsolete dams and other structures from rivers and streams does not require compensatory mitigation. The USACE CWA 404 permits in Oregon require evaluation of sediment impounded by the dam prior to removal.

USACE CWA 404 permits require evaluation of the existing sediment impounded behind the dam to determine potential for pollutants and exposure impacts to biologic receptors. This process is carried out through the Sediment Evaluation Framework (SEF) (RSET, 2018). The SEF is a tiered evaluation process designed to systematically assess, characterize, and manage sediments in areas that will be dredged, disturbed, or naturally released into the environment. A no-test request is being submitted for the Pomeroy dam removal because the sediment expected to be mobilized following dam removal is reflective of current conditions of sediment currently exposed in the river. See Section 3.3 for more details on the impounded reservoir sediments.

1.2.4.2 Section 404 – Oregon Department of State Lands (DSL)

DSL regulates removal and fill of materials in waters of the state, including wetlands and channels below OHW, exceeding a cumulative removal and fill volume of 50 cubic yards (CY). The Project exceeds this threshold and will require a removal-fill permit from DSL. DSL has a general authorization for waterway enhancement that is

limited to a cumulative removal and fill volume of 200 CY for barrier removal. The Project exceeds this threshold and will require an individual removal-fill permit.

Coverage by the individual removal-fill permit will require preparation and submittal of a joint permit application (JPA) to DSL and DEQ. The professional judgment stream function assessment (SFAM) is included in Appendix B of this report.

1.2.4.3 Section 401 – Oregon Department of Environmental Quality (DEQ)

A Section 401 water quality certification (WQC) will be required from DEQ. The WQC will contain turbidity monitoring and reporting requirements. DEQ requires a landuse compatibility statement (LUCS) from Josephine County in order to issue the WQC.

The WQC application requires a pre-filing notice a minimum of 30 days prior to application and DEQ has up to 90 days to issue the certification after application. Coverage by the water quality certification will require preparation and submittal of a JPA to DSL and DEQ.

1.2.5 Oregon Department of Fish and Wildlife (ODFW) Fish Passage Plan

Removal (abandonment) of the dam and relocation of the diversions will require review and approval from ODFW for fish passage. Fish passage is required in waters in which native migratory fish are currently or were historically present. This report (Sections 4, 6, and 7) will form the basis for ODFW review and approval of fish passage during and after the dam is removed.

1.2.6 Floodplain and Riparian Management – Josephine County

Pomeroy Dam is located in a FEMA "Zone AE" area as designated on the flood insurance rate map (FIRM) panel 41033C-0791E shown in Figure 1-4 (FEMA 2009). Zone AE is designated as an area where a base flood elevation (BFE) and floodway have been determined. The Pomeroy Dam removal is designed to be compliant with Josephine County Code Chapter 19.69A (Flood Hazard Overlay). A letter of map revision (LOMR) will be completed for the site to update the floodplain map after removal of the dam.

Josephine County Code chapter 19.69A requires that "nonstructural development such as mining, dredging, filling, grading, paving, stockpiling of materials and excavation must be authorized by a development permit" and that "all encroachments (including fill, new construction, substantial improvements and all other development) are prohibited until a floodway study is provided from a registered engineer or architect demonstrating through hydrologic and hydraulic analyses performed in accordance with standard engineering practices that the proposed encroachment will not result in any increase ("no-rise") in flood levels within the community during the occurrence of the base flood discharge."

The special flood hazard area and floodway analyses are described in the "No-Rise Memo" under separate cover. Removal of the Pomeroy Dam lowers the base flood elevation (1% annual chance peak discharge water surface elevation) by approximately 0.1 ft.

A development permit will be issued for compliance with floodplain development requirements and a riparian landscape plan is included showing the anticipated impacts and restoration of native vegetation (see section 6.4).

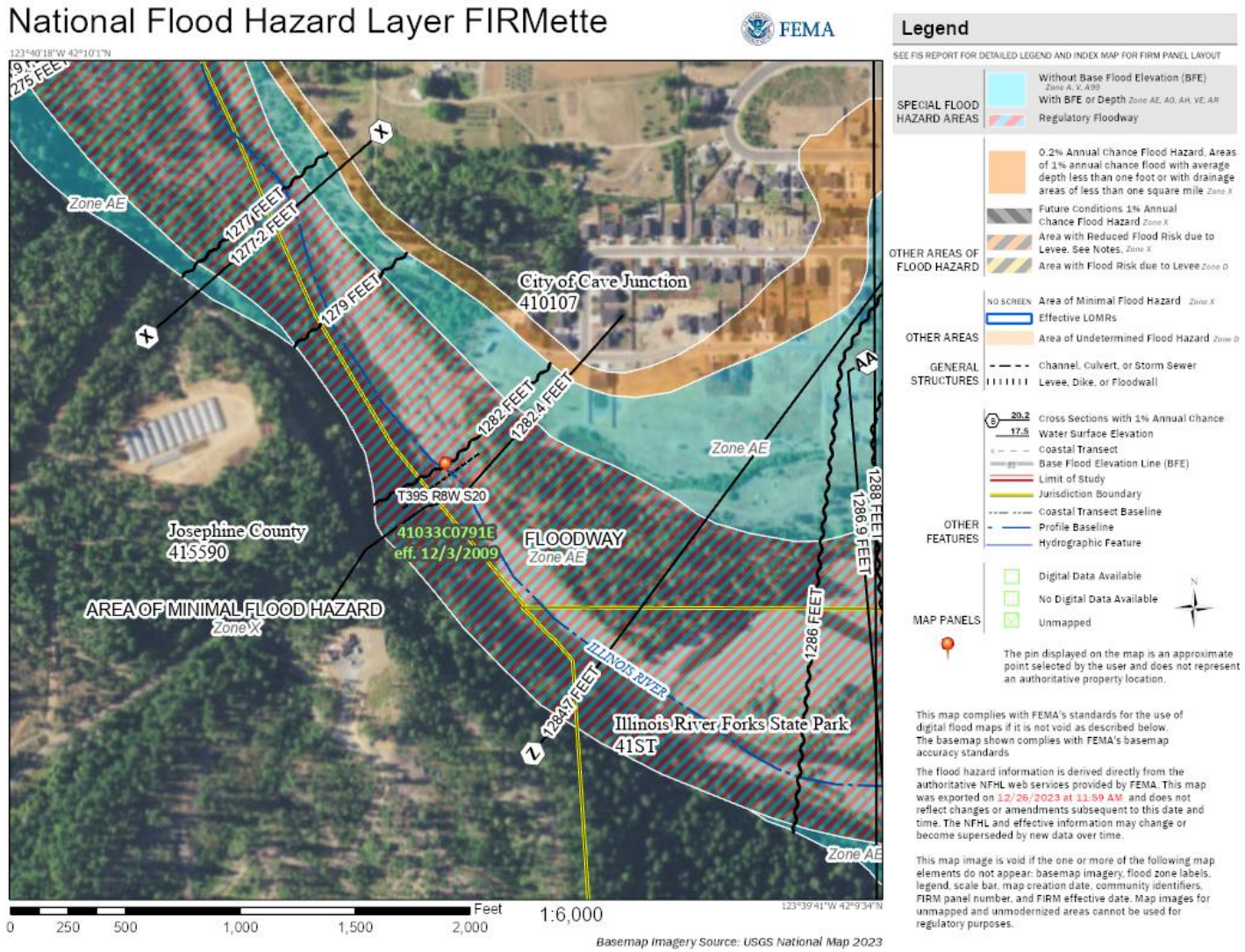


Figure 1-4. FIRMette showing the location of Pomeroy Dam (red pin) and special flood hazard area extents. The dam is included in the effective model geometry.

2 Methods

The following subsections outline RDG's methods for evaluating the existing site conditions and preparation of dam removal, fish passage and diversion fish screen design plans. A combination of field surveys and remote sensing was used to develop existing conditions and establish a baseline of information to evaluate and develop the plan for dam removal.

2.1 Site Investigation and Survey

RDG completed detailed field data collection in August 22-24, 2023, to characterize and survey the existing site conditions at the dam along with conditions upstream in the reservoir area and the channel downstream. Data collection included topographic survey of the existing concrete dam, surrounding structures, and bathymetric survey of Illinois River in and around the project site to develop bathymetric information as shown in Figure 2-1.

In addition, survey data were collected at two river-left locations downstream of the dam as potential locations to relocate the water intakes associated with the dam. RDG data collection efforts utilized an unmanned aerial vehicle and a survey-grade geographic positioning system (GPS) to geo-reference the site. RDG also established horizontal and vertical control benchmarks for use throughout the project area. The bathymetric survey included the extents of the reservoir and scour pool immediately upstream and downstream of the dam and a longitudinal channel profile extending approximately 700 ft (2 to 3 channel widths) further upstream and 500 ft (1.5 to 2 channel widths) further downstream to capture terrain outside the influence of the dam.

RDG integrated the bathymetric surveys with publicly available digital elevation data into seamless models of terrestrial bare earth and bathymetry in AutoCAD Civil3D. The resulting surface elevation model of the project site allows for evaluation of existing conditions, sediment volumes, hydraulic modeling, and likely conditions after dam removal.

Figure 2-1. Surveying the existing dam structure with GPS to augment remotely sensed terrain information.

2.2 Pre-Dam Topography, Reservoir Sediment Volume, and Planform Evolution

Understanding of pre-dam topography is well constrained at the Project site because of the high fraction of bedrock exposed in the channel bed both up- and downstream of the dam, and we can use the existing thalweg profile as representative of pre- and expected post-dam conditions. Most of the thalweg through the Project reach is exposed bedrock rather than alluvium and is unlikely to have been modified at detectable magnitudes in the time since dam construction. There is likely to have been some bedrock scour immediately downstream of the dam due to dam-related hydraulic conditions increasing effectiveness of bedrock erosion processes (e.g., abrasion and plucking), but these impacts on channel profile are likely limited to 25 to 50 ft downstream of the dam face. The exposed bedrock in the Project reach has irregular morphology caused by differential erosion of the tilted sedimentary strata. The small-scale irregularity in the exposed subaqueous bedrock morphology is challenging to represent in a surface model and make accurate sediment transport modeling in the reservoir

area infeasible. The surface model with simplified bedrock geometry is adequate to characterize both the pre- and expected post-dam channel and estimate impounded sediment volumes.

We calculate the volume of impounded reservoir sediments as the volume stored in the river-right bar, i.e., the volume between the bar surface and an estimated underlying bedrock surface as a proxy for dam-out conditions. The estimated bedrock surface is created using the elevations of the river-right-most exposed bedrock along the margin of the gravel bar and assuming a nearly flat surface laterally beneath the bar. Sediment in bars upstream of the confluence is not included as reservoir sediment volume, in part due to the presence of exposed bedrock across the full primary flow thread in the channel immediately downstream of the confluence. Characteristics of the impounded reservoir sediments are provided in Section 3.3.

Channel boundaries and bar margins are digitized in Google Earth and GIS from aerial photos taken 1994.06.08, 2000.08.10, 2005.06.28, 2013.06.07, 2019.10.05, and 2023.08.23 to facilitate analysis of channel evolution and sediment volume calculation. Digitization occurred in the reach from the dam to 0.5 mi and 0.75 mi upstream on the West and East Fork Illinois Rivers, respectively. Boundaries and bar margins are differentiated using wetted boundaries and lines of permanent vegetation.

2.3 Hydrology

Hydrology in the Illinois River watershed is typical for southern Oregon. Mean annual precipitation is 76.4 inches, and the maximum 24-hour precipitation that occurs on average once in two years is 3.6 inches (USGS 2023). An average annual hydrograph (Figure 2-2) was developed from mean daily flow data from an active stream gage on the Illinois River approximately 5 miles downstream of the Pomeroy Dam (Figure 2-3). Most of the precipitation occurs between October and June. The Illinois River is a flashy system in which stream flows increase rapidly in response to precipitation events and quickly recede when the storm ends. Flows are very low in the summer months with lowest flows typically occurring in early to mid-September.

Flow estimates were developed for use in hydraulic analysis of fish passage, temporary work area isolation, and anticipated channel adjustment post-dam removal as described below.

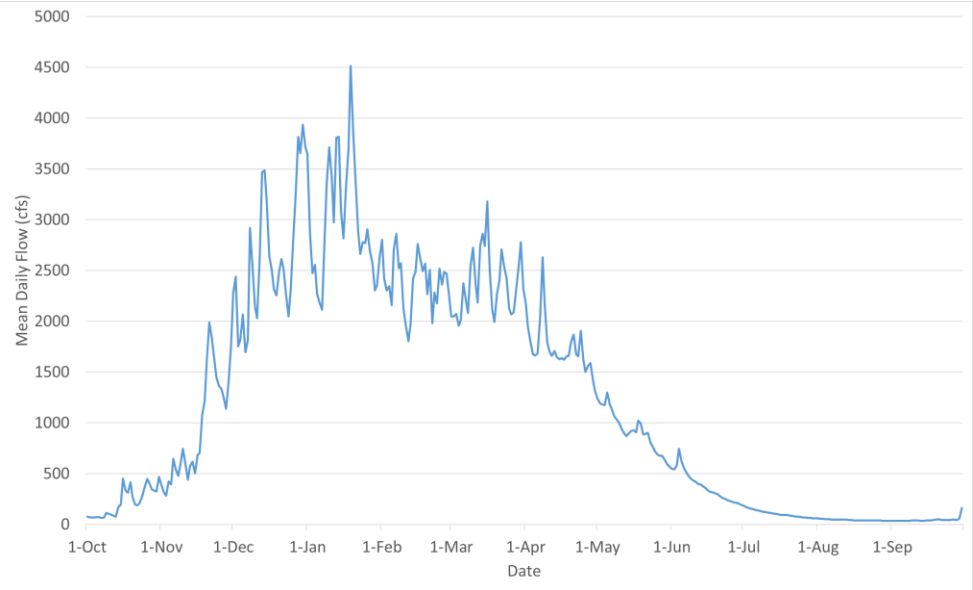


Figure 2-2. Mean daily flow in the Illinois River at USGS streamflow gaging station 14377100 based on the most recent 30 years (October 1, 1993, through September 30, 2023).

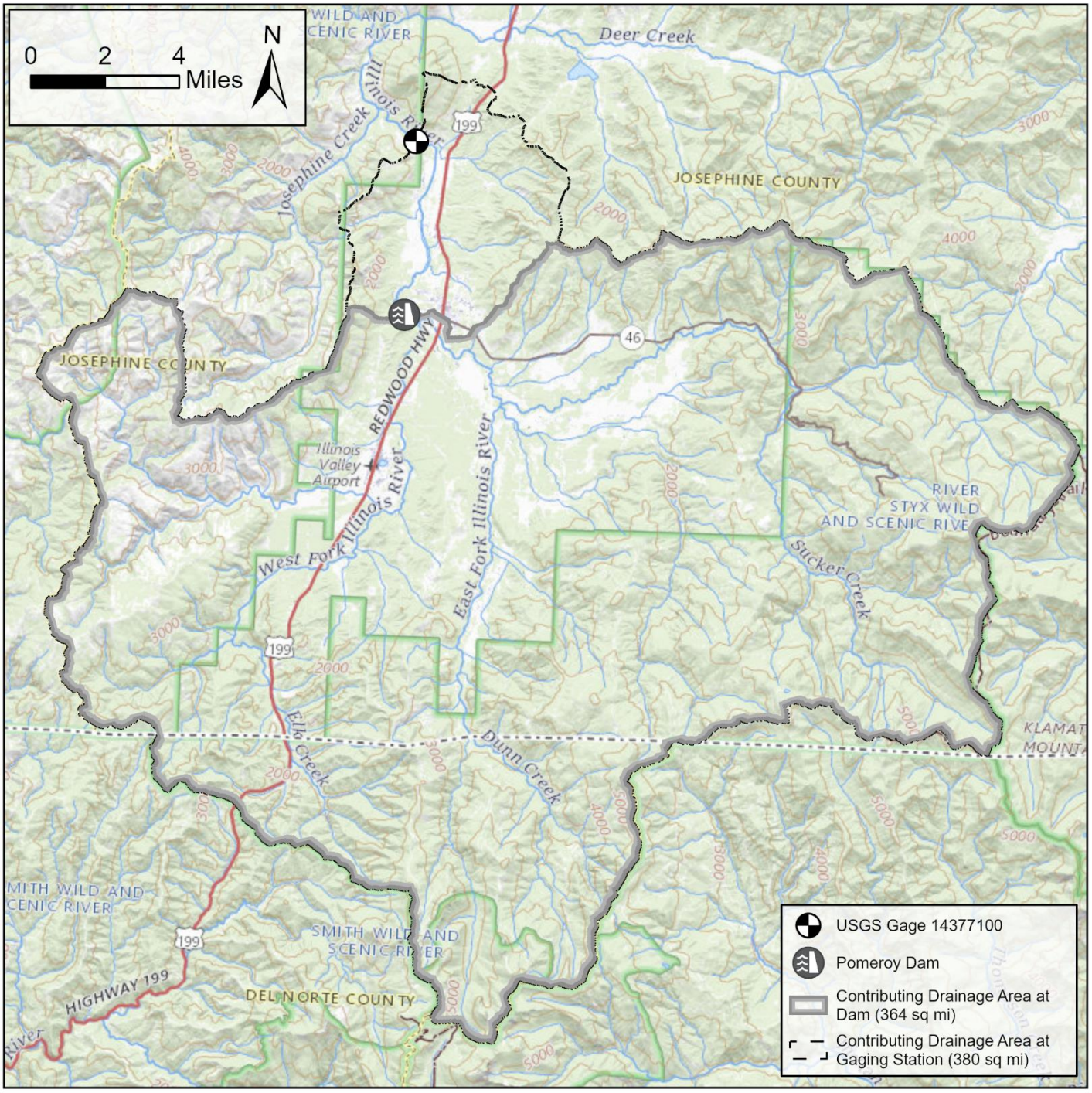


Figure 2-3. Contributing drainage areas to the Illinois River at Pomeroy Dam and USGS Gage 14377100.

2.3.1 Peak Flows

Peak flows are used in hydraulic modeling to evaluate approximate ordinary high water (OHW) elevations, restoration design stability, and floodplain impacts. Peak flows are calculated as a percent annual chance exceedance which is the probability that a peak flow value will during a year. These peak flows are typically short-duration, and the return interval is calculated from the inverse of the annual chance exceedance, e.g., a 1% annual chance exceedance flood has a return interval of 100 years.

Peak flows were estimated using Bulletin 17B flow frequency analysis of streamflow gage data and compared to the peak flow estimates published in the effective flood insurance study (FIS) by the Federal Emergency Management Agency (FEMA 2009). USGS regional regression equations for Oregon are not valid because the watershed upstream of Pomeroy Dam crosses into the state of California (Figure 2-3).

The USGS operates a streamflow gaging station (14377100) on the Illinois River approximately 5 miles downstream of the Pomeroy Dam (Figure 2-3). The period of record for peak streamflow began in 1927 and mean daily flow records are available beginning in 1961. The most recent 30 years of record were used for flow frequency analysis to represent the most recent climate conditions (Figure 2-4). This omits the flood of record which occurred on December 22, 1964 (FEMA 2009).

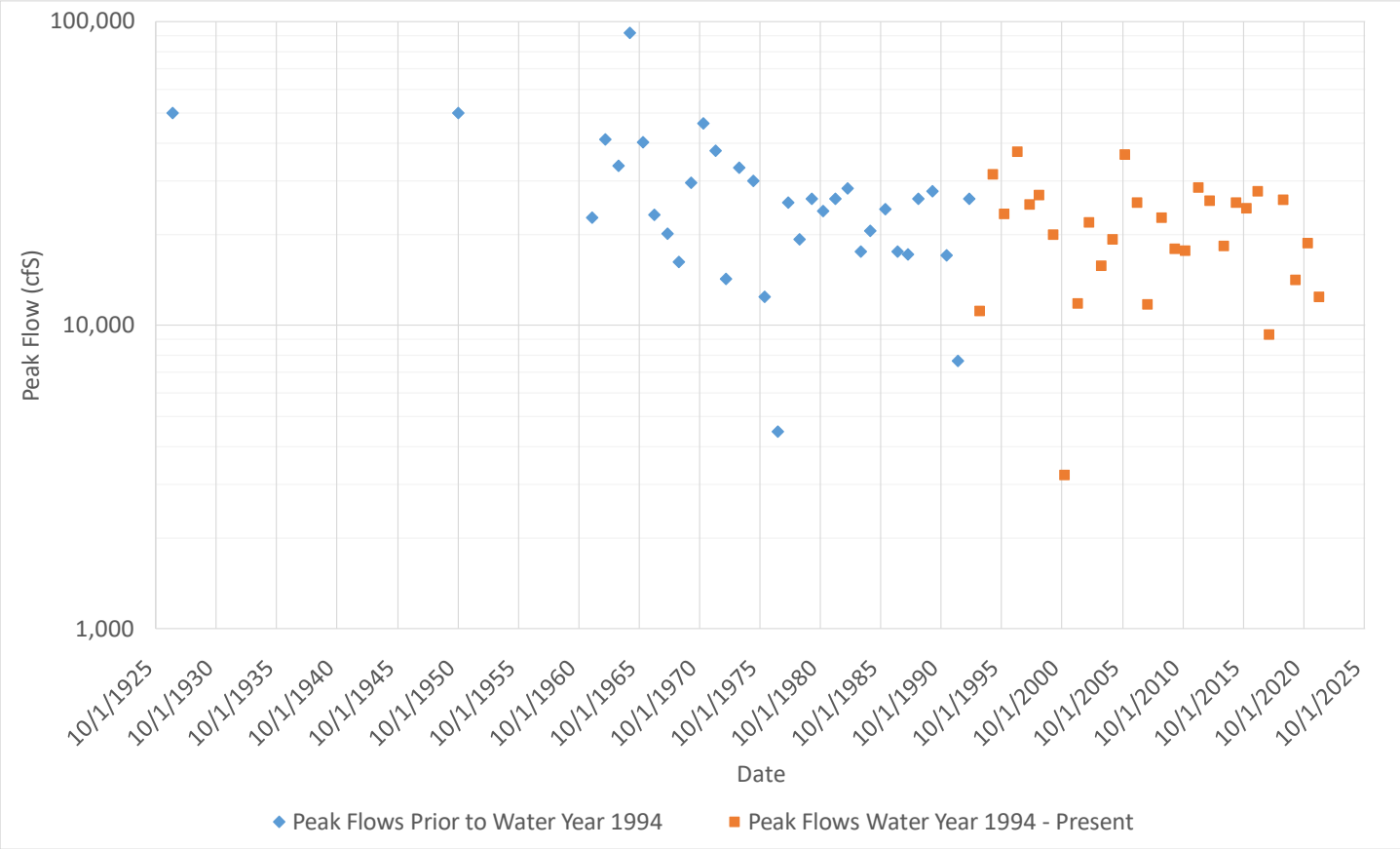


Figure 2-4. Annual peak flows at USGS streamflow gaging station 14377100. Flow in cubic feet per second is shown on a logarithmic scale. Peak flows from water year 1994 (starting October 1, 1993) to present were used in the flow frequency analysis.

FEMA's estimate of peak flows in the effective FIS included the 1964 flood which is a conservative estimate of peak flows for flood risk analysis. The flow frequency analysis was conducted using hydrologic analysis program HEC-SSP version 2.3 (USACE 2023a). The results of the flow frequency analysis were scaled by drainage area ratio to estimate peak flows at Pomeroy Dam. The contributing drainage area is 354 square miles at the dam and 380 square miles at the gage resulting in a drainage area ratio of 0.93. Table 2-1 summarizes the results of the flood frequency analysis, published flow estimates from the flood insurance study (FEMA 2009), and the values selected for design in cubic feet per second (cfs).

The recent gage data were selected for the more frequently occurring lower-magnitude flows (20% to 67% annual exceedance chance) to evaluate potential channel response to dam removal. The FEMA FIS flows were selected for less frequently occurring higher-magnitude flows (0.2% to 10% annual exceedance chance) for flood risk analysis.

Table 2-1. Peak flow estimates for Illinois River watershed upstream at Pomeroy Dam.

Annual Exceedance Chance	Bulletin 17B Gage Analysis (cfs)	FEMA Effective FIS Flow[1] (cfs)	Design Flow (cfs)	Notes
67%	16,810	N/A	**16,810**	Approx. OHW[2]
50%	19,700	N/A	**19,700**	
20%	25,960	N/A	**25,960**	
10%	29,480	44,900	**44,900**	
2%	35,860	63,500	**63,500**	
1%	38,140	71,200	**71,200**	Floodway impact analysis
0.2%	42,690	89,000	**89,000**	Letter of Map Revision

NOTES:
1. FEMA flows reported at confluence of East and West Forks of the Illinois River (drainage area 346 square miles).
2. Approximate Ordinary High Water (OHW) flow

2.3.2 Fish Passage and Temporary Bypass Flows

Fish passage flows and temporary bypass flows are calculated using flow duration methods rather than peak flow frequency. Flow duration refers to the percent of time that the creek conveys a given flow (or as) over a given time period. For example, the 95% probability flow duration exceedance value occurs or is exceeded at least 95% of the time (approximately 30 days out of a 31-day month) and is a relatively low flow rate. The 5% probability flow duration exceedance occurs infrequently (approximately two days during a 31-day month) and is a relatively high flow rate. Mean daily flows from the most recent 30 years at USGS gage 14377100 are used to estimate fish passage flows in the Illinois River at Pomeroy Dam. The results of the flow duration analysis are scaled from the gage to the dam location by drainage area ratio (see discussion above).

Fish passage is required through a range of flows, and the requirements are described in Section 3 of the Anadromous Salmonid Fish Passage Facility Design (NMFS, 2022a). The pilot channel may be considered a temporary roughened channel until flows in Illinois River disperse the sediment stored in the reservoir. The low flow condition for roughened channels is the mean daily average flow that is exceeded 95% of the time during periods when migrating fish are normally present. High flow for fish passage is determined in a similar procedure and consists of the mean daily average flow that is exceeded 5% of the time during fish migration.

Fish are present year-round in Illinois River and the most recent 30 years of mean daily flow data is used to develop fish passage flow estimates reported in Table 2-2 in cubic feet per second (cfs).

Table 2-2. Summary of fish passage flows at Pomeroy Dam on Illinois River from flow duration analysis of mean daily flows at USGS gage 14377100.

Annual Duration Exceedance Probability	Flow (cfs)	Notes
5%	4,640	High fish passage flow
95%	25	Low fish passage flow

Temporary water management during construction includes bypassing flow around the active work area to prevent sediment discharge into Illinois River. The bypassed volume of water varies during the anticipated in-water work window of June 15 to September 15 (ODFW, 2023). Monthly flow duration exceedances are calculated and an average flow weighted by the number of days within the IWWW is calculated for the period of June 15 – September 30 (including the latter half of September outside of the in-water work window). Table 2-3 summarizes the estimated flows during the in-water work window months of June through September in cubic feet per second (cfs) and gallons per minute (GPM).

Table 2-3. Flow duration exceedance during the months fully or partially in the in-water work window (June - September).

Flow Duration Exceedance Probability	June cfs / GPM	July cfs / GPM	August cfs / GPM	September cfs / GPM	Weighted Average Flow During IWW cfs / GPM	Anticipated Days of Flow Exceedance in a 31-Day Month
95%	90 / 40,400	30 / 13,500	20 / 9,000	10 / 4,500	40 / 18,000	30
50%	260 / 116,700	80 / 35,900	40 / 18,000	30 / 13,500	100 / 44,900	16
25%	440 / 197,500	120 / 53,900	50 / 22,400	40 / 18,000	160 / 71,800	8
10%	650 / 291,800	180 / 80,800	70 / 31,400	60 / 26,900	240 / 107,700	4
5%	870 / 390,500	220 / 98,700	70 / 31,400	70 / 31,400	310 / 139,100	2

2.4 Hydraulic Modeling

Hydraulic modeling for the fish passage plan was performed using HEC-RAS version 6.4.1 (USACE, 2023b), which is a hydraulic model capable of one-dimensional and two-dimensional flow in steady state and unsteady flow conditions. The model solves the energy and momentum equations using an iterative technique for a given hydraulic condition. This technique results in a solution to all variables in the energy equation (i.e., velocity, hydraulic head, fiction losses, etc.) at any given or interpolated cross-section or mesh element. Inherent assumptions of the two-dimensional model is that flow is uniform throughout the calculation cell. The model has the ability to simulate subcritical flow, supercritical flow, and a combination of the two for open channels.

A two-dimensional model was used to evaluate fish passage design and channel bed mobility for post dam-removal conditions. Model geometry was developed from the existing conditions surface (a combination of LiDAR and site survey) and proposed conditions grading surfaces. Pomeroy Dam was incorporated into the 2D terrain and mesh. Roughness values were determined using a quantitative approach which is calculated as a function of the base material roughness, degree of irregularity in channel/floodplain shape, variation in cross-

sectional shape, effect of obstructions, amount of vegetation, and degree of meandering (Arcement & Schneider, 1989). The values for the degree of irregularity and variation in cross-sectional shape were set to zero in the existing channel as they are incorporated within the two-dimensional model mesh.

Table 2-4 summarizes the roughness values used in hydraulic analysis of the Pomeroy Dam removal which are shown in Figure 2-5. The roughness values selected are within the ranges in the effective FIS (FEMA 2009).

Table 2-4. Roughness values used in hydraulic model simulations.

Surface Type	Roughness Value
Channel	0.065
Overbank	0.080
Bedrock	0.045
Developed	0.060
Canal	0.050

The model assumes a constant inflow hydrograph for the upstream boundary and a normal depth downstream boundary with a reach-average slope 0.01 ft/ft determined from the site survey. The two-dimensional model with the dam was run using the flow occurring during the site survey on August 22, 2023 (42.6 cfs), and the inundated extents closely match the observed edge of water (Figure 2-6). The model geometry was updated to represent post dam-removal conditions without changes to the roughness values or boundary conditions.

The two-dimensional model was used to evaluate the high and low fish-passage flows and two-year peak flow. Model results were analyzed using the RAS Mapper module within HEC-RAS and exported to geographic information system formatted files for display in ArcGIS Pro version 3.2 (Esri, 2023). Simulation results for existing conditions are discussed in section 3.5 and post dam removal conditions are discussed in Section 6.

A one-dimensional hydraulic model was developed to evaluate changes in the regulatory special flood hazard area for floodplain management following current guidance from the Federal Emergency Management Agency (FEMA), see discussion in Section 1.2.6.

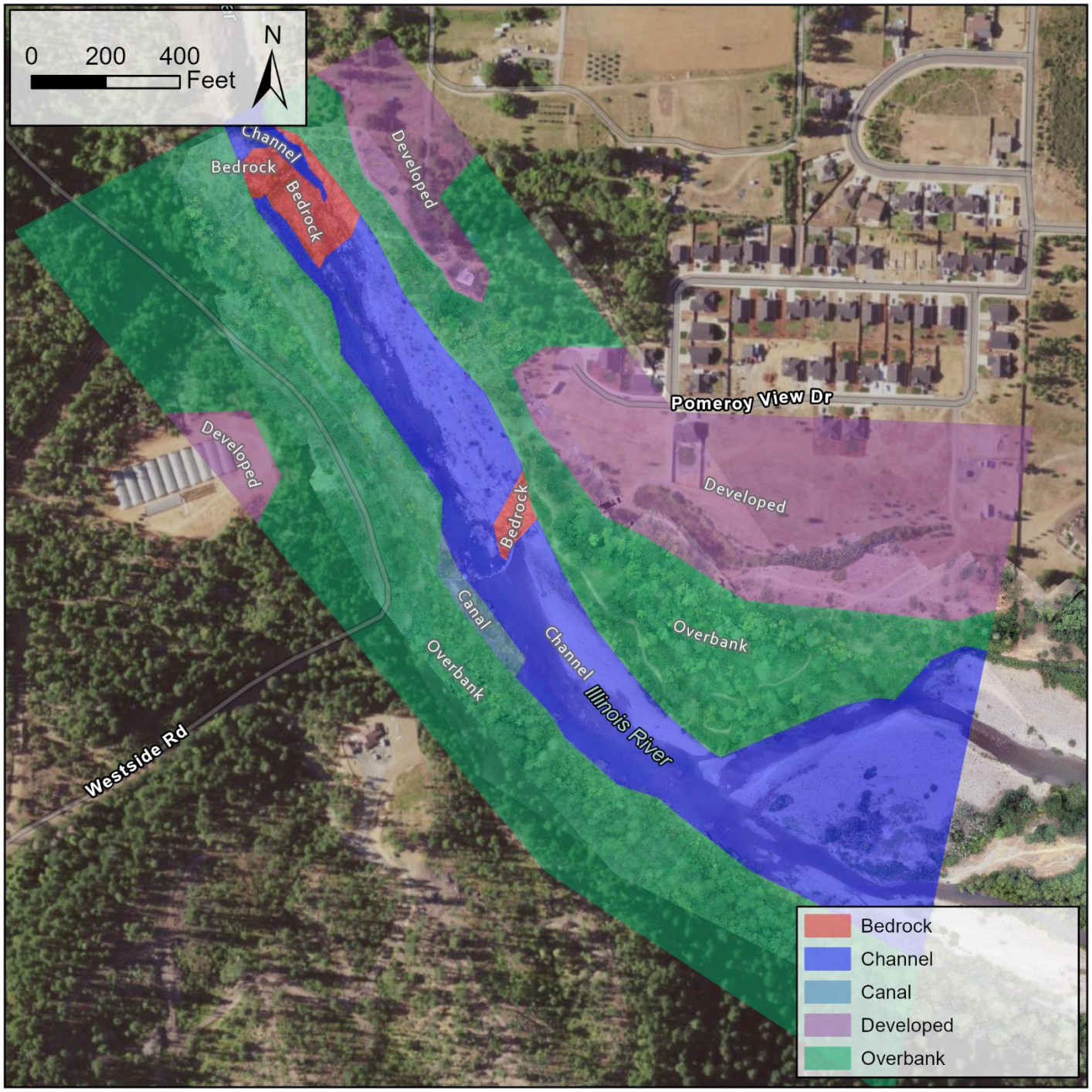


Figure 2-5. Hydraulic model roughness surface types.

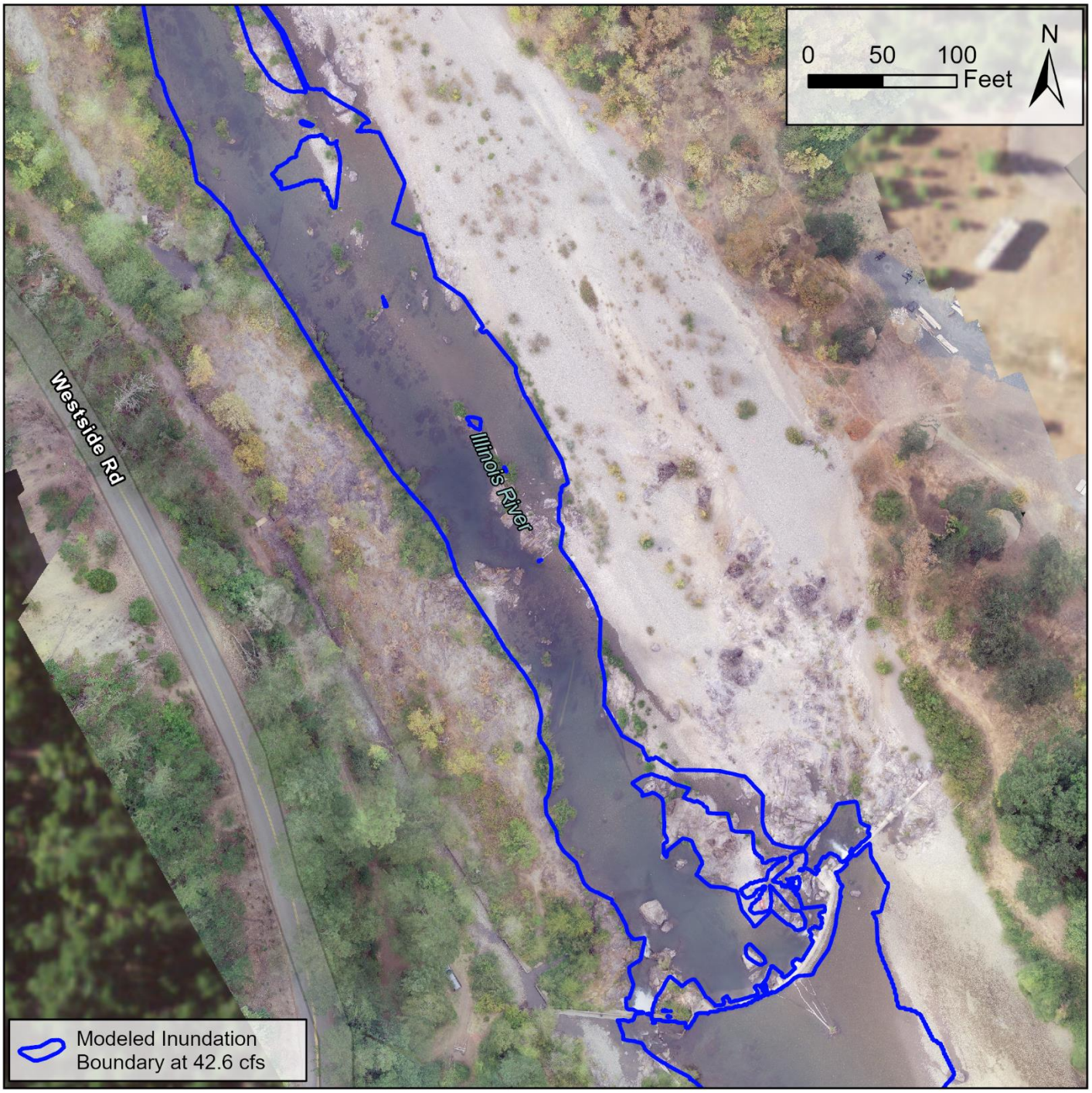


Figure 2-6. Hydraulic model validation checking the calculated inundated extents during the site survey against the observed edge of water.

3 Existing Site Conditions

Pomeroy Dam (42.16°N, 123.67°W) is located on the Illinois River, approximately one-quarter mile downstream from the confluence of the East Fork Illinois River and West Fork Illinois River within the Rogue River Basin. The Pomeroy Dam is a 10-ft tall by 340-ft wide concrete structure fully spanning the channel. It is estimated that the original diversion dam was built in the early 1900s, and the concrete dam was built in the 1940s. The dam supports irrigation water rights for Q Bar X Ranch (see Section 7). The dam has no fish ladder and is a partial fish passage barrier until it is overtopped during high flow.

The Stream Function Assessment Method (SFAM; Nadeau et al. (2020)) professional judgement evaluation, competed in compliance with the DSL permit, provides a description and rating of functions and values under existing conditions and is provided in Appendix B.

Figure 3-1. Aerial view showing Pomeroy Dam (highlighted in yellow), canal and existing flow paths (white arrows). Photo taken August 22, 2023.

The existing irrigation diversion flow passes through a roll-drum screen and flows along a poorly maintained canal for approximately four miles through private lands and public lands until it reaches Q Bar X Ranch (Figure 3-2). Q Bar X Ranch infrequently uses the canal to provide flood irrigation to adjacent fields, and the system is poorly maintained.

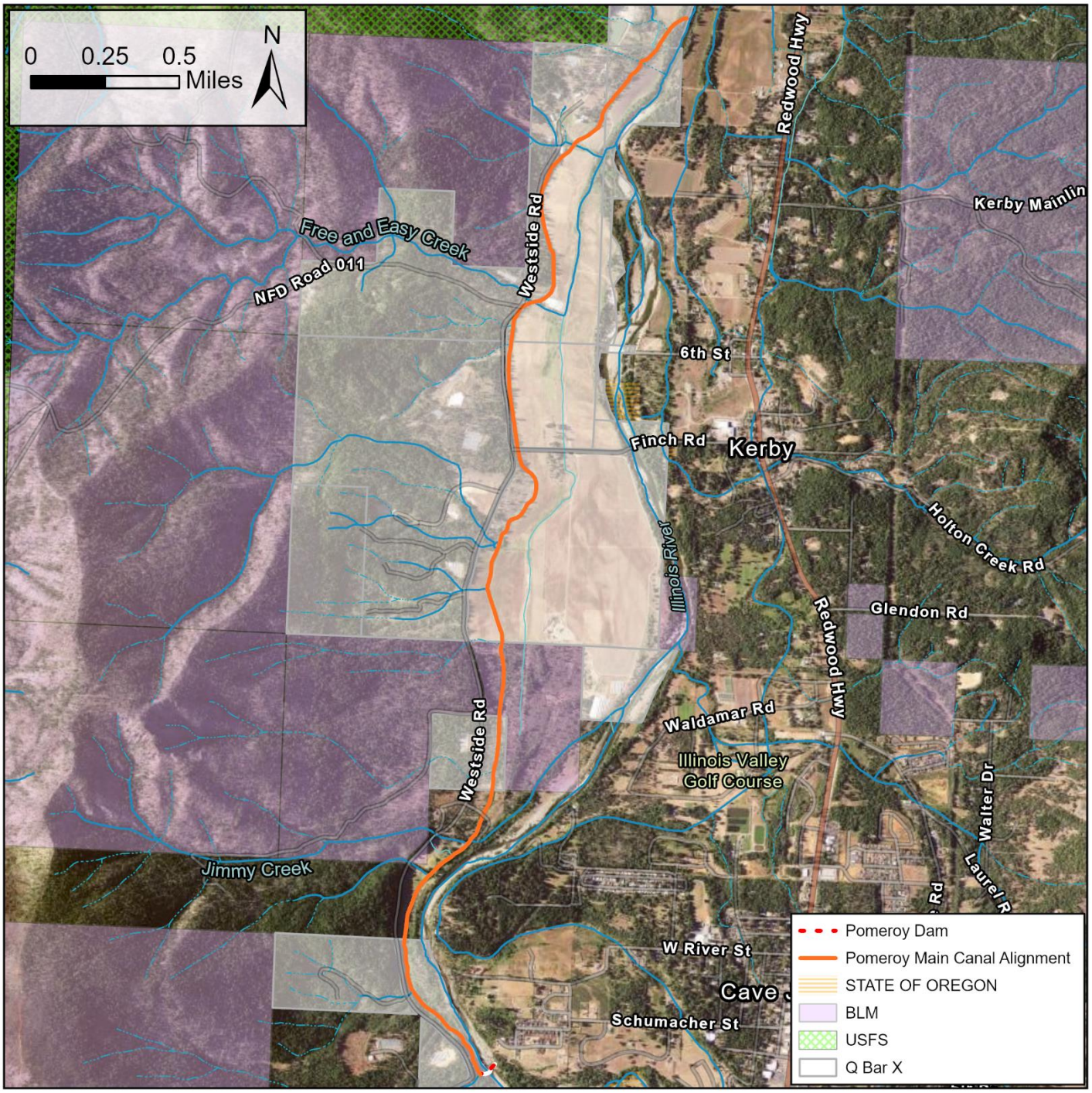


Figure 3-2. Main Pomeroy Canal alignment from diversion at Pomeroy Dam to Q Bar X.

3.1 Watershed Conditions and Land Use

The Illinois River watershed upstream of Pomeroy Dam is comprised of a mix of forested federal lands in the headwaters of the East Fork and West Fork and low-density residential and agricultural lands in the Illinois Valley and the city of Cave Junction (Figure 3-3). The contributing area is 84% forested and 10% of the watershed is owned and managed by the U.S. Forest Service.

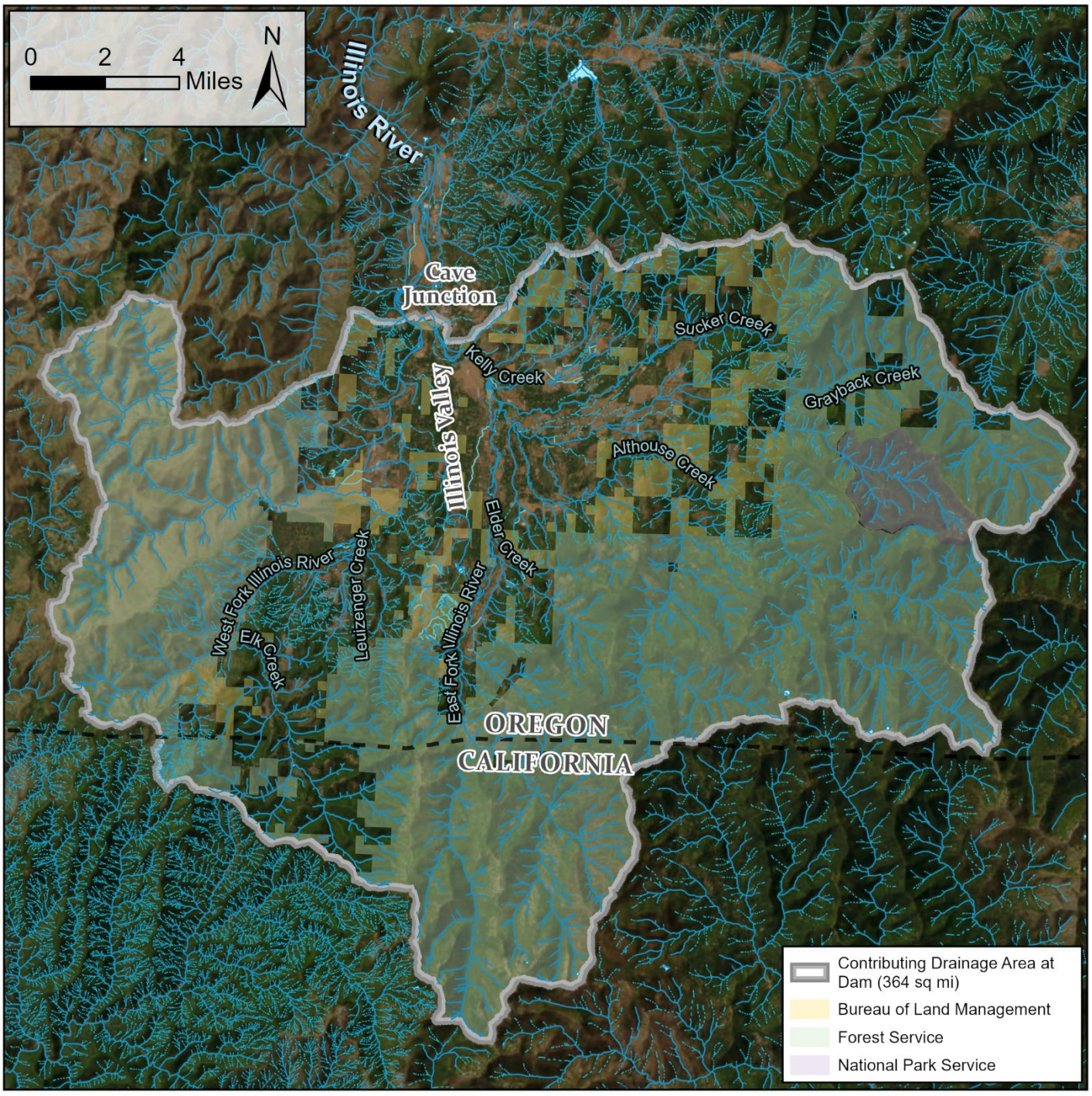


Figure 3-3. Land ownership and landcover in the contributing drainage area to the Illinois River upstream of Pomeroy Dam.

Evaluation of the contributing watershed and potential impacts to impounded reservoir sediments show a low risk of contamination:

- The Project area is far removed from sources of contamination (>0.5 miles) based on state/federal database searches (ODEQ Environmental Cleanup Site Information (ECSI) and Leaking Underground Storage Tanks (LUSTs), EPA's Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), DOGAMI Milo mining database).
- The project is 7 miles downstream from the nearest ECSI site, and there are no LUSTs within a few miles upstream of the Project.
- The majority of the area within 0.5 miles upstream of the dam is the Illinois River State Park. Cave Junction is located east (river right) of the channel, and since 2016 a residential neighborhood has been constructed in the river-right floodplain immediately adjacent to the Pomeroy Dam (Figure 3-7), and the majority of the development is outside of the contributing watershed and lacks surface flow pathways to the site. Prior to the neighborhood development, the area was a combination of field and vegetated floodplain.
- The 354 mi^2 contributing watershed is mostly undeveloped and under Federal ownership. There are 360 miles of roads and highways and several small communities in the contributing watershed.
- There is a history of mining operations in mountainous, high relief southern portions of the watershed (DOGAMI Milo database), but none that pose contamination risks to the Project site sediments. The closest site was a historical surface sand and gravel aggregate mine ("Cave Junction Bar") on the East Fork Illinois within the State Park and is located 0.7 miles upstream from the Pomeroy Dam. There is no available information on gravel mining activity at the Cave Junction Bar with DOGAMI. As evidenced in the aerial imagery since 1994, the area where the Cave Junction Bar aggregate site is located has undergone significant evolution and phases of bar growth and evolution, so any impacts of mining activity are unlikely to be found or have an impact on sediment characteristics in the area.
- Per the DOGAMI Milo database, there are no other gravel aggregate mining operations within 2 miles of the site. The closest metal mining operation is a 5-mile flow pathway upstream of the project area.

3.2 Geology and Geomorphology

The Illinois River watershed upstream of the Pomeroy Dam drains the steep, high relief terrain of the Siskiyou Mountains which are a subset of the Klamath Mountains. The Klamath Mountains were formed over several hundred million years since the Paleozoic by tectonic accretion of exotic terranes and oceanic rocks from ongoing convergence along the Western US boundary (Snoke & Barnes, 2006). The Klamath Mountains have undergone a complex sequence of regional compression, thrust faulting, and metamorphism with periods of extensional tectonics and emplacement of plutonic bodies (Snoke & Barnes, 2006). The Project area and the lower reaches of the East and West Forks are located within the Illinois Valley, which is a conspicuously wide and flat topographic depression within the otherwise steep and mountainous Klamath Mountains. Bedrock geology in the contributing basin consists primarily of Jurassic-aged metamorphic and marine sedimentary rocks of the Western Klamath terrane in the western portions and Triassic/Jurassic-aged medium to high grade metasedimentary and metavolcanic rocks of the Applegate Group in the eastern portions (Figure 3-4).

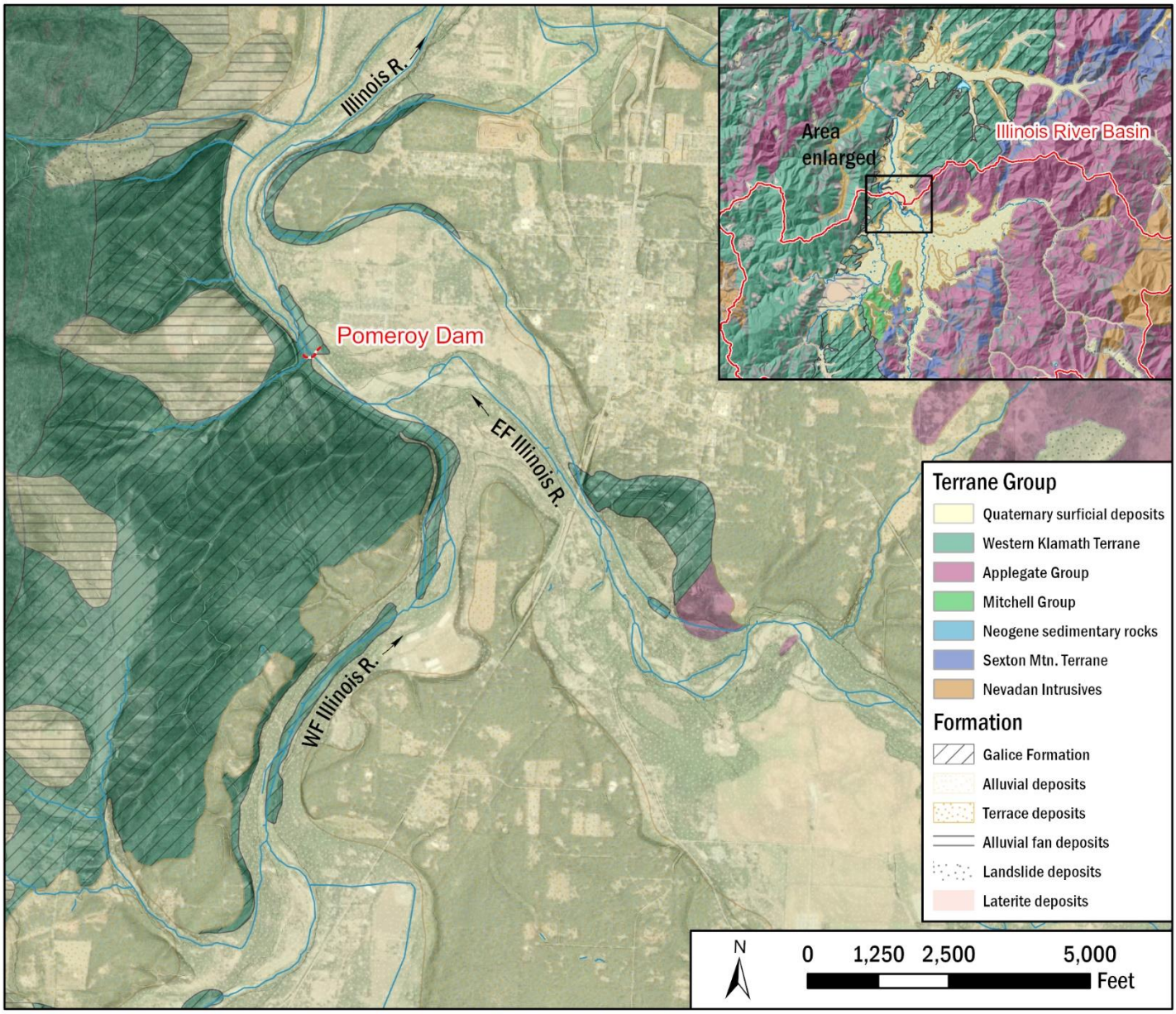


Figure 3-4. Geologic map of the Project area and the Oregon portion of the contributing watershed (inset). Geology data from DOGAMI.

In the Illinois Valley, a set of Pleistocene-aged terraces 20 ft to 100 ft above modern river level binds the river-right sides of the mainstem Illinois River and the West Fork and both sides of the East Fork. The river-left bank of the West Fork and mainstem Illinois in the Project area is bound by steep, high terrain composed of Jurassic-aged marine sedimentary rocks of the Galice Formation (part of the Western Klamath terrane). The Galice Formation is exposed intermittently on river-right at the base of the Pleistocene terraces and is exposed throughout the bed of the channel in the Project area (Figure 3-5).

Figure 3-5. Oblique aerial view looking downstream at the lower reservoir and dam. The Galice Formation is visible through the water on the river-left side of the wetted channel upstream of the dam and throughout the channel downstream of the dam. A red inflatable kayak is visible for scale. Photo taken August 22, 2023.

The underlying geology has a first order control on bedload sediment production and flux in the Illinois River Basin. The intense deformation history has resulted in rock fracture and joint development, which predisposes the hard metasedimentary and metavolcanic source rocks to physical weathering and results in relatively weak hillslope-scale strength (O'Connor et al., 2014). Consequently, the watershed has high rates of gravel-sized sediment production from its steep hillslopes, and the sediment produced is resistant to particle attrition, i.e., breakdown and reduction in size during transport downstream (O'Connor et al., 2014). These conditions result the channels of the Illinois River watershed having some of the largest normalized bedload sediment fluxes and largest scaled gravel bar areas (i.e., bar area normalized by low-flow channel area) in Western Oregon (O'Connor et al., 2014). These measurements provide important context for the high volume of sediment available in the system relative to the sediment impounded by the dam. The annual bedload sediment fluxes to the Project area

are approximately 35,680 CY/yr and 36,210 CY/yr for the East and West Forks, respectively, for a combined annual bedload sediment flux of 71,890 CY/yr (Figure 3-6; O'Connor et al., 2014). The basin bed material yield is low in the contributing HUC12 watershed of the lower reaches of the West Fork, which is expected given the relative flat terrain in this reach, but bedload flux remains high through the reach despite the low local production (Figure 3-6).

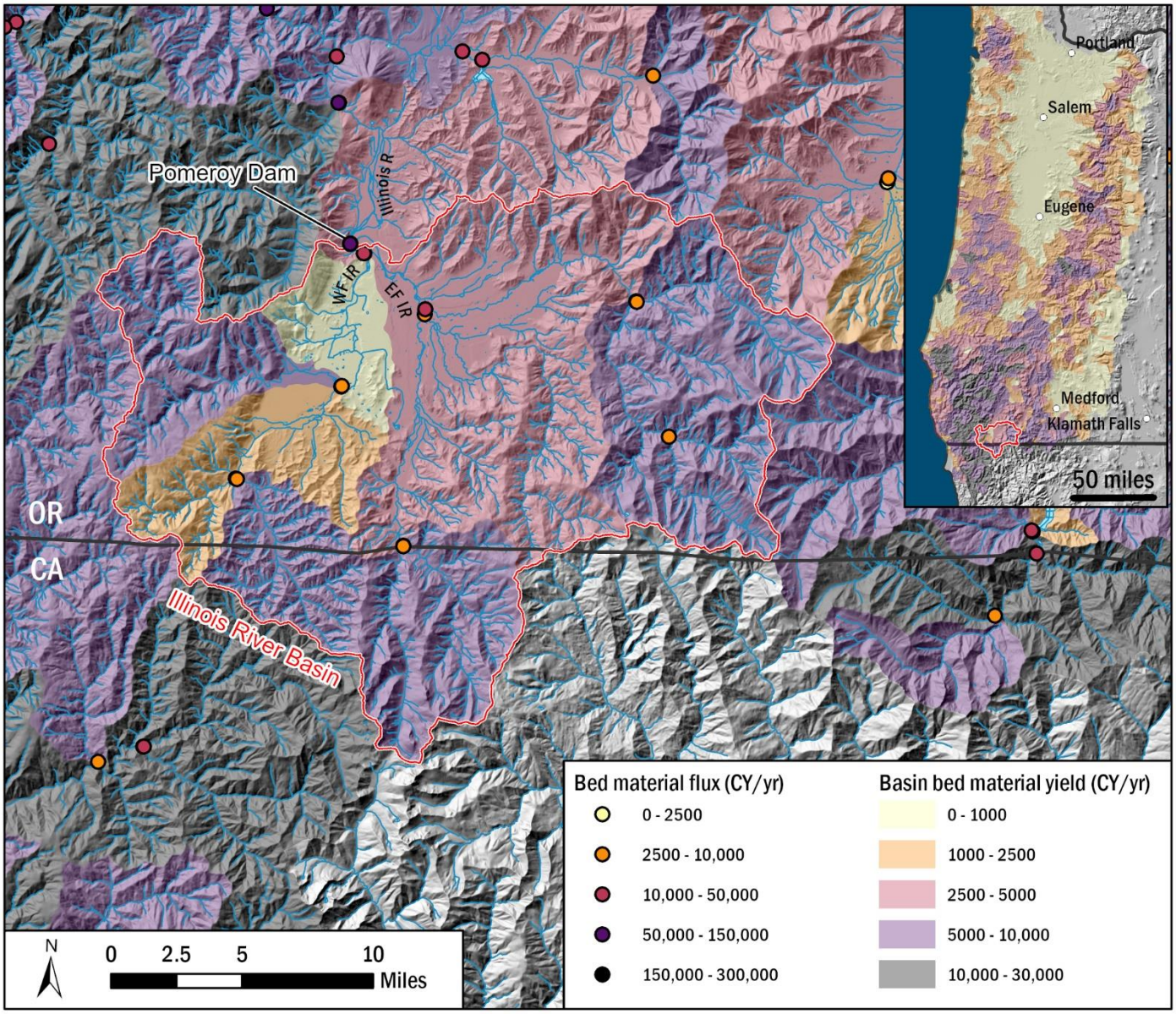


Figure 3-6. Basin bed material yield and bed material flux in cubic yards (CY) per year. Data from O'Connor et al. (2014). Yield data are presented by HUC12. Bed material flux datapoints may be overlapping and obscured where the outlet from two HUC12 are close together. The Illinois River and the East and West Forks Illinois Rivers (EF IR and WF IR, respectively) are labeled. Inset: Complete yield dataset for Western Oregon watersheds.

Channel planform has been stable over the last 30 years in the several miles downstream from the dam and in the approximately 1300-ft-long reach on the mainstem Illinois River between the dam and the East-West Fork confluence but has been more variable in the lower reaches of the East and West Forks. Analysis of the aerial photos taken throughout the previous 29 years (1994 to 2023) is used to characterize planform and channel

evolution in the Pomeroy Dam vicinity and adjacent reaches (Figure 3-7). In the mainstem Illinois River around Pomeroy Dam (i.e., 1000 ft upstream and 3000 ft downstream), the marine sedimentary rocks of the Galice Formation are exposed or covered by relatively thin alluvial deposits and form a stable channel boundary over decadal timescales. Boundary stability is a function of the bedrock resistance to both lateral and vertical incision. The shallow and exposed bedrock results in relatively static lateral position of the channel thalweg and functions as vertical grade control. The bedrock morphology is irregular because of differential erosion of the tilted planar sedimentary strata and supports a range of pool depths and influences movement of alluvium (river sediment) through the reach. The planform in the several mile reach more than 3000 ft downstream of the dam has been stable for the last 30 years and has an alluvial bed with gravel bar deposits which fluctuate in size but have relatively stable position.

Channel evolution upstream of the mainstem Illinois River varies between the East and West Forks of the Illinois River. The East Fork has a greater gravel bar area and is characterized by bank migration and movement and fluctuation of the bars. Bar position and size and channel margins are relatively stable on the West Fork over the last 30 years. Near the confluence, the river-right bank of East Fork has migrated laterally approximately 600 ft over 30 years in some locations. The confluence position has shifted downstream 350 ft. The 1996 flood was responsible for significant rearrangement of bar and channel positions, particularly on the East Fork. Channel migration and bend/bar growth has continued the planform developed during the 1996 flood, and no major reorganizing floods have occurred since that event.

Large wood is sparse in the several miles of channel on the mainstem Illinois around the Pomeroy Dam and the lower reaches of the East and West Forks despite the narrow and moderately continuous riparian area. Large wood is found generally as individual members rather than in jams and at densities of less than one piece per several channel widths. As a result, large wood does not seem to have a significant role in modifying morphology and hydraulics at the reach scale in the area. Large wood concentration (often within jams) and impacts on geomorphology increase on the more actively migrating reach of the East Fork two miles and more upstream of the dam. Large wood distribution through the large channels in the Illinois Valley seems to be controlled at the first order by channel migration rate within the floodplain. Riparian vegetation is described in more detail in Section 6.4.

The two water intake locations downstream of the dam were selected based on river geomorphic stability and hydraulic suitability. Geomorphic stability is provided at both sites by local bedrock exposures that are resistant to erosion and promote boundary scour that reduces sediment accumulation. The scour around the locations creates local maxima for water depths that can sustain withdrawal during summer irrigation season low flows. The upstream intake (Intake A) is located along the river-left bank in a plane-bed gravel substrate section of the mainstem and bounded by a 15 ft to 20 ft tall terrace on river left (Figure 3-8). The intake would be positioned between a set of ridges of conglomerate bedrock, each several feet in width and approximately 10 ft in length, along the river-left bank with elevations near the low-flow water surface. Between the bedrock ridges are a series of 3 to 4 ft deep, several feet wide pools (at low flow). The downstream intake (Intake B) is located at the downstream end of a 70-ft-long, 5- to 10-ft-deep bedrock pool on the river-left side of a right-turning bend opposite a gravel point bar (Figure 3-9). Bend hydraulics and scour of the resistant bedrock exposure reduce sediment accumulation in the bottom of the pool. The intake would be positioned beneath a bedrock shelf

formed by erosion of downstream-tilted rock layers. Water surface elevations are maintained even at low summer flows by bedrock grade control 220 ft downstream.

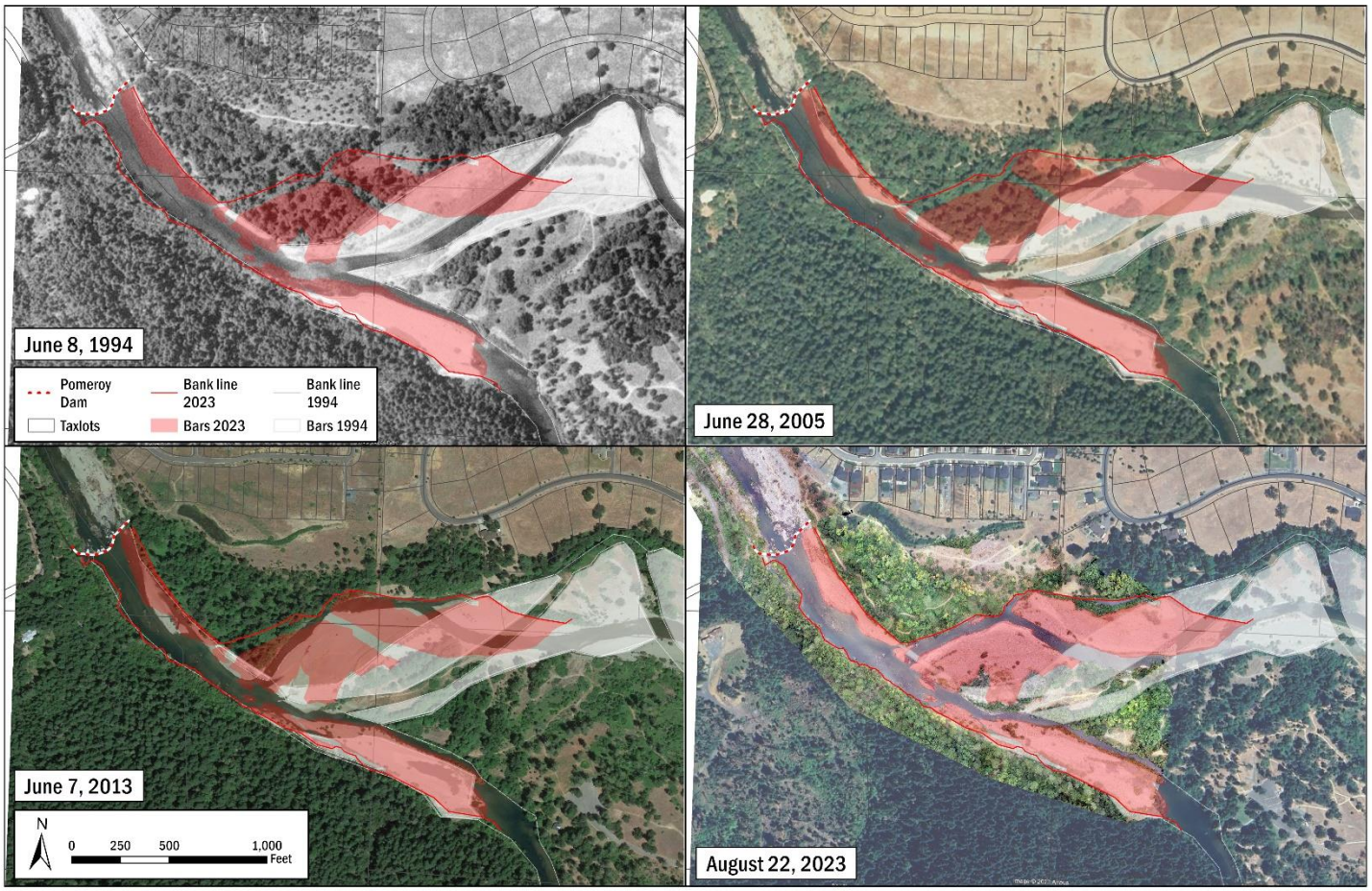


Figure 3-7. Planform evolution upstream of Pomeroy Dam. Aerial photos from 1994, 2005, 2013, and 2023. Digitized bar areas (polygons with transparent fill) and banklines (solid lines) from 1994 (white) and 2023 (red) are shown for reference. Note development of the river-right floodplain.

Figure 3-8. Oblique aerial photo looking upstream at the location of Intake A. Surveyor is standing on one of the bedrock ridges to measure water depth in the adjacent pool. Photo taken August 23, 2023.

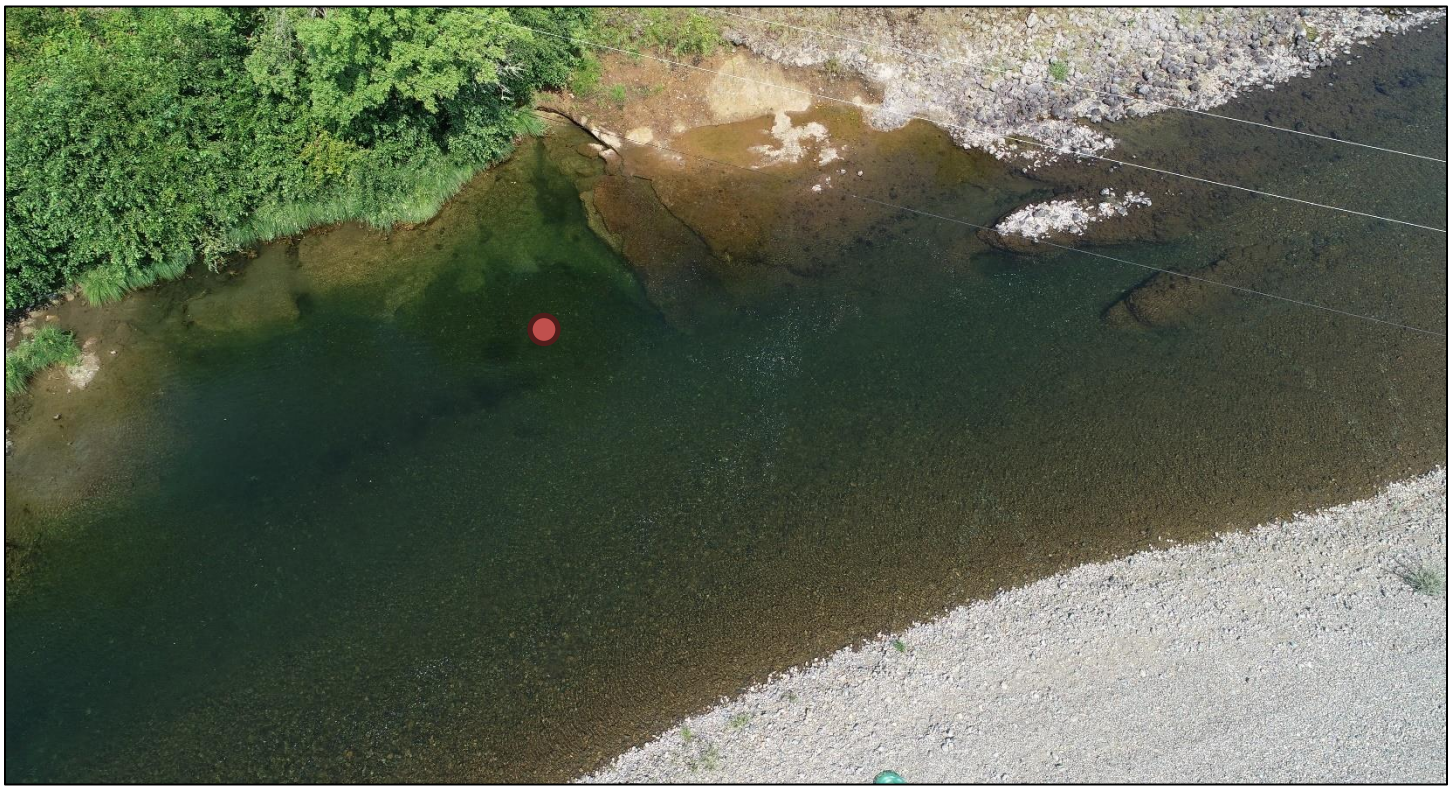


Figure 3-9. Oblique aerial view looking towards the river-left bank of Intake B location (approximate location marked with red circle). Photo taken August 23, 2022.

3.3 Impounded Reservoir Sediments

Dams typically impound sediment behind them due to some combination of reduced transport capacity and sediment trapping. Pomeroy Dam does not have a reservoir sediment deposit typical to most dams, where sediment is in a wedge that spans the full width of the channel with maximum thickness at the dam site and decreasing in thickness with distance upstream. Rather, most of the sediment in the 1300-ft-long reach of the mainstem upstream from the Pomeroy Dam is located within a river-right bar, and bedrock is exposed in the river-left third of the channel. While sediment transport processes are certainly impacted by the presence of the dam, it is uncertain the degree to which the presence of river-right bar deposit is directly attributable to the dam. In other words, it is difficult to say with certainty that the river-right bar sediment is impounded by the dam and would not be there in a dam-out scenario. The exposed portion of the river-right gravel bar was approximately 30 ft wide and 300 ft long in 1994 (Figure 3-7). By 2005, the bar's position moved further downstream towards the dam and began to increase in size. While the exposed bar size fluctuates, it is at approximately its largest area (during the last 30 years) at present. A cause of this bar growth on the mainstem is unknown but could be attributed to a more mobile gravel supply in the system in the wake of the 1996 flood.

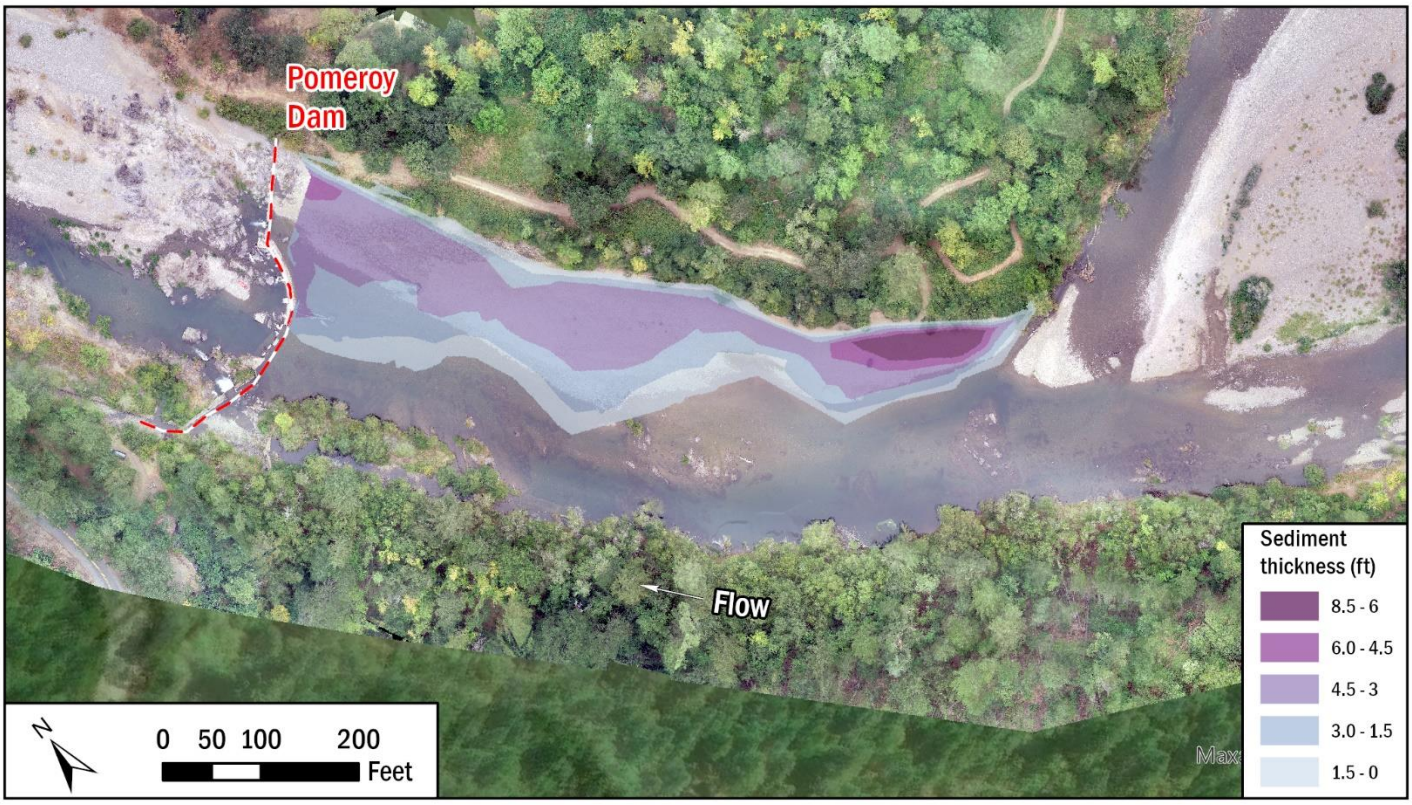


Figure 3-10. High resolution orthoimagery collected August 22, 2024, with estimated thicknesses of the impounded river-right gravel bar. Note bedrock exposures visible in the river-left portion of the channel.

We calculate an estimated 9000 cubic yards (CY) of sediment is stored within the reservoir deposit (i.e., river-right gravel bar), with maximum and mean thicknesses of 8.5 ft and 2.7 ft, **respectively (**Figure 3-10**). The** method and rationale behind the impounded sediment estimation are provided in Section 2.2. Sediment within the reservoir deposit consists primarily of coarse gravel with smaller fractions of sand and cobble (Figure 3-11).

Sediment gradations in the reservoir deposit are similar to those found in gravel bars in the East and West Forks and on the river-right bar downstream of the dam.

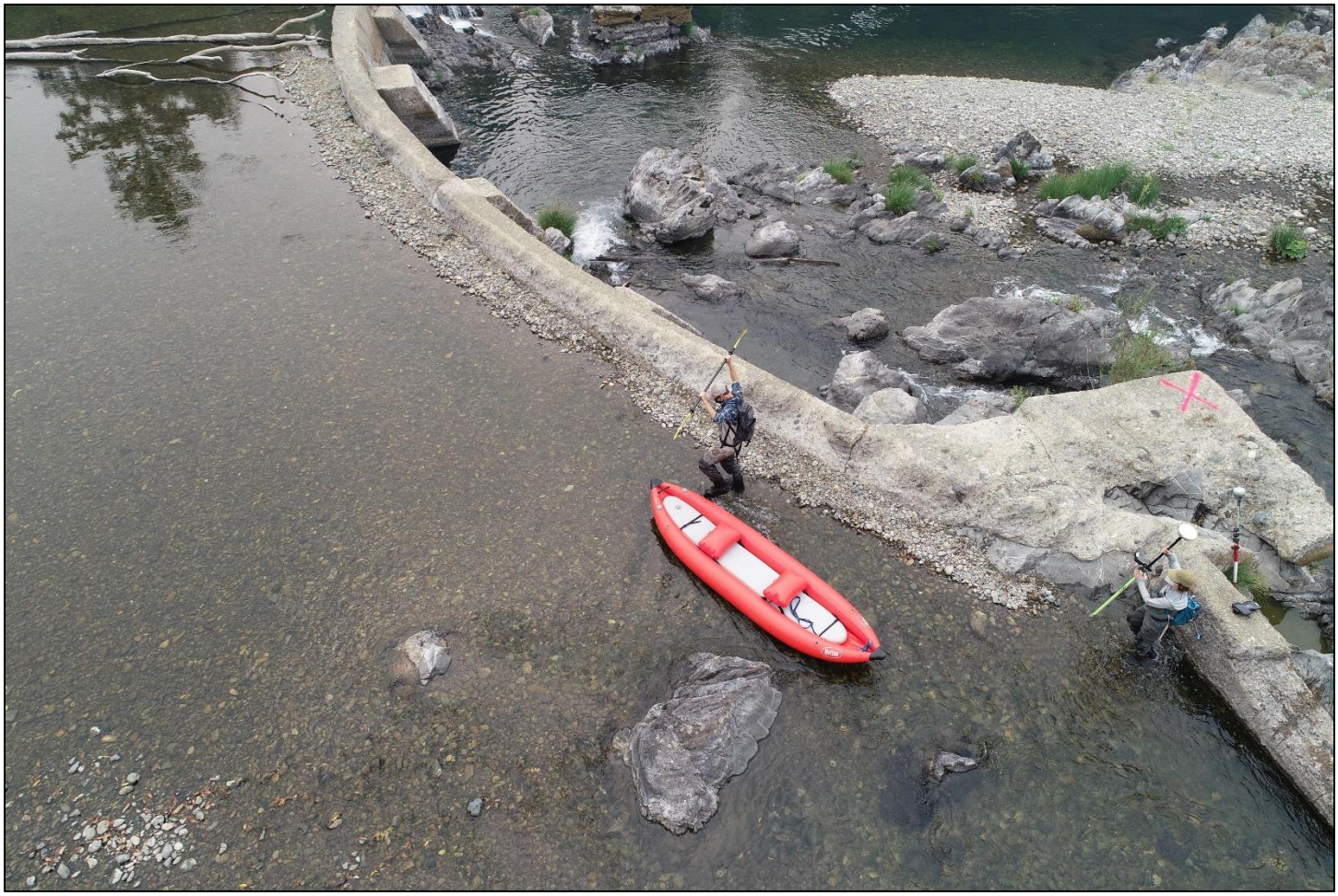


Figure 3-11. Oblique aerial view looking towards river-left of the dam and the gravel-sized sediment impounded behind it. Photo taken August 22, 2023.

3.4 Fisheries

Table 3-1 provides a summary of fisheries periodicity for anadromous species. This table was developed by local ODFW Rogue Watershed Assistant District Fish Biologist Pete Samarin based on past fish counts, returns, and surveys from the basin. This information is the most current understanding on migration, spawning, and rearing patterns for the specific anadromous species as developed by ODFW.

Removal of the Pomeroy Dam will open up approximately 50 miles of habitat for fall Chinook salmon, 86 miles for coho salmon, 125 miles for winter steelhead, 140 miles for cutthroat trout and 60 miles for Pacific lamprey (ODFW, pers. comm.)

Table 3-1. Periodicity of fish species and life stages for Illinois River at Pomeroy Dam from ODFW.

Life Stage/Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
UPSTREAM ADULT MIGRATION												
Winter Steelhead		●	● ●									
Pacific Lamprey				● ●	● ●							
Fall Chinook salmon										● ●	● ●	
Coho salmon											● ●	●
ADULT SPAWNING												
Winter Steelhead			●	● ●	●							
Pacific Lamprey				● ●	● ●							
Fall Chinook salmon											● ●	●
Coho salmon											●	● ●
ADULT HOLDING												
Winter Steelhead												
Pacific Lamprey												
Fall Chinook salmon												
Coho salmon												
EGG INCUBATION THROUGH FRY EMERGENCE												
Winter Steelhead			● ●	● ●	● ●	● ●	●					
Pacific Lamprey				● ●	● ●	● ●	●					
Fall Chinook salmon												
Coho salmon												
JUVENILE REARING												
Winter Steelhead												
Pacific Lamprey												
Fall Chinook salmon												
Coho salmon												
DOWNSTREAM JUVENILE MIGRATION												
Winter Steelhead			●	● ●	●							
Pacific Lamprey												
Fall Chinook salmon				● ●	● ●							
Coho salmon			●	● ●	● ●							

● Denotes peak timing

3.5 Fish Passage

The existing dam spans the channel of the Illinois River and no fish ladder is present. The dam is a partial fish passage barrier until high flows overtop the dam. The low and high fish passage flows were evaluated using the hydraulic model. Depths at the low fish passage flow are near zero over the dam and the water surface plot shows a drop of approximately 5 ft over the crest.

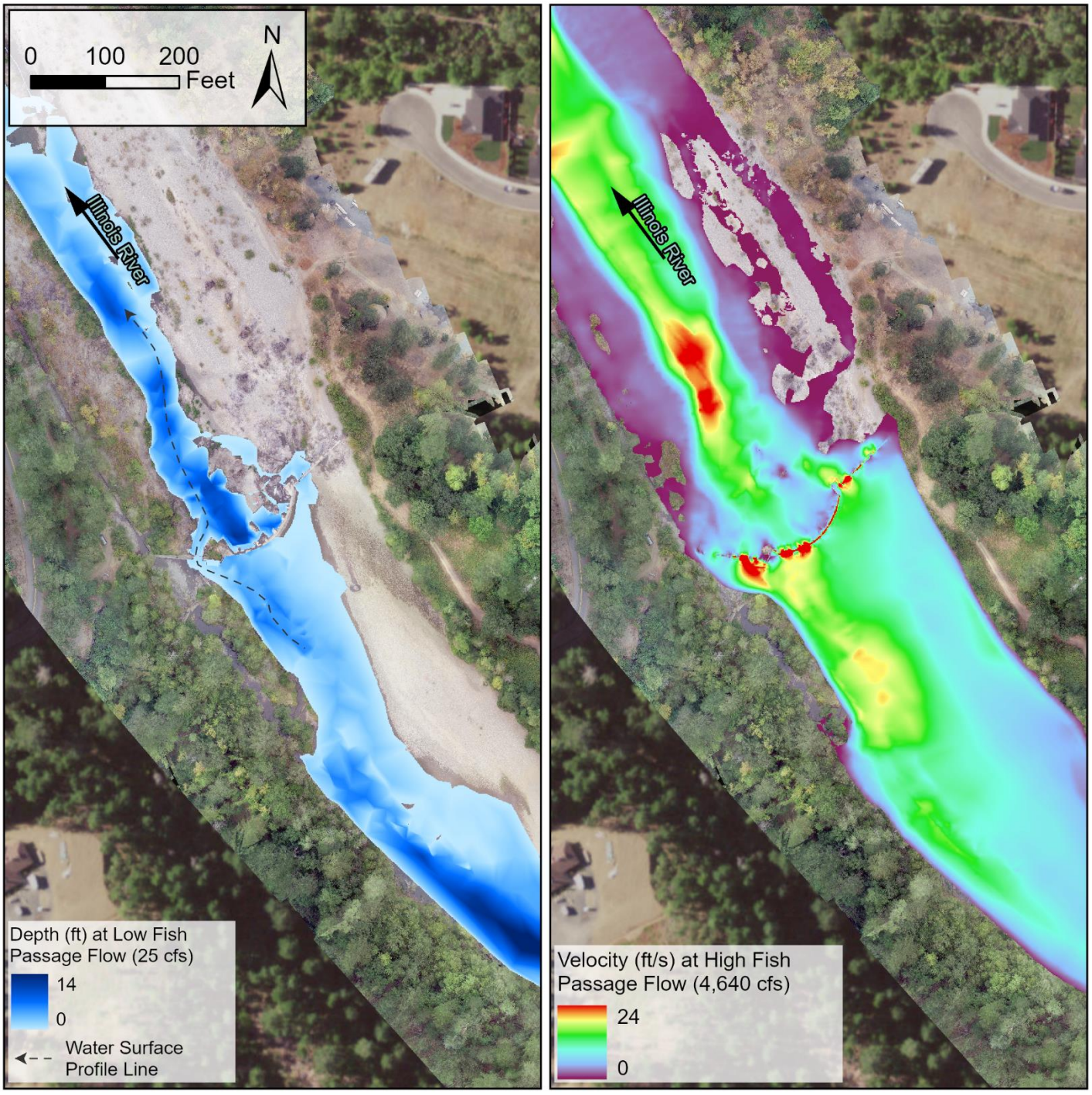


Figure 3-12. HEC-RAS model results of depth at low fish passage flow and velocities at high fish passage flow for existing conditions.

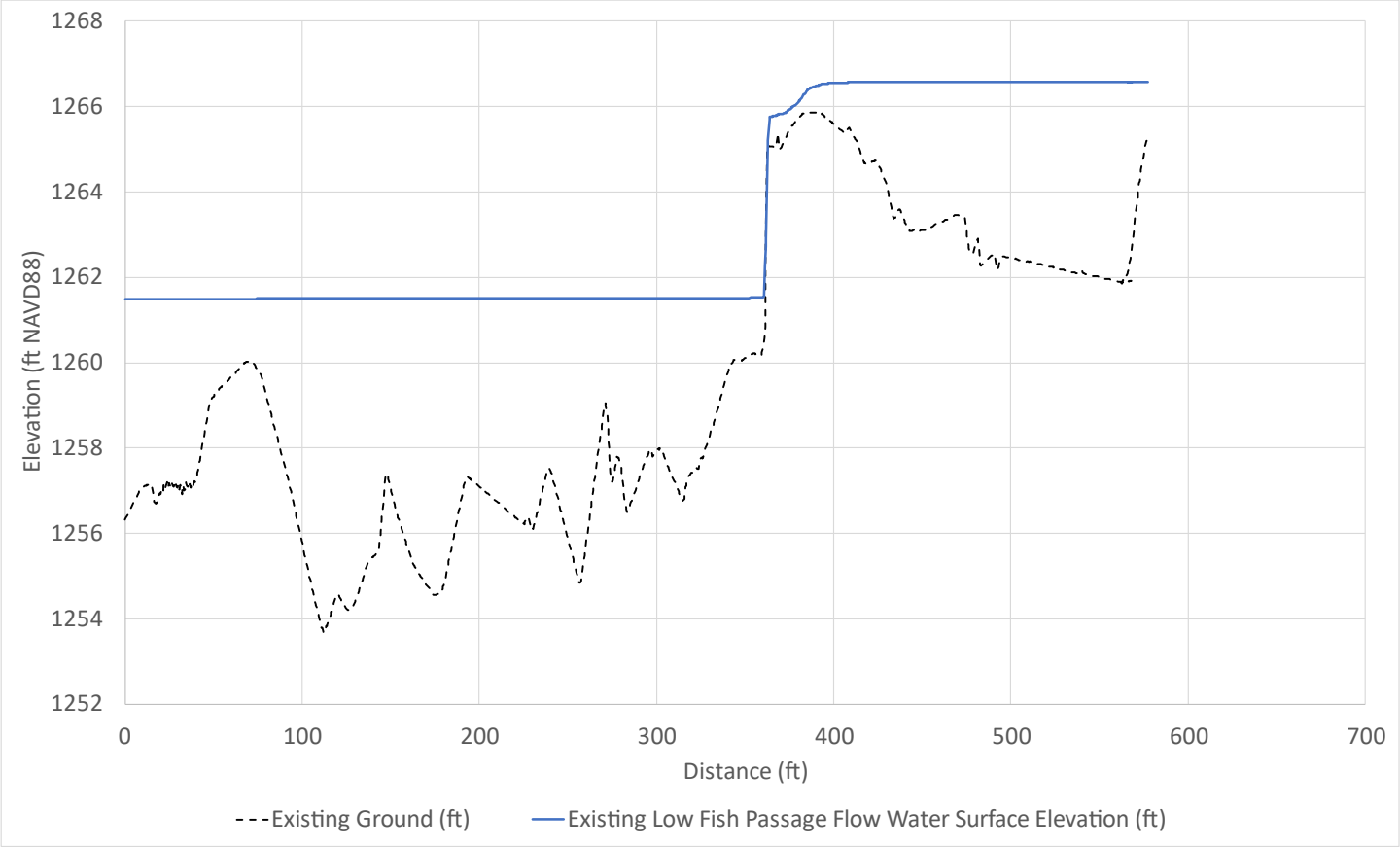


Figure 3-13. Existing water surface profile at low fish passage flow (25 cfs).

4 Dam Removal, Water Management, and Fish Passage Plan

This section provides an overview of the dam removal plan, water management, and strategy for fish passage during construction activities.

The dam removal will occur in two phases to minimize disturbance to the Illinois River and reduce potential turbidity in the channel. Phase one will consist of partial isolation from the left bank and removal of concrete within the canal and part of the dam. Flow will continue over the existing dam on the right bank which provides partial (downstream) fish passage. In phase two, flow will be routed through an isolated part of the dam removed in phase one and a temporary bridge will span the bypass channel. The bypass channel will maintain downstream fish passage. The right bank area will be isolated and the dam removed. All concrete from the dam and existing canal wall will be broken up and used to reclaim the canal to natural floodplain contours. Topsoil will be added to the reclaimed canal to support native vegetation.

Downstream fish passage will be maintained during dam removal which is similar to existing conditions since the existing dam blocks upstream migration during the summer. A fish passage pilot channel will be shaped in reservoir sediments at the end of phase two to provide upstream and downstream migration. It is anticipated that the pilot channel will adjust as sediment is mobilized from the reservoir post-dam removal (see section 6.2).

4.1 Fish Presence and Dam Removal Schedule

The following schedule is anticipated for removing the dam and stabilizing the dam site.

- May 2024, mobilize necessary construction equipment and prepare construction zones, begin staging isolation materials and cofferdam bulk bags. Excavate irrigation pipe excavation outside of ordinary high water if ground conditions are suitable (not saturated).
- June 2024, remove dam, reclaim canal, and excavate fish passage channel.
- July 2024, implement site restoration and revegetation plan along exposed bank lines (note: revegetation may occur later in autumn when seasonal rains return. Temporary erosion control measures will be in place until vegetation becomes established).

Juvenile lifestages of all anticipated species are likely to be present in the Illinois River during dam removal. Adult Pacific lamprey and winter steelhead may be present during dam removal. Best management guidance from the Pacific lamprey conservation initiative (Lamprey Technical Workgroup 2020) are included in the project conservation measure drawings (Appendix A).

4.2 Dam Removal

In-water work for deconstruction of the dam is proposed to start on or after June 15, 2024. The removal plan creates a sound design for removing the dam while reducing risks. It creates a controlled environment downstream of the dam that is isolated from moving water to reduce the potential for disturbance of aquatic resources. The plan allows for a controlled drawdown of the reservoir. It will be critical that the drawdown of the reservoir area be completed in a controlled manner if high numbers of fish are stranded or unreachable. An adaptive management approach will be taken during this time, as necessary, and the potential to increase drawdown rate of the reservoir may be acceptable based on fish salvage efforts.

Figure 4-1 includes a layout of the project area and steps involved with phase one of the dam removal. Figure 4-2 includes a layout of the project area and steps involved with phase two of the dam removal.

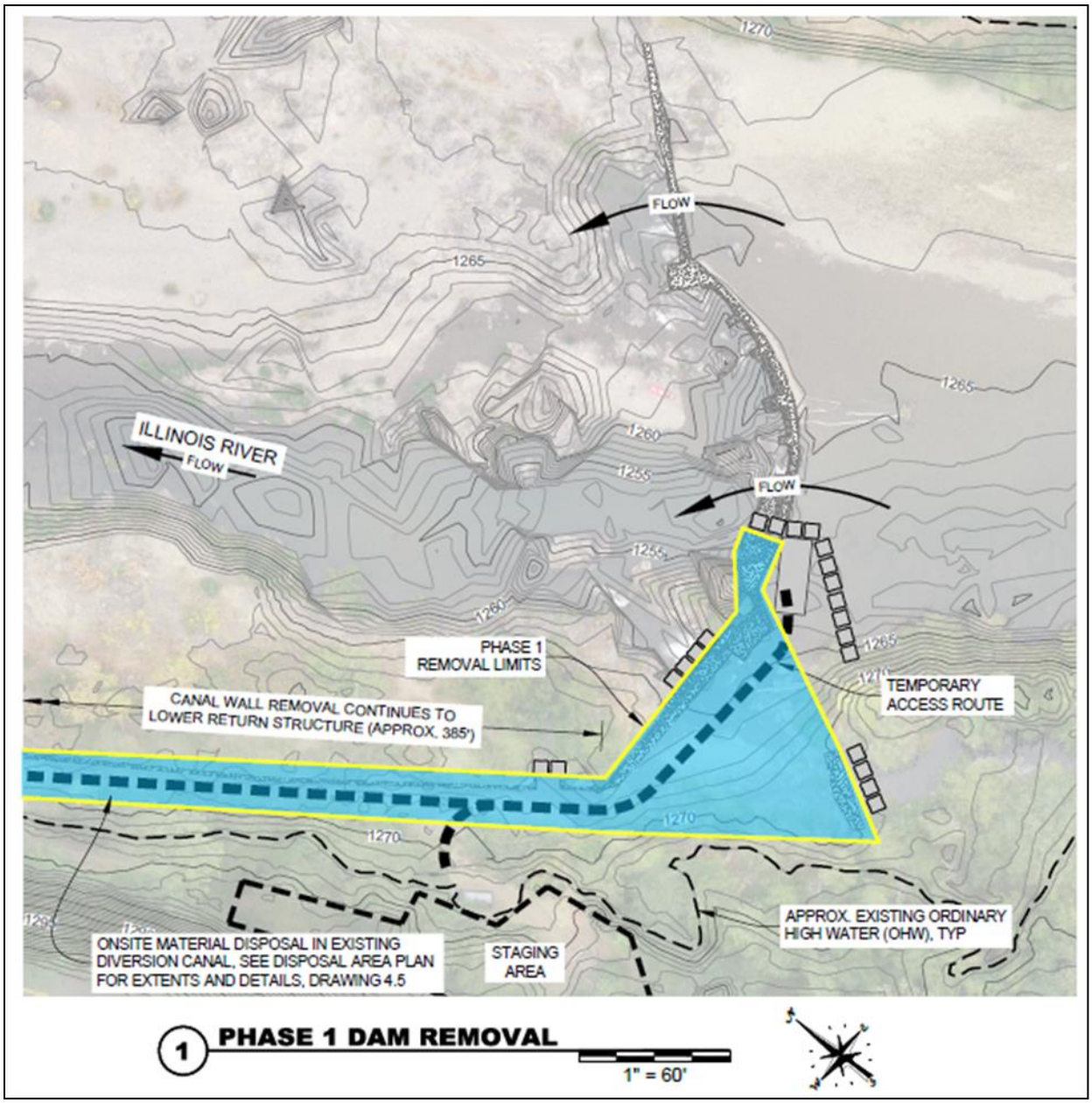


Figure 4-1. Dam removal plan phase one plan.

The following steps describe the removal plan during phase one:

1. Mobilize construction equipment and facilities on site.
2. Isolate concrete structure for removal by installing temporary sand bags/bulk bags upstream and downstream of dam to divert flow through the east (river right) notch of the dam.
3. Conduct fish salvage in isolated areas of the dam and diversion canal per aquatic conservation measures.
4. Construct temporary access road across existing diversion canal.
5. Remove isolated portion of concrete dam and canal wall. Dispose of approximately 100 cubic yards of concrete rubble in diversion canal.
6. Place concrete rubble in diversion canal starting at lower return structure (downstream of phase one access crossing).

7. Install temporary bridge for phase two access.
8. Remove phase one work area isolation measures incrementally during reservoir drawdown per the direction of the engineer. Direct river flow through phase two temporary access bridge and removed portion of the dam.

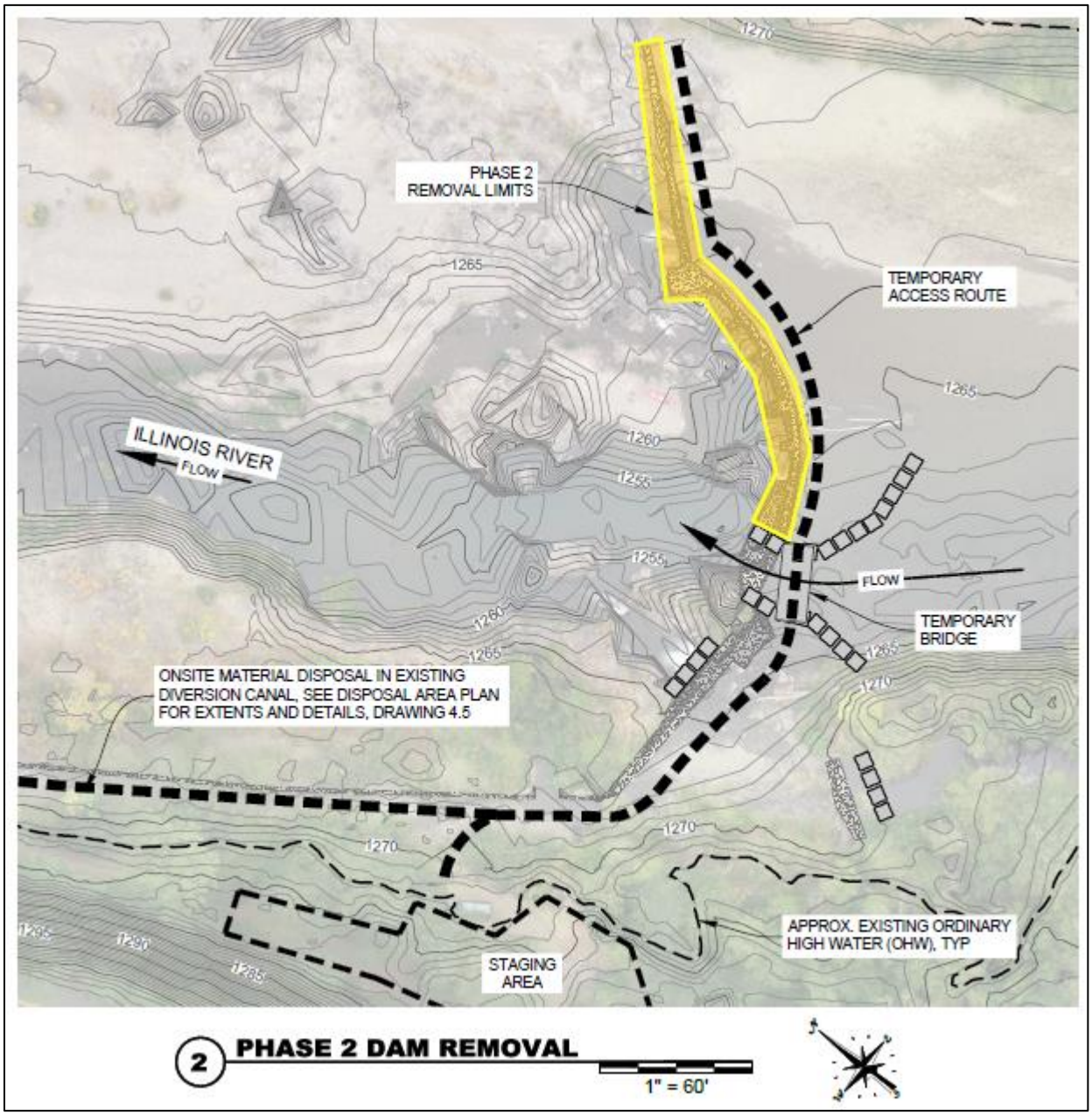


Figure 4-2. Dam removal phase two plan.

The following steps describe the removal plan during phase two:

1. Construct temporary access road along dam crest to east (river right) portion of the dam.
2. Concurrent with access road installation, isolate concrete structure for removal by placing temporary bulk bag cofferdam upstream of dam to divert flow through phase one removed portion of the dam.

3. Conduct fish salvage in isolated areas per aquatic conservation measures.
4. Remove remaining portion of the dam starting at the east end (river right) of the dam and moving towards the temporary access bridge. Dispose of approximately 100 cubic yards of concrete rubble in diversion canal.
5. Place concrete rubble in diversion canal starting at lower return structure (downstream of phase one access crossing).
6. Shape fish passage pilot channel and remove phase two temporary access road, temporary bridge, and isolation measures. Dispose of temporary access road material in diversion canal or offsite.
7. Stabilize and revegetate the project area.

4.3 Fish Passage During Dam Removal

The existing dam provides partial (downstream) fish passage during summer flow conditions and is a barrier (primarily due to jump height) for upstream passage. Downstream fish passage will be maintained through the existing dam during phase one and through the bypass channel during phase two. The bypass channel may provide upstream fish passage depending on the extent and depth of bedrock beneath the dam. A fish passage pilot channel will be constructed through the reservoir sediments during phase two to provide passage during low flows until the reservoir sediments are mobilized.

5 Fish Capture and Release Plan

This section provides the concepts for isolating work areas and defishing the isolated areas in accordance with the NMFS Endangered Species Act Section 7 Programmatic Restoration Opinion for Joint Ecosystem Conservation by the Services (PROJECTS) by the U.S. Fish and Wildlife Service Using the Partners for Fish and Wildlife, Fisheries, Coastal, and Recovery Programs and NOAA Restoration Center Using the Damage Assessment, Remediation and Restoration Program (DARRP), and Community-Based Restoration Program (CRP) in the States of Oregon, Washington, and Idaho (NMFS 2013). The primary focus of the plan is to minimize the potential for fish harm or “take” by isolating the work areas to the maximum extent possible. In addition, the work schedule has been established based on opportune times to minimize the potential risk to aquatic resources as determined by ODFW and NMFS.

5.1 Work Area Isolation

One of the most important aspects of in-water work is isolation of the work area. Work area isolation creates a safer environment for construction activities and protects aquatic species and wildlife from the work area. By reducing or eliminating active stream flow in the work area, it also reduces the risk of sediment or sediment laden waters from entering active stream flows. Work area isolation will be executed in the following manner.

5.1.1 Timing and Stream Flows

Work will be completed in the ODFW in-stream work window (June 15 – September 15). The flows during the in-water work window range from 10 cfs to 870 cfs with the 50% flow duration exceedance value of 160 cfs during the in-water work months (Table 2-3, Section 2.3.2).

5.1.2 Isolation Plan

The work area isolation plan was developed in accordance with PROJECTS general conservation measures 27 (Work Area Isolation) and 28 (Fish Capture and Release) (NMFS 2013) as summarized below:

- Work areas are isolated from the active flow.
- Engineered plans are provided that show all work area isolation elements.
- Dewatered area is reduced to the smallest area practicable.
- Fish screens meeting NMFS criteria are required for all pumps used for dewatering.
- Slowly rewater the isolated work area to prevent loss of surface flow downstream.

Initial isolation of the work area will be done using bulk bags filled with native stream sand and gravels (or approved equal). Bulk bags are made of geotextile fabric and are similar to standard sandbags but on a larger scale. The proposed bulk bags are 6 ft wide x 6 ft long x 4 ft high as illustrated in Figure 5-1 below. This type of work area isolation barrier has been successfully used for multiple dam removal projects in Oregon and have become the standard for cofferdams.

Figure 5-1. Example of bulk bags (left) used for work area isolation and moving a loaded bulk bag (right).

Bulk bags will be filled with native sand and gravels from an off-site source. After the bags are filled, they will be placed by track hoe into the river. Drawing [xx] (Appendix A) illustrates how the bulk bags will be placed in relationship to the existing dam removal. The overall concept of work area isolation using bulk bags minimizes potential harm to the stream environment during deconstruction of the concrete dam.

Bulk bags filled with existing native sand and gravels stored nearby and are well suited for work area isolation with the following properties:

- Made of fabric that does not react with water and will not harm aquatic species
- Filled with native stream sand and gravel that would not cause a noticeable disturbance in the stream if a bag were unintentionally cut or breaks during handling
- Flexible and can deform to match the irregular shape of the stream bottom
- Each bag is self-contained which reduced the risk of structural failure of the entire cofferdam

The pool directly downstream of the dam will be isolated with a floating silt/turbidity curtain. The curtain is a permeable barrier constructed of a flexible reinforced thermoplastic material or geotextile with a flotation

material on the top and a ballast chain on the bottom. The curtain is designed to control the distribution of suspended sediment by creating a controlled containment area. When combined with low-flow conditions, turbidity curtains provide a highly effective way to reduce turbid water interaction with clean stream water as illustrated in Figure 5-2.

Figure 5-2. Example of a silt curtain isolating an active work area from clean water flowing by the project site. Turbid water is contained within the work area by the silt curtain.

5.1.3 Equipment and Conservation Measures

Removal of Pomeroy Dam can be accomplished with standard, heavy civil-works type equipment. Based on experience, Table 5-1 provides a list of anticipated machinery that will be on-site and necessary for the dam removal.

Table 5-1. Equipment necessary for deconstruction of Pomeroy Dam.

Quantity	Equipment Description
1	Trackhoe, with bucket and thumb extension
1	Trackhoe, with hydraulic breaker
1	Dump truck
1	8” Pump with screen for dewatering (if necessary)
1	6” Pump with screen for dewatering (if necessary)

The contractor shall have adequate supplies of floating turbidity curtains, bulk bags for temporary cofferdams, silt fence for erosion control, and emergency clean up spill kits. The contractor will implement an approved emergency spill containment plan that includes notification procedures, cleanup and disposal instructions for different products, a description of quick response containment, supply of sediment control materials, methods for disposal of spilled materials, and employee training for spill containment. No hazardous materials will be used or contained on the project site.

The following conservation measures will be taken during the course of dam removal to reduce impacts to the area in and around Pomeroy Dam. These measures were developed the PROJECTS General Conservation Measures (NMFS 2013).

- **Site layout and flagging** will be performed prior to ground disturbance or entry of mechanized equipment. Flagging will designate sensitive areas, equipment ingress/egress, staging areas, and stockpile areas.
- **Staging, storage, and stockpile areas** will be clearly marked to store materials, fuel, and equipment at least 150 feet from the water body. Site restoration of all disturbed areas will be completed in compliance with the approved plans.
- **Erosion control measures** will be installed in accordance with the approved plans and all measures will be inspected and maintained regularly.
- **Hazardous material spill prevention and control** plan for the project site will be clearly posted and the contractor will maintain a spill containment kit.
- **Equipment, vehicles, and power tools** will be operated to minimize adverse effects on the environment. Equipment within 150 feet of a water body will utilize biodegradable hydraulic fluids.
- **Temporary access roads and paths** will utilize existing access points and will minimize the removal of vegetation. After construction, the roads will be restored to natural conditions as described in the approved plans.
- **Dust abatement** measures will be commensurate with the amount of disturbance and will likely include sprinkling the area with a water truck multiple times each day as needed.
- **Temporary stream crossings** will be minimized to one crossing only and will be installed to minimize overall disturbance of the stream and will utilize a culvert. All equipment will cross the flowing water at the approved temporary crossing site only.
- **Surface water withdrawal** is not allowed for this project to ensure the maximum amount of water is maintained in the stream.
- **Fish passage** will be provided in accordance with this plan. Current fish passage for adult and juvenile ESA-listed species is not functional during the in-water work period.
- **Work area isolation** will be provided in accordance with this plan and the approved drawings.
- **Fish capture and release** will be provided in accordance with this plan and the approved drawings.
- **Site restoration** will begin by minimizing riparian and bank disturbance to the maximum extent possible. Site restoration plans are provided in the plan set for final stabilization and restoration of the site after dam removal.
- **Revegetation** of the streambank in the disturbed construction area will follow the approved construction site restoration plan and includes a mix of wetland, transitional, and upland plantings.

5.2 Fish Capture and Release

Isolation of the work area, fish removal, and release of fish will be conducted or directed by an ODFW fisheries biologist, who possesses the competence to ensure safe handling of all Endangered Species Act (ESA) listed fish and other aquatic organisms and who is also experienced with work area isolation techniques. The fish salvage plan is based on a multi-level effort that uses a combination of isolation and strategic handling of fish to reduce

risks to aquatic resources. The fish capture and release plan uses handheld dip nets, seine nets, and backpack electrofishing units in isolated pool areas as described below.

5.2.1 Species

Section 3.4 of this report describes the likely fish species at the Project site. From a fish salvage standpoint, the primary focus will be on native salmonids and special status species as identified by the ESA listing; however, a reasonable attempt will be made to salvage all aquatic species and fish with the available resources.

The following steps will be taken to properly handle fish and aquatic wildlife and remove them from the isolated work areas and reservoir drawdown areas.

5.2.2 Initial Isolation

The quickest and safest way to reduce potential harm to fish and aquatic resources is effective isolation of the work areas creating separation between equipment and moving water. Bulk bags filled with native stream sediments and floating silt curtains will be installed as described in the deconstruction plan found in Section 4 to isolate work areas.

5.2.3 Fish Removal in Isolated Areas

In cofferdam work areas and other isolated areas, the first step will be to reduce the volume of water to the fullest extent possible to help consolidate fish and improve salvage efforts. Reducing water volume will be done using diesel powered pumps with a pumping capacity of 1,000 to 3,000 gallons per minute (gpm). Pump intakes will be set near the water surface and fitted with approved wire fish screens that prevent impingement or entrainment of fish.

Water will be drawn down in a controlled manner with fish salvage crews continuously monitoring the pumps, newly exposed areas, and fish numbers for crowding. If isolated pockets or pools are uncovered, they will be defished with dip nets and electrofishing equipment will be used if necessary. Pumping will be reduced once manageable water levels are obtained that can easily be waded and de-fished.

After waters are reduced to a manageable level, seine nets (made from 9.5 mm stretched nylon mesh) will be used in order to remove fish from the isolated in-water work site. An on-site biologist will determine the pass methods and the number of times each area will be seined. Once the seining becomes ineffective, areas conducive to electrofishing may be electrofished by the on-site biologist. If electrofishing is necessary to adequately de-fish the area the following standards will be followed:

> Electrofishing will only be conducted when a biologist with 100 hours of electrofishing experience is on-site to conduct or direct all activities associated with capture attempts in accordance with "Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act" (NMFS, 2000). The directing biologist will be familiar with the principles of electrofishing including the interrelated effects of voltage, pulse width and pulse rate on fish species and associated risk of injury/mortality. The directing biologist will have knowledge regarding galvanotaxis, narcosis and tetany, their respective relationships to injury/mortality rates, and have the ability to recognize these responses when exhibited by fish.

Table 5-2 will be used as guidelines for electrofishing in water likely to support ESA-listed juvenile fish. Visual observation of the size classes of fish in the work area is helpful to avoid injury to larger fish by the mistaken assumption that they are not present.

Table 5-2. Electrofisher setting in waters likely to support ESA-listed juvenile fish.

	Initial Setting	Conductivity (µS/cm)	Maximum Settings
Voltage	100 V	less than 100	1100 V
		100-300	800 V
		greater than 300	400 V
Pulse Width	500 µs		5 ms
Pulse Rate	15 Hz		60 Hz

The on-site biologist will consult with ODFW to ensure electrofishing during the in-water work window is appropriate in this location of the Illinois River during the construction time period.

Electrofishing will be performed in a manner that minimizes harm to fish in accordance with NMFS 2000 guidelines. Each session will begin with low settings for pulse width and pulse rate. If fish present in the area being electrofished do not exhibit an appropriate response the settings will be gradually increased until the appropriate response is achieved (galvanotaxis). Minimum effective voltage settings are dependent upon water conductivity and will need to increase as conductivity decreases. Higher voltages elevate the risk of serious injury to fish removal personnel. The lowest effective setting will be used to minimize personnel safety concerns and help minimize fish injury/mortality rates.

Once an appropriate fish response (galvanotaxis) is noted, the stream segment will be worked systematically, moving the anode continuously through the water. The number of passes will be kept to a minimum and an area will not be electrofished for an extended period of time. Adequate staff to net, recover and release fish in a prompt manner will be present. Fish will be removed from the electrical field immediately and recovered when necessary. Fish will not be held in net while continuing to capture additional fish.

Personnel will observe and document the condition of the captured fish, noting dark bands on the body and extended recovery time. The settings for the electrofishing unit will be adjusted if these conditions are observed. Specimens will be released immediately upstream or downstream of the block nets in an area that provides refuge. Each fish will be recovered prior to release (see Fish Release section).

5.2.4 Fish Release

All captured aquatic life will be immediately put into dark colored five gallon buckets filled with clean stream water during the period between capture and release. Fish will be transferred in the buckets to low velocity flowing water upstream or downstream of the site depending on conditions. Large fish will be kept separate from smaller prey-sized fish to avoid predation during containment. Non-native gamefish shall be relocated to a suitable location by ODFW personnel. Upon coordination with the salvage activities, ODFW will transport the non-native species from the site to the release location. Injuries or mortalities to ESA-listed or proposed species will be recorded and the data will be provided to NOAA Fisheries.

6 Post Dam Removal Conditions

Short-term and long-term changes are expected after the dam is removed from the Illinois River and natural stream processes are restored to an unimpeded condition. This section provides an overview of expected conditions based on hydraulic modeling, sediment characteristics, and insight from past dam removal projects similar to Pomeroy Dam.

The Stream Function Assessment Method (SFAM; Nadeau et al. (2020) professional judgement evaluation, competed in compliance with the DSL permit, describes changes in the rating of functions and values as a result of the Project and is provided in Appendix B.

6.1 Channel Responses to Dam Removal

Channel responses to removal of the Pomeroy Dam include lowering of the upstream water surface and mobilization of impounded predominantly gravel-sized sediment. These responses are expected to be local (i.e., within several channel widths from the dam) and of similar or smaller magnitude than what typically occurs in the channel under existing conditions. Removal of the dam will lower the low-flow water surface by 3 to 5 ft in the 1000 ft upstream of the dam, remove the sediment trapping capability of the dam, and provide an opportunity for the channel to mobilize any impounded sediment to the underlying bedrock surface. The bedrock is exposed or shallowly buried by alluvium under existing conditions. Channel responses are constrained by the stable planform boundary provided by pervasive bedrock in the Project area and by the small volume of impounded sediment relative to the annual bedload sediment flux of the Illinois River.

In the near term (i.e., first few months following removal), the fish passage pilot channel will expand and some of the gravel-sized sediment in the downstream portion of the reservoir will likely be evacuated as bedload during modest streamflow events. This sediment movement is driven by the increased transport competency and capacity due to the local increase in channel slope at the location of the former dam. The amount of sediment mobilized in this manner is expected to be minor given that pilot channel development would have excavated the majority of the sediment stored in the primary flow thread immediately upstream of the dam and that the majority of the deepest channel in the 1000 ft upstream is composed of exposed bedrock. The bedrock exposure in the thalweg makes it unlikely that a knickpoint will form and migrate upstream (Figure 6-1). Some mobilized sediment is likely to be deposited, at least temporarily, in the scour hole immediately downstream of the dam (Figure 6-1 and Figure 6-2).

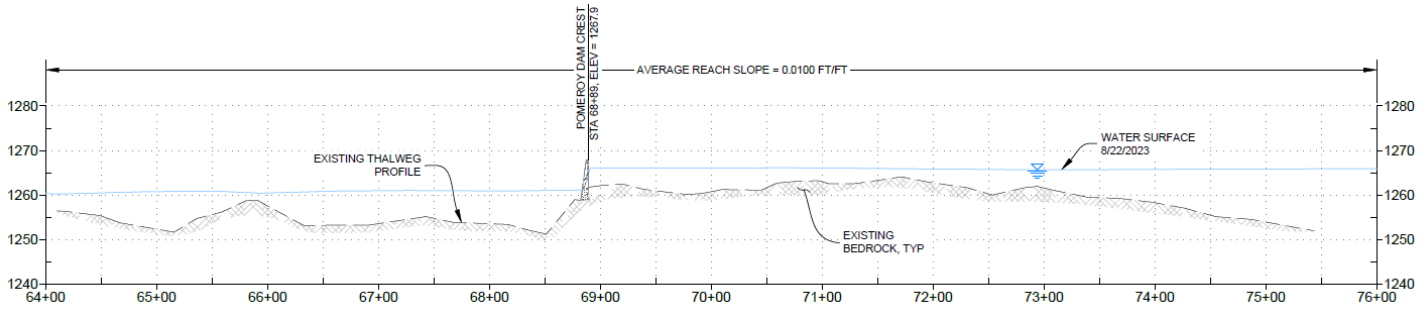


Figure 6-1. Longitudinal profile through the dam area under existing conditions. Profile and the associated plan view provided in Design Drawings in Appendix A.

Figure 6-2. Oblique aerial view looking upstream at Pomeroy Dam, river-right bar deposit, and bedrock scour hole downstream of the dam. Photo taken August 22, 2023.

In the long term, the processes, the potential magnitude of disturbance, and the amount of channel change related to sediment movement from the removal of Pomeroy Dam will likely be smaller than what is naturally occurring in the Project area. There is an estimated 9000 cubic yards (CY) of sediment impounded in the river-right bar behind the dam which is approximately 13% of the combined annual bedload sediment flux of 71,890 CY/yr coming in from the East and West Forks (Section 3.2; O'Connor et al., 2014). Sediment evacuation from the 9000 CY impounded river-right bar deposit may occur during high flow events which typically inundate the entire deposit. The area may persist as a bar location for a time given that it is prone to deposition on the inside of the slight right-turning geometry of channel (cf. Figure 3-7) and its deep bedrock thalweg (Figure 6-1). We do not anticipate long-term sediment accumulation in the reach downstream of the dam as a result of dam removal because gravel currently passes over the dam during high flows and there is extensive exposed bedrock in the 3000 ft downstream of the under existing conditions (Figure 6-3). Bedrock forms a stable channel boundary in the Project reach of the Illinois River, which constrains the channel from migrating laterally or incising vertically in response to dam removal.

Figure 6-3. Oblique aerial view looking upstream at the 3000-ft-long reach downstream of the Pomeroy Dam showing bedrock exposures throughout thin alluvial deposits. Photo taken August 22, 2023.

The behavior of sediment impounded by dams following removal is typically treated as a sediment pulse introduced to the system and analyzed for its dispersive and translative evolutionary tendencies (Figure 6-4). The tendency to disperse in place (i.e., with maximum sediment thicknesses of the sediment pulse remaining approximately at the dam site while the deposit spreads downstream and traps material upstream) or translate (i.e., maximum sediment thickness of the sediment pulse moving downstream) or both is generally a function of the relative fractions of gravel and sand in the deposit and in the downstream channel with higher gravel content in the pulse and bed favoring dispersion (Lisle et al., 2001; Lisle, 2008; Pace et al., 2017). Most of the gravel deposits studied are dominated by dispersion (e.g., Table 6-1). Those that show a mix of the two behaviors (e.g., Fielder and Savage Rapids dams) had large pools in the reach downstream of the pulse that trapped sediment (Tullos et al., 2016). Savage Rapids had a higher fraction of sand than other pulses examined, a characteristic more likely to lead to translation (Cui and Parker, 1997; Lisle et al., 2001).

Evolution of the sediments associated with the Pomeroy Dam removal is not likely to be well-represented by the commonly used sediment pulse conceptual model, however, because of the irregular geometry of the river-right bar deposit impounded behind Pomeroy Dam, the bedrock exposure in the thalweg, and the small volume of the impounded sediment relative to the annual bedload flux. The river-right bar deposit impounded behind Pomeroy Dam and the substrate in the Illinois River have a high gravel fraction, and therefore the deposit would be expected to evolve in a dispersive manner following removal. The bulk of the impounded sediment is located at higher elevations on river-right, rather than in the deepest part of the channel as is expected in many reservoirs. The bulk of the deposit will be more shallowly inundated and may erode more gradually than if the sediment was stored within the thalweg. The gradual mobilization of gravel from the deposit and response of

the deposit geometry may still be characterized by dispersion, but the signal of this sediment movement downstream will be lost within the large amount of material typically transported during high flow events.

We use the metric *V**, a commonly used ratio of the volume of stored reservoir sediment to volume of average annual sediment load, to demonstrate the relatively minor potential perturbation of the impounded deposit to the river system (e.g., Major et al., 2012; Tullos and Wang, 2014). Higher values of *V** represent sediment pulses that may have larger and/or longer-lived sediment impacts to a channel. Values less than 20 are considered relatively small (Major et al., 2017), and a value less than one means that the deposit is smaller than the typical annual sediment flux, i.e., that volume is common for the channel to transport on average years. *V** for the Pomeroy Dam removal is 0.13, which is an order of magnitude smaller than most of the other nearby dam removals (Table 6-1). Therefore, the *V** ratio suggests that the maximum potential disturbance is likely much smaller than background channel adjustment in the reach. *V** cannot be used to directly calculate the amount of material evacuated from a deposit each year. It is common for 50% +- 10% of the sediment to be evacuated in the first 2 years after removal.

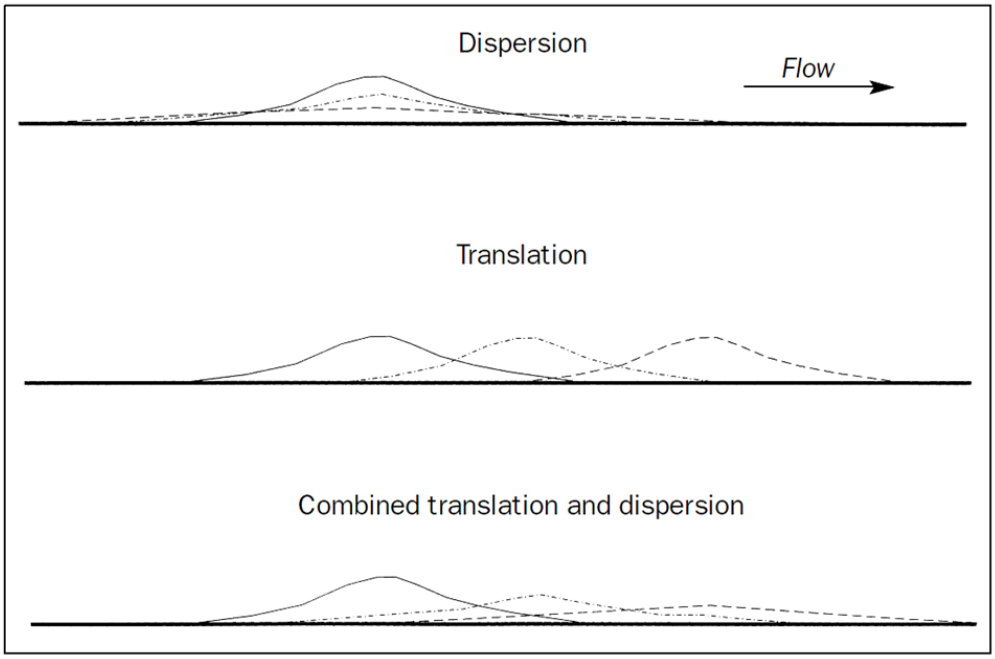


Figure 6-4. Typical scenarios for sediment pulse to move downstream (Pizzuto, 2002; adapted from Lisle et al. 2001). Due to the non-cohesive and coarse nature of the stored sediment, it is anticipated that the Baker Creek sediment will disperse downstream similar to the top figure showing the stored sediment (solid black line) and the dispersed sediment with successive dashed lines.

Table 6-1. Dam removal statistics compiled from Major et al. (2017), Pace et al. (2017), and Zunka et al. (2015).

Dam (all in Oregon)	River	Deposit volume (CY)	Reservoir Sediment Composition	Dominant pulse behavior	Volume evacuated after 2 years (%)	Channel width (ft)	Channel slope (%)	*V**
Pomeroy	Illinois	9000	gravel	TBD	TBD	250	1.0	0.13
Fielder	Evans Creek	20,500	50% gravel, 50% sand	mixed	100	30	0.5	0.67
Brownsville	Calapooia	22,400	coarse gravel	dispersive	40	120	0.3	2
Savage Rapids	Rogue	196,200	70% sand, 30% gravel	mixed	>50	295		1.5 – 2.3
Gold Ray	Rogue	526,000	gravel	dispersive		200	0.21	11.8
Marmot	Sandy	750,000	50% sand, 50% gravel	dispersive	60	215	0.6	10

6.2 Fish Passage

Fish passage conditions post dam removal were evaluated using the two-dimensional HEC-RAS model of post dam removal conditions (Section 2.4). The conditions within the fish passage pilot channel are compared to the conditions in the channel upstream and downstream of the former dam location. During low fish passage flows, the pilot channel depths are similar to the existing channel downstream of the dam (Figure 6-5) and the jump barrier is eliminated (Figure 6-6). The velocities during the high fish passage flow are similar to the existing channel downstream and there are low-velocity routes along the margin of the inundated area. Velocities in the pilot channel are expected to decrease as sediment is mobilized from the reservoir and the pilot channel widens to expose natural bedrock in the channel bed.

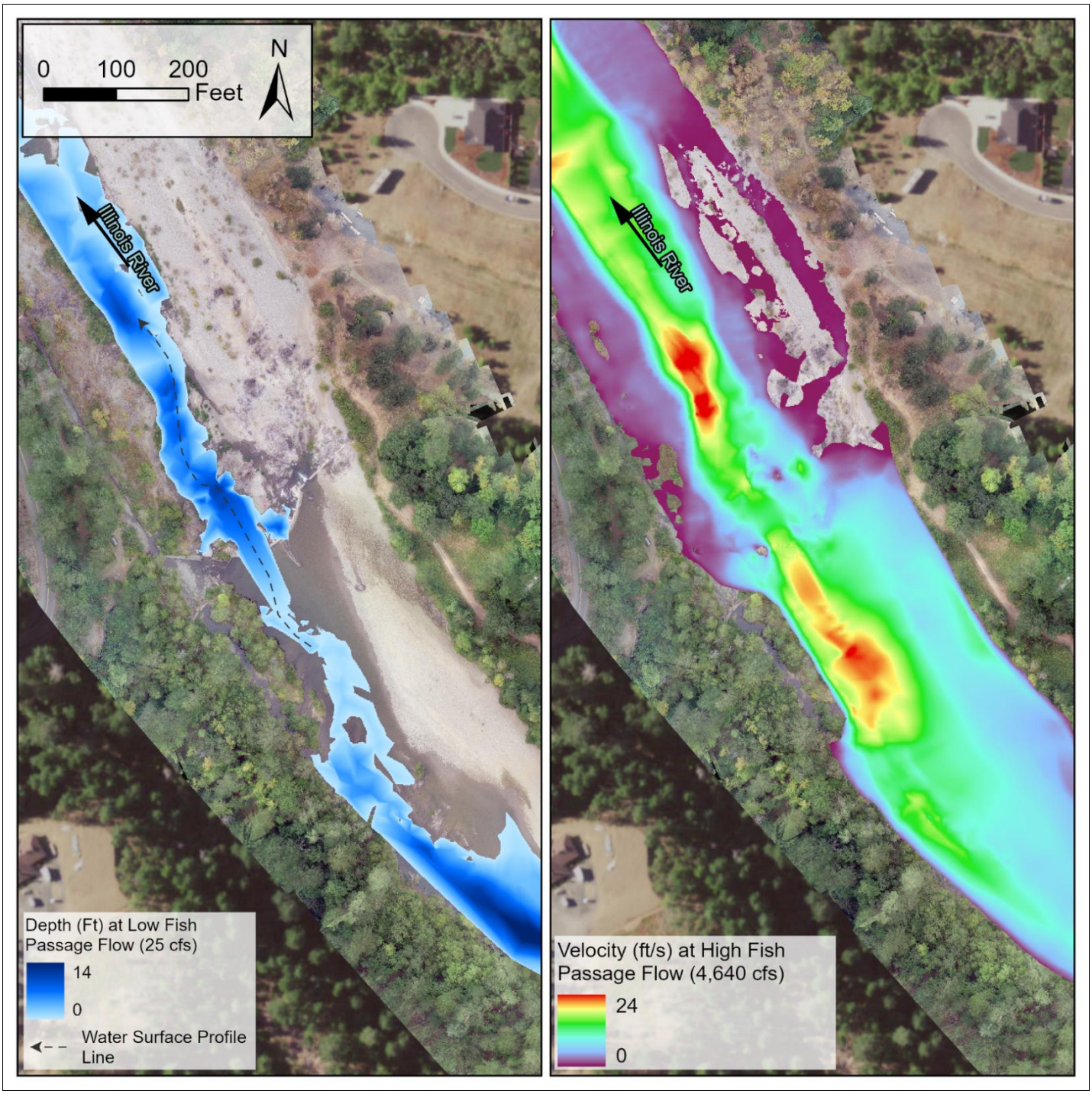


Figure 6-5. HEC-RAS model results of depth at low fish passage flow and velocities at high fish passage flow for post dam-removal conditions.

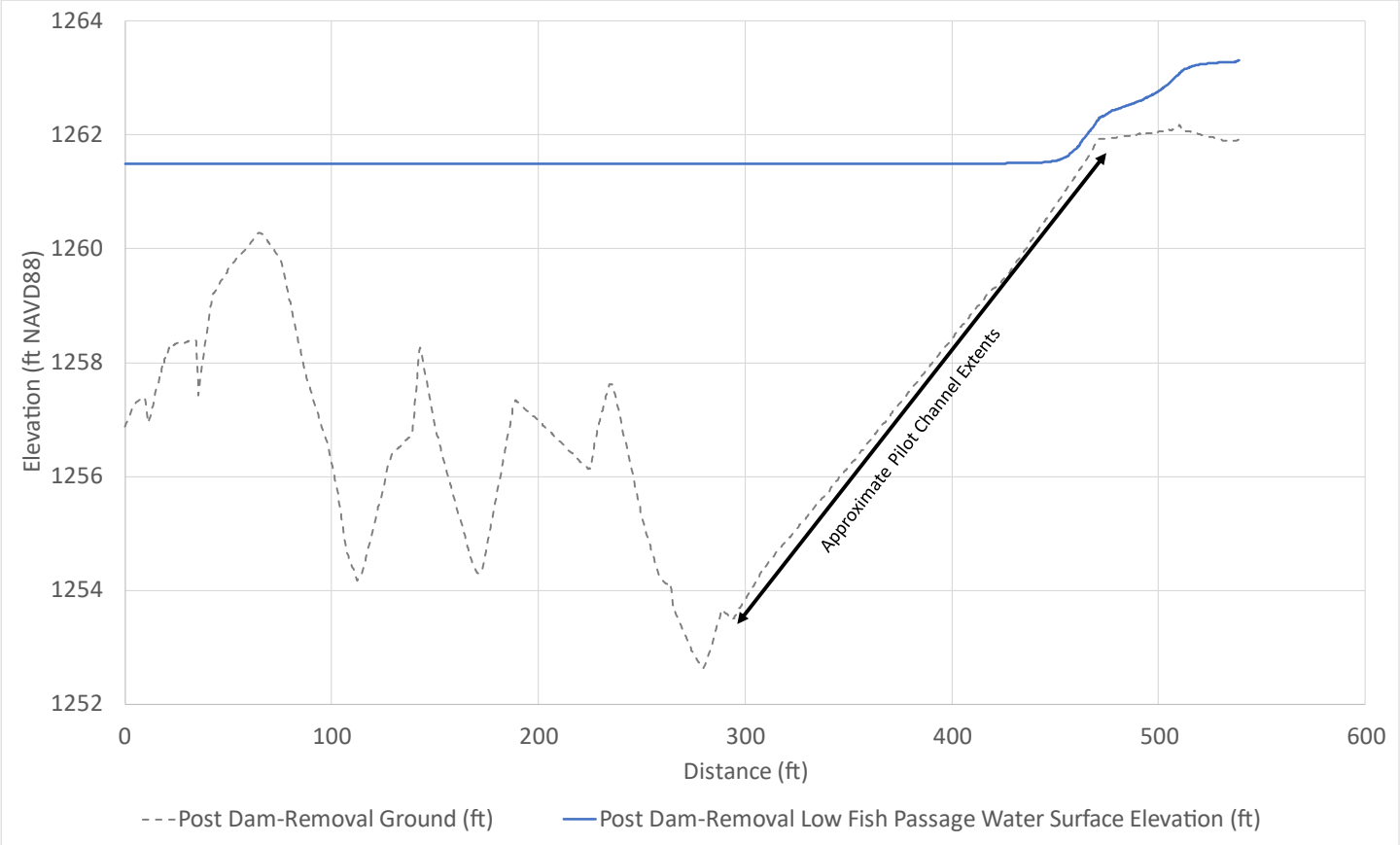


Figure 6-6. Post dam-removal water surface profile at low fish passage flow (25 cfs).

6.3 Fish Passage Monitoring and Adaptive Management

A primary goal of the Pomeroy Dam removal is to restore longitudinal stream processes that facilitate fish passage and develop natural stream corridor conditions that sustain ecosystem functions. Long-term monitoring of the site is critical to confirm that this goal is met after dam removal. It is inherently challenging to predict the response of the river to dam removal and the conditions for fish passage due to the stored reservoir sediment and the dynamic nature of rivers. The following monitoring and adaptive management plan is proposed to identify and facilitate correction of an unforeseen condition that hinders fish passage and longitudinal stream connectivity:

1. **As-Built Survey**: An as-built survey will be performed to document the completed project and provide the baseline condition for future monitoring. Permanent markers will be established for the purpose of conducting consistent monitoring. The exact location of monitoring points will be determined in the field after dam removal. The following information and data will be collected as part of the as-built documentation:
    a. Longitudinal channel profile and channel cross-sections,
    b. GPS survey to create surface model map to document important features, and
    c. Photos at permanent monitoring points.

2. **Post-Dam Removal River Conditions**: Monitoring of the post-dam removal river conditions will be conducted for three years to ensure fish passage is acceptable and consistent with surrounding conditions upstream and downstream of the site. Site monitoring should occur after flows anticipated to transport sediment occur. The USGS stream gage on the Illinois River near Kerby (14377100) has real-time data available to monitor flows.
    a. The most significant channel changes are expected to occur during the first winter as a result of natural erosion of the stored reservoir sediment. More frequent monitoring is recommended in the first winter to document these changes. Site conditions should be visually observed each time after a 5% exceedance flow (high fish passage flow) as determined from the USGS gage (4,980 cfs at the gage).
    b. Second winter and third winter monitoring could be reduced to larger flows on the order of 11,000 to 18,000 cfs.
    c. The third winter monitoring could be visual only if the majority of the sediment has already been mobilized during the first and second winters.

Proposed monitoring timing and information is summarized in Table 6-2.

Table 6-2. Summary of monitoring protocol for post-dam conditions.

Metric	Monitoring Frequency	Performance Standard	Monitoring Protocol
First Winter Monitoring (2024/2025)			
Fish passage	After 4,980 cfs*	ODFW/NMFS fish passage criteria	Visual observation & physical measurements
Second Winter Monitoring (2025/2026)			
Fish passage	After 11,000 – 18,000 cfs*	ODFW / NMFS fish passage criteria	Visual observation & physical measurements
Third Winter Monitoring (2025/2026)			
Fish passage	After 11,000 – 18,000 cfs*	ODFW/NMFS fish passage criteria	Visual observation & physical measurements (if sediment remains in reservoir)

* At station 14377100. Data accessible from USGS https://waterdata.usgs.gov/monitoring-location/14377100

If the fish passage or channel stability does not meet the performance standard, a corrective action will be recommended. WaterWatch will be the lead organization responsible for developing a corrective action, procuring funds, and ensuring implementation to rectify the performance of the unsuitable condition.

6.4 Site Restoration and Revegetation

The existing vegetation community is composed of grasses, shrubs and trees growing on the banks and in bars along the channel. Some grasses and shrubs are growing directly on the bedrock in the channel. Native species observed at the site include white alder (*alnus rhombifolia*), willow species (*salix spp.*), umbrella plant (*darmera peltata*), and torrent sedge (*carex nudata*). The willow species are most likely coyote willow (*salix exigua*) and

may also include Pacific willow (*salix lasiandra*) and Scouler's willow (*salix scouleriana*). Upland areas had some Garry oak (*quercus garryana*) and potentially Western hazelnut (*corylus cornuta*).

Figure 6-7. Existing vegetation along the Illinois River near Pomeroy Dam. Photo taken August 23, 2023.

A suite of native plant species is proposed for the site restoration and revegetation after dam removal. Species selected for revegetation include white alder, Scouler's willow, Western hazelnut, red-stem ceanothus (*ceanothus sanguineus*), umbrella plant, sulphur-flower buckwheat (*eriogonum umbellatum*), and small-fruited bulrush (*scirpus microcarpus*). These species were selected to provide a variety of canopy layers (tree, shrub, and grass), tolerance for disturbed sites and rocky/shallow soils, tolerance for dry or seasonally flooded conditions, wildlife habitat value, and commercial availability in containers. The torrent sedge is not commercially available in containers, however, we anticipate it will reestablish from the seedbank in the soils and from remaining plants after construction. Table 6-3 summarizes the plants species selected for revegetation (Oregon Flora 2024).

The revegetation areas will include the temporary access routes, abandoned diversion ditch, and bank restoration at the intake locations. These areas will likely vary from rocky/dry/well-drained conditions along the access routes and abandoned diversion ditch to seasonally saturated / flooded along the banks and intake

locations. Erosion control seed with weed-free straw mulch will also be applied to provide short-term stabilization while the plants become established.

Table 6-3. Summary of selected species for revegetation.

Common Name	Scientific Name	Size at Maturity	Notes	Wildlife Support
White alder	*Alnus rhombifolia*	9 – 50 ft high, 30 – 40 ft wide	Deciduous perennial shrub or tree, tolerates constant flooding and dry conditions, spreads by runners and seed	Caterpillar host plant/larval food source
Scouler's willow	*Salix scouleriana*	3 – 50 ft high, 30 – 40 ft wide	Deciduous perennial shrub or tree, tolerates frequent flooding, drought tolerant, spreads vigorously by runners	Caterpillar host plant/larval food source, supports pollinators, pest-eating insects, and hummingbirds
Western hazelnut	*Corylus cornuta*	3 – 14 ft high, 10 – 20 ft wide	Deciduous perennial shrub or tree, prefers well-drained and dry conditions, thicket-forming, spreads by seed	Caterpillar host plant/larval food source, supports pollinators and pest-eating insects
Red-stem ceanothus	*Ceanothus sanguineus*	1 – 10 ft high, 6 – 10 ft wide	Deciduous perennial shrub, prefers well-drained and dry conditions, spreads by seed	Caterpillar host plant/larval food source, supports pollinators, pest-eating insects, and hummingbirds
Umbrella plant	*Darmera peltata*	2 – 5 ft high, 3 – 5 ft wide	Deciduous perennial shrub, prefers wet rocky soils, spreads by runners	Supports pollinators
Sulphur-flower buckwheat	*Eriogonum umbellatum*	0 – 2 ft high, 0 – 4 ft wide	Deciduous perennial herb or shrub, prefers well-drained dry rocky soils, spreads by seed	Caterpillar host plant/larval food source, supports pollinators,
Small-fruited bulrush	*Scirpus microcarpus*	1 – 7 ft high, 1 – 3 ft wide	Evergreen perennial grass, tolerates constant flooding, spreads by runners and seed	Cover and food for waterfowl and other birds

7 Point of Diversion Transfer and Water Intake Screen Design

The primary function of the dam has historically been water diversion for agricultural irrigation purposes. However, utilization of the diversion system has been inconsistent, and its maintenance is subpar, resulting in inefficiencies in diverting and conveying water through the open-channel system. The diverted water is screened using a roll-drum screen and subsequently flows through an open canal that traverses multiple properties before reaching its destination at Q Bar X Ranch. Notably, the entire irrigation system is inadequately maintained, with sporadic usage, and utilizes flood irrigation techniques across expansive pasture areas.

In an initiative to modernize and enhance the efficiency of water diversion, an application for the transfer of the water right point of diversion (POD) was submitted to the Oregon Water Resources Department (OWRD). This POD transfer, identified as T-14209, has received tentative approval to move the POD's downstream as illustrated in Figure 7-1.

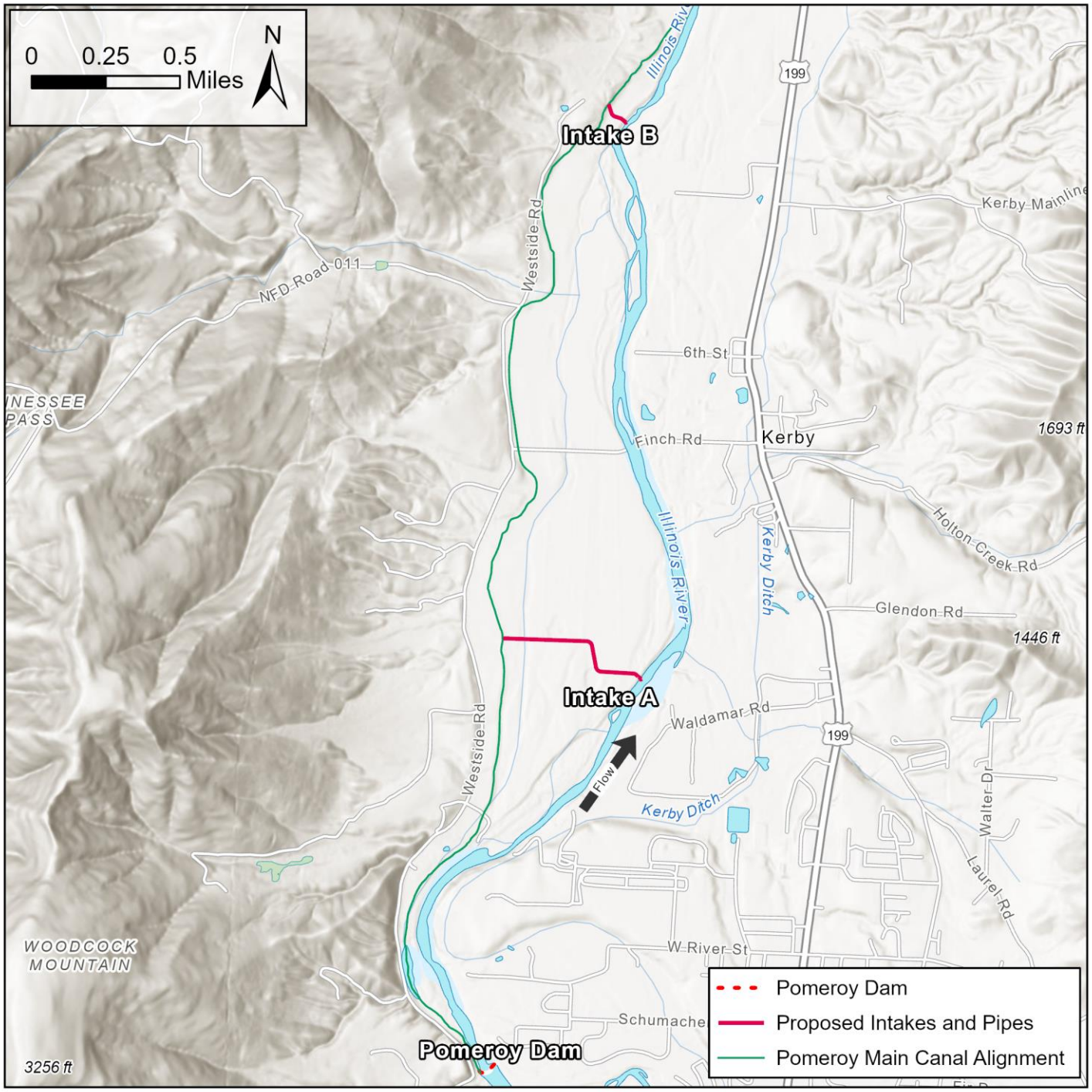


Figure 7-1. Proposed diversion intake locations in relation to Pomeroy dam and canal.

As a result of this approval, two new surface water intake diversions are set to be established downstream from the dam, marking a significant step in the efforts to upgrade and create an efficient irrigation diversion system that protects fish and delivers water where it is used.

In the POD transfer, the following water rights were substantiated:

- Certificate 3394 transfers 0.25 cfs (±112 GPM) to new POD 3 (Intake B),

- Certificate 13935 transfers max of 1.0 cfs (±448 GPM) to downstream PODs 2 (Intake A) and 3 (Intake B), and
- Certificate 20780 transfers 1.93 cfs (±866 GPM) to downstream PODs 2 (Intake A) and 3 (Intake B)

Intake A is designed for a maximum flow of 3.0 cfs or 1350 gallons per minute (GPM), consistent with the approved water right, and Intake B is designed for 2.2 cfs (1000 GPM). The maximum water intake rate will not exceed 3.71 cfs based on the water rights transfer. Each intake screen utilizes the proprietary passive "Pump-Rite" screen. For instance, the T1000 Pump-Rite screen can convey over 1,000 GPM while meeting ODFW and NOAA Fisheries requirements. Pump-rite screens have been tested by the US Bureau of Reclamation (Leslie Hanna, Water Resources Research Laboratory) and meet the requirements for screen opening size, approach velocities, and other criteria established by ODFW and NOAA Fisheries, West Coast Region Anadromous Salmonid Passage Design Manual (NMFS, 2022a). The screens are constructed with 20 gauge perforated stainless steel screen with .075" screen openings with a 50% open area as illustrated in Figure 7-2.

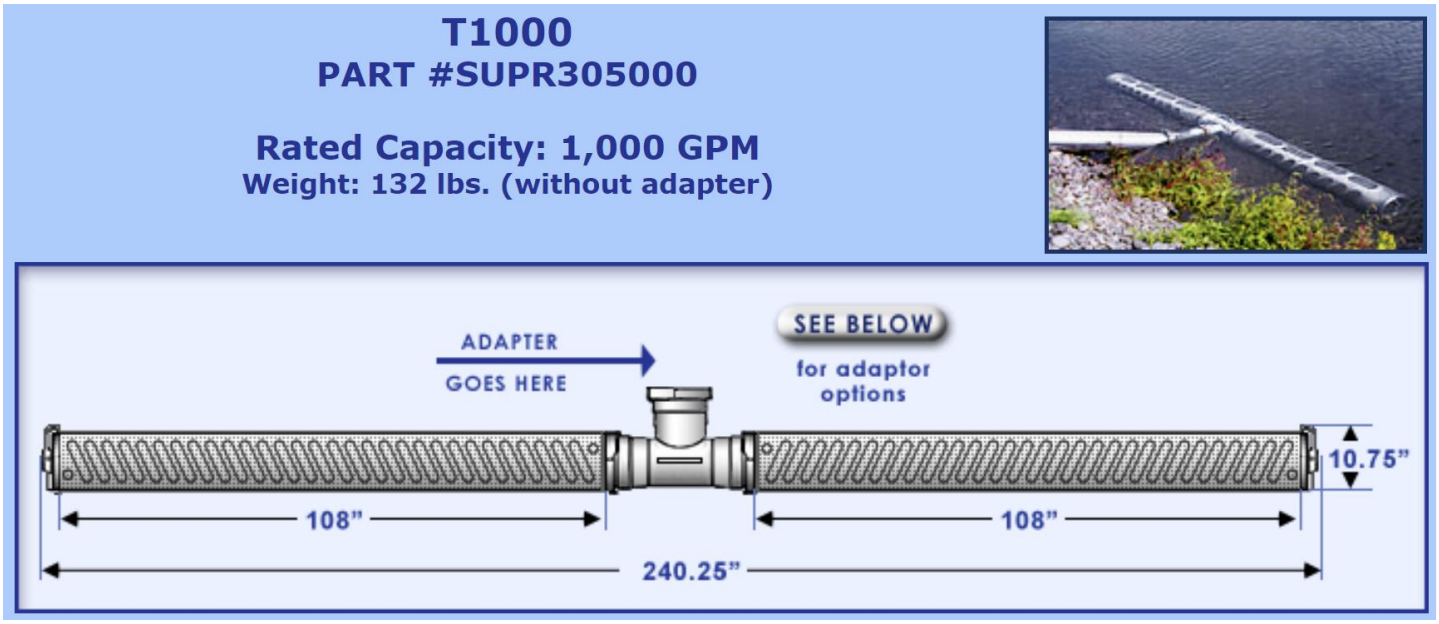


Figure 7-2. Pump-rite T-1000 screen schematic.

The water intake screens and pipes will be placed on the edge of the riverbank and connected to pumps, located in a nearby vault, that extracts water from the river in accordance with the approved water rights. The water will be conveyed in new underground, pressure pipelines to the existing open canal that delivers water throughout the Q Bar X Ranch. Screens are not oversized as the water right and static water elevation will not change over time due to climate change projections. Likewise, the approach velocities and submergence of the screens will remain constant.

8 Summary

Removal of the Pomeroy Dam will yield multifaceted benefits, primarily centered around the restoration of volitional fish passage and the rejuvenation of watershed processes, including sediment and wood transport, within the Illinois River. Notably, this ambitious undertaking aims to achieve these ecological enhancements

while ensuring the continued withdrawal of irrigation water for agricultural purposes and creating a win-win scenario for the landowners and public.

A key feature of the dam removal plan involves the implementation of a fish passage pilot channel, designed to facilitate immediate fish movement during low flows immediately following dam removal. Concurrently, the stored sediments within the dam reservoir will be transported downstream during seasonal high flows, contributing to the natural dynamics of the watershed and river processes. To maintain irrigation water withdrawals, the existing surface water diversion at the dam will be replaced with a more modernized system consisting of two water intakes and pumped diversions. This upgrade will feature state-of-the-art end-of-pipe pump-rite fish screens to enhance environmental compatibility. Furthermore, to accommodate the relocation of PODs, new irrigation pipelines will be constructed. The pipelines not only ensure the seamless transition of water to the existing irrigation network but also plays a pivotal role in optimizing the overall efficiency of the irrigation system.

Beyond the hydraulic aspects, the project encompasses a comprehensive ecological approach. Invasive vegetation within the project area is earmarked for removal, creating space for the introduction of native plants. This strategic ecological intervention aims to establish a healthy riparian corridor along the river, promoting biodiversity and contributing to the overall well-being of the surrounding ecosystem. Through these integrated measures, the removal of the Pomeroy Dam emerges as a holistic endeavor, harmonizing ecological restoration with sustainable agricultural practices.

9 References

Cooper, R. M. (2005). Estimation of Peak Discharges for Rural, Unregulated Streams in Western Oregon. Reston, Virginia: U.S. Geologic Survey. Retrieved from https://pubs.usgs.gov/sir/2005/5116/

Cui Y, Parker G. 1997. A quasi-normal simulation of aggradation and downstream fining with shock fitting. International Journal of Sediment Research 12: 68–82.

Esri. 2023. ArcGIS Pro. (3.2).

Federal Emergency Management Agency (FEMA). 2009. "Flood Insurance Study for Josephine County, Oregon and Incorporated Areas."

Lamprey Technical Workgroup. 2020. Best management guidelines for native lampreys during in-water work. Original Version 1.0, May 4, 2020. 26 pp. + Appendices. Available: https://www.pacificlamprey.org/ltwg/.

Lisle, T.E., Cui, Y., Parker, G., Pizzuto, J.E. and Dodd, A.M., 2001. The dominance of dispersion in the evolution of bed material waves in gravel-bed rivers. Earth Surface Processes and Landforms, 26(13), pp.1409-1420.

Lisle, T.E. 2008. The evolution of sediment waves influenced by varying transport capacity in heterogeneous rivers. In Gravel-bed Rivers VI: From Process Understanding to River Restoration, Habersack H, Piegay H, Rinaldi M (eds). Elsevier: Amsterdam; 213–230. DOI. 10.1016/S0928-2025(07)11136-6

Major, J.J., East, A.E., O'Connor, J.E., Grant, G.E., Wilcox, A.C., Magirl, C.S., Collins, M.J., and Tullos, D.D., 2017. Geomorphic responses to dam removal in the United State – a two-decade perspective. In Gravel-Bed Rivers Processes and Disasters, 1st ed, Tsutsumi, D., Laronne, J.B. (eds). John Wiley & Sons Ltd.

Major, J.J., O'Connor, J.E., Podolak, C.J., Keith, M.K., Grant, G.E., Spicer, K.R., Pittman, S., Bragg, H.M., Wallick, J.R., Tanner, D.Q. and Rhode, A., 2012. Geomorphic response of the Sandy River, Oregon, to removal of Marmot Dam. US Department of the Interior, US Geological Survey.

Nadeau, T-L., D. Hicks, C. Trowbridge, N. Maness, R. Coulombe, N. Czarnomski. 2020. Stream Function Assessment Method for Oregon (SFAM, Version 1.1). Oregon Dept. of State Lands, Salem, OR, EPA 910-R-20-002, U.S. Environmental Protection Agency, Region 10, Seattle, WA.

NMFS (National Marine Fisheries Service). 2000. Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act. NMFS, Northwest Region, Portland, Oregon.

NMFS. 2013. Endangered Species Act Section 7 Programmatic Restoration Opinion for Joint Ecosystem Conservation by the Services (PROJECTS) by the U.S. Fish and Wildlife Service Using the Partners for Fish and Wildlife, Fisheries, Coastal, and Recovery Programs and NOAA Restoration Center Using the Damage Assessment, Remediation and Restoration Program (DARRP), and Community-Based Restoration Program (CRP) in the States of Oregon, Washington, and Idaho. NWR-2013-10221. December 3, 2013, West Coast Region, Portland, Oregon.

NMFS. 2022a. NOAA Fisheries West Coast Region Anadromous Salmonid Passage Design Manual. NMFS, Northwest Region, Portland, Oregon.

NMFS. 2022b. NOAA Fisheries West Coast Region Guidance to Improve the Resilience of Fish Passage Facilities to Climate Change. NMFS, Northwest Region, Portland, Oregon.

O'Connor, J. E., Mangano, J. F., Anderson, S. W., Wallick, J. R., Jones, K. L., & Keith, M. K. 2014. Geologic and physiographic controls on bed-material yield, transport, and channel morphology for alluvial and bedrock rivers, western Oregon. Geological Society of America Bulletin, B30831-1.

Oregon Department of Fish and Wildlife (ODFW). 2023. Oregon Guidelines For Timing Of In-Water Work To Protect Fish And Wildlife Resources April 2023.

Oregon Flora. 2024. Retrieved from https://oregonflora.org/

Pace, K.M., Tullos, D., Walter, C., Lancaster, S. and Segura, C., 2017. Sediment Pulse Behaviour Following Dam Removal in Gravel-Bed Rivers. *River Research and Applications*, 33(1), pp.102-112.

Pizzuto, J. 2002. Effects of Dam Removal on River Form and Process. Bioscience. Vol. 52 No. 8.

Northwest Regional Sediment Evaluation Team (RSET). 2018. Sediment Evaluation Framework for the Pacific Northwest. Prepared by the RSET Agencies, May 2018, 183 pp plus appendices.

Snoke, A. W., and C. G. Barnes. 2006. The development of tectonic concepts for the Klamath Mountains province, California and Oregon. In A. W. Snoke, & C. G. Barnes (Eds.), Geological studies in the Klamath Mountains province, California and Oregon: A volume in honor of William P. Irwin (pp. 1-29). Geological Society of America. doi:10.1130/2006.2410(01)

Tullos, D. and Wang, H.W., 2014. Morphological responses and sediment processes following a typhoon-induced dam failure, Dahan River, Taiwan. *Earth Surface Processes and Landforms*, 39(2), pp.245-258.

Tullos, D.D., Collins, M.J., Bellmore, J.R., Bountry, J.A., Connolly, P.J., Shafroth, P.B. and Wilcox, A.C., 2016. Synthesis of common management concerns associated with dam removal. *JAWRA Journal of the American Water Resources Association*, 52(5), pp.1179-1206.

United States Army Corps of Egnineers (USACE). 2023a. Hydrologic Engineering Center (HEC) Statistical Software Package (SSP). (2.3).

United States Army Corps of Egnineers (USACE). 2023b. Hydrologic Engineering Center River Analysis System. (6.4.1).

United States Geological Survey (USGS). 2023. StreamStats v4.16.0. Retrieved from https://streamstats.usgs.gov/ss/

Zunka, J.P., Tullos, D.D. and Lancaster, S.T., 2015. Effects of sediment pulses on bed relief in bar-pool channels. Earth Surface Processes and Landforms, 40(8), pp.1017-1028.

10 Appendices

Appendix A – Project Drawings (under separate cover)

Appendix B – Stream Function Assessment Summary

APPENDIX A

Project Drawings (under separate cover)

APPENDIX B

Stream Function Assessment Summary

Stream Functional Assessment Method (SFAM) – Best Professional Judgement

Project: Pomeroy Dam Removal on the Illinois River

Location: 42.1628°, -123.6656°

Date: 2024.01.18

Best professional judgement was used to assess the existing and expected conditions at the Pomeroy Dam Removal Project (Project) for the eleven functions that are included in the stream functional assessment method (Nadeau et al., 2020). Under the proposed action, assessed functions show increased or similar function relative to the existing condition, although the existing function group scores do not change rating under the proposed condition. The Pomeroy Dam is located in a bedrock-controlled river valley, which exerts a first order influence on channel form, behavior, and function, and, as a result, the impacts of removing the Pomeroy Dam will have only minor local impacts, primarily on sediment-related characteristics and water levels immediately upstream of the former dam. Biological and water quality functions are largely unaffected by the Project, except for in relation to the increased migratory fish access to pre-European settlement extents, which is valuable for both the survival of the fish species and the trophic health of the watershed. A summary of stream function scores for the existing and proposed conditions is presented in Table 1 and specific values for existing and post-project functions are presented in Table 2.

Table 1. SFAM summary for the Pomeroy Dam Removal Project.

Functional Group	Function	Existing Condition Function Rating	Proposed Condition Function Rating	Change in Function Rating
Hydrologic	Surface Water Storage	Moderate	Moderate	Decrease
	Subsurface Water Transfer	Moderate	Moderate	None
	Flow Variation	Moderate	Moderate	Increase
Geomorphic	Sediment Continuity	Moderate	Moderate	Increase
	Substrate Mobility	High	High	Increase
Biologic	Maintain Biodiversity	Moderate	Moderate	Increase
	Create and Maintain Habitat	Moderate	Moderate	None
	Sustain Trophic Structure	Moderate	Moderate	Increase
Water Quality	Nutrient Cycling	Moderate	Moderate	Increase
	Chemical Regulation	Moderate	Moderate	None
	Thermal Regulation	Moderate	Moderate	None

Table 2. SFAM – Specific Functions or Values Table for Existing Conditions and Anticipated Post-project Conditions.

Functional Group	Specific Functions or Values	Definition	Existing Condition Function and Value	Anticipated Post-project Function and Value
Hydrologic Function	Surface Water Storage (SWS)	Temporary storage of surface water in relatively static state, generally during high flow, as in floodplain inundation, backwater channels, wetland depressions. Providing regulating discharge, replenishes soil moisture, provides pathways for fish and invertebrate movement, low velocity habitat and refuge, and contact time for biogeochemical processes.	SWS is *moderate* at the site under existing conditions. The 10-ft-tall Pomeroy Dam is a grade control on the Illinois River and provides a backwatering effect during low flow that increases temporary water storage upstream relative to a no-dam condition. At low flows, this is represented by an approximately 5 ft drop in water surface across the dam. At high flows, the dam is fully submerged and has only a minor impact on temporary storage of surface water. Temporary water storage upstream of the dam is generally contained to a single thread of flow on the Illinois River and the EF and WF Illinois River due to the relatively confined nature of the channel by on river-left and residential development on river-right. Gravel bars upstream of the dam provide topographic irregularity (e.g., alcoves, depressions) that result in hydraulic variability for aquatic species.	SWS will decrease but remain *moderate* under post-project conditions. Removal of the dam will have a minor decrease on temporary storage upstream of the dam, and the decrease decreases with increasing discharge such that high flows will have the smallest change in storage. The channel around the dam is underlain bedrock, which will function as a grade control approximately 5 ft lower than the crest post-removal. This bedrock will continue to provide a backwater effect during low flows. Changes in channel morphology and concomitant water storage attributed to the mobile sediment bars in the reach are harder to predict but expected to be minor because of the mobility of the bars under existing conditions and because the dam is actively passing sediment.
	Subsurface Water Transfer (SST)	Transfer of water between surface and subsurface environments, often through hyporheic zone. Provides aquifer recharge, baseflow, exchange of nutrients/chemicals through hyporheic, moderates flow, and maintains soil moisture.	SST is *moderate* at the site under existing conditions. Transfer of water between surface and subsurface environments is expected to be efficient at the site due to the high permeability of the gravel alluvium. However, low permeability bedrock is exposed or only shallowly covered by gravel in the reach, such that the aquifer is thin with little storage.	SST will remain *moderate* and unchanged at the site under post-project conditions. Gravel will be redistributed as a result of dam removal, but the overall coverage and average thicknesses of gravel deposits are not expected to change and therefore will not impact SST or subsurface storage.
	Flow Variation (FV)	Daily, seasonal and inter-annual variation in flow. Provides variability in stream energy driving channel dynamics, provides	FV is *moderate* at the site under existing conditions. Hydrology and sediment transport are driven by seasonal precipitation	FV will increase but remain *moderate* at the site under post-project conditions. There will be a slight increase in inundation and

Functional Group	Specific Functions or Values	Definition	Existing Condition Function and Value	Anticipated Post-project Function and Value
		environmental cues for life history transitions, redistributes sediment, provides habitat variability (temporal), provides sorting of sediment and differential deposition.	patterns typical of western Oregon with dry summers and wet winters. There are no large flow regulating barriers upstream of Pomeroy that modify site hydrology in a significant way.	flow variability in the reach immediately upstream of the former dam that will see more variability at low and moderate flows with the removal of the barrier.
Geomorphic Function	Sediment Continuity (SC)	The balance between transport and deposition of sediment such that there is no net erosion or deposition (aggradation or degradation) within the channel. Maintains channel character and associated habitat diversity, provides sediment source and storage for riparian and aquatic habitat succession, maintains channel equilibrium.	SC is *moderate* at the site under existing conditions. The reach is not prone to short-term net aggradation or degradation, the latter of which is controlled by bedrock. The dam modifies sediment transport and coverage locally and at moderate flows. There is a scour hole immediately downstream of the dam in the primary flow thread. Sediment is transported over the dam during high flows, events during which sediment is transported and changes in bed elevation would occur. There is likely some increased sediment accumulation relative to pre-dam conditions because of the dam's function as a grade control. The impact is minor as represented by the high percentage of exposed bedrock in the wetted area immediately upstream of the dam and sediment accumulation manifested in the form of evolving gravel bars.	SC will increase but remain *moderate* at the site under post-project conditions. With the dam out, sediment will be free to naturally distribute throughout the former dam area, which may or may not result in changes to width-averaged bed elevation. Any changes to bed elevation are expected to be minor and small with respect to existing elevation variability of the longitudinal profile.
	Sediment Mobility (SM)	Regular movement of channel bed substrate. Provides sorting of sediments, mobilizes/flushes fine sediment, creates and maintains hydraulic diversity, creates and maintains habitat	SM is *high* at the site under existing conditions. The Illinois River is routinely transporting its gravel-sized sediment load, which results in mobile and evolving gravel bar deposits. Bar evolution results in creation of alcoves and topographic variability in the reach. There are small and moderate amounts of large wood in the West and	SM will increase and remain *high* under post-project conditions. Sediment will be transported at higher rates and at lower flows than current conditions when the dam is removed.

Functional Group	Specific Functions or Values	Definition	Existing Condition Function and Value	Anticipated Post-project Function and Value
			East Folks, respectively, to promote scour of alluvium to sustain deep pools.	
Biologic Function	Maintain Biodiversity (MB)	Maintain the variety of species, life forms of a species, community compositions, and genetics. Biodiversity provides species and community resilience in the face of disturbance and disease, full spectrum trophic resources, balance of resource use (through interspecies competition).	MB is *moderate* at the site under existing conditions. The project area provides a variety of mountain, floodplain, and in-channel habitats to support biodiversity. The channel has mobile substrate, off-channel features, irregular bedrock, and large wood to support species. There is agricultural and residential development near the site, which reduces the quality of the habitat. The dam is a partial fish passage barrier, which limits concentrations of migratory fish in the contributing watershed.	MB will increase but remain *moderate* under post-project conditions. The character of the reach and floodplain will be unchanged by the project's removal of the dam. Removal of the passage barrier will improve migratory fish access to the upstream watershed and provide a more natural species assemblage.
	Create and Maintain Habitat (CMH)	Create and maintain the suite of physical, chemical, thermal and nutritional resources necessary to sustain organisms. Habitat sustains native organisms. Habitat includes in-channel habitat, as defined largely by depth, velocity, and substrate, and riparian habitat, as defined largely by vegetative structure.	CMH is *moderate* at the site under existing conditions. In-channel habitat is supported by irregular bedrock bathymetry, by frequently evolving gravel bars, and hydrology relatively unimpacted by flow regulation. There are small and moderate amounts of large wood in the West and East Folks, respectively, to promote scour of alluvium to sustain deep pools. Riparian habitat is relatively healthy given the natural protections provided by the presence of the State Park along the river left hillside and floodplain between the two forks of the Illinois. Development limits the creation and maintenance of river-right riparian habitats.	CMH will remain *moderate* under post-project conditions. Bar mobility and sediment transport should increase some through the dam location, which may increase the ability of the channel to create new habitats. Flow depths and velocities will differ post-removal around the former dam, particularly at low flows. Maximum depths will be smaller. Given the small spatial scale, hydraulic changes will likely only have minor impacts on local habitat in the reach. Land management will not change and a large amount of new riparian will not be exposed by the dam removal, so riparian conditions will be similar post-project.
	Sustain Trophic Structure (STS)	Production of food resources necessary to sustain all trophic levels	STS is *moderate* at the site under existing conditions. There is a moderate amount of intact riparian forest in the reaches upstream of the	STS will increase but remain *moderate* under post-project conditions. The project will not impact conditions in the

Functional Group	Specific Functions or Values	Definition	Existing Condition Function and Value	Anticipated Post-project Function and Value
		including primary producers, consumers, prey species and predators. Trophic structure provides basic nutritional resources for aquatic resources, regulates the diversity of species and communities.	dam, although not along river-right adjacent to the dam, that provides nutritional resources to support trophic structure in the reaches. The dam is a partial fish passage barrier, which limits concentrations of migratory fish and disrupts the natural trophic structure in the contributing watershed.	contributing watershed. The primary impact of the project will be a removal of a passage barrier, which will improve migratory fish access upstream to support a more natural trophic structure.
Water Quality Function	Nutrient Cycling (NC)	Transfer and storage of nutrients from environment to organisms and back to environment. Provides basic resources for primary production, regulates excess nutrients, provides sink and source for nutrients.	NC is *moderate* at the site under existing conditions. There is moderate amount of intact riparian forest in the reaches upstream of the dam, although not along river-right adjacent to the dam, that provides nutritional resources. Unregulated hydrology and floodplain connection supports nutrient exchange between the channel and floodplain environments. The dam limits migratory fish access to the upstream watershed, which removes a pathway for transporting nutrients upstream.	NC will increase but remain *moderate* under post-project conditions. The primary change resulting from the project is that migratory fish will have improved access to return nutrients to the upstream watershed.
	Chemical Regulation (CR)	Moderation of chemicals in the water. Limits the concentration of beneficial and detrimental chemicals in the water.	CR is *moderate* at the site under existing conditions. There is a high fraction of mobile gravel substrate that encourages hyporheic chemical regulatory processes. These processes are somewhat limited by the amount of exposed bedrock in the bed and banks. There is moderate amount of intact riparian forest in the reaches upstream of the dam, although not along river-right adjacent to the dam, that can moderate chemical inputs to the channel.	CR will remain *moderate* under post-project conditions. Riparian conditions won't change as a result of the project. Hyporheic exchange may increase locally at the dam site depending on whether and how sediment is redistributed following removal.
	Thermal Regulation (TR)	Moderation of water temperature. Limits the transfer and storage	TR is *moderate* at the site under existing conditions. There is a high fraction of mobile gravel substrate to	TR will remain *moderate* under post-project conditions. Riparian conditions won't change as

Functional Group	Specific Functions or Values	Definition	Existing Condition Function and Value	Anticipated Post-project Function and Value
		of thermal energy to and from streamflow and hyporheic zone.	support hyporheic exchange and alcove creation that can moderate water temperatures. Bedrock features create cooler deep pockets of water and promote scour. There are small and moderate amounts of large wood in the West and East Folks, respectively, to promote scour of alluvium to sustain deep pools and provide temperature moderation. There is a moderate amount of intact riparian forest in the reaches upstream of the dam, although not along river-right adjacent to the dam, that can provide some shading. Topographic shading is relatively small along the forks of the Illinois just upstream of the dam but increases with distance upstream into the contributing watershed.	a result of the project. Hyporheic exchange may increase locally at the dam site depending on whether and how sediment is redistributed following removal.

RDG
RIVER DESIGN GROUP

RIVER, STREAM & WETLAND RESTORATION EXPERTS

236 Wisconsin Avenue | Whitefish, Montana 59937 | 406.862.4927
311 SW Jefferson Avenue | Corvallis, Oregon 97333 | 541.738.2920
www.riverdesigngroup.com

POMEROY DAM REMOVAL

CAVE JUNCTION, OR

PERMIT

PROJECT PARTNERS

WATERWATCH

U.S. FISH & WILDLIFE SERVICE

OREGON Fish & Wildlife

ROGUE BASIN PARTNERSHIP

PROJECT DESCRIPTION

THE PROJECT INVOLVES THE REMOVAL OF THE EXISTING CONCRETE POMEROY DAM TO RESTORE VOLITIONAL FISH PASSAGE IN THE ILLINOIS RIVER. THE DAM REMOVAL WILL OCCUR IN TWO PHASES WITH WORK AREA ISOLATION, TURBIDITY CONTROL, AND FISH SALVAGE AND EXCLUSION FOR EACH PHASE. THE EXISTING DIVERSION CANAL WILL BE RECLAIMED USING ON-SITE MATERIALS TO RESTORE PRE-DAM CONDITIONS. A FISH PASSAGE PILOT CHANNEL WILL BE SHAPED IN THE RESERVOIR SEDIMENT TO PROVIDE IMMEDIATE PASSAGE AT THE END OF CONSTRUCTION. CONSTRUCTION WILL COMPLY WITH THE GENERAL CONSERVATION MEASURES IN THE PROJECTS PROGRAMMATIC BIOLOGICAL OPINION AND THE CONDITIONS OF THE USACE NWP 27.

SPATIAL REFERENCE

SURVEY CONTROL USED FOR THE PROJECT IS PROVIDED ON DRAWING 2.0 AND COORDINATES CORRESPOND TO THE TOP CENTER OF CONTROL MARKERS.

LIDAR, GPS RTK, AND TOTAL STATION:

HORIZONTAL PROJECTION: OREGON STATE PLANE SOUTH — SURVEY DATES: 2015 (ODFW)
HORIZ DATUM: NAD83 — UNITS: INT FT — 4/4/2023 (RDG)
VERT DATUM: NAVD88 — UNITS: INT FT — LIDAR COLLECTED: 2012

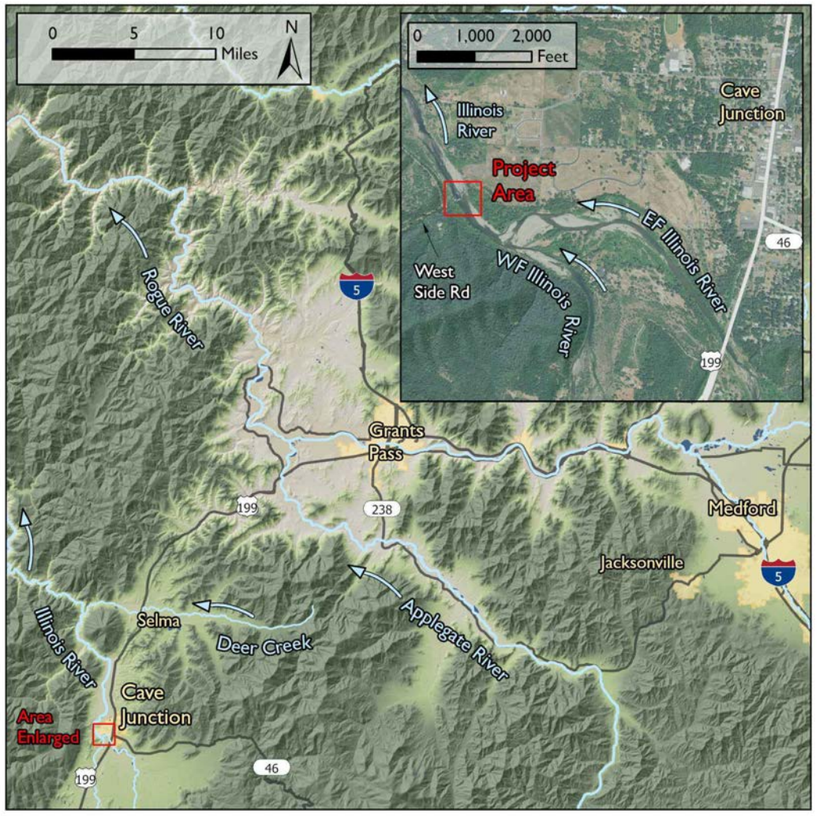
STANDARD OF PRACTICE

RDG WORKS EXCLUSIVELY IN THE RIVER ENVIRONMENT AND EMPLOYS THE MOST CURRENT AND ACCEPTED PRACTICES AVAILABLE FOR PLANNING AND DESIGN OF RESTORATION AND CHANNEL ENHANCEMENT PROJECTS. THE ANALYSIS FOR THE POMEROY DAM REMOVAL RELIED ON CURRENT FISH PASSAGE CRITERIA FROM ODFW AND HEC-RAS HYDRAULIC MODELING OF EXISTING AND PROPOSED CONDITIONS. ALL WORK WAS PERFORMED OR DIRECTED BY A REGISTERED PROFESSIONAL CIVIL ENGINEER WITH PAST EXPERIENCE IN THE DESIGN AND IMPLEMENTATION OF DAM REMOVALS.

REUSE OF DRAWINGS

DRAWING INDEX

PROJECT VICINITY MAP



N 1/2 OF SECTION 20, T.39S., R.08W., WILLAMETTE MERIDIAN
JOSEPHINE COUNTY, OREGON
USGS QUADRANGLE: CAVE JUNCTION, OR

DIRECTION OF SECTION

SECTION OR DETAIL

SHEET WHERE SECTION OR DETAIL IS SHOWN

CROSS-SECTION SHEET REFERENCE

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

COVER SHEET AND NOTES
POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER RDG-22-283

DRAWING NUMBER 1.0

GENERAL CONSERVATION MEASURES FROM PROGRAMMATIC RESTORATION OPINION FOR JOINT ECOSYSTEM CONSERVATION BY THE SERVICES (PROJECTS)

1. **SITE ACCESS**. THE ACTION AGENCIES WILL RETAIN THE RIGHT OF REASONABLE ACCESS TO EACH PROJECT SITE TO MONITOR THE USE AND EFFECTIVENESS OF THESE CONDITIONS.

2. **ON-SITE DOCUMENTATION**. THE FOLLOWING DOCUMENTATION WILL BE POSTED AT THE PROJECT SITE OR ACCESSIBLE IN THE AREA OF WORK IF NOT FEASIBLE TO POST:
   a. NAME(S), PHONE NUMBER(S), AND ADDRESS(ES) OF THE PERSON(S) RESPONSIBLE FOR OVERSIGHT WILL BE POSTED AT THE WORK SITE.
   b. A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES WILL BE AVAILABLE ON-SITE.
   c. PROCEDURES TO CONTAIN AND CONTROL A SPILL OF ANY HAZARDOUS MATERIAL GENERATED, USED OR STORED ON-SITE, INCLUDING NOTIFICATION OF PROPER AUTHORITIES, WILL BE READILY AVAILABLE ON-SITE.
   d. A STANDING ORDER TO CEASE WORK IN THE EVENT OF HIGH FLOWS (ABOVE THOSE ADDRESSED IN THE DESIGN AND IMPLEMENTATION PLANS) OR EXCEEDANCE OF WATER QUALITY LIMITS WILL BE POSTED ON-SITE.

3. **PROJECT DESIGN PROCESS**. IN ADDITION TO SPECIFIC CONSERVATION MEASURES BELOW, IT IS EXPECTED THAT PROJECT MANAGERS WILL USE THE BEST AVAILABLE SCIENTIFIC INFORMATION REGARDING THE LIKELY EFFECTS OF CLIMATE CHANGE ON RESOURCES IN THE PROJECT AREA, INCLUDING PROJECTIONS OF LOCAL STREAM FLOW AND WATER TEMPERATURE, AND/OR SEA LEVEL RISE AND SEDIMENT TRANSPORT PROCESSES, TO ENSURE THAT THE PROJECT WILL BE ADAPTABLE TO THOSE CHANGES.

   THE FOLLOWING GENERAL DESIGN CONSIDERATIONS WILL BE APPLIED FOR ALL ACTIONS COMPLETED UNDER THE PROJECTS PROGRAM:
   a. OBTAIN ALL APPLICABLE REGULATORY PERMITS AND OFFICIAL PROJECT AUTHORIZATIONS BEFORE BEGINNING CONSTRUCTION.
   b. DESIGN THE PROJECT TO MINIMIZE THE EXTENT AND DURATION OF EARTHWORK, E.G., COMPACTING, DREDGING, DRILLING, EXCAVATION, NOISE, AND FILLING, INCLUDING THE FOLLOWING CONCERNS:
      i. MINIMIZE USE OF HEAVY EQUIPMENT, VEHICLES OR POWER TOOLS BELOW BANKFULL ELEVATION TO THE EXTENT POSSIBLE PROJECT SPECIALISTS DETERMINE SUCH WORK IS NECESSARY, OR WILL RESULT IN LESS RISK OF SEDIMENTATION OR OTHER ECOLOGICAL DAMAGE THAN WORK ABOVE THAT ELEVATION.
      ii. COMPLETE EARTHWORK IN WETLANDS, RIPARIAN AREAS, AND STREAM CHANNELS AS QUICKLY AS POSSIBLE.
      iii. SPECIFY THAT THE CONSTRUCTION CONTRACTOR IS TO CEASE PROJECT OPERATIONS WHEN HIGH FLOWS OR HIGH TIDES MAY INUNDATE THE PROJECT AREA, EXCEPT FOR EFFORTS TO AVOID OR MINIMIZE RESOURCE DAMAGE.
   c. PROJECT DESIGNS FOR A SPECIFIC SPECIES SHOULD INCLUDE REVIEW/INPUT FROM A BIOLOGIST AT THE LOCAL SERVICE OFFICE WITH APPROPRIATE KNOWLEDGE OF THE PARTICULAR SPECIES, SUCH AS THE SERVICE STATE SPECIES LEAD FOR AFFECTED SPECIES. THE BIOLOGIST HAS THE DISCRETION TO ADJUST DISTURBANCE AND DISRUPTION DISTANCES, BASED ON SITE-SPECIFIC CONDITIONS AND KNOWN BIOLOGY OF THE SPECIES.
   d. HOLLOW PIPES, SUCH AS THOSE USED FOR SIGNS, FENCES AND GATES, WILL BE CAPPED TO PREVENT TRAPPING SMALL BIRDS AND MAMMALS.

4. **SITE CONTAMINATION ASSESSMENT.** PURSUANT TO SERVICE POLICY, PROJECT MANAGERS WILL CONDUCT A SITE CONTAMINATION ASSESSMENT AS PART OF THE DESIGN PROCESS TO DETERMINE WHETHER THERE IS A LIKELIHOOD OF HAZARDOUS MATERIALS BEING PRESENT AT THE SITE, AND INCLUDE MEASURES IN THE DESIGN TO PREVENT RELEASE OF SUCH MATERIALS AS A RESULT OF THE PROJECT AND TO HANDLE AND DISPOSE OF THEM ACCORDING TO APPLICABLE REGULATIONS.
   a. THE LEVEL OF DETAIL AND RESOURCES COMMITTED TO SUCH AN ASSESSMENT WILL BE COMMENSURATE WITH THE LEVEL AND TYPE OF PAST OR CURRENT DEVELOPMENT AT THE SITE. ASSESSMENTS MAY INCLUDE THE FOLLOWING:
      i. REVIEW AVAILABLE RECORDS, SUCH AS FORMER SITE USE, BUILDING PLANS, AND RECORDS OF ANY PRIOR CONTAMINATION EVENTS.
      ii. IF THE PROJECT SITE WAS USED FOR INDUSTRIAL PROCESSES (I.E., MINING OR MANUFACTURING WITH CHEMICALS), INSPECT TO DETERMINE THE ENVIRONMENTAL CONDITION OF THE PROPERTY.
      iii. INTERVIEW PEOPLE WHO ARE KNOWLEDGEABLE ABOUT THE SITE, E.G., SITE OWNERS, OPERATORS, AND OCCUPANTS, NEIGHBORS, OR LOCAL GOVERNMENT OFFICIALS.
   b. RETAIN CONTAMINANT SURVEY INFORMATION IN THE PROJECT FILE. DISCUSS WITH NMFS AND THE SERVICE IF GROUND DISTURBANCE OR OTHER ACTIVITIES TO ACCOMPLISH THE PROPOSED PROJECT HAS SUBSTANTIAL POTENTIAL TO RELEASE CONTAMINANTS INTO HABITATS THAT SUPPORT LISTED FISH AND WILDLIFE SPECIES TO DETERMINE IF ADDITIONAL CONSULTATION IS NEEDED.

5. **SITE LAYOUT AND FLAGGING**
   a. BEFORE ANY SIGNIFICANT GROUND DISTURBANCE OR ENTRY OF MECHANIZED EQUIPMENT OR VEHICLES INTO THE CONSTRUCTION AREA, CLEARLY FLAG, MARK WITH SURVEY PAINT, OR OTHER OBVIOUS BOUNDARY MARKER, THE FOLLOWING AREAS AS APPROPRIATE:
      i. SENSITIVE AREAS, E.G., WETLANDS, WATER BODIES, ORDINARY HIGH WATER, SPAWNING AREAS, APPROPRIATE BUFFER ZONES FOR LISTED PLANT AND ANIMAL SPECIES AND THEIR HABITATS, AS IDENTIFIED IN THE PROPOSED CONSERVATION MEASURES.
      ii. EQUIPMENT ENTRY AND EXIT POINTS.
      iii. ROAD AND STREAM CROSSING ALIGNMENTS.
      iv. STAGING, STORAGE, AND STOCKPILE AREAS.
   b. BEFORE THE USE OF HERBICIDES, CLEARLY FLAG NO-APPLICATION BUFFER ZONES IF POSSIBLE.

6. **STAGING, STORAGE, AND STOCKPILE AREAS**
   a. DESIGNATE AND USE STAGING AREAS TO STORE HAZARDOUS MATERIALS, OR TO STORE, FUEL, OR SERVICE HEAVY EQUIPMENT, VEHICLES AND OTHER POWER EQUIPMENT WITH TANKS LARGER THAN 18.9 L (5 GALLONS), THAT ARE AT LEAST 45.7 M (150 FEET) FROM ANY NATURAL WATER BODY OR WETLAND, OR ON AN ESTABLISHED PAVED AREA, SUCH THAT SEDIMENT AND OTHER CONTAMINANTS FROM THE STAGING AREA CANNOT BE DEPOSITED IN THE FLOODPLAIN OR STREAM.
   b. NATURAL MATERIALS THAT ARE DISPLACED BY CONSTRUCTION AND RESERVED FOR RESTORATION, E.G., LW, GRAVEL, AND BOULDERS, MAY BE STOCKPILED WITHIN THE 100-YEAR FLOODPLAIN.
   c. DISPOSE OF ANY MATERIAL NOT USED IN RESTORATION AND NOT NATIVE TO THE FLOODPLAIN OUTSIDE OF THE FUNCTIONAL FLOODPLAIN.
   d. AFTER CONSTRUCTION IS COMPLETE, OBLITERATE ALL STAGING, STORAGE, OR STOCKPILE AREAS, STABILIZE THE SOIL, AND REVEGETATE THE AREA.

ROAD AND PATH OBLITERATION REFERS TO THE MOST COMPREHENSIVE DEGREE OF DECOMMISSIONING AND INVOLVES DECOMPACTING THE SURFACE AND DITCH, PULLING THE FILL MATERIAL ONTO THE RUNNING SURFACE, AND RESHAPING TO MATCH THE ORIGINAL CONTOUR.

7. **EROSION CONTROL**
   a. USE SITE PLANNING AND SITE EROSION CONTROL MEASURES COMMENSURATE WITH THE SCOPE OF THE PROJECT TO PREVENT EROSION AND SEDIMENT DISCHARGE FROM THE PROJECT SITE.
   b. BEFORE SIGNIFICANT EARTHWORK BEGINS, INSTALL APPROPRIATE, TEMPORARY EROSION CONTROLS DOWNSLOPE TO PREVENT SEDIMENT DEPOSITION IN THE RIPARIAN AREA, WETLANDS, OR WATER BODY.
   c. DURING CONSTRUCTION, IF ERODED SEDIMENT APPEARS LIKELY TO BE DEPOSITED IN THE STREAM, INSTALL ADDITIONAL SEDIMENT BARRIERS AS NECESSARY.
   d. TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE FIBER WATTLES, SILT FENCES, JUTE MATTING, WOOD FIBER MULCH AND SOIL BINDER, OR GEOTEXTILES AND GEOSYNTHETIC FABRIC.
   e. SOIL STABILIZATION UTILIZING WOOD FIBER MULCH AND TACKIFIER (HYDRO-APPLIED) MAY BE USED TO REDUCE EROSION OF BARE SOIL IF THE MATERIALS ARE NOXIOUS WEED-FREE AND NONTOXIC TO AQUATIC AND TERRESTRIAL ANIMALS, SOIL MICROORGANISMS, AND VEGETATION.
   f. REMOVE SEDIMENT FROM EROSION CONTROLS IF IT REACHES 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL.
   g. WHENEVER SURFACE WATER IS PRESENT, MAINTAIN A SUPPLY OF SEDIMENT CONTROL MATERIALS AND AN OIL-ABSORBING FLOATING BOOM AT THE PROJECT SITE.
   h. STABILIZE ALL DISTURBED SOILS FOLLOWING ANY BREAK IN WORK UNLESS CONSTRUCTION WILL RESUME WITHIN FOUR DAYS.
   i. REMOVE TEMPORARY EROSION CONTROLS AFTER CONSTRUCTION IS COMPLETE AND THE SITE IS FULLY STABILIZED.
   j. FOR PROJECTS INVOLVING NEAR- AND IN-WATER CONSTRUCTION, COMPLETE AND RECORD THE FOLLOWING WATER QUALITY OBSERVATIONS TO ENSURE THAT ANY INCREASES IN SUSPENDED SEDIMENT DO NOT EXCEED BACKGROUND LEVELS:
      i. TAKE A TURBIDITY SAMPLE USING AN APPROPRIATELY AND REGULARLY CALIBRATED TURBIDIMETER, OR A VISUAL TURBIDITY OBSERVATION, EVERY 4 HOURS WHEN WORK IS BEING COMPLETED, OR MORE OFTEN AS NECESSARY TO ENSURE THAT THE IN-WATER WORK AREA IS NOT CONTRIBUTING VISIBLE SEDIMENT TO WATER, AT A RELATIVELY UNDISTURBED AREA APPROXIMATELY 100 FEET UPSTREAM FROM THE PROJECT AREA, OR 300 FEET FROM THE PROJECT AREA IF IT IS SUBJECT TO TIDAL OR COASTAL SCOUR. RECORD THE OBSERVATION, LOCATION, AND TIME BEFORE MONITORING AT THE DOWNSTREAM POINT.
      ii. TAKE A SECOND VISUAL OBSERVATION, IMMEDIATELY AFTER EACH UPSTREAM OBSERVATION, APPROXIMATELY 50 FEET DOWNSTREAM FROM THE PROJECT AREA IN STREAMS THAT ARE 30 FEET WIDE OR LESS, 100 FEET FROM THE PROJECT AREA FOR STREAMS BETWEEN 30 AND 100 FEET WIDE, 200 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR STREAMS GREATER THAN 100 FEET WIDE, AND 300 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR AREAS SUBJECT TO TIDAL OR COASTAL SCOUR. RECORD THE DOWNSTREAM OBSERVATION, LOCATION, AND TIME.
      iii. COMPARE THE UPSTREAM AND DOWNSTREAM OBSERVATIONS. IF MORE TURBIDITY OR POLLUTANTS IS/ARE OBSERVED DOWNSTREAM THAN UPSTREAM, THE ACTIVITY WILL BE MODIFIED TO REDUCE POLLUTION. CONTINUE TO MONITOR EVERY 4 HOURS.
      iv. IF THE EXCEEDANCE CONTINUES AFTER THE SECOND MONITORING INTERVAL (AFTER 8 HOURS), THE ACTIVITY WILL STOP UNTIL THE LEVELS RETURNS TO BACKGROUND.
      v. RESULTS OF TURBIDITY MONITORING AND SAMPLING WILL BE SUMMARIZED AND SUBMITTED TO NMFS IN THE ACTION IMPLEMENTATION FORM WITHIN 60 DAYS OF END OF CONSTRUCTION.

8. **HAZARDOUS MATERIAL SPILL PREVENTION AND CONTROL**
   a. AT THE PROJECT SITE:
      i. POST OR HAVE AVAILABLE ON SITE, WRITTEN PROCEDURES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES, INCLUDING AN INVENTORY AND DESCRIPTION OF ALL HAZARDOUS MATERIALS PRESENT, AND THE STORAGE AND HANDLING PROCEDURES FOR THEIR USE.
      ii. MAINTAIN A SPILL CONTAINMENT KIT, WITH SUPPLIES AND INSTRUCTIONS FOR CLEANUP AND DISPOSAL, ADEQUATE FOR THE TYPES AND QUANTITY OF HAZARDOUS MATERIALS PRESENT.
      iii. TRAIN WORKERS IN SPILL CONTAINMENT PROCEDURES, INCLUDING THE LOCATION AND USE OF THE SPILL CONTAINMENT KITS.
   b. TEMPORARILY CONTAIN ANY WASTE LIQUIDS UNDER AN IMPERVIOUS COVER, SUCH AS A TARPAULIN, IN THE STAGING AREA UNTIL THE WASTES CAN BE PROPERLY TRANSPORTED TO, AND DISPOSED OF, AT AN APPROVED RECEIVING FACILITY.

9. **EQUIPMENT, VEHICLES, AND POWER TOOLS**
   a. SELECT, OPERATE AND MAINTAIN ALL HEAVY EQUIPMENT, VEHICLES, AND POWER TOOLS TO MINIMIZE ADVERSE EFFECTS ON THE ENVIRONMENT AND NOISE DISTURBANCE TO LISTED SPECIES, E.G., LOW PRESSURE TIRES, MINIMAL HARD-TURN PATHS FOR TRACK VEHICLES, USE OF TEMPORARY MATS OR PLATES TO PROTECT WET SOILS.
   b. BEFORE ENTERING WETLANDS OR WORKING WITHIN 150 FEET OF A WATERBODY, REPLACE ALL PETROLEUM-BASED HYDRAULIC FLUIDS WITH BIODEGRADABLE PRODUCTS (E.G., MINERAL OIL, POLYGLYCOL, VEGETABLE OIL, SYNTHETIC ESTER; MOBIL® BIODEGRADABLE HYDRAULIC OILS, TOTAL® HYDRAULIC FLUID, TERRESOLVE TECHNOLOGIES LTD.® BIO-BASED BIODEGRADABLE LUBRICANTS, COUGAR LUBRICATION® 2XT BIO ENGINE OIL, SERIES 4300 SYNTHETIC BIO-DEGRADABLE HYDRAULIC OIL, 8060-2 SYNTHETIC BIO-DEGRADABLE GREASE NO. 2, ETC.) THE USE OF TRADE, FIRM, OR CORPORATION NAMES IN THIS OPINION IS FOR THE INFORMATION AND CONVENIENCE OF THE ACTION AGENCY AND APPLICANTS AND DOES NOT CONSTITUTE AN OFFICIAL ENDORSEMENT OR APPROVAL BY THE U.S. DEPARTMENT OF INTERIOR OR USFWS OF ANY PRODUCT OR SERVICE TO THE EXCLUSION OF OTHERS THAT MAY BE SUITABLE.;
   c. TAKE APPROPRIATE MEASURES NECESSARY FOR INVASIVE SPECIES PREVENTION AND CONTROL:
      i. BEFORE ENTERING AND LEAVING THE PROJECT SITE, POWER WASH ALL HEAVY EQUIPMENT, VEHICLES AND POWER TOOLS, ALLOW THEM TO FULLY DRY, AND INSPECT THEM TO MAKE CERTAIN NO PLANTS, SOIL, OR OTHER ORGANIC MATERIAL IS ADHERING TO THEIR SURFACE.
      ii. BEFORE ENTERING AND LEAVING THE WATER, INSPECT ANY WATERCRAFT, WADERS, BOOTS, OR OTHER GEAR TO BE USED IN OR NEAR WATER AND REMOVE ANY PLANTS, SOIL, OR OTHER ORGANIC MATERIAL ADHERING TO THE SURFACE.
      iii. ENSURE ALL VEHICLES, EQUIPMENT, AND TOOLS ARE AS CLEAN AS POSSIBLE AND FREE FROM ANY SEEDS OR VEGETATIVE MATTER.
   d. INSPECT ALL EQUIPMENT, VEHICLES, AND POWER TOOLS FOR FLUID LEAKS BEFORE THEY LEAVE THE STAGING AREA.
   e. BEFORE OPERATION WITHIN 150 FEET OF ANY WATERBODY, AND AS OFTEN AS NECESSARY DURING OPERATION, THOROUGHLY CLEAN ALL EQUIPMENT, VEHICLES, AND POWER TOOLS TO KEEP THEM FREE OF EXTERNAL FLUIDS AND GREASE AND TO PREVENT LEAKS AND SPILLS FROM ENTERING THE WATER.
   f. GENERATORS, CRANES OR OTHER STATIONARY HEAVY EQUIPMENT OPERATED WITHIN 150 FEET OF ANY WATERBODY WILL BE MAINTAINED AND PROTECTED AS NECESSARY TO PREVENT LEAKS AND SPILLS FROM ENTERING THE WATER.

10. **TEMPORARY ACCESS ROADS AND PATHS**
   a. WHENEVER REASONABLE, PREFERENTIALLY USE EXISTING ACCESS ROADS AND PATHS.
   b. MINIMIZE THE NUMBER AND LENGTH OF TEMPORARY ACCESS ROADS AND PATHS THROUGH RIPARIAN AREAS AND FLOODPLAINS.
   c. MINIMIZE REMOVAL OF RIPARIAN VEGETATION.
   d. WHEN IT IS NECESSARY TO REMOVE VEGETATION, CUT AT GROUND LEVEL (NO GRUBBING).
   e. DO NOT BUILD TEMPORARY ACCESS ROADS OR PATHS WHERE GRADE, SOIL, OR OTHER FEATURES SUGGEST SLOPE INSTABILITY.
   f. ANY ROAD ON A SLOPE STEEPER THAN 30% WILL BE DESIGNED BY A CIVIL ENGINEER WITH EXPERIENCE IN STEEP ROAD DESIGN.
   g. AFTER CONSTRUCTION IS COMPLETE, OBLITERATE ALL TEMPORARY ACCESS ROADS AND PATHS, STABILIZE THE SOIL, AND REVEGETATE THE AREA.
   h. TEMPORARY ROADS AND PATHS IN WET AREAS OR AREAS PRONE TO FLOODING WILL BE OBLITERATED BY THE END OF THE IN-WATER WORK WINDOW. DECOMPACT ROAD SURFACES AND DRAINAGE AREAS, PULL FILL MATERIAL ONTO THE RUNNING SURFACE, AND RESHAPE TO MATCH THE ORIGINAL CONTOURS.

PERMIT

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PROJECTS CONSERVATION MEASURES

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
1.1

GENERAL CONSERVATION MEASURES FROM PROGRAMMATIC RESTORATION OPINION FOR JOINT ECOSYSTEM CONSERVATION BY THE SERVICES (PROJECTS), CONTINUED

11. DUST ABATEMENT

a. EMPLOY DUST ABATEMENT MEASURES COMMENSURATE WITH SOIL TYPE, EQUIPMENT USE, WIND CONDITIONS, AND THE EFFECTS OF OTHER EROSION CONTROL MEASURES.
b. SEQUENCE AND SCHEDULE WORK TO REDUCE THE EXPOSURE OF BARE SOIL TO WIND EROSION.
c. MAINTAIN SPILL CONTAINMENT SUPPLIES ON-SITE WHENEVER DUST ABATEMENT CHEMICALS ARE APPLIED.
d. DO NOT USE PETROLEUM-BASED PRODUCTS.
e. DO NOT APPLY DUST-ABATEMENT CHEMICALS, E.G., MAGNESIUM CHLORIDE, CALCIUM CHLORIDE SALTS, LIGNINSULFONATE, WITHIN 25 FEET OF WATER BODY, OR IN OTHER AREAS WHERE THERE MAY BE RUNOFF INTO A WETLAND OR WATER BODY.
f. DO NOT APPLY LIGNINSULFONATE AT RATES EXCEEDING 2.26 L/M^2 (0.5 GALLONS PER SQUARE YARD) OF ROAD SURFACE, ASSUMING A 50:50 SOLUTION OF LIGNINSULFONATE TO WATER.

12. TEMPORARY STREAM CROSSINGS

a. NO STREAM CROSSING MAY OCCUR WHERE LISTED AMPHIBIANS ARE PRESENT.
b. NO STREAM CROSSING MAY OCCUR AT ACTIVE SPAWNING SITES WHEN HOLDING ADULT LISTED FISH ARE PRESENT, OR WHEN EGGS OR ALVEINS ARE IN THE GRAVEL.
c. DO NOT PLACE TEMPORARY CROSSINGS IN AREAS THAT MAY INCREASE THE RISK OF CHANNEL RE-ROUTING OR AVULSION, OR IN POTENTIAL SPAWNING HABITAT, E.G., POOLS AND POOL TAILOUTS.
d. MINIMIZE THE NUMBER OF TEMPORARY STREAM CROSSINGS; USE EXISTING STREAM CROSSINGS WHENEVER REASONABLE.
e. INSTALL TEMPORARY BRIDGES AND CULVERTS TO ALLOW FOR EQUIPMENT AND VEHICLE CROSSING OVER PERENNIAL STREAMS TO ACCESS CONSTRUCTION AREAS.
f. WHEREVER POSSIBLE, VEHICLES AND MACHINERY WILL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL.
g. EQUIPMENT AND VEHICLES MAY CROSS THE STREAM IN THE WET ONLY WHERE THE STREAMBED IS BEDROCK, WHERE THE STREAMBED IS NATURALLY STABLE, OR WHERE MATS OR OFF-SITE LOGS ARE PLACED IN THE STREAM AND USED AS A CROSSING.
h. OBLITERATE ALL TEMPORARY STREAM CROSSINGS AS SOON AS THEY ARE NO LONGER NEEDED, AND RESTORE ANY DAMAGE TO AFFECTED STREAM BANKS OR CHANNEL.

13. SURFACE WATER WITHDRAWAL AND CONSTRUCTION DISCHARGE WATER

a. SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS, BUT ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE.
b. DIVERSIONS MAY NOT EXCEED 10% OF THE AVAILABLE FLOW AND WILL HAVE A JUVENILE FISH EXCLUSION DEVICE THAT IS CONSISTENT WITH NMFS'S CRITERIA (NMFS 2011 OR THE MOST RECENT VERSION).
c. TREAT ALL CONSTRUCTION DISCHARGE WATER USING BMPS TO REMOVE DEBRIS, SEDIMENT, PETROLEUM PRODUCTS, AND ANY OTHER POLLUTANTS LIKELY TO BE PRESENT (E.G., GREEN CONCRETE, CONTAMINATED WATER, SILT, WELDING SLAG, SANDBLASTING ABRASIVE, GROUT CURED LESS THAN 24 HOURS, DRILLING FLUIDS), TO ENSURE THAT NO POLLUTANTS ARE DISCHARGED TO ANY PERENNIAL OR INTERMITTENT WATERBODY.

14. TEMPORARY FISH PASSAGE

a. PROVIDE FISH PASSAGE FOR ANY ADULT OR JUVENILE LISTED FISH LIKELY TO BE PRESENT IN THE ACTION AREA DURING CONSTRUCTION, UNLESS PASSAGE DID NOT EXIST BEFORE CONSTRUCTION. STREAM ISOLATION AND DEWATERING IS REQUIRED DURING PROJECT IMPLEMENTATION, UNLESS THE STREAM IS NATURALLY IMPASSABLE AT THE TIME OF CONSTRUCTION.
b. AFTER CONSTRUCTION, PROVIDE FISH PASSAGE THAT MEETS NMFS'S FISH PASSAGE CRITERIA FOR ANY ADULT OR JUVENILE LISTED FISH (NMFS 2011 OR THE MOST RECENT VERSION), FOR THE LIFE OF THE ACTION.

15. TIMING OF IN-WATER WORK

a. THE IN-WATER WORK WINDOW WILL LIMIT IN-WATER CONSTRUCTION TO THE TIMES SPECIFIED IN THE PROJECT NOTIFICATION FORM. THE CONSTRUCTION SCHEDULE WILL CONFORM TO THE MOST UP-TO-DATE GUIDELINES ON IN-WATER WORK WINDOWS ESTABLISHED IN OREGON, WASHINGTON, AND IDAHO BY THE OREGON DEPARTMENT OF FISH AND WILDLIFE, WASHINGTON DEPARTMENT OF FISH AND WILDLIFE, AND IDAHO DEPARTMENT OF FISH AND GAME, RESPECTIVELY, AND THE SERVICE FOR BULL TROUT. FOR NEARSHORE PROJECTS IN PUGET SOUND, NO IN-WATER WORK IS ALLOWED IN BULL TROUT FORAGING, MIGRATION AND OVERWINTERING HABITAT FROM FEBRUARY 16 TO JULY 15, AND NEAR THE DUWAMISH RIVER FROM FEBRUARY 16 TO SEPTEMBER 30. ANY EXCEPTIONS TO IN-WATER WORK WINDOWS RECOMMENDED BY ODFW, WDFW, OR IDFG WILL BE APPROVED BY NMFS AND THE SERVICE, AS APPROPRIATE.
b. HYDRAULIC AND TOPOGRAPHIC MEASUREMENTS AND PLACEMENT OF LW, BOULDERS, OR GRAVEL MAY BE COMPLETED ANYTIME, PROVIDED THERE IS NO EXCAVATION IN AREAS OCCUPIED BY ADULT FISH CONGREGATING FOR SPAWNING, OR IN AREAS WHERE REDDS ARE OCCUPIED BY EGGS OR PRE-EMERGENT ALEVINS.

16. FISHERIES, HYDROLOGY, GEOMORPHOLOGY, WILDLIFE, BOTANY, AND CULTURAL SURVEYS IN SUPPORT OF HABITAT RESTORATION

THIS INCLUDES ASSESSMENTS AND MONITORING PROJECTS THAT ARE ASSOCIATED WITH PLANNING, IMPLEMENTATION, AND MONITORING OF RESTORATION PROJECTS COVERED BY THIS OPINION. SUCH SUPPORT PROJECTS MAY INCLUDE SURVEYS TO DOCUMENT THE FOLLOWING AQUATIC, RIPARIAN, COASTAL AND UPLAND ATTRIBUTES: HABITAT, HYDROLOGY, CHANNEL GEOMORPHOLOGY, WATER QUALITY, FISH SPAWNING, SPECIES PRESENCE (ENUMERATION BY NON-LETHAL TECHNIQUES THAT DO NOT REQUIRE HANDLING, I.E., SNORKELING, OCULAR SURVEYS, ETC.; NOT HOOKING OR ELECTROFISHING FOR FISH SPECIES), MACROINVERTEBRATES, RIPARIAN VEGETATION, WILDLIFE, AND CULTURAL RESOURCES (INCLUDING EXCAVATING TEST PITS LESS THAN 1 M^2 (~1.2 SQUARE YARD) IN SIZE). THIS ALSO INCLUDES EFFECTIVENESS MONITORING ASSOCIATED WITH PROJECTS IMPLEMENTED UNDER THIS OPINION, PROVIDED THE EFFECTIVENESS MONITORING IS LIMITED TO THE SAME SURVEY TECHNIQUES DESCRIBED IN THIS SECTION.

a. PROJECT SITES WILL BE SURVEYED FOR PRESENCE OF ANY LISTED PLANT OR ANIMAL SPECIES THAT MAY OCCUR WITHIN THE PROJECT AREA. SURVEYS WILL TAKE PLACE PRIOR TO INITIATION OF THE PROJECT AND DURING THE APPROPRIATE TIME FRAMES. IF NO SURVEYS OCCUR OR ARE AVAILABLE, OCCUPANCY FOR LISTED ANIMAL SPECIES WILL BE ASSUMED IN ALL SUITABLE HABITAT IN PROXIMITY TO KNOWN OCCUPIED HABITAT (DISTANCE IS DEFINED ON A SPECIES BY SPECIES BASIS WITHIN THE CONSERVATION MEASURES), AND LISTED PLANT OCCUPANCY WILL BE ASSUMED IN ALL SUITABLE HABITAT WHERE THE SPECIES IS KNOWN TO OCCUR, UNLESS ABSENCE CAN BE CONFIRMED BY A SERVICE SPECIES LEAD.
b. TRAIN PERSONNEL IN SURVEY METHODS TO PREVENT OR MINIMIZE DISTURBANCE OF FISH AND WILDLIFE AND PLANTS. CONTRACT SPECIFICATIONS SHOULD INCLUDE THESE METHODS WHERE APPROPRIATE.
c. AVOID IMPACTS TO FISH REDDS. WHEN POSSIBLE, AVOID SAMPLING DURING SPAWNING PERIODS.
d. AVOID TRAMPLING AND/OR STEPPING ON LISTED SPECIES, THEIR NESTS AND THEIR FORAGE PLANTS WHEN COMPLETING SURVEYS, ASSESSMENTS, AND MONITORING ACTIVITIES.
e. DO NOT WALK THROUGH VERNAL POOL HABITATS, ESPECIALLY DURING THE WET SEASON, UNLESS ABSOLUTELY NECESSARY TO COMPLETE REQUIRED SURVEYS, ASSESSMENTS, AND MONITORING ACTIVITIES.
f. COMPLETE SURVEYS, ASSESSMENTS, AND MONITORING ACTIVITIES DURING NON-CRITICAL LIFE HISTORY PERIODS FOR A LISTED SPECIES (E.G., NOT DURING SPAWNING AND BREEDING PERIODS), UNLESS THE ACTIVITY OBJECTIVE(S) REQUIRES THIS LEVEL OF TIMING.
g. COORDINATE WITH OTHER LOCAL AGENCIES TO PREVENT REDUNDANT SURVEYS.
h. LOCATE EXCAVATED MATERIAL FROM CULTURAL RESOURCE TEST PITS AWAY FROM STREAM CHANNELS. REPLACE ALL MATERIAL IN TEST PITS WHEN SURVEY IS COMPLETED AND STABILIZE THE SURFACE.

17. WORK AREA ISOLATION

a. ISOLATE ANY WORK AREA WITHIN THE WETTED CHANNEL FROM THE ACTIVE STREAM WHENEVER LISTED FISH ARE REASONABLY CERTAIN TO BE PRESENT, OR IF THE WORK AREA IS LESS THAN 91.44 M (300 FEET) UPSTREAM FROM KNOWN SPAWNING HABITATS. HOWEVER, WORK AREA ISOLATION MAY NOT ALWAYS BE NECESSARY OR PRACTICAL IN CERTAIN SETTINGS; E.G., DRY STREAMBEDS AND TIDAL ZONES, RESPECTIVELY.
b. ENGINEERING DESIGN PLANS FOR WORK AREA ISOLATION WILL INCLUDE ALL ISOLATION ELEMENTS. FINAL SITE SPECIFIC PLANS BY CONTRACTORS WILL BE APPROVED BY PROJECT SPONSOR AND BIOLOGIST.
c. DEWATER THE SHORTEST LINEAR EXTENT OF WORK AREA PRACTICABLE, UNLESS WETTED IN-STREAM WORK IS DEEMED TO BE MINIMALLY HARMFUL TO FISH, AND IS BENEFICIAL TO OTHER AQUATIC SPECIES. FOR INSTRUCTIONS ON HOW TO DEWATER AREAS OCCUPIED BY LAMPREY, SEE BEST MANAGEMENT PRACTICES TO MINIMIZE ADVERSE EFFECTS TO PACIFIC LAMPREY (ENTOSPHENUS TRIDENTATUS) (USFWS 2010).
   i. USE A COFFER DAM AND A BY-PASS CULVERT OR PIPE, OR A LINED, NON-ERODIBLE DIVERSION DITCH TO DIVERT FLOW AROUND THE DEWATERED AREA. DISSIPATE FLOW ENERGY TO PREVENT DAMAGE TO RIPARIAN VEGETATION OR STREAM CHANNEL AND PROVIDE SAFE DOWNSTREAM RE-ENTRY FOR FISH, PREFERABLY INTO POOL HABITAT WITH COVER.
   ii. WHERE GRAVITY FEED IS NOT POSSIBLE, PUMP WATER FROM THE WORK SITE TO AVOID RE-WATERING. MAINTAIN A FISH SCREEN ON THE PUMP INTAKE TO AVOID JUVENILE FISH ENTRAINMENT (NMFS 2011 OR THE MOST RECENT VERSION).
   iii. PUMP SEEPAGE WATER TO A TEMPORARY STORAGE AND TREATMENT SITE, OR INTO UPLAND AREAS, TO ALLOW WATER TO PERCOLATE THROUGH SOIL OR TO FILTER THROUGH VEGETATION BEFORE REENTERING THE STREAM CHANNEL. THE WATER TREATMENT SITE SHOULD HAVE A TREATMENT SYSTEM COMPRISED OF EITHER A HAY BALE BASIN OR OTHER SEDIMENT CONTROL DEVICE.
   iv. MONITOR WATER LEVELS BELOW THE CONSTRUCTION SITE TO PREVENT STRANDING OF AQUATIC ORGANISMS.
   v. WHEN CONSTRUCTION IS COMPLETE, RE-WATER THE CONSTRUCTION SITE SLOWLY TO PREVENT LOSS OF SURFACE FLOW DOWNSTREAM, AND TO PREVENT A RELEASE OF SUSPENDED SEDIMENT.
d. WHENEVER A PUMP IS USED TO DEWATER THE ISOLATION AREA AND LISTED FISH MAY BE PRESENT, A FISH SCREEN WILL BE USED THAT MEETS NMFS'S FISH SCREEN CRITERIA (NMFS 2011 OR THE MOST RECENT VERSION). NMFS APPROVAL IS REQUIRED FOR PUMPING THAT EXCEEDS 3 CFS.

18. FISH CAPTURE AND RELEASE

a. IF PRACTICABLE, ALLOW LISTED FISH SPECIES TO MIGRATE OUT OF THE WORK AREA OR REMOVE FISH BEFORE DEWATERING; OTHERWISE REMOVE FISH FROM AN EXCLUSION AREA AS IT IS SLOWLY DEWATERED WITH METHODS SUCH AS HAND OR DIP-NETS, SEINING, AND TRAPPING WITH MINNOW TRAPS (OR GEE-MINNOW TRAPS).
b. FISH CAPTURE WILL BE SUPERVISED BY A QUALIFIED FISHERIES BIOLOGIST WITH EXPERIENCE IN WORK AREA ISOLATION AND COMPETENCE TO ENSURE THE SAFE HANDLING OF FISH.
c. CONDUCT FISH CAPTURE ACTIVITIES DURING PERIODS OF THE DAY WITH THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING TO MINIMIZE STRESS AND INJURY OF SPECIES PRESENT.
d. MONITOR THE NETS FREQUENTLY ENOUGH TO ENSURE THEY STAY SECURED TO THE BANKS AND FREE OF ORGANIC ACCUMULATION.
e. ELECTROFISH DURING THE COOLEST TIME OF DAY, AND ONLY AFTER OTHER MEANS OF FISH CAPTURE ARE DETERMINED TO BE NOT FEASIBLE OR INEFFECTIVE.
   i. FOLLOW THE MOST RECENT VERSION OF NMFS (2000) ELECTROFISHING GUIDELINES.
   ii. DO NOT ELECTROFISH WHEN THE WATER APPEARS TURBID, E.G., WHEN OBJECTS ARE NOT VISIBLE AT DEPTH OF 30 CM (12 INCHES).
   iii. DO NOT INTENTIONALLY CONTACT FISH WITH THE ANODE.
   iv. USE DIRECT CURRENT OR PULSED DIRECT CURRENT WITHIN THE FOLLOWING RANGES:

1. IF CONDUCTIVITY IS LESS THAN 100 MICROSECOND (MS), USE 900 TO 1100 VOLTS.
2. IF CONDUCTIVITY IS BETWEEN 100 AND 300 MS, USE 500 TO 800 VOLTS.
3. IF CONDUCTIVITY GREATER THAN 300 MS, USE LESS THAN 400 VOLTS.

   f. BEGIN ELECTROFISHING WITH A MINIMUM PULSE WIDTH AND RECOMMENDED VOLTAGE, THEN GRADUALLY INCREASE TO THE POINT WHERE FISH ARE IMMOBILIZED.
   g. IMMEDIATELY DISCONTINUE ELECTROFISHING IF FISH ARE KILLED OR INJURED, I.E., DARK BANDS VISIBLE ON THE BODY, SPINAL DEFORMATIONS, SIGNIFICANT DE-SCALING, FISH ARE TORPID OR NOT ABLE TO MAINTAIN UPRIGHT ATTITUDE AFTER SUFFICIENT RECOVERY TIME. RECHECK MACHINE SETTINGS, WATER TEMPERATURE AND CONDUCTIVITY, AND ADJUST OR POSTPONE PROCEDURES AS NECESSARY TO REDUCE INJURIES.
   h. IF BUCKETS ARE USED TO TRANSPORT FISH:
      i. MINIMIZE THE TIME FISH ARE IN A TRANSPORT BUCKET.
      ii. KEEP BUCKETS IN SHADED AREAS OR, IF NO SHADE IS AVAILABLE, COVERED BY A CANOPY.
      iii. LIMIT THE NUMBER OF FISH WITHIN A BUCKET; FISH WILL BE OF RELATIVELY COMPARABLE SIZE TO MINIMIZE PREDATION.
      iv. USE AERATORS OR REPLACE THE WATER IN THE BUCKETS AT LEAST EVERY 15 MINUTES WITH COLD CLEAR WATER.
      v. RELEASE FISH IN AN AREA UPSTREAM WITH ADEQUATE COVER AND FLOW REFUGE; DOWNSTREAM RELEASE IS ACCEPTABLE PROVIDED THE RELEASE SITE IS BELOW THE INFLUENCE OF CONSTRUCTION.
      vi. BE CAREFUL TO AVOID MORTALITY COUNTING ERRORS.
   i. MONITOR AND RECORD FISH PRESENCE, HANDLING, AND INJURY DURING ALL PHASES OF FISH CAPTURE AND SUBMIT A FISH SALVAGE REPORT TO NMFS AND THE SERVICE FOR ANY LISTED FISH SPECIES THAT MAY BE PRESENT, WITHIN 60 DAYS OF CAPTURE. THE REPORT MUST, DOCUMENT THE DATE, TIME OF DAY, FISH HANDLING PROCEDURES, AIR AND WATER TEMPERATURES, AND TOTAL NUMBERS OF EACH FISH SPECIES HANDLED, AND NUMBERS OF LISTED FISH INJURED OR KILLED.

PERMIT

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue 311 SW Jefferson Avenue
Whitefish, MT 59937 Corvallis, OR 97333
406.862.4927 541.738.2920

PROJECTS CONSERVATION MEASURES
POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
1.2

M:\Projects\2022\22-283 Pomeroy Dam Removal\CAD\RDG-22-283 Pomeroy Dam Production Const Measures.dwg

GENERAL CONSERVATION MEASURES FROM PROGRAMMATIC RESTORATION OPINION FOR JOINT ECOSYSTEM CONSERVATION BY THE SERVICES (PROJECTS), CONTINUED

19. INVASIVE SPECIES AND NON-NATIVE PLANT CONTROL

INVASIVE SPECIES IMPACTS ARE OF CONCERN TO THE SERVICE AND NMFS. INVASIVE SPECIES DEGRADE, CHANGE, OR DISPLACE NATIVE HABITATS AND COMPETE WITH NATIVE WILDLIFE AND ARE THUS HARMFUL TO FISH, WILDLIFE, AND PLANT RESOURCES. PREVENTING THE INTRODUCTION OR SPREAD OF INVASIVE AND NON-TARGET SPECIES IS THE MOST EFFECTIVE STRATEGY TO AVOID IMPACTS TO NATIVE SPECIES AND ECOSYSTEMS. PREVENTIVE MEASURES TYPICALLY OFFER THE MOST COST-EFFECTIVE MEANS TO MINIMIZE OR ELIMINATE ENVIRONMENTAL AND ECONOMIC IMPACTS DUE TO INVASIVE SPECIES.

INVASIVE SPECIES PREVENTION MEASURES

a. EACH PROJECT MUST CLEARLY IDENTIFY AND IMPLEMENT INVASIVE SPECIES PREVENTION MEASURES, INCLUDING:

i. GENERATING A LIST OF INVASIVE SPECIES OF CONCERN FOR IMPORTING OR EXPORTING FROM THE PROJECT SITE.

ii. SPECIFYING METHODS TO BE USED TO REDUCE THE RISK OF SPREADING INVASIVE SPECIES.

iii. MONITORING THAT WILL OCCUR TO DETECT INVASIVE SPECIES AND;

iv. IDENTIFYING ACTIONS THAT WILL BE IMPLEMENTED TO CONTROL INVASIVE SPECIES IF IDENTIFIED AND IT IS DEEMED NECESSARY TO TAKE ACTION.

b. CONTROL OR REMOVAL OF INVASIVE AND NON-NATIVE VEGETATION MUST BE COMPLETED IN A MANNER THAT MINIMIZES THE ACCIDENTAL DISPERSAL OF SEEDS OR REPRODUCTIVE PLANT PARTS TO OTHER LOCATIONS. PROJECT PERSONNEL SHOULD COMPLETE THE FOLLOWING TASKS.

i. SHAKE OUT ALL WORK CLOTHES WORN BEFORE LEAVING A PROJECT SITE.

ii. CHANGE WORK CLOTHES (E.G., COVERALLS, GLOVES, AND HATS) AND CLEAN BOOTS IF WORKERS WILL BE GOING TO A NEW LOCATION.

iii. LAUNDER WORK CLOTHES FREQUENTLY.

iv. PROPERLY DISPOSE OF ALL INVASIVE AND NON-NATIVE PLANT MATERIALS REMOVED DURING A TREATMENT IN A TIMELY MANNER.

v. CLEAN ALL EQUIPMENT, VEHICLES, AND TOOLS USED AT A PROJECT SITE BEFORE GOING TO A NEW LOCATION.

INVASIVE PLANT TREATMENT MEASURES

a. HERBICIDE METHODS.

•FOR HERBICIDE USE IN PRAIRIE RESTORATION SITES, SEE PDC 61 FOR ADDITIONAL INFORMATION AND RESTRICTIONS ON PRAIRIE, COASTAL AND OAK HABITAT RESTORATION.

•HERBICIDE LABEL. HERBICIDE APPLICATORS WILL COMPLY WITH ALL LABEL INSTRUCTIONS.

•POWER EQUIPMENT. REFUEL GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN 19 LITERS (5 GALLONS) IN A VEHICLE STAGING AREA PLACED 45.72 M (150 FEET) OR MORE FROM ANY NATURAL WATERBODY, OR IN AN ISOLATED HAZARD ZONE SUCH AS A PAVED PARKING LOT.

•MAXIMUM HERBICIDE TREATMENT AREA. IN RIPARIAN HABITAT: DO NOT TREAT MORE THAN 10% OF THE ACRES OF RIPARIAN HABITAT WITHIN A 6 TH-FIELD HUC WITH HERBICIDES PER YEAR.

•HERBICIDE APPLICATOR QUALIFICATIONS. HERBICIDES MAY ONLY BE APPLIED BY AN APPROPRIATELY LICENSED THE DIRECT SUPERVISION OF A LICENSED APPLICATOR. ONLY USE AN HERBICIDE SPECIFICALLY TARGETED FOR A PARTICULAR PLANT SPECIES THAT WILL CAUSE THE LEAST IMPACT.

•HERBICIDE TRANSPORTATION AND SAFETY PLAN. THE APPLICATOR WILL PREPARE AND CARRY OUT AN HERBICIDE SAFETY/SPILL RESPONSE PLAN TO REDUCE THE LIKELIHOOD OF SPILLS OR MISAPPLICATION, TAKE REMEDIAL ACTIONS IN THE EVENT OF SPILLS, AND FULLY REPORT THE EVENT. THE FOLLOWING MEASURES WILL BE USED TO REDUCE THE RISK OF A SPILL DURING WATER TRANSPORT: A) NO MORE THAN 9.5 L (2.5 GALLONS) OF HERBICIDE CONCENTRATE WILL BE TRANSPORTED PER PERSON OR RAFT, AND GLYPHOSATE WILL BE CARRIED IN 3.8 L (1 GALLON) OR SMALLER PLASTIC CONTAINERS. THE CONTAINERS WILL BE WRAPPED IN PLASTIC BAGS AND THEN SEALED IN A SECONDARY WATERTIGHT CONTAINER. IF TRANSPORTED BY RAFT, THE CONTAINER WILL BE SECURED TO THE WATERCRAFT.

•BEFORE APPLYING HERBICIDE, APPLICATORS MUST THOROUGHLY REVIEW THE SITE TO IDENTIFY AND MARK ANY REQUIRED BUFFER AREAS.

b. ALL REASONABLE EFFORTS WILL BE MADE TO DETERMINE ADVERSE IMPACTS TO LISTED SPECIES FOLLOWING HERBICIDE APPLICATIONS.

c. NOTIFY THE SERVICE WITHIN 24 HOURS OF ANY SPILL OR MISAPPLICATION.

d. PERMITTED HERBICIDES. THE ONLY HERBICIDES ALLOWED FOR USE UNDER THIS OPINION ARE DIVIDED INTO "AQUATIC AND UPLAND" AND "UPLAND USE ONLY". HERBICIDES AND ADJUTANTS IDENTIFIED FOR "UPLAND USE ONLY," MUST NOT BE USED WITHIN 30.5 M (100 FEET) (EXCEPT ORZALIN WHICH HAS A 297 M (975 FEET) BUFFER) OF AQUATIC HABITATS OR WHERE THERE IS A REASONABLE LIKELIHOOD THAT IT WILL DRIFT OR LEACH INTO AQUATIC HABITATS. ALL BMPS FOR HERBICIDE USE AND SPECIES SPECIFIC CONSERVATION MEASURES MUST BE OBSERVED. THE USE OF DYES IS STRONGLY ENCOURAGED WHEN SPRAYING NEAR THE 30 M (100 FEET) BUFFER. VEGETATION CONTROL CLOSER THAN 30 M (100 FEET) MAY USE "AQUATIC" HERBICIDES WITH ASSOCIATED BUFFERS, OR OTHER CONTROL TECHNIQUES REMOVAL.

e. PERMITTED HERBICIDES, COMMON TRADE NAMES (THE USE OF TRADE, FIRM, OR CORPORATION NAMES IN THIS OPINION IS FOR THE INFORMATION AND CONVENIENCE OF THE ACTION AGENCY AND APPLICANTS AND DOES NOT CONSTITUTE AN OFFICIAL ENDORSEMENT OR APPROVAL BY THE U.S. DEPARTMENT OF INTERIOR OR USFWS OF ANY PRODUCT OR SERVICE TO THE EXCLUSION OF OTHERS THAT MAY BE SUITABLE), AND ALLOWABLE USES UNDER THIS OPINION ARE AS FOLLOWS:

AQUATIC AND UPLAND HERBICIDES

•AQUATIC IMAZAPYR (E.G., HABITAT) - AQUATIC AND UPLAND, NO T&E PLANTS AND BUTTERFLIES

•AQUATIC GLYPHOSATE (E.G., AQUAMASTER, AQUAPRO, RODEO) - AQUATIC AND UPLAND

•AQUATIC TRICLOPYR-TEA (E.G., RENOVATE 3) - AQUATIC AND UPLAND, NO T&E PLANTS AND BUTTERFLIES

•CHLORSULFURON (E.G., TELAR, GLEAN, CORSAIR) - AQUATIC AND UPLAND

•CLOPYRALID (E.G., TRANSLINE) - AQUATIC AND UPLAND

•IMAZAPIC (E.G., PLATEAU) - AQUATIC AND UPLAND

•IMAZAPYR (E.G., ARSENAL, CHOPPER) - AQUATIC AND UPLAND, NO T&E PLANTS AND BUTTERFLIES

•METSULFURON-METHYL (E.G., ESCORT) - AQUATIC AND UPLAND

•PICLORAM (E.G., TORDON) - AQUATIC AND UPLAND

•SETHOXYDIM (E.G., POAST, VANTAGE) - AQUATIC AND UPLAND

•SULFOMETURON-METHYL (E.G., OUST, OUST XP) - AQUATIC AND UPLAND

•GLYPHOSATE (NONAQUATIC FORMULATION) - UPLAND USE ONLY, NO VERNAL POOL USE.

•TRICLOPYR (E.G., GARLON4ULTRA) - UPLAND USE ONLY, NO VERNAL POOL USE.

•FLUAZIFOP-P-BUTYL (E.G., FUSILADE) - UPLAND USE ONLY, NO VERNAL POOL USE.

•CLETHODIM (E.G., ENVOY) - UPLAND USE ONLY, NO VERNAL POOL USE

•TRICLOPYR +2,4-D ESTER (E.G., CROSSBOW) - UPLAND USE ONLY, NO VERNAL POOL USE.

•DIQUAT DIBROMIDE (E.G., REWARD) - UPLAND USE ONLY, NO VERNAL POOL USE

•2,4-D AMINE, CANNOT USE ON T&E PLANTS AND BUTTERFLIES, NO VERNAL POOL USE.

•DICAMBA (E.G., BANVEL, CLARITY) - UPLAND USE ONLY, NO VERNAL POOL USE.

•ORYZALIN, CANNOT USE ON T&E PLANTS AND BUTTERFLIES, NO VERNAL POOL USE.

•AMINOPYRALID - UPLAND USE ONLY, NO VERNAL POOL USE.

f. PERMITTED HERBICIDE ADJUVANTS. WHEN RECOMMENDED BY THE LABEL, AN APPROVED AQUATIC SURFACTANT OR DRIFT RETARDANT CAN BE USED TO IMPROVE HERBICIDAL ACTIVITY OR APPLICATION CHARACTERISTICS. ADJUVANTS THAT CONTAIN ALKYAMINE ETHOLOXYLATES, I.E., POLYETHOXYLATED TALLOW AMINE (POEA), ALKYLPHENOL ETHOXYLATE (INCLUDING ALKYL PHENOL ETHOXYLATE PHOSPHATE ESTERS), OR HERBICIDES THAT CONTAIN THESE COMPOUNDS ARE NOT COVERED BY THIS OPINION. THE FOLLOWING PRODUCT NAMES ARE COVERED BY THIS OPINION:

•AGRI-DEX

•AQUASURF

•BOND

•BRONC MAX

•BRONC PLUS DRY-EDT

•CLASS ACT NG

•COMPETITOR

•CUT RATE

•CYGNET PLUS

•DESTINY HC

•EXCITER FRACTION

•INTERLOCK

•KINETIC

•LEVEL 7

•LIBERATE

•MAGNIFY

•ONE-AP XL

•PRO AMS PLUS

•SPRAY-RITE

•SUPERB HC

•TACTIC

•TRONIC

•ACTIVATE PLUS - UPLAND USE ONLY

•NUFILM - UPLAND USE ONLY

•OTHER VEGETABLE-BASED SURFACTANTS FOR WHICH THERE IS A DEMONSTRATED TRACK RECORD FOR USE WITH SERVICE ESA-LISTED SPECIES - UPLAND USE ONLY

g. MEASURES FOR HANDLING HERBICIDES ARE AS FOLLOWS.

i. DURING TRANSPORT, THE APPLICATOR MUST SECURE HERBICIDES CONTAINERS TO PREVENT MOVEMENT WITHIN THE VEHICLE OR LOSS FROM THE VEHICLE.

ii. WHEN SPRAY EQUIPMENT IS NOT BEING USED, THE APPLICATOR MUST ENSURE THAT ALL VALVES AND TANKS COVERS ARE CLOSED DURING MOVEMENT OF THE VEHICLE.

h. THE APPLICATOR MUST FIRMLY SECURE ANY FILLED PORTABLE TANKS USED FOR HERBICIDE APPLICATIONS TO THE FRAME OF THE VEHICLE.

i. HERBICIDE CARRIERS. HERBICIDE CARRIERS (SOLVENTS) ARE LIMITED TO WATER OR SPECIFICALLY LABELED VEGETABLE OIL. USE OF DIESEL OIL AS AN HERBICIDE CARRIER IS NOT COVERED BY THIS OPINION.

j. DYES. THE PRESENCE OF DYE MARKS IT EASIER TO SEE WHERE THE HERBICIDE HAS OR HAS NOT BEEN APPLIED, AS WELL AS ENABLING APPLICATOR TO IMMEDIATELY SEE IF THERE ARE DRIFT ISSUES, SPILLS, LEAKS OR DRIPS (SERA 1997).

i. DYES SHOULD BE USED FOR ALL APPLICATIONS TO ENSURE COMPLETE AND UNIFORM TREATMENT OF INVASIVE PLANTS.

ii. USE A NON-HAZARDOUS INDICATOR DYE (E.G., HI-LIGHT OR DYNAMARK) WITH HERBICIDES WITHIN 30.5 M (100 FEET) OF WATER.

k. MEASURES FOR HERBICIDE MIXING.

i. MIX HERBICIDES AND ADJUVANTS, CARRIERS, AND/OR DYES MORE THAN 45.7 M (150 FEET) FROM ANY PERENNIAL OR INTERMITTENT WATERBODY TO MINIMIZE THE RISK OF AN ACCIDENTAL DISCHARGE.

ii. APPLICATORS MUST PREPARE SPRAY MIXTURES IN ACCORDANCE WITH THE LABEL INSTRUCTIONS AND NOT EXCEED THE AMOUNT OF HERBICIDE PER ACRE AS SPECIFIED IN THE INSTRUCTIONS.

iii. APPLICATORS MUST MIX AND LOAD HERBICIDES AT LEAST 45.7 M (150 FEET) FROM ANY SURFACE WATERS AND RESIDENTIAL WELLS AND ONLY IN LOCATIONS WHERE ACCIDENTAL SPILLS CANNOT FLOW INTO SURFACE WATERS OR CONTAMINATE GROUNDWATER. REQUIRED BUFFER DISTANCES TO LISTED SPECIES AND SENSITIVE RESOURCES MUST ALSO BE ADHERED TO AS ADDRESSED IN THE SPECIES CONSERVATION MEASURES.

l. TANK MIXTURES. THE POTENTIAL INTERACTIVE RELATIONSHIPS THAT EXIST AMONG MOST ACTIVE INGREDIENT COMBINATIONS HAVE NOT BEEN DEFINED AND ARE UNCERTAIN. THEREFORE, COMBINATIONS OF HERBICIDES IN A TANK MIX ARE NOT COVERED BY THIS OPINION.

m. SPILL CLEANUP KIT. PROVIDE A SPILL CLEANUP KIT WHENEVER HERBICIDES ARE USED, TRANSPORTED, OR STORED. AT A MINIMUM, CLEANUP KITS WILL INCLUDE MATERIAL SAFETY DATA SHEETS, THE HERBICIDE LABEL, EMERGENCY PHONE NUMBERS, AND ABSORBENT MATERIAL SUCH AS CAT LITTER TO CONTAIN SPILLS.

n. HERBICIDE APPLICATION RATES. APPLY HERBICIDES AT THE LOWEST EFFECTIVE LABEL RATES.

o. HERBICIDE APPLICATION METHODS. HERBICIDES WILL ONLY BE APPLIED BY AN APPROPRIATELY LICENSED APPLICATOR OR UNDER THE DIRECT SUPERVISION OF A LICENSED APPLICATOR, AND APPLICATION METHODS MUST COMPLY WITH ALL LABEL INSTRUCTIONS. APPLY LIQUID OR GRANULAR FORMS OF HERBICIDES AS FOLLOWS:

i. BROADCAST SPRAYING - HAND HELD NOZZLES ATTACHED TO BACK PACK TANKS OR VEHICLES, OR BY USING VEHICLE MOUNTED BOOMS.

ii. SPOT SPRAYING - HAND HELD NOZZLES ATTACHED TO BACK PACK TANKS OR VEHICLES, HAND-PUMPED SPRAY, OR SQUIRT BOTTLES TO SPRAY HERBICIDE DIRECTLY ONTO SMALL PATCHES OR INDIVIDUAL PLANTS.

iii. HAND/SELECTIVE - WICKING AND WIPING, BASAL BARK, FILL ("HACK AND SQUIRT"), STEM INJECTION, CUT-STUMP.

n. MEASURES FOR SPOT SPRAYING

i. KEEP THE SPRAY NOZZLE WITHIN 1.2 M (4 FEET) OF THE GROUND WHEN APPLYING HERBICIDE LESS THAN 4.6 M (15 FEET) FROM HIGH WATER MARK (HWM). IF SPOT OR PATCH SPRAYING TALL VEGETATION MORE THAN 4.6 M (15 FEET) AWAY FROM THE HWM, KEEP THE SPRAY NOZZLE WITHIN 1.8 M (6 FEET) OF THE GROUND.

ii. APPLY SPRAY IN SWATHS PARALLEL TOWARDS THE PROJECT AREA, AWAY FROM THE CREEK AND DESIRABLE VEGETATION, I.E., THE PERSON APPLYING THE SPRAY WILL GENERALLY HAVE THEIR BACK TO THE CREEK OR OTHER SENSITIVE RESOURCE.

o. MEASURES FOR WICK AND WIPE APPLICATIONS

i. THE APPROPRIATE TYPE AND SIZE OF EQUIPMENT WILL BE USED TO APPLY HERBICIDES ONTO THE TARGET FOLIAGE AND STEMS.

ii. HERBICIDE APPLICATIONS WILL BE MADE IN A MANNER THAT PREVENTS HERBICIDE RUNOFF ONTO THE GROUND.

p. MEASURES FOR BASAL BARK APPLICATIONS

i. APPLICATORS WILL AVOID UNNECESSARY RUN-OFF WHEN APPLYING HERBICIDE TO STEMS OF TARGET VEGETATION. A DRYER IS RECOMMENDED TO ESTABLISH COVERAGE AND PREVENT RUNOFF.

ii. HERBICIDE APPLICATIONS WILL BE APPLIED USING THE LOWEST NOZZLE PRESSURE THAT WILL ALLOW ADEQUATE COVERAGE.

q. MEASURES FOR SPOT AND PATCH APPLICATIONS

i. HERBICIDES APPLICATIONS MAY BE USED WITH HAND APPLICATORS OR AN ALL-TERRAIN VEHICLE WITH LOW PRESSURE BOOM SPRAYERS.

ii. HERBICIDE WILL BE APPLIED IN A MANNER WHERE THE SPRAY IS DIRECTED TOWARDS THE APPLICATION AREA AND AWAY FROM LISTED PLANTS.

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RIVER DESIGN GROUP
RDG
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920

PROJECTS CONSERVATION MEASURES

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
1.3

Drawing 4 of 27

GENERAL CONSERVATION MEASURES FROM PROGRAMMATIC RESTORATION OPINION FOR JOINT ECOSYSTEM CONSERVATION BY THE SERVICES (PROJECTS), CONTINUED

r. MEASURES FOR CUT SURFACE AND HACK AND SQUIRT/INJECTION APPLICATIONS
   i. HERBICIDE APPLICATIONS WILL BE MADE IN A MANNER THAT PREVENTS HERBICIDE RUNOFF ONTO THE GROUND.
s. MEASURES FOR SPOT APPLICATIONS OF DRY GRANULES, PELLETS, AND DUST
   i. A 3 M (10 FEET) BUFFER WILL BE MAINTAINED BETWEEN LISTED PLANTS AND APPLICATION AREAS TO PREVENT EXPOSURE TO LISTED PLANTS.
t. MEASURES FOR TRACTOR-BASED BROADCAST APPLICATIONS
   i. NOZZLES AND PRESSURES WILL BE ADJUSTED TO MINIMIZE FINE PARTICLE SIZE SO THAT THE SPRAY DOES NOT DRIFT OFF THE APPLICATION AREA, WHILE STILL PROVIDING FOR REASONABLE HERBICIDE COVERAGE.
   ii. DRIFT CONTROL AGENTS WILL BE USED IF NECESSARY TO PREVENT ANY SPRAY FROM DRIFTING OFF THE APPLICATION AREA.
u. WASHING SPRAY TANKS. WASH SPRAY TANKS 91.4 M (300 FEET) OR MORE AWAY FROM ANY SURFACE WATER.
v. AVOID THE USE OF ANY IRRIGATION WATERS THAT ARE CONTAMINATED WITH HERBICIDES. DO NOT USE THESE WATERS IN ANY AREA THAT CONTAINS A LISTED PLANT SPECIES.
w. MINIMIZATION OF HERBICIDE DRIFT AND AS FOLLOWS:
   i. DO NOT BROADCAST SPRAY WHEN WIND SPEEDS EXCEED 16.1 KM (10 MILES) PER HOUR, OR ARE LESS THAN 3.2 KM (2 MILES) PER HOUR. DO NOT SPOT SPRAY WHEN WIND SPEEDS EXCEED 16.1 KM (10 MILES) PER HOUR. WINDS LESS THAN 3.2 KM (2 MILES) PER HOUR ARE ACCEPTABLE FOR SPOT SPRAYING.
   ii. BE AWARE OF WIND DIRECTIONS AND POTENTIAL FOR HERBICIDES TO AFFECT AQUATIC HABITAT AREA DOWNWIND.
   iii. KEEP BOOM OR SPRAY AS LOW AS POSSIBLE TO REDUCE WIND EFFECTS.
   iv. USE MINIMUM EFFECTIVE NOZZLE HEIGHT RECOMMENDED BY NOZZLE MANUFACTURER.
   v. INCREASE SPRAY DROPLET SIZE WHENEVER POSSIBLE BY DECREASING SPRAY PRESSURE TO LOWEST EFFECTIVE NOZZLE PRESSURE RECOMMENDED BY NOZZLE MANUFACTURER, USING HIGH FLOW RATE NOZZLES, USING WATER DILUENTS INSTEAD OF OIL, AND ADDING THICKENING AGENTS.
   vi. DO NOT APPLY HERBICIDES DURING TEMPERATURE INVERSIONS, OR WHEN AIR TEMPERATURE EXCEEDS 27 ºC (81 ºF). DO NOT APPLY HERBICIDES WHEN THE SOIL IS SATURATED OR WHEN A PRECIPITATION EVENT LIKELY TO PRODUCE DIRECT RUNOFF TO SALMON/BULL TROUT BEARING WATERS FROM THE TREATED AREA IS FORECASTED BY THE NOAA NATIONAL WEATHER SERVICE OR OTHER SIMILAR FORECASTING SERVICE WITHIN 48 HOURS FOLLOWING APPLICATION. SOIL-ACTIVATED HERBICIDES MAY FOLLOW LABEL INSTRUCTIONS. DO NOT CONDUCT HACK-SQUIRT/INJECTION APPLICATIONS DURING PERIODS OF HEAVY RAINFALL. FOR ALL OTHER CASES: HERBICIDE APPLICATIONS WILL BE DELAYED IF PRECIPITATION IS FORECAST TO OCCUR WITHIN 24 HOURS, EXCEPT FOR PELLET BASED APPLICATIONS. AT UPLAND PRAIRIE SITES, CHEMICAL APPLICATIONS WILL NOT OCCUR WITHIN 24 HOURS OF PREDICTED PRECIPITATION. AT WET PRAIRIE SITES, CHEMICAL APPLICATIONS WILL ONLY BE CONDUCTED IF THE 7-DAY WEATHER FORECAST INDICATES NO SIGNIFICANT RAINFALL.
   vii. WIND AND OTHER WEATHER DATA WILL BE MONITORED AND REPORTED FOR ALL BROADCAST APPLICATIONS.

A. HERBICIDE BUFFER DISTANCES. TABLE 1 OUTLINES REQUIRED NO-APPLICATION BUFFER-WIDTHS, MEASURED IN FEET, AS MAP DISTANCE PERPENDICULAR TO THE BANKFULL ELEVATION FOR STREAMS, THE UPLAND BOUNDARY FOR WETLANDS, OR THE UPPER BANK FOR ROADSIDE DITCHES. WIDTHS ARE BASED ON HERBICIDE FORMULA, STREAM TYPE, AND APPLICATION METHOD DURING HERBICIDE APPLICATIONS. BEFORE HERBICIDE APPLICATION BEGINS, FLAG OR MARK THE UPLAND BOUNDARY OF EACH APPLICABLE HERBICIDE BUFFER TO ENSURE THAT ALL BUFFERS ARE IN PLACE AND FUNCTIONAL DURING TREATMENT.

20. PILING INSTALLATION - NOT APPLICABLE TO THIS PROJECT.

21. SITE RESTORATION

a. RESTORE ANY SIGNIFICANT DISTURBANCE OF RIPARIAN, WETLAND OR UPLAND VEGETATION, SOILS, STREAM BANKS OR STREAM CHANNEL.
b. REMOVE ALL PROJECT RELATED WASTE; E.G., PICK UP TRASH, SWEEP ROADWAYS IN THE PROJECT AREA TO AVOID RUNOFF-CONTAINING SEDIMENT AND TRASH.
c. OBLITERATE ALL TEMPORARY ACCESS ROADS, CROSSINGS, AND STAGING AREAS.
d. LOOSEN SOIL IN COMPACTED AREAS WHEN NECESSARY FOR REVEGETATION OR INFILTRATION.
e. ALTHOUGH NO SINGLE CRITERION IS SUFFICIENT TO MEASURE RESTORATION SUCCESS, THE INTENT IS THAT THE FOLLOWING FEATURES SHOULD BE PRESENT IN THE UPLAND PARTS OF THE PROJECT AREA, WITHIN REASONABLE LIMITS OF NATURAL AND MANAGEMENT VARIATION:
   i. HUMAN AND LIVESTOCK DISTURBANCE, IF ANY, ARE CONFINED TO SMALL AREAS NECESSARY FOR ACCESS OR OTHER SPECIAL MANAGEMENT SITUATIONS.
   ii. AREAS WITH SIGNS OF SIGNIFICANT PAST EROSION ARE COMPLETELY STABILIZED AND HEALED, BARE SOIL SPACES ARE SMALL AND WELL-DISPERSED.
   iii. SOIL MOVEMENT, SUCH AS ACTIVE RILLS AND SOIL DEPOSITION AROUND PLANTS OR IN SMALL BASINS, IS ABSENT OR SLIGHT AND LOCAL.
   iv. NATIVE WOODY AND HERBACEOUS VEGETATION, AND GERMINATION MICROSITES, ARE PRESENT AND WELL DISTRIBUTED ACROSS THE SITE; INVASIVE PLANTS ARE MINIMAL OR ABSENT.
   v. PLANTS HAVE NORMAL, VIGOROUS GROWTH FORM, AND A HIGH PROBABILITY OF REMAINING VIGOROUS, HEALTHY AND DOMINANT OVER UNDESIRED COMPETING VEGETATION.
   vi. PLANT LITTER IS WELL DISTRIBUTED AND EFFECTIVE IN PROTECTING THE SOIL WITH LITTLE OR NO LITTER ACCUMULATED AGAINST VEGETATION AS A RESULT OF ACTIVE SHEET EROSION ("LITTER DAMS").
   vii. A CONTINUOUS CORRIDOR OF SHRUBS AND TREES APPROPRIATE TO THE SITE ARE PRESENT TO PROVIDE SHADE AND OTHER HABITAT FUNCTIONS FOR THE ENTIRE STREAMBANK/SHORELINE.

22. REVEGETATION

a. PLANT AND SEED DISTURBED AREAS BEFORE OR AT THE BEGINNING OF THE FIRST GROWING SEASON AFTER CONSTRUCTION.
b. NATIVE VEGETATION WILL PLANTED ON DISTURBED PROJECT SITES AND SITES PROTECTED FROM FURTHER DISTURBANCE UNTIL NEW GROWTH IS WELL ESTABLISHED. DO NOT USE NON-NATIVE SPECIES FOR SITE RESTORATION WITH THE EXCEPTION OF STERILE SEED FOR STABILIZATION IF NATIVE SEED IS NOT AVAILABLE.
c. USE AN ASSEMBLAGE OF VEGETATION SPECIES APPROPRIATE FOR LONG-TERM PRODUCTIVITY OF THE SITE, INCLUDING NATIVE TREES, SHRUBS, AND HERBACEOUS SPECIES. VEGETATION, SUCH AS WILLOW (SALIX SPP.), SEDGE (CAREX SPP.) AND RUSH (JUNCUS SPP.) MATS, MAY BE GATHERED FROM ABANDONED FLOODPLAINS, STREAM CHANNELS, AND WETLANDS.
d. PLANTING TECHNIQUES MUST NOT CAUSE MAJOR SOIL DISTURBANCE AT PROJECT SITES.
e. NATIVE VEGETATION SHOULD BE SALVAGED, AS APPROPRIATE, FROM AREAS WHERE SOIL DISTURBANCE WILL BE OCCURRING ON A PROJECT SITE AND REPLANTED LATER AT THE SITE. WHEN FEASIBLE, USE VEGETATION SALVAGED FROM OTHER LOCAL AREAS SCHEDULED FOR CLEARING DUE TO DEVELOPMENT.
f. USE SPECIES THAT WILL ACHIEVE SHADE AND EROSION CONTROL OBJECTIVES, INCLUDING FORB, GRASS, SHRUB, OR TREE SPECIES THAT ARE APPROPRIATE FOR THE SITE AND NATIVE TO THE PROJECT AREA OR REGION. SHORT-TERM STABILIZATION MEASURES MAY INCLUDE USE OF NON-
   NATIVE STERILE SEED MIX IF NATIVE SEEDS ARE NOT AVAILABLE, WEED-FREE CERTIFIED STRAW, JUTE MATTING, AND SIMILAR METHODS.
g. DO NOT APPLY SURFACE FERTILIZER WITHIN 15.4 M (50 FEET) OF ANY WETLAND OR WATER BODY.
h. INSTALL FENCING AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.
i. CONDUCT POST-CONSTRUCTION MONITORING AND TREATMENT TO REMOVE OR CONTROL INVASIVE PLANTS UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED.

TABLE 1. HERBICIDE BUFFER DISTANCES BY HERBICIDE FORMULA, STREAM TYPE, AND APPLICATION METHOD FOR AQUATIC HABITAT RESTORATION PROJECTS. UPLAND USE ONLY HERBICIDES MUST BE USED AT LEAST 30.5 M (100 FEET) FROM ANY AQUATIC HABITAT, EXCEPT FOR ORYZALIN, WHICH REQUIRES A 297 M (975 FEET) BUFFER FROM AQUATIC HABITATS. CHECK SPECIES-SPECIFIC CONSERVATION MEASURES FOR ADDITIONAL RESTRICTIONS FOR EACH LISTED SPECIES AT EACH PROJECT SITE.

Herbicide	No Application Buffer Width (feet)					
	Streams and Roadside Ditches with flowing or standing water present and Wetlands			Dry Streams, Roadside Ditches, and Wetlands (no standing water present)		
	Broadcast Spraying	Spot Spraying	Hand Selective	Broadcast Spraying	Spot Spraying	Hand Selective
Labeled for Aquatic Use						
Aquatic Glyphosate	100	waterline	Waterline	50	None	None
Aquatic Imazapyr	100	15	Waterline	50	None	None
Aquatic Triclopyr-TEA	**Not Allowed**	15	Waterline	**Not Allowed**	None	None
Low Risk to Aquatic Organisms						
Imazapic	100	15	bankfull elevation	50	None	None
Clopyralid	100	15	bankfull elevation	50	None	None
Metsulfuron-methyl	100	15	bankfull elevation	50	None	None
Moderate Risk to Aquatic Organisms						
Imazapyr	100	50	bankfull elevation	50	15	bankfull elevation
Sulfometuron-methyl	100	50	50	50	15	bankfull elevation
Chlorsulfuron	100	50	bankfull elevation	50	15	bankfull elevation
High Risk to Aquatic Organisms						
Picloram	100	50	50	100	50	50
Sethoxydim	100	50	50	100	50	50
Upland Use Only Herbicides						
Triclopyr - BEE	100	100	100	100	100	100
Glyphosate	100	100	100	100	100	100
2, 4-D amine	100	100	100	100	100	100
Clethodim	100	100	100	100	100	100
Fluazifop-P-butyl	100	100	100	100	100	100
Oryzalin	**Not Allowed**	975	975	**Not Allowed**	975	975
Aminopyralid	100	100	100	100	100	100
diquat dibromide (e.g., Reward)	100	100	100	100	100	100
triclopyr +2,4-D ester (e.g., Crossbow)	100	100	100	100	100	100

PERMIT

RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

PROJECTS CONSERVATION MEASURES

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
1.4

LAMPREY AND MUSSELS CONSERVATION MEASURES

PRIOR TO DEWATERING

- MUSSEL SALVAGE: LOCATE MUSSELS BY SNORKELING OR WADING WITH AN UNDERWATER VIEWING SCOPE AND THEN SALVAGE THEM BY HAND. RELOCATION CAN BE TIME-CONSUMING. PLEASE SEE GUIDANCE PROVIDED BY XERCES SOCIETY: MUSSEL-FRIENDLY RESTORATION GUIDE (BLEVINS ET AL. 2019, HTTPS://XERCES.ORG/ENDANGERED-SPECIES/FRESHWATER-MUSSELS).
- WATERED SALVAGE OF LARVAL LAMPREYS: SALVAGE USING LAMPREY ELECTROFISHING SETTINGS (APPENDIX C, TABLE C1), WHICH WILL GENERALLY NOT AFFECT OTHER FISHES.
- SALVAGE OTHER FISHES (E.G. SALMON, SCULPIN) AFTER LAMPREYS WITH NETS OR BY ELECTROFISHING WITH APPROPRIATE SETTINGS. SEE "GUIDELINES FOR ELECTROFISHING WATERS CONTAINING SALMONIDS LISTED UNDER THE ENDANGERED SPECIES ACT" (NMFS 2000, HTTPS://ARCHIVE.FISHERIES.NOAA.GOV/WCR/PUBLICATIONS/REFERENCE_DOCUMENTS/ESA_REFS/SECTION4D/ELECTRO2000.PDF).

DEWATERING: AS WATER LEVELS RECEDE

- SALVAGE LARVAL LAMPREYS AND MUSSELS BY HAND AND NETS. LAMPREYS AND MUSSELS MAY CONTINUE TO EMERGE FROM SUBSTRATE MINUTES OR DAYS AFTER DEWATERING, SO RE-SURVEY FREQUENTLY TO MINIMIZE TIME OUT OF WATER.
- SALVAGE LARVAL LAMPREYS IN SHALLOW WATER OR ON DEWATERED SUBSTRATE USING "DRYSHOCKING" WITH LAMPREY-SPECIFIC ELECTROFISHER SETTINGS (TABLE C1). TYPE I HABITAT IS THEIR PREFERRED HABITAT, BUT MANY SEEK REFUGE IN OTHER HABITAT (TYPE II AND III) AS WATER LEVELS RECEDE.
- SOME PEOPLE CAN BE HAND-PICKING LAMPREYS FROM EXPOSED SEDIMENTS, WHILE OTHERS ARE ELECTROFISHING OR SALVAGING REMAINING SPECIES.

AFTER DEWATERING IS COMPLETE

- CONTINUE SALVAGING LARVAL LAMPREYS AND MUSSELS; RE-SURVEY AND SALVAGE AS NEEDED.
- TO ENCOURAGE LARVAL LAMPREY EMERGENCE, "DRY SHOCK" IN TYPE I HABITAT. OFTEN LAMPREYS WILL GET TRAPPED IN ISOLATED POOLS, SO CHECK AREAS AROUND HABITAT STRUCTURE WHERE THEY MAY TRY TO BURROW.
- HOLD ALL FISHES IN BUCKETS, FINE MESH BASKETS OR TANKS IN SMALL GROUPS TO MINIMIZE CROWDING, WITH GOOD WATER QUALITY CONDITIONS (TEMPERATURE AND DISSOLVED OXYGEN) UNTIL RELEASE (SEE TABLE 3).
- MUSSELS: FOR SHORT TIME PERIODS, MUSSELS CAN BE HELD IN BUCKETS OF WATER, PROVIDED WATER TEMPERATURES ARE KEPT COOL AND STABLE. FOR LONGER PERIODS, HOLD MUSSELS WRAPPED IN MESH BAGS BETWEEN WET TOWELS IN COOLERS WITH NO WATER UNTIL RELEASE.

RELEASE

- RELEASE ALL FISHES THROUGHOUT THE SALVAGE PROCESS AS QUICKLY AS POSSIBLE TO MINIMIZE STRESS AND PREDATION RISK. SALVAGED LAMPREYS SHOULD BE RELEASED IN OR NEAR PREFERRED HABITATS, AWAY FROM IN-WATER WORK AND OTHER HUMAN DISTURBANCES. LARVAL LAMPREYS WILL QUICKLY BURROW INTO FINE SEDIMENTS IN LOW VELOCITY AREAS; JUVENILE AND ADULT PACIFIC LAMPREY SEEK COVER IN COARSE SUBSTRATE OR IN CREVICES UNDER LARGE ROCKS OR OTHER STRUCTURES. CARE SHOULD BE TAKEN TO RELEASE LAMPREYS INTO HABITATS WHERE THERE IS A LOW RISK TO PREDATION (LAMPMAN AND BEALS 2019).
- MUSSELS: FOR SHORT TRANSPORTS, MUSSELS CAN BE TRANSPORTED IN BUCKETS OF WATER TO RELEASE SITE, PROVIDED WATER TEMPERATURES ARE KEPT COOL AND STABLE. FOR LONGER TRANSPORTS, TRANSPORT MUSSELS WRAPPED IN MESH BAGS BETWEEN WET TOWELS IN COOLERS WITH NO WATER AND RELOCATE THEM IN A PRE-SELECTED, APPROPRIATE HABITAT. PLACE NATIVE FRESHWATER MUSSELS IN PREFERRED HABITATS (STABLE SUBSTRATE WITH REFUGE FROM HIGH OR LOW FLOWS), SAFE FROM IN WATER WORK AND OTHER IMMEDIATE DISTURBANCES. PLACE INDIVIDUALS FLAT ON THE STREAMBED, WHICH ALLOWS MUSSELS TO SELECT WHERE THEY BURROW INTO THE SUBSTRATE.

SEE "BEST MANAGEMENT GUIDELINES FOR NATIVE LAMPREYS DURING IN-WATER WORK" FOR ADDITIONAL GUIDANCE:
HTTPS://WWW.PACIFICLAMPREY.ORG/WP-CONTENT/UPLOADS/2022/10/BMGS-FOR-NATIVE-LAMPRES-DURING-IN-WATER-WORK-FINAL-UPDATED-2022-2.PDF

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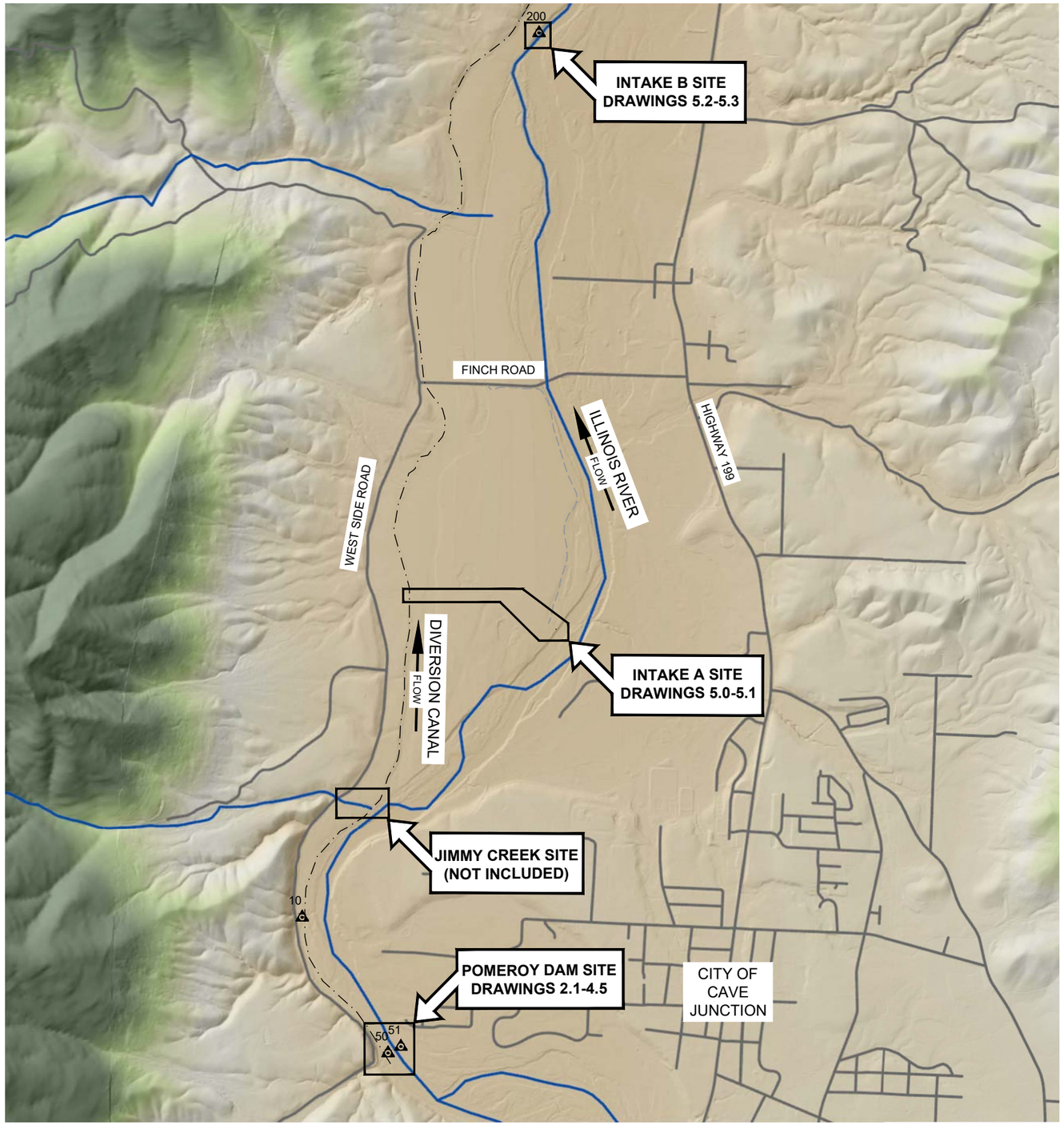
RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

LAMPREY AND MUSSELS CONSERVATION MEASURES
POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
1.5



1 **SITE LOCATION MAP**

1" = 2000'

CONTROL NETWORK

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
10	199404.49	4061397.22	1269.03	SET IR
50	197165.99	4062814.15	1263.50	SET PK NAIL
51	197273.07	4063025.69	1267.32	SET PK NAIL
200	213991.71	4065305.12	1221.91	SET PK NAIL

NOTE:
EXISTING CONDITION INFORMATION IS NOT A LAND SURVEY AND IS PRIMARILY A TOPOGRAPHIC ANALYSIS FOR RESTORATION DESIGN PURPOSES.

COORDINATE SYSTEM: OREGON STATE PLANE SOUTH
HORIZ DATUM: NAD83
VERT DATUM: NAVD88
UNITS: INTERNATIONAL FEET

POMEROY DAM SITE

- LENGTH OF CREST ~340 FT
- HEIGHT OF DAM ~10 FT
- CONCRETE VOLUME (DAM) ±200 CUBIC YARDS
- STORED SEDIMENT ±9,000 CUBIC YARDS

PROPOSE INTAKE A SITE

- 3.0 CFS
- 1.70 MILE DOWNSTREAM OF POMEROY DAM

PROPOSED INTAKE B SITE

- 3.0 CFS
- 3.79 MILE DOWNSTREAM OF POMEROY DAM

ANTICIPATED TEMPORARY BYPASS FLOWS

FLOW DURATION EXCEEDANCE PROBABILITY	JUNE	JULY	AUGUST	SEPTEMBER	WEIGHTED AVERAGE FLOW DURING IWW	ANTICIPATED DAYS OF FLOW EXCEEDANCE IN A 31-DAY MONTH
	(cfs) / (GPM)	(cfs) / (GPM)	(cfs) / (GPM)	(cfs) / (GPM)	(CFS) / (GPM)	
95%	90 / 40400	30 / 13500	20 / 9000	10 / 4500	40 / 18000	30
50%	260 / 116700	80 / 35900	40 / 18000	30 / 13500	100 / 44900	16
25%	440 / 197500	120 / 53900	50 / 22400	40 / 18000	160 / 71800	8
10%	650 / 291800	180 / 80800	70 / 31400	60 / 26900	240 / 107700	4
5%	870 / 390500	220 / 98700	70 / 31400	70 / 31400	310 / 139100	2

PERMIT

RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

SITE MAP AND INFO

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
2.0

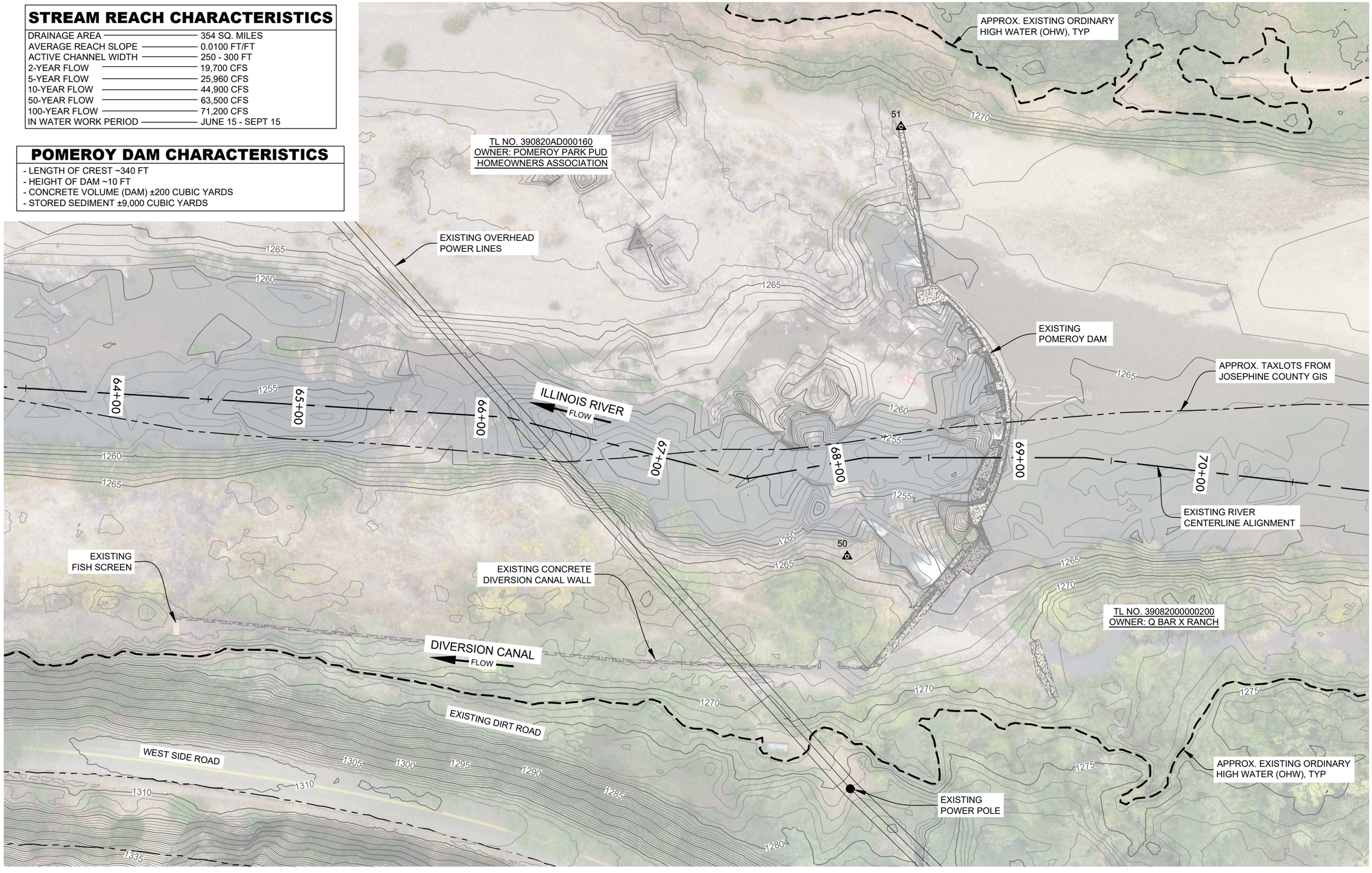
Drawing 7 of 27

STREAM REACH CHARACTERISTICS

DRAINAGE AREA	354 SQ. MILES
AVERAGE REACH SLOPE	0.0100 FT/FT
ACTIVE CHANNEL WIDTH	250 - 300 FT
2-YEAR FLOW	19,700 CFS
5-YEAR FLOW	25,960 CFS
10-YEAR FLOW	44,900 CFS
50-YEAR FLOW	63,500 CFS
100-YEAR FLOW	71,200 CFS
IN WATER WORK PERIOD	JUNE 15 - SEPT 15

POMEROY DAM CHARACTERISTICS

- LENGTH OF CREST ~340 FT
- HEIGHT OF DAM ~10 FT
- CONCRETE VOLUME (DAM) ±200 CUBIC YARDS
- STORED SEDIMENT ±9,000 CUBIC YARDS



1 **PROJECT ELEMENTS PLAN VIEW**

1" = 50'

PERMIT

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

POMEROY DAM PROJECT ELEMENTS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
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PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
2.1

Drawing 8 of 27

TL NO. 39082000010000

EXISTING OVERHEAD POWER LINES

APPROX. EXISTING ORDINARY HIGH WATER (OHW), TYP

TL NO. 390820AD000160
OWNER: POMEROY PARK PUD HOMEOWNERS ASSOCIATION

TL NO. 39082000050100

EXISTING POMEROY DAM

ILLINOIS RIVER
FLOW

DIVERSION CANAL
FLOW

EXISTING CONCRETE CANAL WALL

EXISTING FISH SCREEN

EXISTING DIRT ROAD

WEST SIDE ROAD

TL NO. 39082000000200
OWNER: Q BAR X RANCH

EXISTING RIVER CENTERLINE ALIGNMENT

APPROX. EXISTING ORDINARY HIGH WATER (OHW), TYP

EXISTING CONCRETE WALL

EXISTING POWER POLE

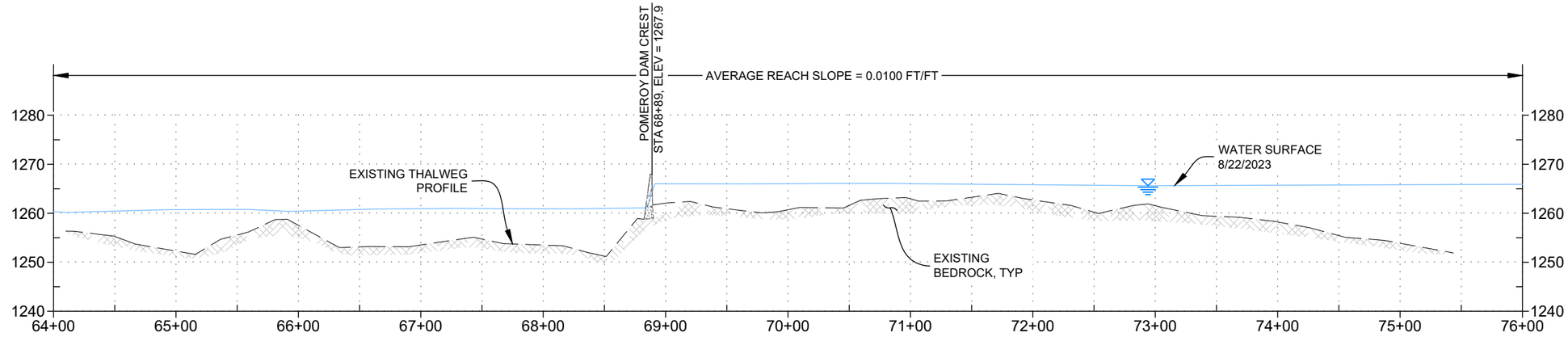
TL NO. 39082000050000

62+00 63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00 71+00 72+00 73+00 74+00 75+00 76+00

1 3.1 2 3.1 3 3.1 50 51

1 EXISTING CONDITIONS PLAN VIEW

1" = 100'



2 EXISTING LONG PROFILE

HORIZ 1" = 100'
VERT 1" = 25'

PERMIT

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

EXISTING CONDITIONS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

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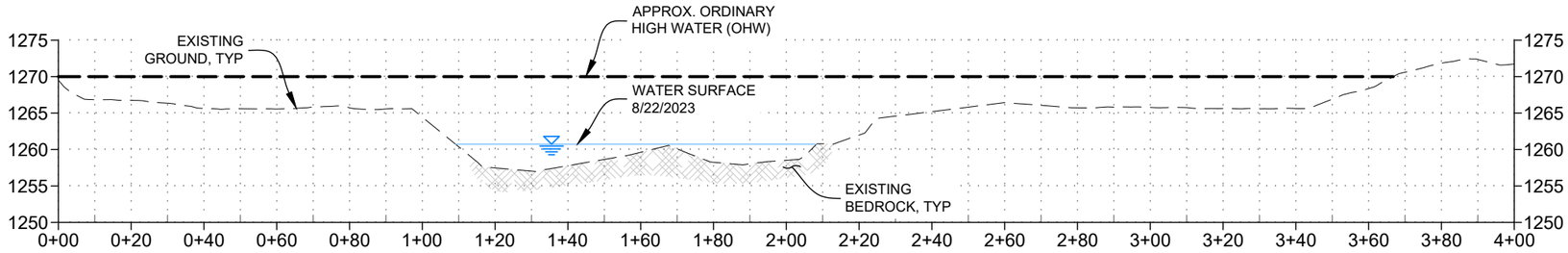
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
3.0

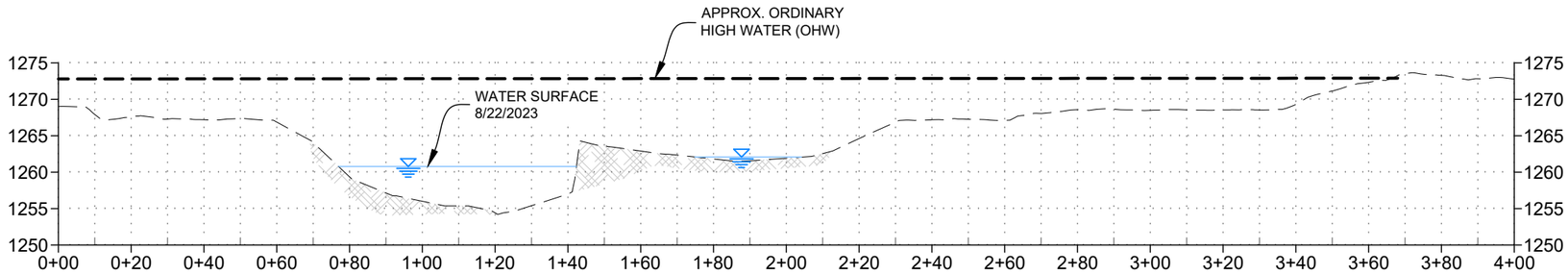
Drawing 9 of 27

Jan 25, 2024 - 5:09pm M:\Projects\2022\22-283 Pomeroy Dam Removal\CAD\RDG-22-283 Pomeroy Dam_Production.dwg



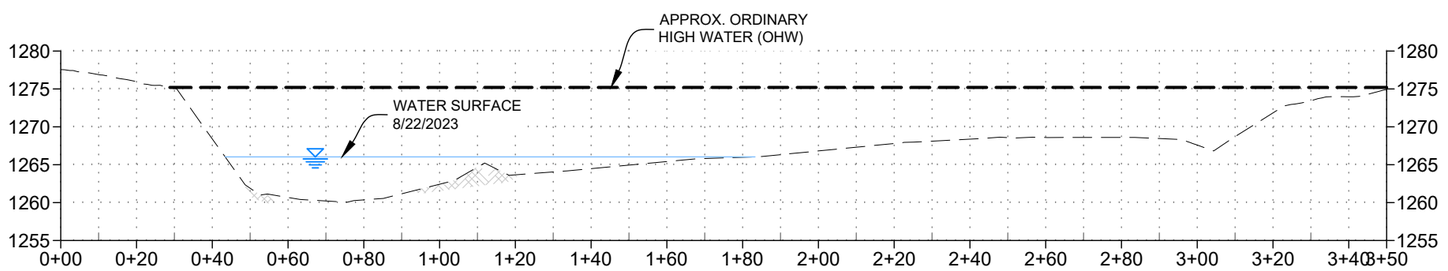
1 EXISTING CHANNEL SECTION STA 63+50

HORIZ 1" = 40'
VERT 1" = 20'



2 EXISTING CHANNEL SECTION STA 67+60

HORIZ 1" = 40'
VERT 1" = 20'



3 EXISTING CHANNEL SECTION STA 72+50

HORIZ 1" = 40'
VERT 1" = 20'

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RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

EXISTING SECTIONS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
3.1

Drawing 10 of 27

TL NO. 390820AD000160
OWNER: POMEROY PARK PUD
HOMEOWNERS ASSOCIATION

PROJECT DEMOLITION
WORK AREA LIMITS

ILLINOIS RIVER
FLOW

POMEROY DAM

APPROX. EXISTING ORDINARY
HIGH WATER (OHW), TYP

TL NO. 39082000050100

62+00 63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00 71+00 72+00 73+00 74+00 75+00 76+00

3 CAUTION
CONSTRUCTION
AREA
AUTHORIZED
PERSONNEL ONLY
24 X 18

2

EQUIPMENT REFUELING TO BE
A MIN. 150 FT FROM CHANNEL
ALONG ACCESS ROAD

TL NO. 39082000000200
OWNER: Q BAR X
RANCH

EXISTING DIRT ROAD

WEST SIDE ROAD

APPROX. EXISTING ORDINARY
HIGH WATER (OHW), TYP

TL NO. 39082000050000

PROJECT STAGING AREA,
APPROX. 6,000 SQ FT
OUTSIDE OF OHW

1 TRUCKS
48 X 48
500
FEET
24 X 18

EXISTING OVERHEAD
POWER LINES

EXISTING
ACCESS ROUTE

EXISTING GATE

EXISTING SITE
ACCESS
ENTRANCE

1 TRUCKS
48 X 48
500
FEET
24 X 18

811 Know what's below. Call before you dig.

CONSTRUCTION NOTES

1. INSTALL 48 INCH "TRUCKS" SIGN WITH 18 INCH "500 FEET" RIDER PER ODOT AND MUTCD STANDARDS. CONTRACTOR SHALL REMOVE SIGN AT PROJECT COMPLETION. SIGN TO BE INSTALLED ON 4" X 6" WOOD POST PER TEMPORARY SIGN PLACEMENT ODOT STANDARD DETAIL TM821 AND WOOD POST SIGN SUPPORTS STANDARD DETAILS TM 670, TM671.
2. INSTALL CONSTRUCTION FENCE PER DETAIL 5 DRAWING 3.3.
3. INSTALL 24 INCH BY 18 INCH "CAUTION CONSTRUCTION AREA" OR APPROVED EQUAL SIGN. ATTACH SIGN TO TEMPORARY CONSTRUCTION FENCE AND TO EXISTING GATE AT ENTRANCE.

SAFETY NOTES

ALL PEOPLE ACCESSING THE SITE MUST CHECK IN WITH THE SITE SUPERINTENDENT IMMEDIATELY UPON ENTERING THE PREMISES.

ALL PEOPLE ACCESSING THE SITE MUST WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT THAT INCLUDES A HARD HAT, HIGH VISIBILITY CLOTHING, AND BOOTS.

PERMIT

1 **SITE ACCESS, STAGING, AND SAFETY**
1" = 100'

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

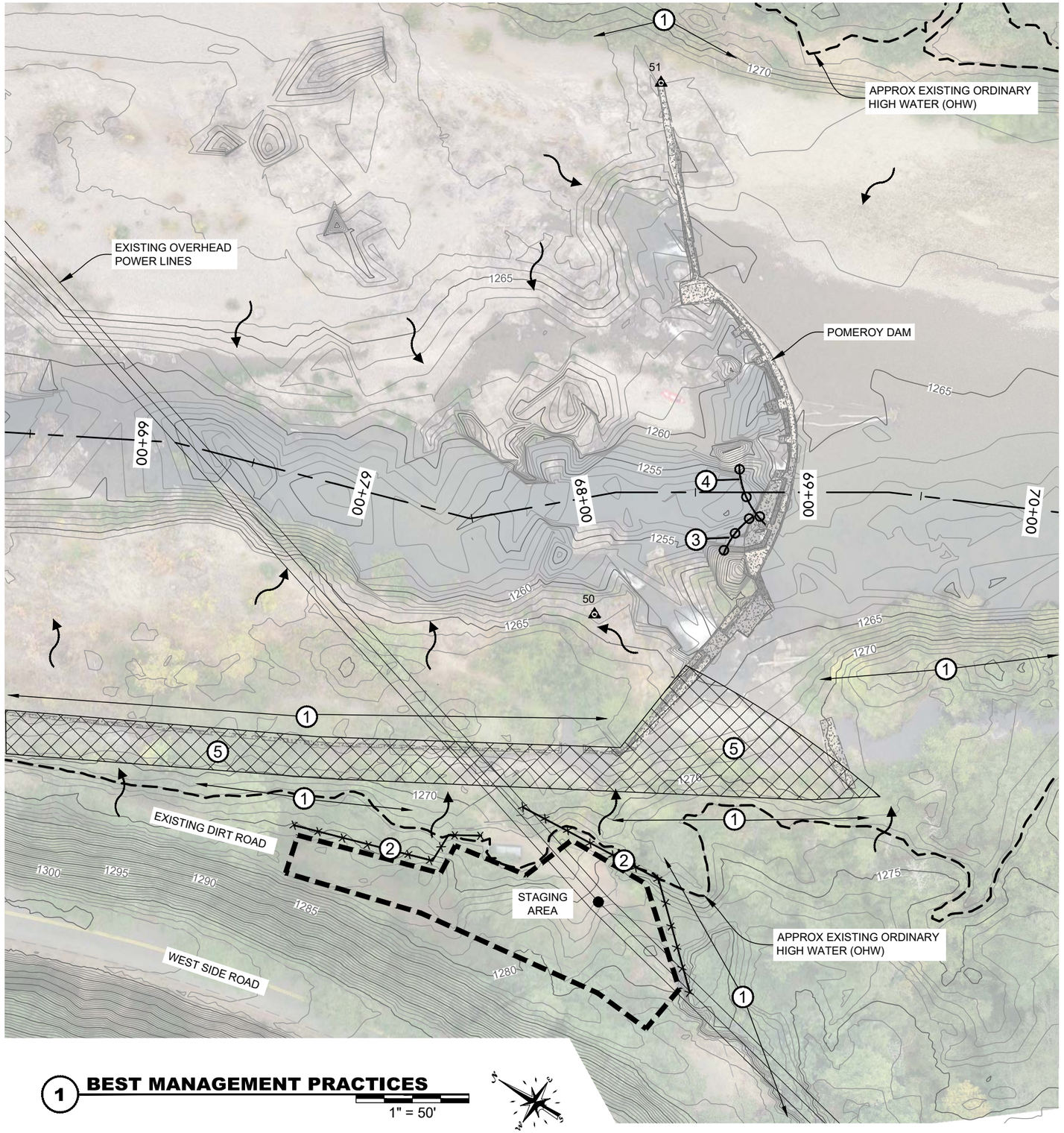
SITE ACCESS, STAGING, AND SAFETY

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
3.2



1 **BEST MANAGEMENT PRACTICES**

1" = 50'

LEGEND

- EXISTING CONDITIONS FLOW DIRECTION
- FLOATING SILT CURTAIN
- SILT FENCE
- DESIGNATED FILL AREA

GENERAL NOTES

ALL EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.

BEST MANAGEMENT PRACTICE (BMP) NOTES

1. PRESERVE AND PROTECT EXISTING VEGETATION TO THE FULLEST EXTENT POSSIBLE TO CREATE A VEGETATED BUFFER. ALL VEGETATION TO BE REMOVED WILL BE DESIGNATED.
2. INSTALL SILT FENCE AT A MINIMUM AS DESIGNATED ON PLAN PER DETAIL 1 DWG 3.4. PRIMARY PLACEMENT TO BE AROUND EQUIPMENT STAGING AND MATERIAL STOCKPILING AREA AND ALONG TOE OF TEMPORARY ACCESS FILLS.
3. INSTALL FLOATING SILT CURTAIN PER DETAIL 4 DWG 3.4 FOR PHASE 1 DAM REMOVAL.
4. INSTALL FLOATING SILT CURTAIN PER DETAIL 4 DWG 3.4 FOR PHASE 2 DAM REMOVAL.
5. SEED AND VEGETATE EXPOSED SOIL PER SITE REVEGETATION PLAN DWG 6.0.

EROSION CONTROL NOTES

AT A MINIMUM, EROSION CONTROL MEASURES SHOWN ON PROJECT BMP PLAN SHALL BE IN PLACE PRIOR TO COMMENCING CONSTRUCTION.

DURING CONSTRUCTION, ALL EROSION CONTROLS SHALL BE INSPECTED BY THE PROJECT ENGINEER DAILY TO ENSURE THEY ARE WORKING ADEQUATELY.

(1) IF INSPECTION SHOWS THAT THE EROSION CONTROLS ARE INEFFECTIVE, WORK CREWS WILL BE MOBILIZED IMMEDIATELY TO MAKE REPAIRS, INSTALL REPLACEMENTS, OR INSTALL ADDITIONAL CONTROLS AS NECESSARY.

(2) SEDIMENT MUST BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL.

CONTRACTOR SHALL PROVIDE MEASURES TO PREVENT MOVEMENT OF SOIL INTO WATERWAYS OR WETLANDS, E.G. FILTER BAGS, SEDIMENT TRAPS OR CATCH BASINS, VEGETATIVE STRIPS, BERMS, JERSEY BARRIERS, FIBER BLANKETS, BONDED FIBER MATRICES, GEOTEXTILES, MULCHES OR COMPOST, WATTLES AND SEDIMENT FENCES.

CONTRACTOR SHALL PROVIDE MEASURES TO PREVENT STOCKPILE EROSION DURING RAIN EVENTS OR WHEN THE STOCKPILE SITE IS NOT MOVED OR RESHAPED FOR MORE THAN 48 HOURS, BY SURROUNDING PILES WITH COMPOST BERMS, COVERING PILES WITH IMPERVIOUS MATERIALS OR OTHER EQUALLY EFFECTIVE METHODS.

CONTRACTOR SHALL PROVIDE MEASURES TO PREVENT CONSTRUCTION VEHICLES FROM TRACKING SEDIMENT OFFSITE OR ONTO ROADWAYS WHERE IT IS SUBJECT TO WASHING INTO STORM DRAINS, WATERWAYS, OR WETLANDS; INCLUDING GRAVEL ACCESS PADS, WHEEL WASH STATIONS, OR OTHER EQUALLY EFFECTIVE METHODS.

CONTRACTOR SHALL INSTALL REMOVABLE PADS OR MATS TO PREVENT SOIL COMPACTION IN ALL TEMPORARY CONSTRUCTION ACCESS POINTS AND STAGING AREAS IN RIPARIAN OR WETLAND AREAS.

CONTRACTOR SHALL PREPARE AND HAVE ON-SITE A SPILL CONTAINMENT AND CONTROL PLAN WITH NOTIFICATION PROCEDURES, EQUIPMENT, SPECIFIC CLEANUP AND DISPOSAL INSTRUCTIONS FOR ALL PRODUCTS USED ON SITE.

CONTRACTOR SHALL HAVE AN EMERGENCY SUPPLY OF SEDIMENT CONTROL MATERIALS ON HAND (SILT FENCE, STRAW BALES, ETC.), AN OIL ADSORBING FLOATING BOOM, AND ABSORBENT PADS.

STATIONARY POWER EQUIPMENT, SUCH AS GENERATORS, WITHIN 150 FEET OF THE WATER SHALL BE DIAPERED TO PREVENT LEAKS.

ALL POWER EQUIPMENT WITHIN 150 FEET OF THE WATER SHALL BE INSPECTED DAILY FOR FLUID LEAKS AND REPAIRED. THE CONTRACTOR MUST KEEP DAILY INSPECTION REPORTS IN A DIARY.

ALL EQUIPMENT TO REMAIN WITHIN THE BOUNDS OF THE CONSTRUCTION STAGING AREA, ACCESS ROADS, OR PROJECT CONSTRUCTION AREA.

DUST CONTROL: ALL HEAVY USE AREAS ARE TO BE MAINTAINED IN A CONDITION THAT MINIMIZES DUST ON THE PROJECT SITE AND THE CONTRACTOR SHALL HAVE ACCESS TO A WATER TRUCK FOR DUST MANAGEMENT IF REQUIRED. THE PROJECT INSPECTOR WILL NOTIFY THE CONTRACTOR TO MOBILIZE DUST CONTROL ACTIVITIES (INCLUDING WATERING) IF CONDITIONS REQUIRE.

PERMIT

RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

BEST MANAGEMENT PRACTICES

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
3.3

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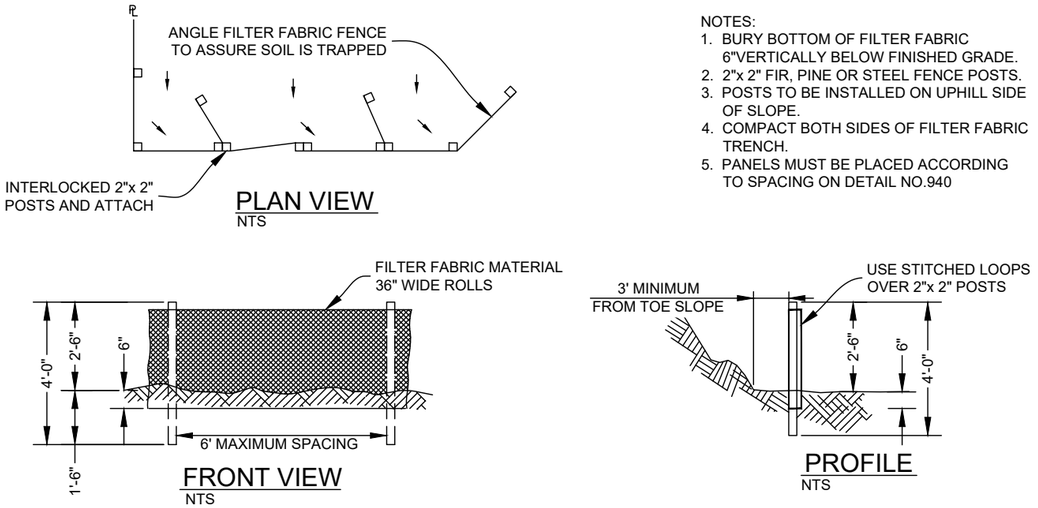


NOTES:
1. BURY BOTTOM OF FILTER FABRIC 6"VERTICALLY BELOW FINISHED GRADE.
2. 2"x 2" FIR, PINE OR STEEL FENCE POSTS.
3. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
4. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
5. PANELS MUST BE PLACED ACCORDING TO SPACING ON DETAIL NO.940

1 TYPICAL SILT FENCE INSTALLATION

BULK BAG NOTES

BULK BAGS ARE ALSO CALLED FLEXIBLE INTERMEDIATE BULK CONTAINERS (FIBC) THAT CAN BE CUSTOM MADE FROM VARIOUS FABRIC. THE FOLLOWING REQUIREMENTS ARE NECESSARY FOR THE RIVER ENVIRONMENT:

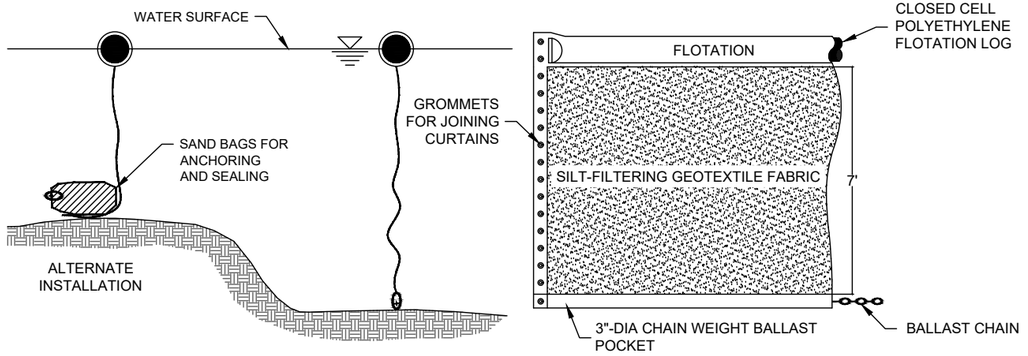
LARGE BULK BAGS SHALL BE CONSTRUCTED OF 8 oz WOVEN FABRIC, 1200 HOUR UV RESISTANT WITH SEWN LIFTING LOOPS. WHEN FILLED WITH NATIVE RIVER SAND AND GRAVEL, THE BAGS ARE APPROXIMATELY 6' WIDE x 6' LONG x 4' HIGH.

SMALL BULK BAGS SHALL BE CONSTRUCTED OF 8 oz WOVEN FABRIC, 1200 HOUR UV RESISTANT WITH SEWN LIFTING LOOPS. WHEN FILLED WITH NATIVE RIVER SAND AND GRAVEL, THE BAGS ARE APPROXIMATELY 3' WIDE x 3' LONG x 2.5' HIGH.

BULK BAGS SHALL BE CAREFULLY PLACED TO ENSURE NO TEARING OR CUTTING OF THE BAGS OCCURS.

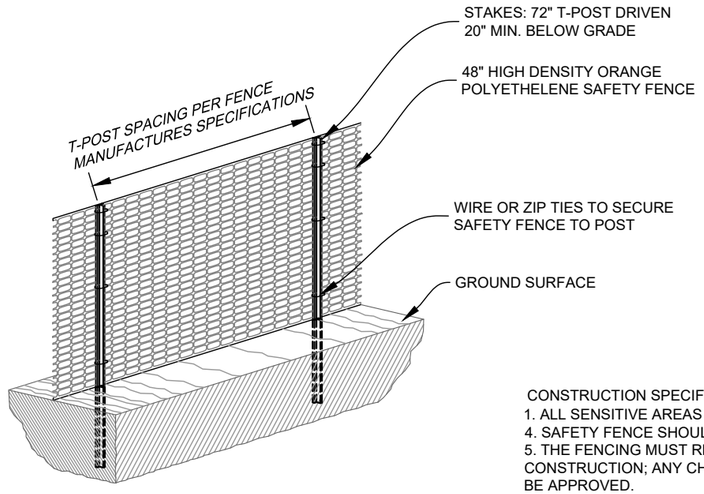
BULK BAGS SHALL BE PLACED USING A HYDRAULIC CRANE OR TRACKHOE USING LIFTING BARS AND STEEL CABLES TO EQUALIZE LOAD ON LIFTING LOOPS.

2 TYPICAL BULK BAG INSTALLATION



FLOATING SILT CURTAIN SHALL BE A "LAYFIELD FSC 13" OR APPROVED EQUAL. THE BODY OF THE FLOATING SILT CURTAIN IS MADE FROM A STRONG, HIGH-FILTRATION FABRIC THAT RETAINS FINE SILTS AND SEDIMENTS ON-SITE. THE FLOAT AND BOTTOM SLEEVE ARE CONSTRUCTED FROM A UV-STABLE, HIGH-STRENGTH POLYETHYLENE (I.E. RIPSTOP-TYPE MATERIAL). THE FLOATING SILT CURTAIN IS INCREASED IN LENGTH BY JOINING ADDITIONAL SECTIONS OF CURTAIN, WHICH TYPICALLY COMES IN 50' LENGTHS.

3 FLOATING SILT CURTAIN



CONSTRUCTION SPECIFICATIONS:
1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
4. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T-POSTS.
5. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.

4 TEMPORARY CONSTRUCTION FENCE

PERMIT

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

BMP DETAILS

POMEROY DAM REMOVAL
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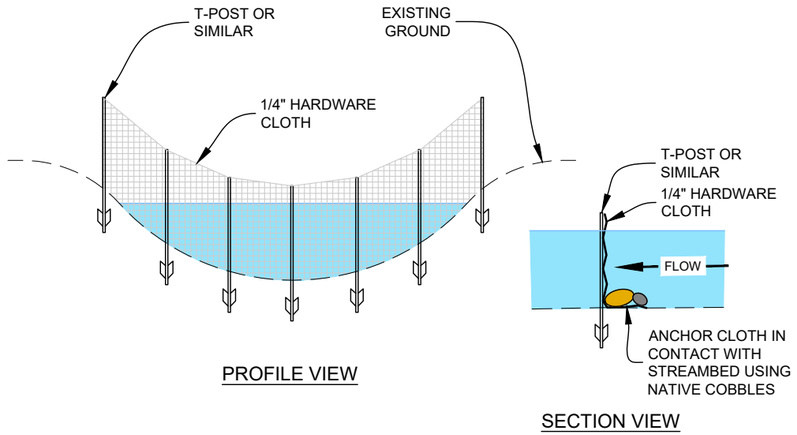
PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
3.4



EXAMPLE OF FISH BLOCK NET

1 FISH BLOCK NET DETAIL

NOT TO SCALE

PERMIT

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236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

AQUATIC CONS. DETAILS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
3.5

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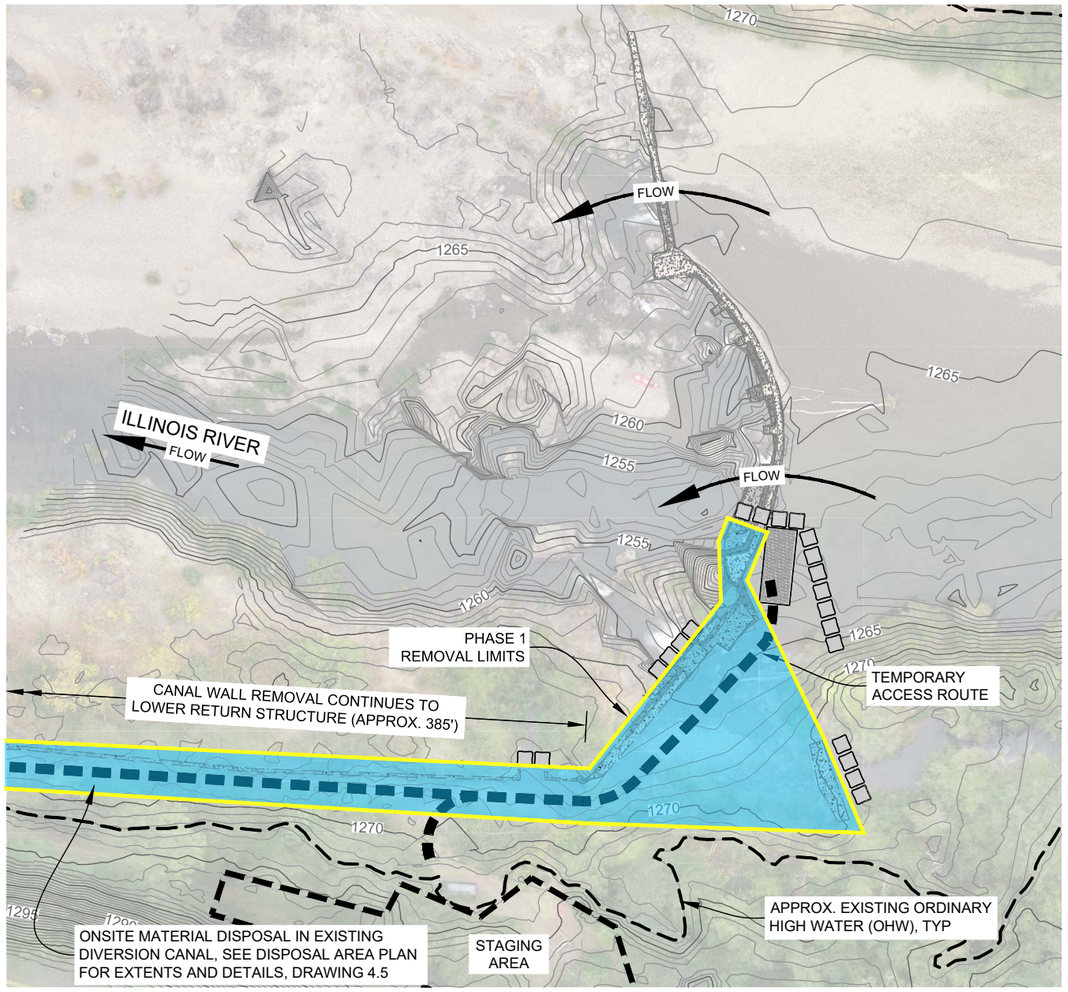


1 PHASE 1 DAM REMOVAL

1" = 60'

PHASE 1

1.1 MOBILIZE CONSTRUCTION EQUIPMENT AND FACILITIES ON SITE.

1.2 ISOLATE CONCRETE STRUCTURE FOR REMOVAL BY INSTALLING TEMPORARY SAND BAGS/BULK BAGS UPSTREAM AND DOWNSTREAM OF DAM TO DIVERT STREAM FLOW THROUGH THE EAST (RIVER RIGHT) NOTCH OF THE DAM. SEE DETAIL 2 ON DRAWING 3.4.

1.3 CONDUCT FISH SALVAGE IN ISOLATED AREAS OF DAM AND DIVERSION CANAL PER AQUATIC CONSERVATION MEASURES AND DETAILS, SEE DRAWINGS 3.4-3.5.

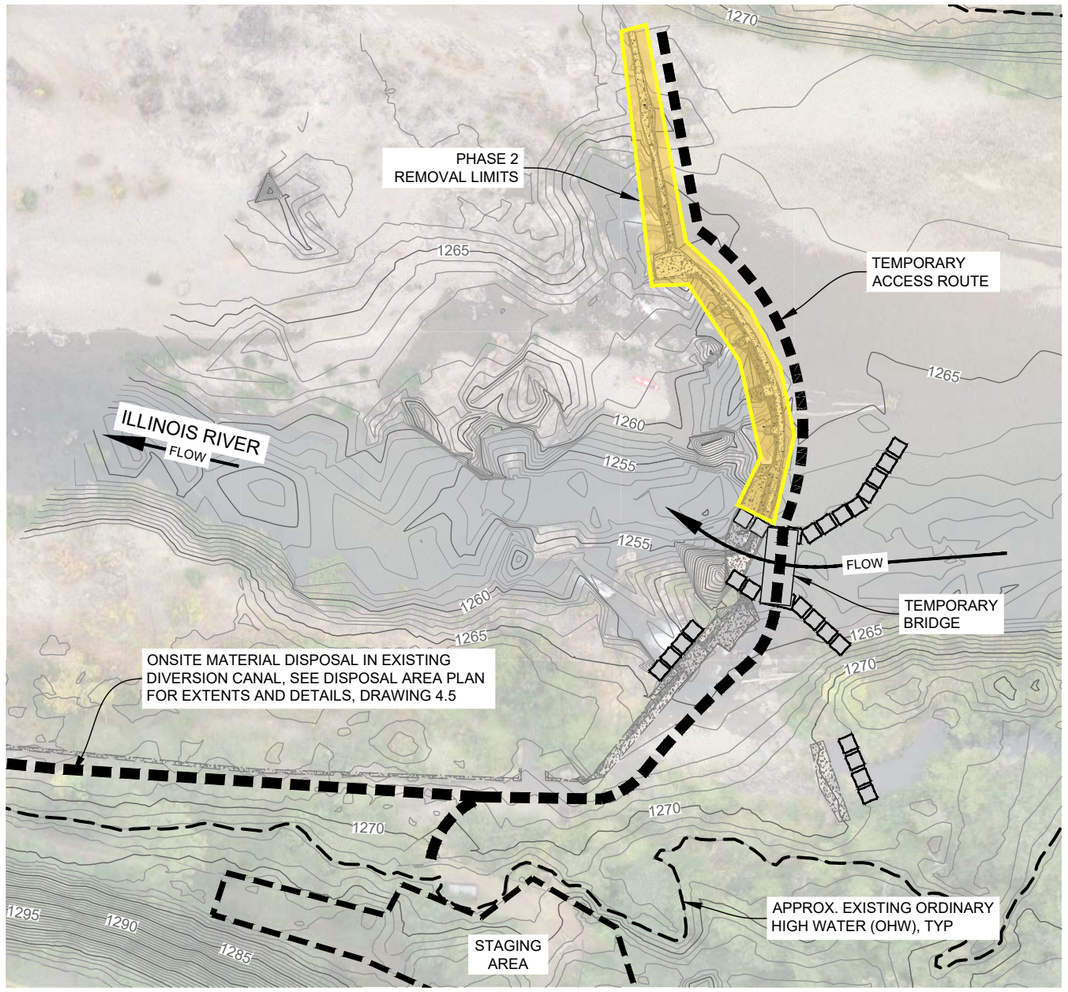
1.4 CONSTRUCT TEMPORARY ACCESS ROAD ACROSS EXISTING DIVERSION CANAL.

1.5 REMOVE ISOLATED PORTION OF CONCRETE DAM AND CANAL WALL. CONCRETE RUBBLE TO BE DISPOSED OF ONSITE. APPROXIMATELY, ±100 CUBIC YARDS OF CONCRETE.

1.6 PLACE CONCRETE RUBBLE IN CANAL STARTING AT LOWER RETURN STRUCTURE (DOWNSTREAM OF PHASE 1 ACCESS CROSSING). SEE DISPOSAL AREA PLAN, DRAWING 4.5.

1.7 INSTALL BRIDGE TO BE USED FOR PHASE 2 ACCESS. SEE DRAWING 4.2.

1.8 REMOVE PHASE 1 WORK AREA ISOLATION MEASURES INCREMENTALLY DURING RESERVOIR DRAW DOWN PER THE DIRECTION OF THE ENGINEER. DIRECT RIVER TO FLOW THROUGH THE PHASE 2 BRIDGE AND REMOVED PORTION OF DAM.



2 PHASE 2 DAM REMOVAL

1" = 60'

PHASE 2

2.1 CONSTRUCT TEMPORARY ACCESS ROAD ALONG DAM CREST FOR ACCESS TO EAST PORTION OF DAM.

2.2 CONCURRENT TO ACCESS ROAD INSTALLATION, ISOLATE CONCRETE STRUCTURE FOR REMOVAL BY PLACING TEMPORARY BULK BAG COFFER DAM UPSTREAM OF DAM TO DIVERT STREAM FLOW THROUGH PHASE 1 REMOVED PORTION OF DAM. SEE DETAIL 2 ON DRAWING 3.4.

2.3 CONDUCT FISH SALVAGE IN ISOLATED AREAS PER AQUATIC CONSERVATION MEASURES AND DETAILS, SEE DRAWINGS 3.4-3.5.

2.4 REMOVE REMAINING PORTION OF DAM STARTING AT THE EAST END OF THE DAM AND MOVING TOWARDS THE TEMPORARY BRIDGE. CONCRETE RUBBLE TO BE DISPOSED OF ONSITE. APPROXIMATELY, ±100 CUBIC YARDS OF CONCRETE.

2.5 PLACE CONCRETE RUBBLE IN CANAL STARTING AT LOWER RETURN STRUCTURE (DOWNSTREAM OF PHASE 1 ACCESS CROSSING). SEE DISPOSAL AREA PLAN, DRAWING 4.5.

2.6 REMOVE PHASE 2 TEMPORARY ACCESS ROAD, TEMPORARY BRIDGE, AND ISOLATION MEASURES. ACCESS ROAD MATERIAL TO BE DISPOSED OF IN CANAL OR REMOVED FROM SITE.

2.7 STABILIZE AND REVEGETATE PROJECT AREA PER DRAWING 6.0.

PERMIT

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

PROJECT SEQUENCING OVERVIEW

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
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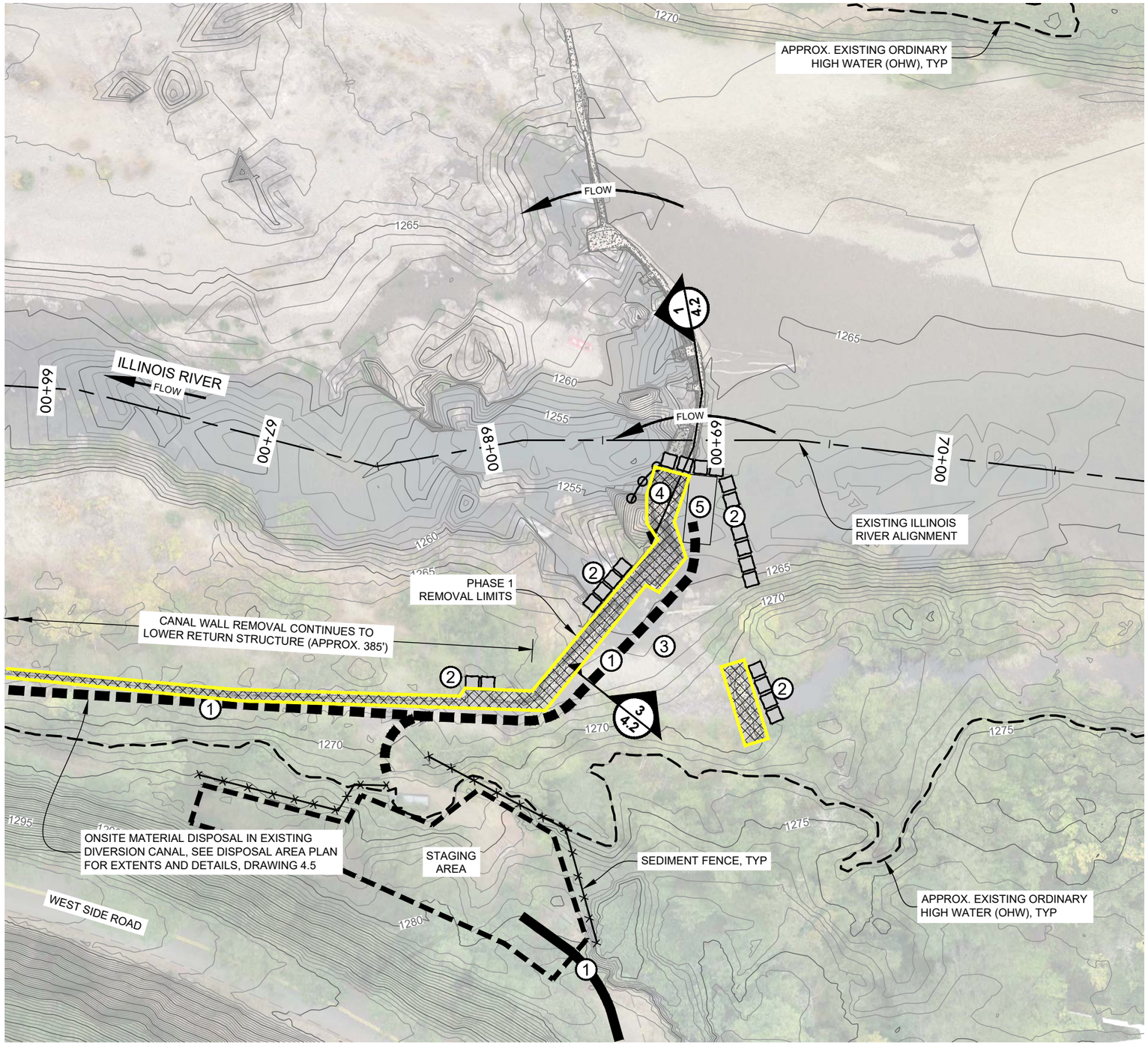
PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
4.0



PHASE 1 CONSTRUCTION NOTES

1. ACCESS RIVER FROM WEST SIDE ROAD PER SITE ACCESS AND STAGING PLAN (DRAWING 3.2). IMPROVE EXISTING ROAD NETWORK AND CONSTRUCT TEMPORARY ACCESS ROADS PER DETAILS DWG 4.2.
2. INSTALL TEMPORARY SAND BAGS, BULK BAGS, OR APPROVED ALTERNATIVE COFFERDAM PER DRAWING 3.4 TO ISOLATE ACTIVE FLOW FROM WORK AREA PER PHASE 1 CARE AND DIVERSION OF WATER NOTES THIS SHEET.
3. FISH SALVAGE PLAN SHALL BE ACTIVATED FOR ISOLATED AREAS OF DAM AND DIVERSION CANAL WHERE RUBBLE WILL BE DISPOSED. SALVAGE TO BE PER FISH SALVAGE NOTES THIS SHEET AND CONSERVATION MEASURES DRAWINGS 1.1-1.5.
4. REMOVE ISOLATED PORTION OF CONCRETE DAM AS NOTED ON DRAWING (1 SPILLWAY BAY). ENGINEER SHALL PROVIDE FINAL APPROVAL OF CONCRETE REMOVAL UPON INSPECTION. CONCRETE SHALL BE BROKEN INTO 2' BY 2' PIECES WITH ALL EXPOSED REBAR REMOVED. CONCRETE TO BE DISPOSED OF ONSITE ALONG CANAL PER DWG 4.5, WITH REBAR DISPOSED OF OFF-SITE AT LEGAL DUMPING FACILITY.
5. INSTALL TEMPORARY BRIDGE (DETAIL DRAWING 4.4). BRIDGE DESIGN PROVIDED BY CONTRACTOR SHALL BE ABLE TO PASS 150 CFS WITH 1' FREEBOARD.

PHASE 1 CARE AND DIVERSION OF WATER

FLOW CONDITIONS DURING IN-WATER WORK

THE PROJECT WILL BE IMPLEMENTED DURING THE IN-STREAM WORK WINDOW JUNE 15 - SEPTEMBER 15. SEE TABLE ON DRAWING 2.0 FOR ANTICIPATED FLOWS DURING CONSTRUCTION.

METHOD OF WORK AREA ISOLATION - NORTH PORTION OF DAM

THE WORK AREA WILL BE ISOLATED FROM ACTIVE FLOW USING A SAND BAG/BULK BAG COFFERDAM INSTALLED UPSTREAM AND DOWNSTREAM OF THE STRUCTURE TO RETAIN ANY SUSPENDED SEDIMENT FROM REMOVAL ACTIVITIES.

FISH PASSAGE

FISH PASSAGE WILL BE PRESERVED THROUGH THE EXISTING RIVER-RIGHT FLOW PATH.

PHASE 1 FISH SALVAGE NOTES

1. CONTRACTOR SHALL COORDINATE WITH OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW) TO REMOVE EXISTING FISH AT THE PROJECT SITE PRIOR TO ISOLATION AND DEWATERING THE AREA. FISH SALVAGE TO BE CONDUCTED BY TRAINED FISHERIES BIOLOGISTS AND PER ODFW AND NOAA RULES. IF POSSIBLE ALLOW FISH SPECIES TO MIGRATE OUT OF WORK AREA. IF NECESSARY, A BACKPACK ELECTROSHOCKER OR SEINE NET (MADE FROM 9.5 MM STRETCHED NYLON MESH) MAY BE USED TO REMOVE FISH FROM THE ISOLATED WORK AREA.
2. IN COFFERDAM WORK AREAS AND OTHER ISOLATED AREAS, WATER MAY BE DRAWN DOWN TO HELP CONSOLIDATE FISH AND IMPROVE SALVAGE EFFORTS IF DEEMED NECESSARY BY EITHER ODFW OR RDG BIOLOGISTS. REDUCING WATER VOLUME WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DONE USING PUMPS FITTED WITH APPROVED FISH SCREENS THAT PREVENT IMPINGEMENT OR ENTRAINMENT OF FISH.
3. WATER WILL BE DRAWN DOWN IN A CONTROLLED MANNER WITH FISH SALVAGE CREWS CONTINUOUSLY MONITORING THE PUMPS, NEWLY EXPOSED AREAS, AND FISH NUMBERS FOR CROWDING. IF ISOLATED POCKETS OR POOLS OCCUR, THEY WILL BE DEFISHED AND PUMPING WILL BE REDUCED ONCE MANAGEABLE WATER LEVELS ARE OBTAINED.
4. FOR THE PERIOD BETWEEN CAPTURE AND RELEASE, ALL CAPTURED AQUATIC LIFE WILL BE IMMEDIATELY PUT INTO CLEAN DARK COLORED FIVE GALLON BUCKETS FILLED WITH CLEAN RIVER WATER. FISH SPECIES AND LIFE STAGE WILL BE DOCUMENTED AND FISH WILL BE RELEASED IN A SAFE ENVIRONMENT DETERMINED BY EITHER ODFW OR RDG BIOLOGISTS WITHIN THE VICINITY OF THE PROJECT AREA.

ESTIMATED STRUCTURE REMOVAL QUANTITIES PHASE 1	
CONCRETE RUBBLE	±100 CY

1 PHASE 1 DAM REMOVAL

1" = 50'

RDG RIVER DESIGN GROUP
236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
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PHASE 1 - DAM REMOVAL

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER RDG-22-283

DRAWING NUMBER 4.1

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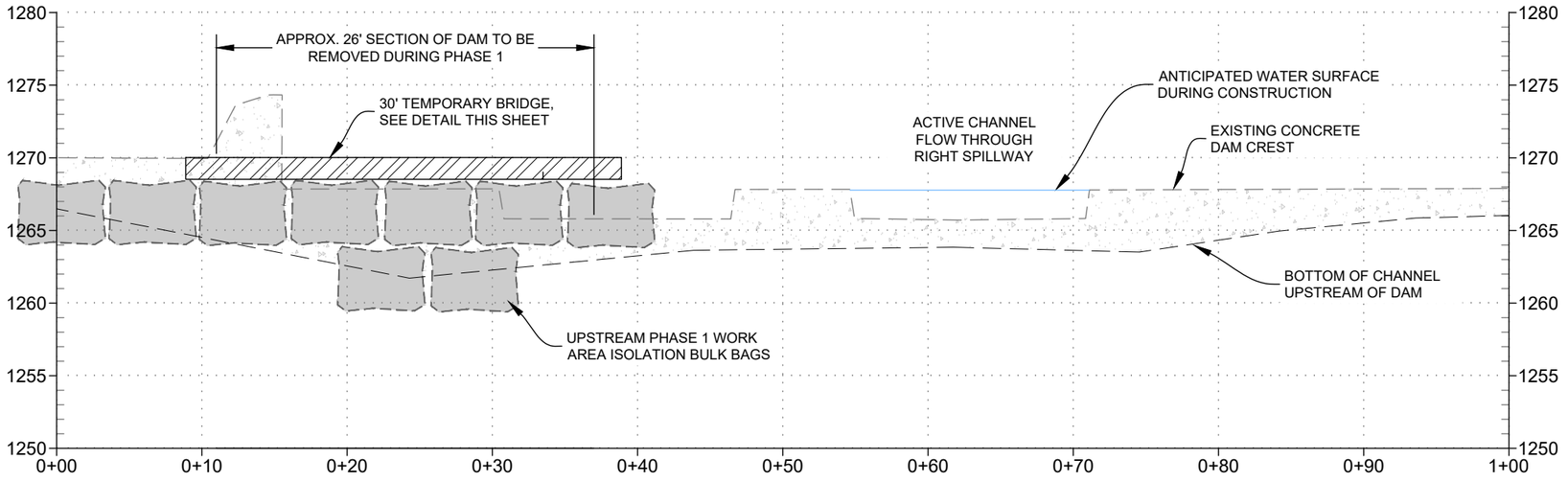
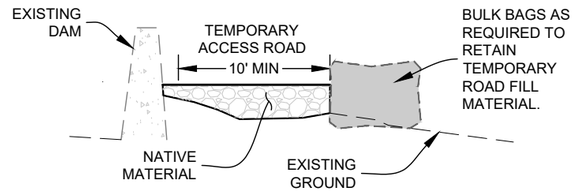
PERMIT



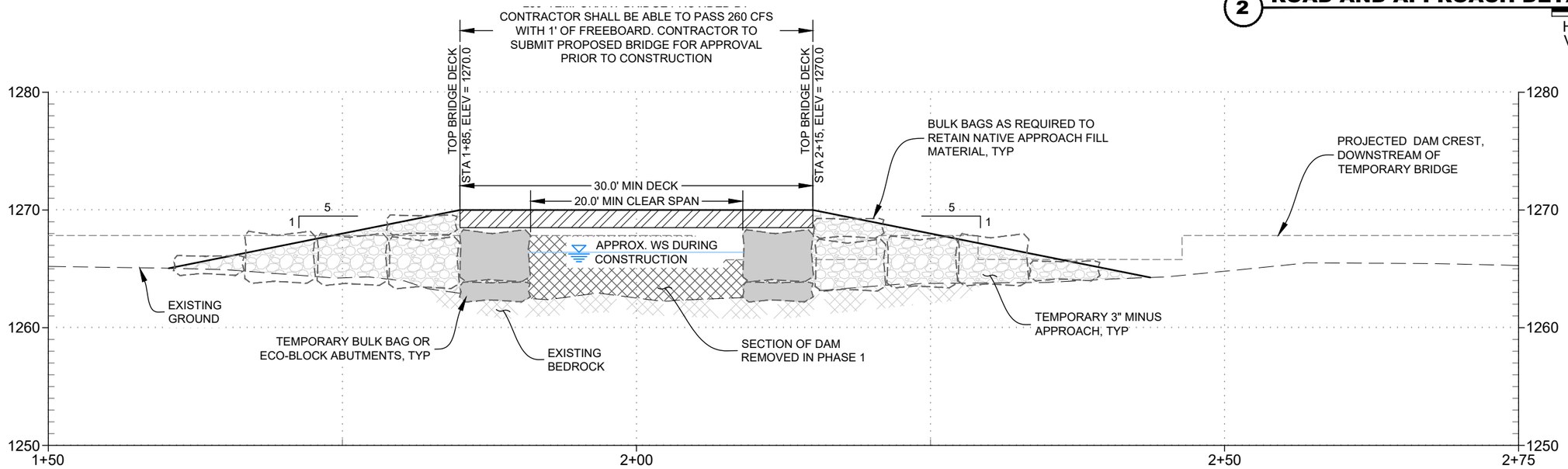
1 PHASE 1 ISOLATION DETAIL

HORZ 1" = 10'
VERT 1" = 10'



2 TYPICAL TEMPORARY ACCESS ROAD AND APPROACH DETAIL

HORZ 1" = 10'
VERT 1" = 10'



3 TEMPORARY BRIDGE DETAIL

HORZ 1" = 10'
VERT 1" = 10'

PERMIT

RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

PHASE 1 DETAILS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
4.2

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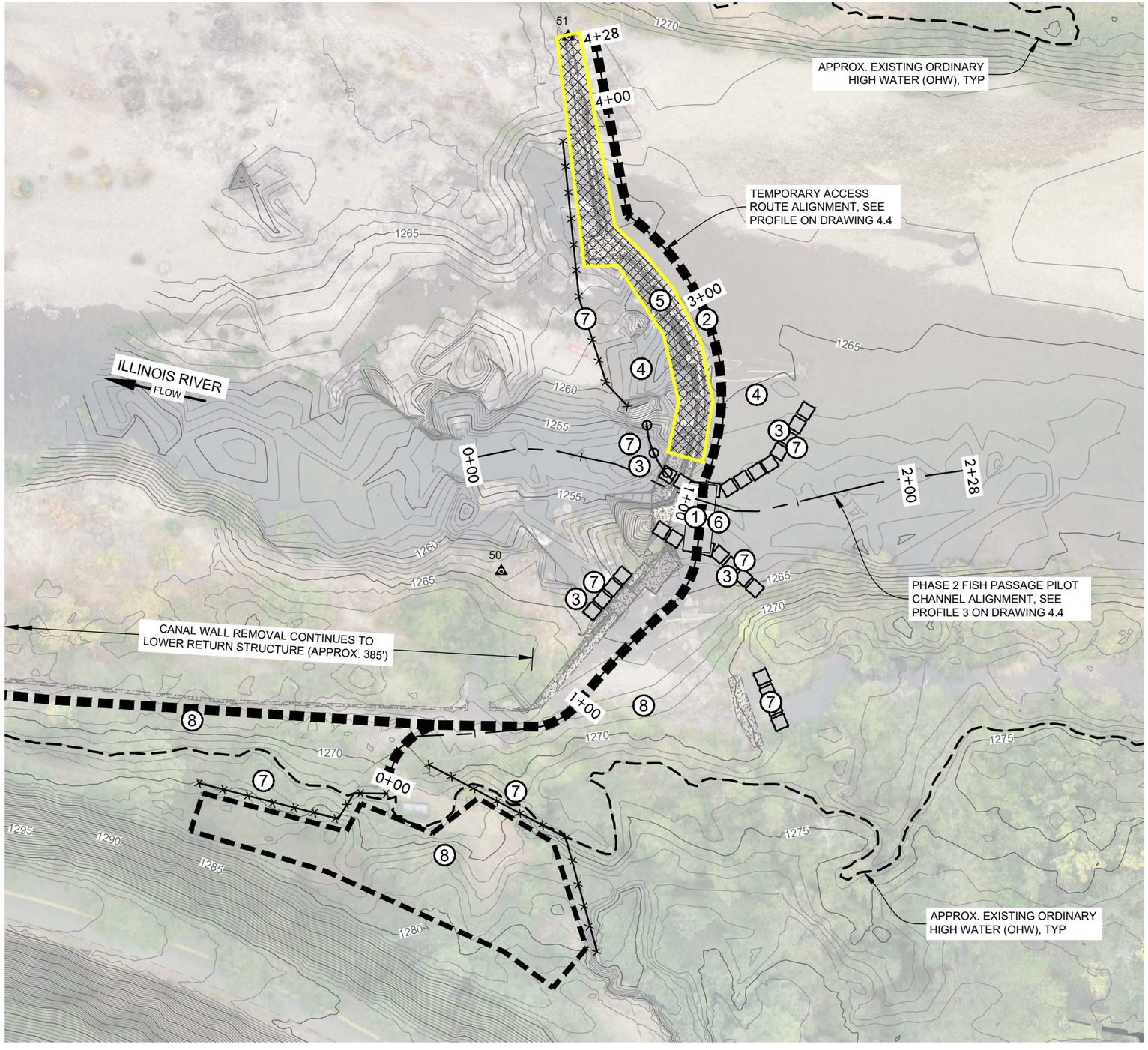

PHASE 2 CONSTRUCTION NOTES

1. ACCESS DAM BY MEANS OF TEMPORARY BRIDGE INSTALLED AT THE COMPLETION OF PHASE 1. (DETAIL DWG 4.4).
2. CONSTRUCT TEMPORARY ACCESS ROAD ALONG DAM CREST FOR ACCESS TO SOUTH PORTION OF DAM PER DETAIL DWG 4.5 (±100 CUBIC YARDS OF NATIVE MATERIAL).
3. INSTALL TEMPORARY FLOATING SILT CURTAIN, SAND BAGS, BULK BAGS, OR APPROVED ALTERNATIVE COFFERDAM PER DRAWINGS 3.4 AND 4.4 TO ISOLATE ACTIVE FLOW FROM WORK AREA PER PHASE 2 CARE AND DIVERSION OF WATER NOTES THIS SHEET.
4. FISH SALVAGE PLAN SHALL BE ACTIVATED FOR ISOLATED AREAS OF DAM. SALVAGE TO BE PER FISH SALVAGE NOTES THIS SHEET AND CONSERVATION MEASURES DRAWINGS 1.1-1.5.
5. REMOVE ISOLATED PORTION OF CONCRETE DAM, CANAL WALL, AND ASSOCIATED STRUCTURES AS NOTED ON DRAWING. ENGINEER SHALL PROVIDE FINAL APPROVAL OF CONCRETE REMOVAL UPON INSPECTION. CONCRETE SHALL BE BROKEN INTO 2' BY 2' PIECES WITH ALL EXPOSED REBAR REMOVED. CONCRETE TO BE DISPOSED OF ONSITE ALONG CANAL PER DWG 4.4, WITH REBAR AND TIMBERS DISPOSED OF OFF-SITE AT LEGAL DUMPING FACILITY.
6. REMOVE PHASE 2 TEMPORARY ACCESS ROAD AND BRIDGE. ACCESS ROAD MATERIAL TO BE DISPOSED OF IN AND/OR ADJACENT TO CANAL.
7. REMOVE PHASE 2 WORK AREA ISOLATION MEASURES AND SHAPE FISH PASSAGE PILOT CHANNEL.
8. STABILIZE AND REVEGETATE PROJECT AREA.

PHASE 2 CARE AND DIVERSION OF WATER

FLOW CONDITIONS DURING IN-WATER WORK
THE PROJECT WILL BE IMPLEMENTED DURING THE IN-STREAM WORK WINDOW JULY 1 - SEPTEMBER 30. SEE TABLE ON DRAWING 2.0 FOR ANTICIPATED FLOWS DURING CONSTRUCTION.

METHOD OF WORK AREA ISOLATION - EAST HALF OF DAM AND EAST FISH LADDER
THE WORK AREA WILL BE ISOLATED FROM ACTIVE FLOW USING A SAND BAG/BULK BAG COFFERDAM INSTALLED UPSTREAM AND DOWNSTREAM OF THE STRUCTURE TO RETAIN ANY SUSPENDED SEDIMENT FROM REMOVAL ACTIVITIES.

FISH PASSAGE
FISH PASSAGE WILL BE THROUGH THE NATURAL CHANNEL UNDER THE TEMPORARY BRIDGE.

PHASE 2 FISH SALVAGE NOTES

1. CONTRACTOR SHALL COORDINATE WITH OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW) TO REMOVE EXISTING FISH AT THE PROJECT SITE PRIOR TO ISOLATION AND DEWATERING THE AREA. FISH SALVAGE TO BE CONDUCTED BY TRAINED FISHERIES BIOLOGISTS AND PER ODFW AND NOAA RULES. IF POSSIBLE ALLOW FISH SPECIES TO MIGRATE OUT OF WORK AREA. IF NECESSARY, A BACKPACK ELECTROSHOCKER OR SEINE NET (MADE FROM 9.5 MM STRETCHED NYLON MESH) MAY BE USED TO REMOVE FISH FROM THE ISOLATED WORK AREA.
2. IN COFFERDAM WORK AREAS AND OTHER ISOLATED AREAS, WATER MAY BE DRAWN DOWN TO HELP CONSOLIDATE FISH AND IMPROVE SALVAGE EFFORTS IF DEEMED NECESSARY BY EITHER ODFW OR RDG BIOLOGISTS. REDUCING WATER VOLUME WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DONE USING PUMPS FITTED WITH APPROVED FISH SCREENS THAT PREVENT IMPINGEMENT OR ENTRAINMENT OF FISH.
3. WATER WILL BE DRAWN DOWN IN A CONTROLLED MANNER WITH FISH SALVAGE CREWS CONTINUOUSLY MONITORING THE PUMPS, NEWLY EXPOSED AREAS, AND FISH NUMBERS FOR CROWDING. IF ISOLATED POCKETS OR POOLS OCCUR, THEY WILL BE DEFISHED AND PUMPING WILL BE REDUCED ONCE MANAGEABLE WATER LEVELS ARE OBTAINED.
4. FOR THE PERIOD BETWEEN CAPTURE AND RELEASE, ALL CAPTURED AQUATIC LIFE WILL BE IMMEDIATELY PUT INTO CLEAN DARK COLORED FIVE GALLON BUCKETS FILLED WITH CLEAN RIVER WATER. FISH SPECIES AND LIFE STAGE WILL BE DOCUMENTED AND FISH WILL BE RELEASED IN A SAFE ENVIRONMENT DETERMINED BY EITHER ODFW OR RDG BIOLOGISTS WITHIN THE VICINITY OF THE PROJECT AREA.

ESTIMATED STRUCTURE REMOVAL QUANTITIES PHASE 2	
CONCRETE RUBBLE	±100 CY

1 PHASE 2 DAM REMOVAL
1" = 50'

PERMIT

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236 Wisconsin Avenue Whitefish, MT 59937 406.862.4927
311 SW Jefferson Avenue Corvallis, OR 97333 541.738.2920

PHASE 2 - DAM REMOVAL

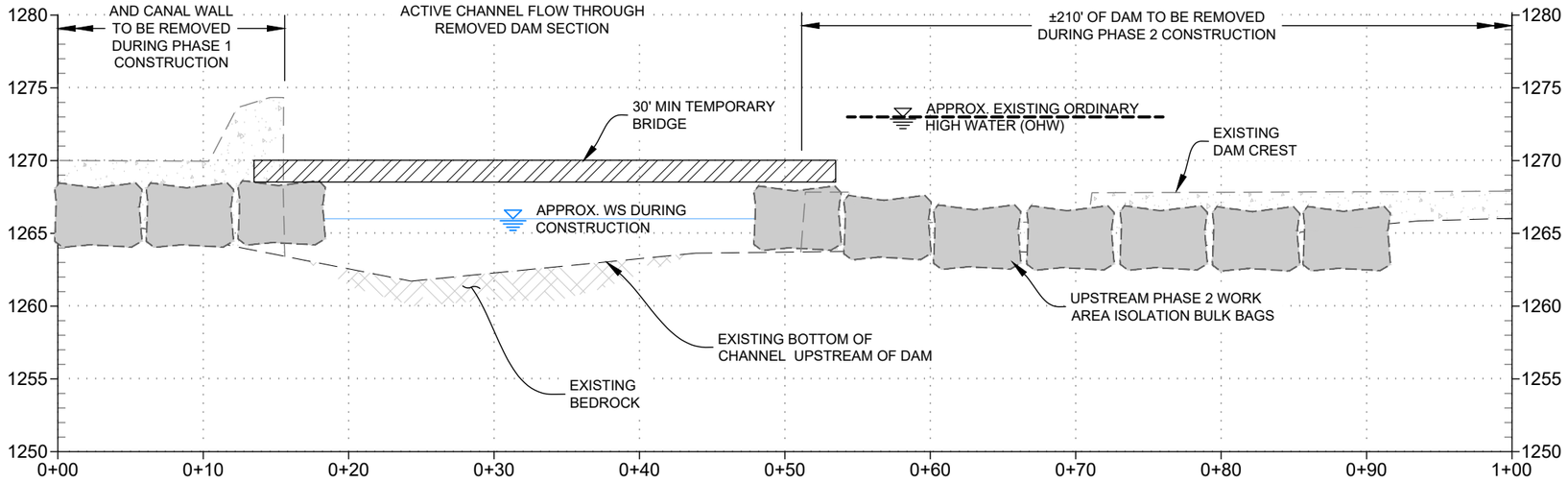
POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

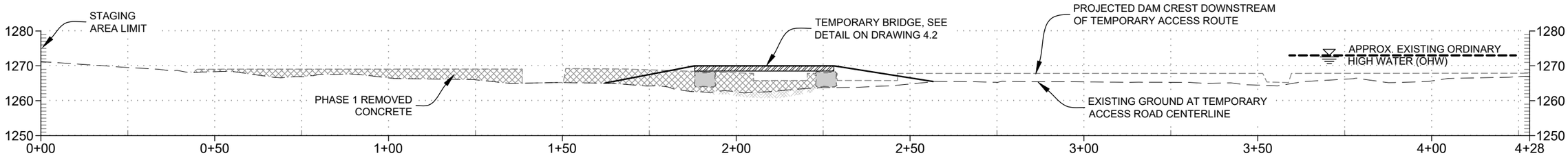
DRAWING NUMBER
4.3

Drawing 18 of 27



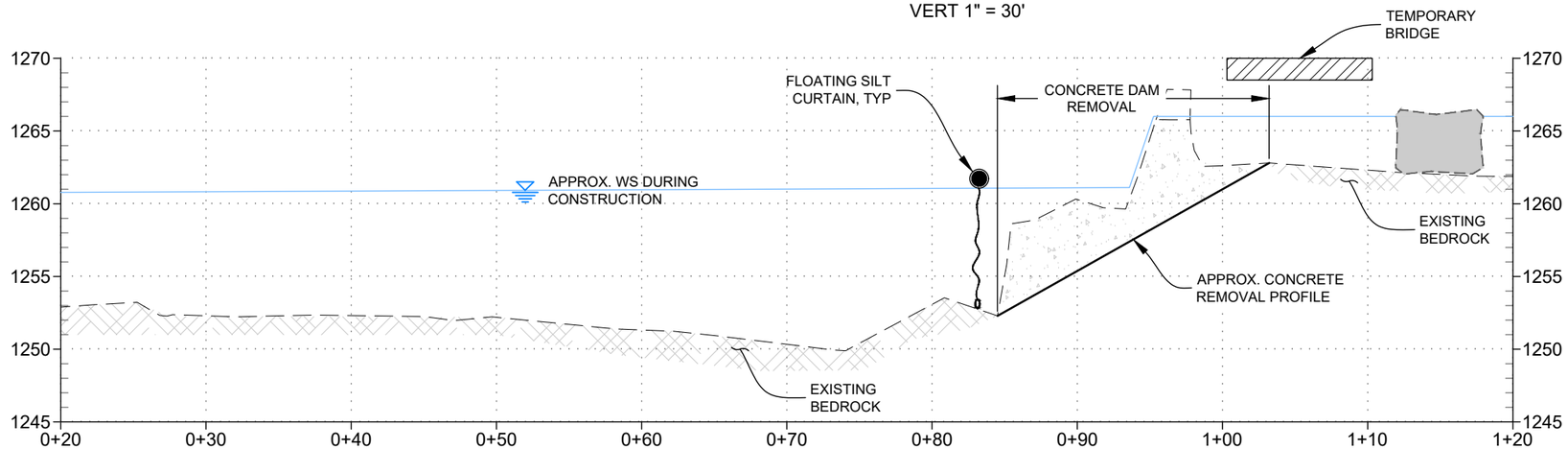
1 PHASE 2 ISOLATION DETAIL

HORZ 1" = 10'
VERT 1" = 10'



2 PROPOSED ACCESS PROFILE

HORIZ 1" = 30'
VERT 1" = 30'



3 CONCRETE REMOVAL PROFILE

HORZ 1" = 10'
VERT 1" = 10'

PERMIT

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Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

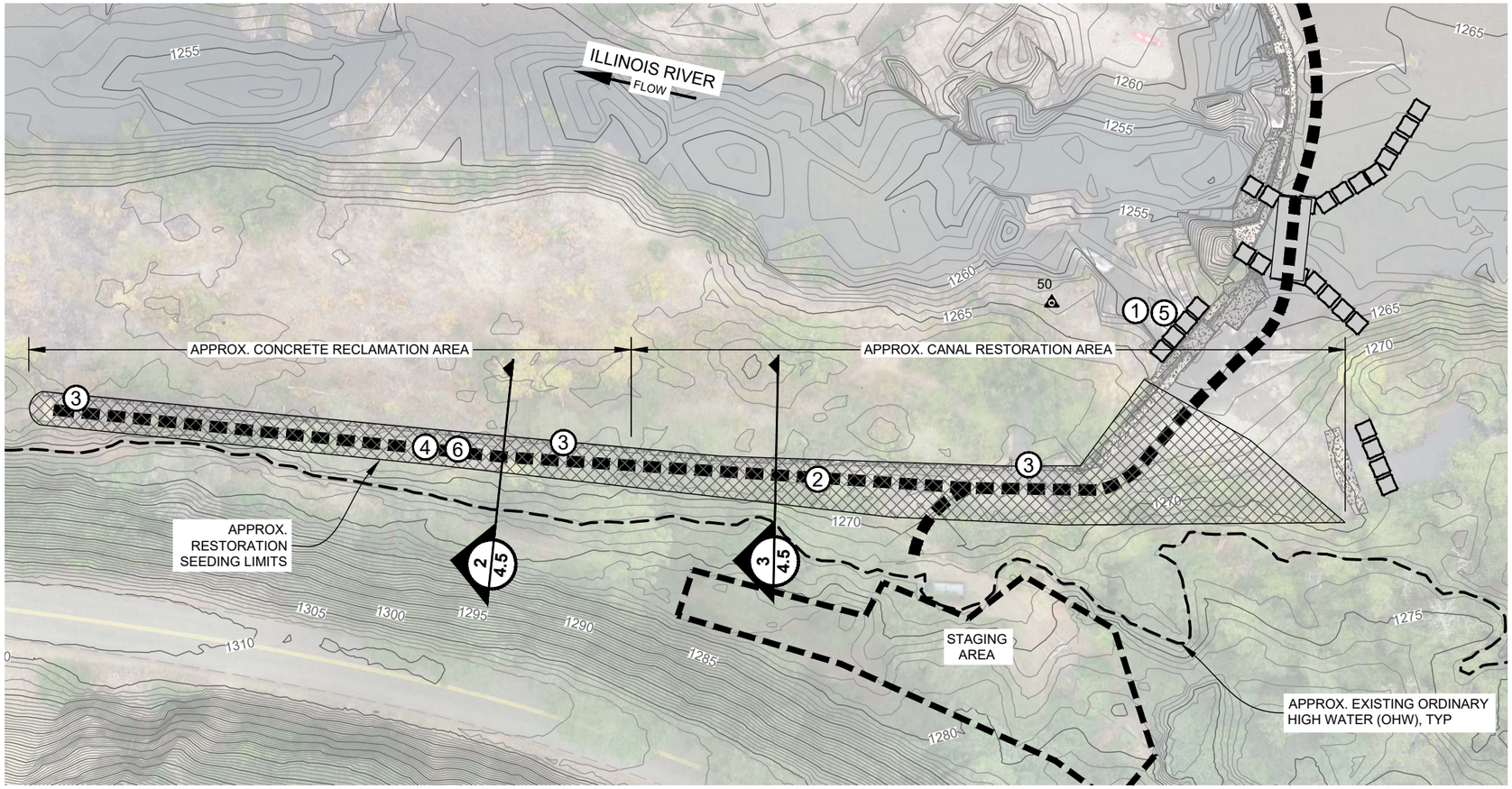
PHASE 2 DETAILS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
4.4



1 DISPOSAL AREA PLAN

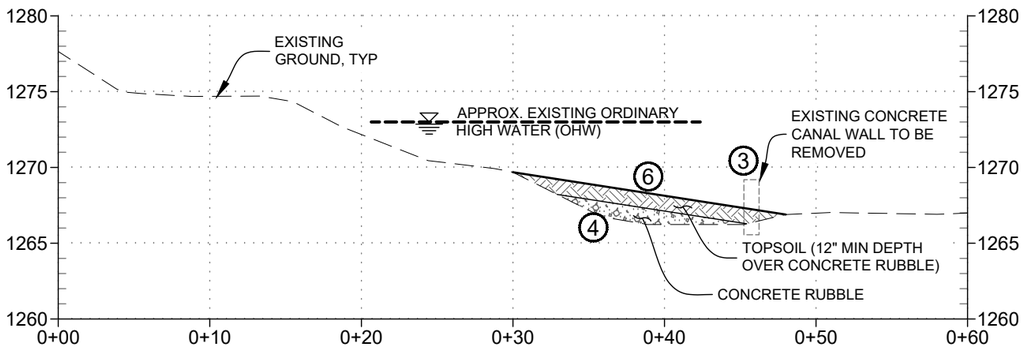
1" = 50'

CONSTRUCTION NOTES

1. INSTALL WORK AREA ISOLATION MEASURES PER BEST MANAGEMENT PRACTICES DRAWINGS 3.3-3.4 PRIOR TO CONSTRUCTION.
2. ACCESS DISPOSAL AREA BY TEMPORARY ACCESS ROUTE CONSTRUCTED DOWN EXISTING DIVERSION CANAL.
3. REMOVE CONCRETE STRUCTURES AND CANAL WALLS STARTING AT THE MOST DOWNSTREAM EXTENT OF THE DISPOSAL AREA. REMOVE ALL EXPOSED REBAR AND DISPOSE OF OFFSITE.
4. PLACE CONCRETE RUBBLE IN EXISTING CANAL AN COVER WITH A MINIMUM OF 12" OF TOPSOIL. SEE TYPICAL DETAIL SECTION THIS DRAWING.
5. REMOVE WORK AREA ISOLATION MEASURES.
6. STABILIZE AND REVEGETATE PROJECT AREA PER RESTORATION AND REVEGETATION PLAN, DRAWING 6.0.

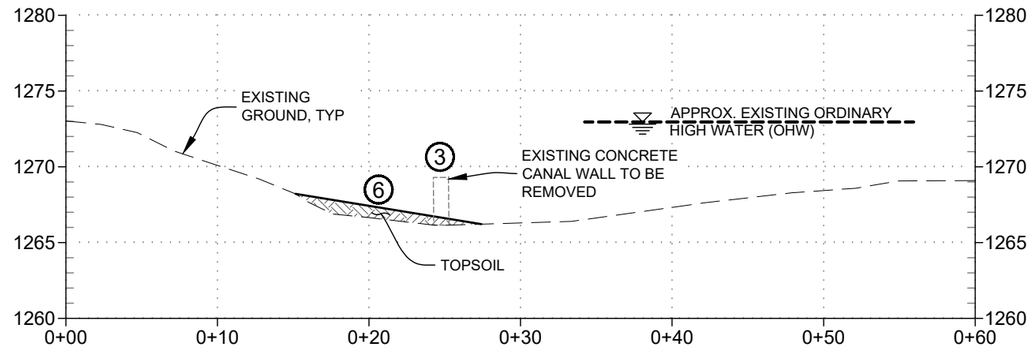
ESTIMATED STRUCTURE QUANTITIES PHASE 1	
CONCRETE RUBBLE	±100 CY

ESTIMATED STRUCTURE QUANTITIES PHASE 2	
CONCRETE RUBBLE	±100 CY



2 TYPICAL CONCRETE RECLAMATION SECTION

HORZ 1" = 10'
VERT 1" = 10'



3 TYPICAL CANAL RESTORATION SECTION

HORZ 1" = 10'
VERT 1" = 10'

PERMIT

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DISPOSAL AREA PLAN

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

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RDG-22-283

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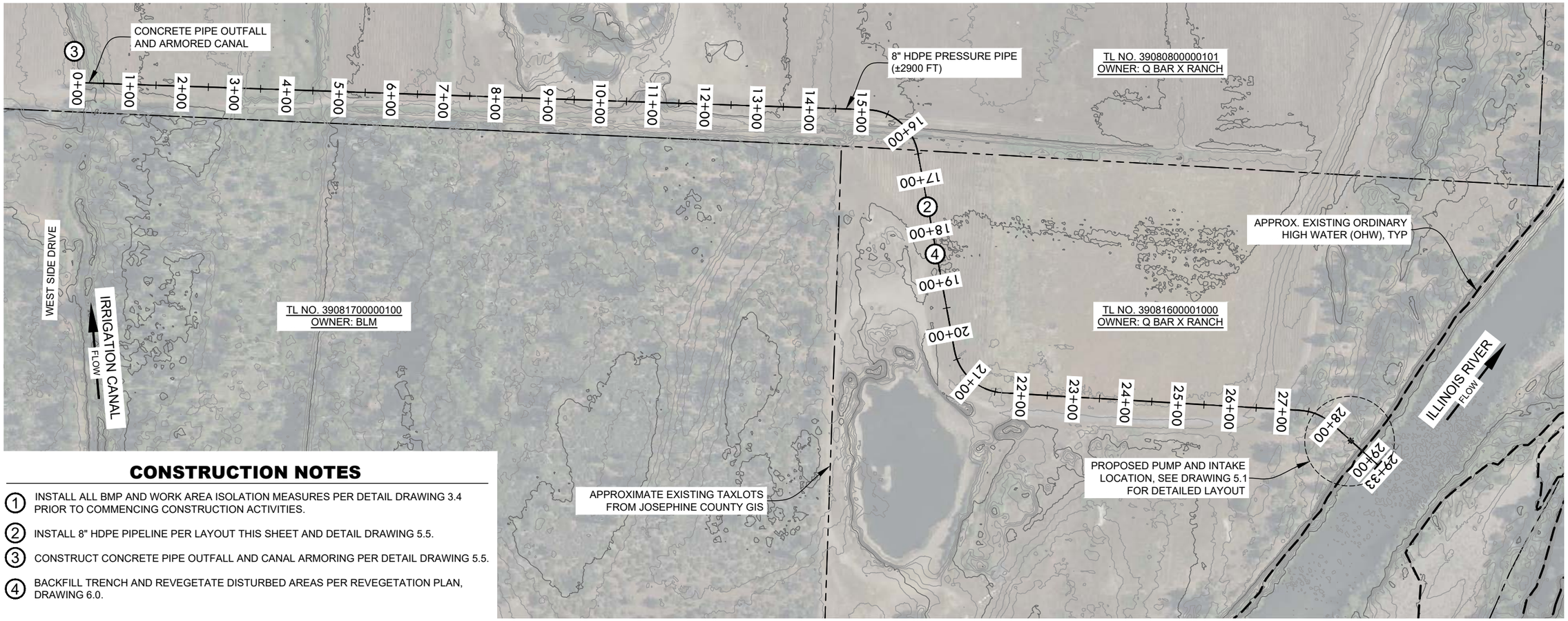
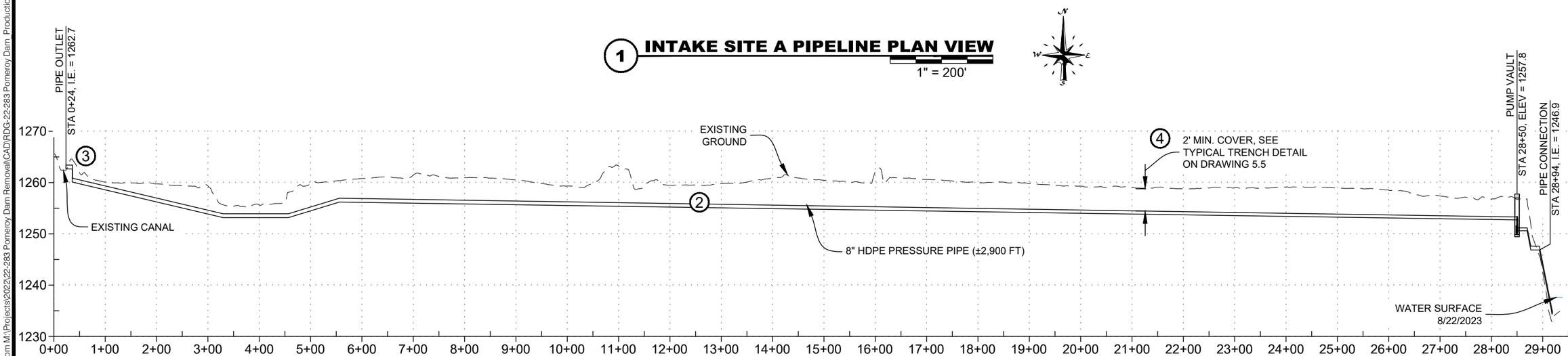


CONSTRUCTION NOTES

1. INSTALL ALL BMP AND WORK AREA ISOLATION MEASURES PER DETAIL DRAWING 3.4 PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
2. INSTALL 8" HDPE PIPELINE PER LAYOUT THIS SHEET AND DETAIL DRAWING 5.5.
3. CONSTRUCT CONCRETE PIPE OUTFALL AND CANAL ARMORING PER DETAIL DRAWING 5.5.
4. BACKFILL TRENCH AND REVEGETATE DISTURBED AREAS PER REVEGETATION PLAN, DRAWING 6.0.

1 INTAKE SITE A PIPELINE PLAN VIEW

1" = 200'



2 PIPELINE PROFILE

HORIZ 1" = 200'
VERT 1" = 20'

PERMIT

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INTAKE A PIPELINE

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

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*	1/26/24	TF	PERMIT	SW

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RDG-22-283

DRAWING NUMBER
5.0

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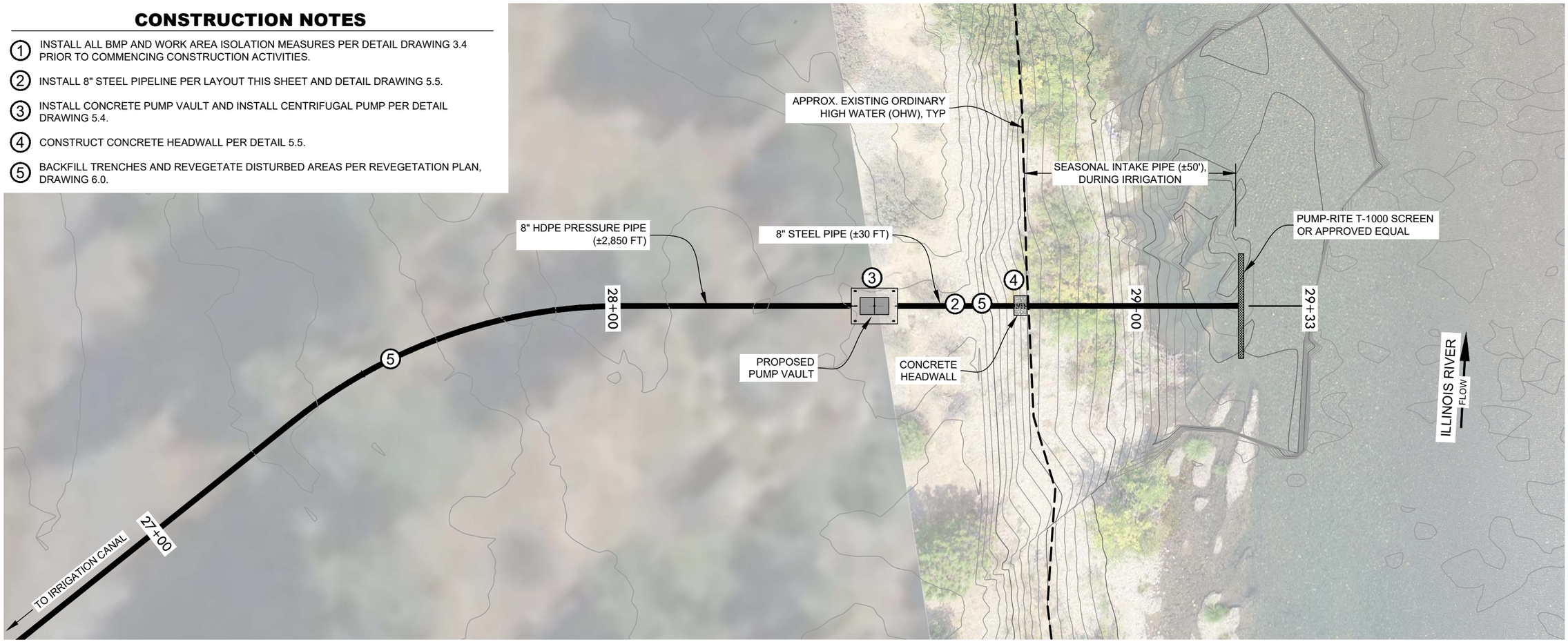
Jan 25, 2024 - 5:12pm M:\Projects\2022\22-283 Pomeroy Dam Removal\CAD\RDG-22-283 Pomeroy Dam Production.dwg

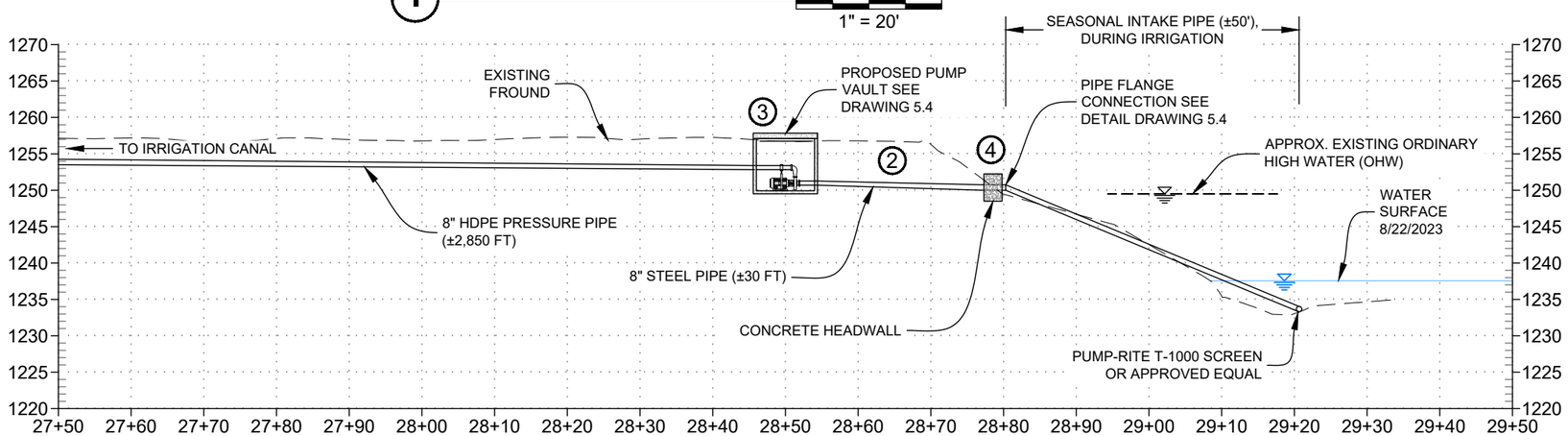
CONSTRUCTION NOTES

1. INSTALL ALL BMP AND WORK AREA ISOLATION MEASURES PER DETAIL DRAWING 3.4 PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
2. INSTALL 8" STEEL PIPELINE PER LAYOUT THIS SHEET AND DETAIL DRAWING 5.5.
3. INSTALL CONCRETE PUMP VAULT AND INSTALL CENTRIFUGAL PUMP PER DETAIL DRAWING 5.4.
4. CONSTRUCT CONCRETE HEADWALL PER DETAIL 5.5.
5. BACKFILL TRENCHES AND REVEGETATE DISTURBED AREAS PER REVEGETATION PLAN, DRAWING 6.0.



1 INTAKE SITE A PLAN VIEW

1" = 20'



2 INTAKE SITE A PROFILE

HORIZ 1" = 20'
VERT 1" = 20'

PERMIT

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Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
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INTAKE A PUMP LAYOUT

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

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RDG-22-283

DRAWING NUMBER
5.1

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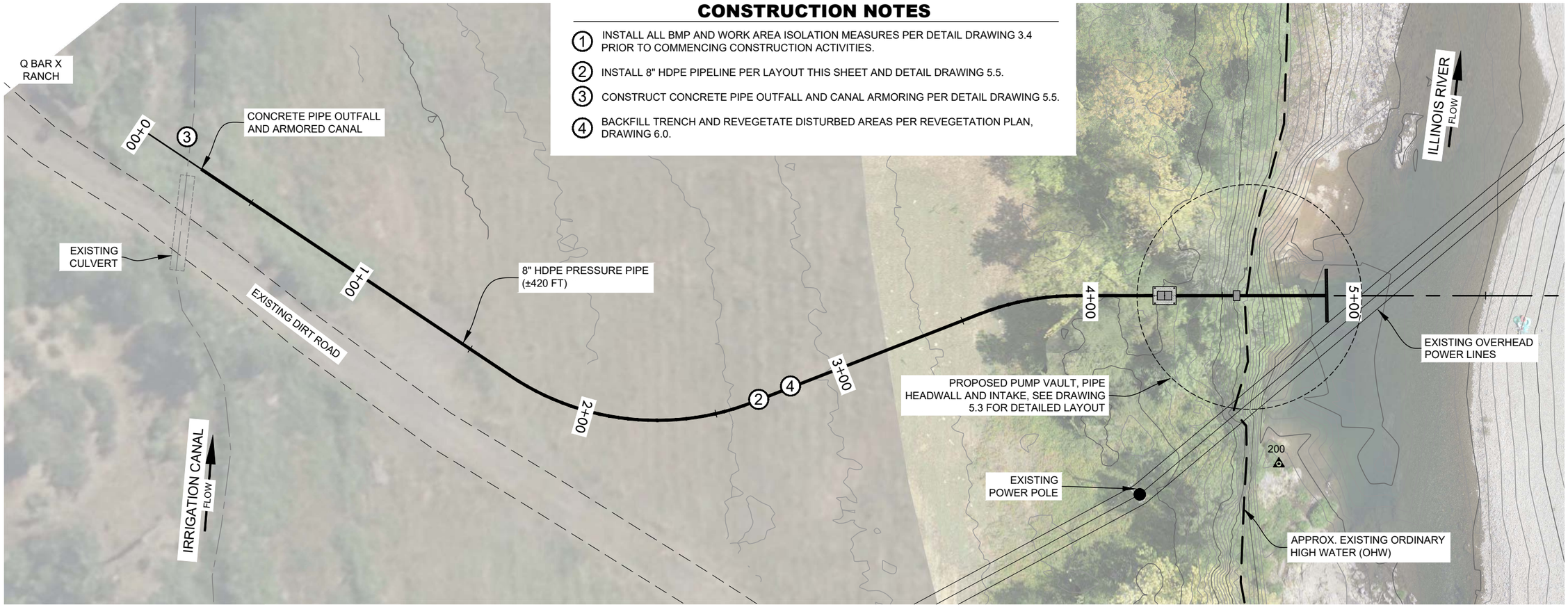
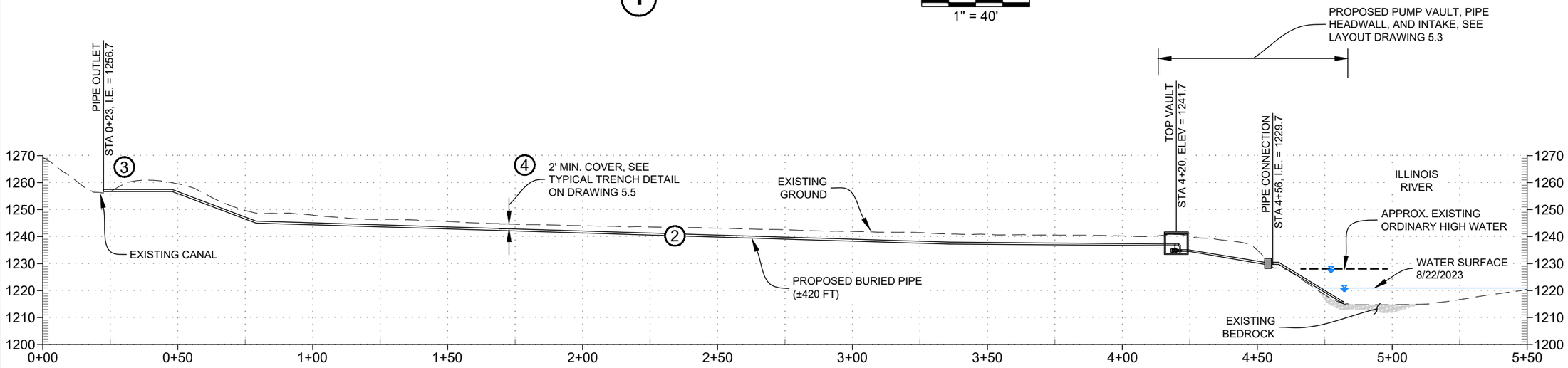
CONSTRUCTION NOTES

1. INSTALL ALL BMP AND WORK AREA ISOLATION MEASURES PER DETAIL DRAWING 3.4 PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
2. INSTALL 8" HDPE PIPELINE PER LAYOUT THIS SHEET AND DETAIL DRAWING 5.5.
3. CONSTRUCT CONCRETE PIPE OUTFALL AND CANAL ARMORING PER DETAIL DRAWING 5.5.
4. BACKFILL TRENCH AND REVEGETATE DISTURBED AREAS PER REVEGETATION PLAN, DRAWING 6.0.



1 INTAKE SITE B PLAN VIEW

1" = 40'



2 PIPELINE PROFILE

HORIZ 1" = 40'
VERT 1" = 40'

PERMIT

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INTAKE B PIPELINE

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

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*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
5.2

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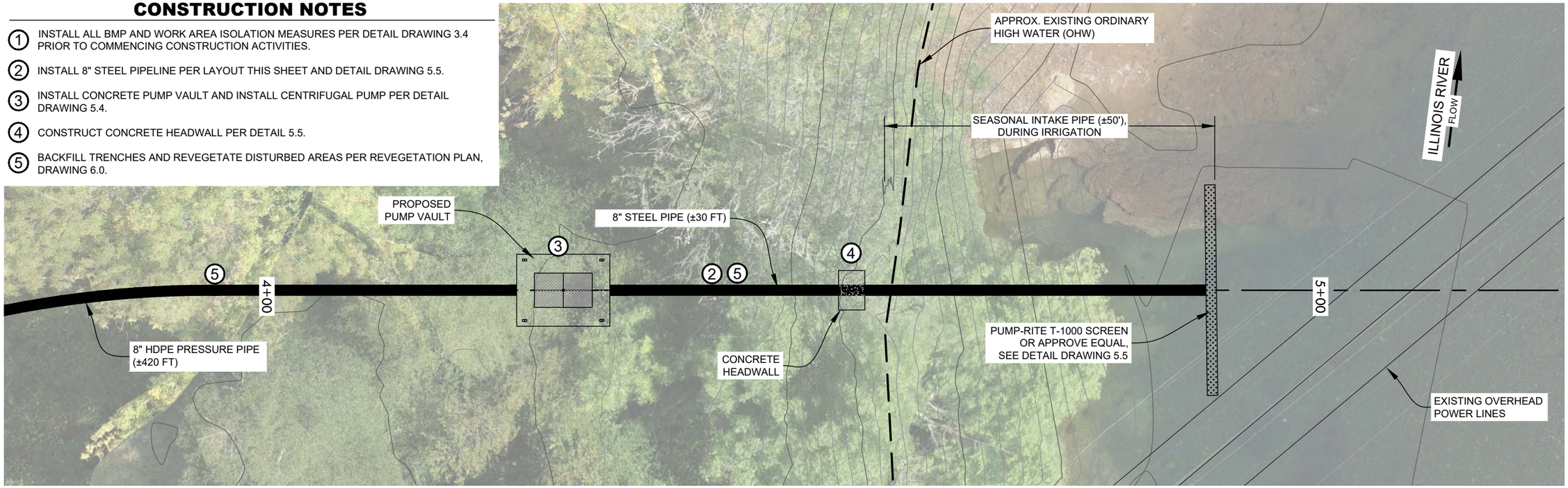
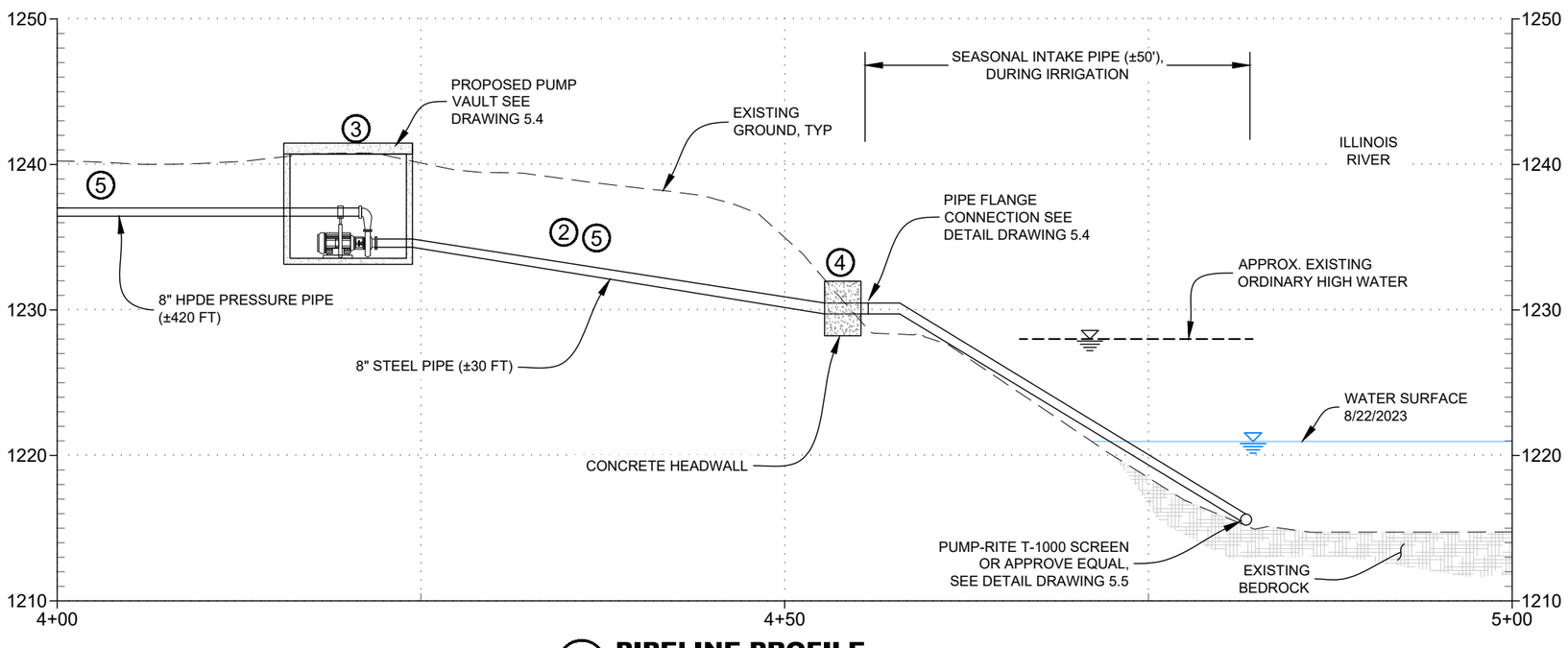
CONSTRUCTION NOTES

1. INSTALL ALL BMP AND WORK AREA ISOLATION MEASURES PER DETAIL DRAWING 3.4 PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
2. INSTALL 8" STEEL PIPELINE PER LAYOUT THIS SHEET AND DETAIL DRAWING 5.5.
3. INSTALL CONCRETE PUMP VAULT AND INSTALL CENTRIFUGAL PUMP PER DETAIL DRAWING 5.4.
4. CONSTRUCT CONCRETE HEADWALL PER DETAIL 5.5.
5. BACKFILL TRENCHES AND REVEGETATE DISTURBED AREAS PER REVEGETATION PLAN, DRAWING 6.0.



1 INTAKE SITE B PLAN VIEW

1" = 40'



2 PIPELINE PROFILE

HORIZ 1" = 40'
VERT 1" = 40'

PERMIT

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INTAKE B PUMP LAYOUT

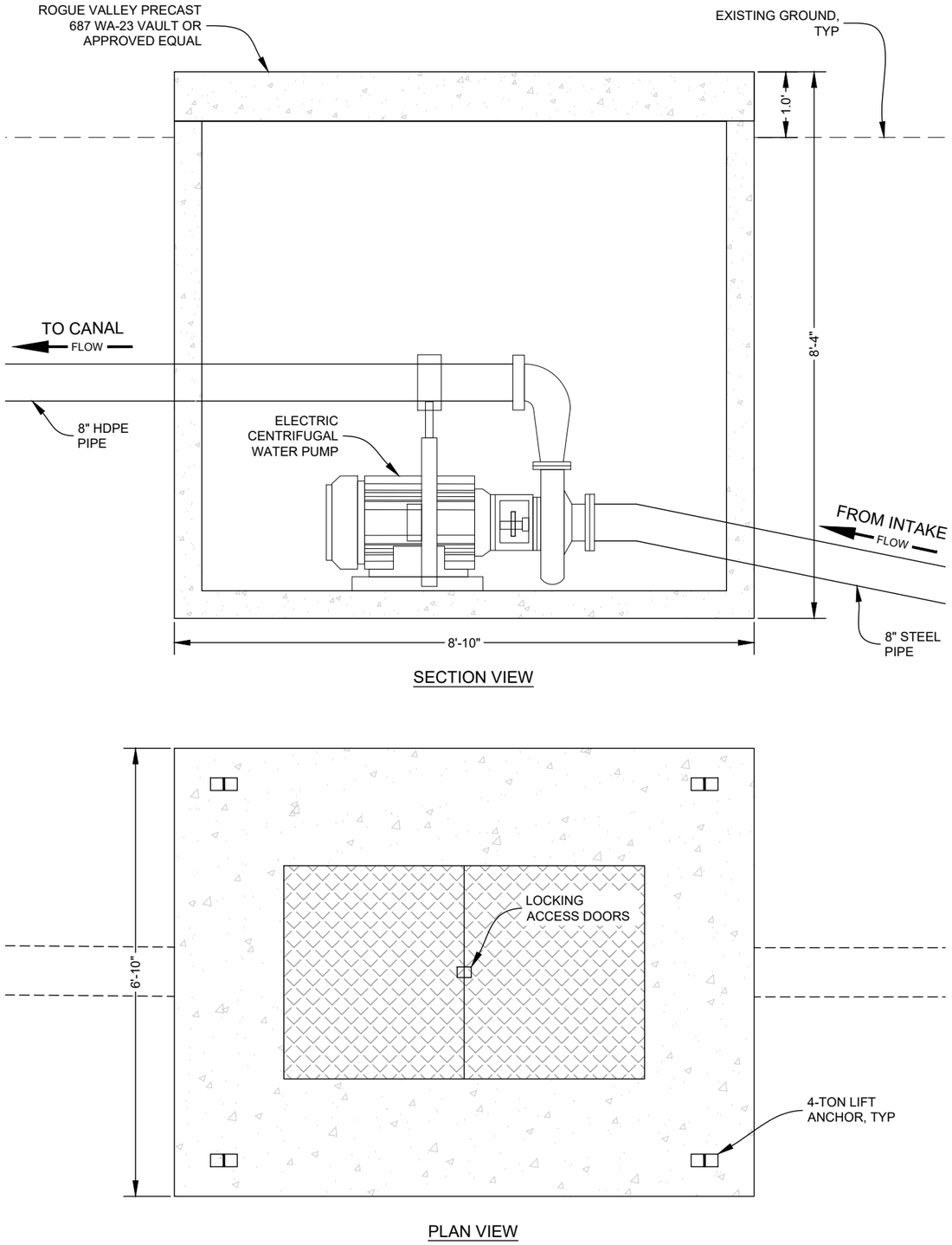
POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
5.3

Drawing 24 of 27

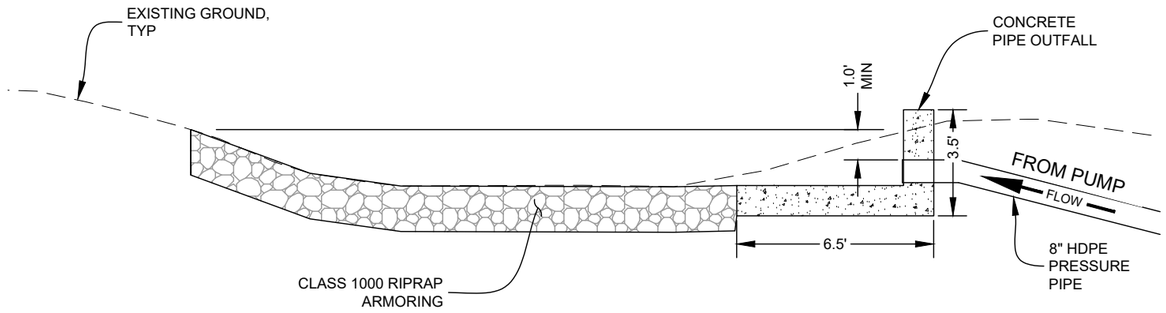


SECTION VIEW

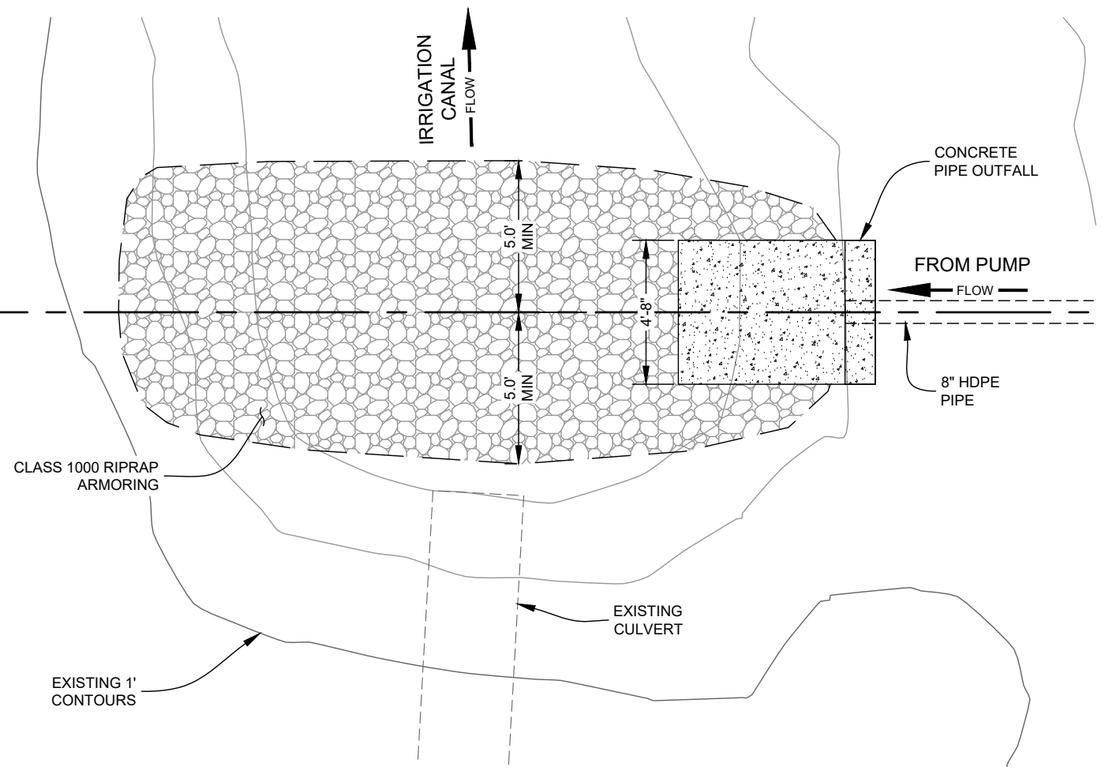
PLAN VIEW

1 TYPICAL PUMP VAULT DETAIL

1" = 2'



SECTION VIEW



PLAN VIEW

2 TYPICAL PIPE OUTFALL ARMORING DETAIL

HORIZ 1" = 5'
VERT 1" = 5'

PERMIT

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541.738.2920
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PUMP AND OUTFALL DETAILS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

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*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

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5.4

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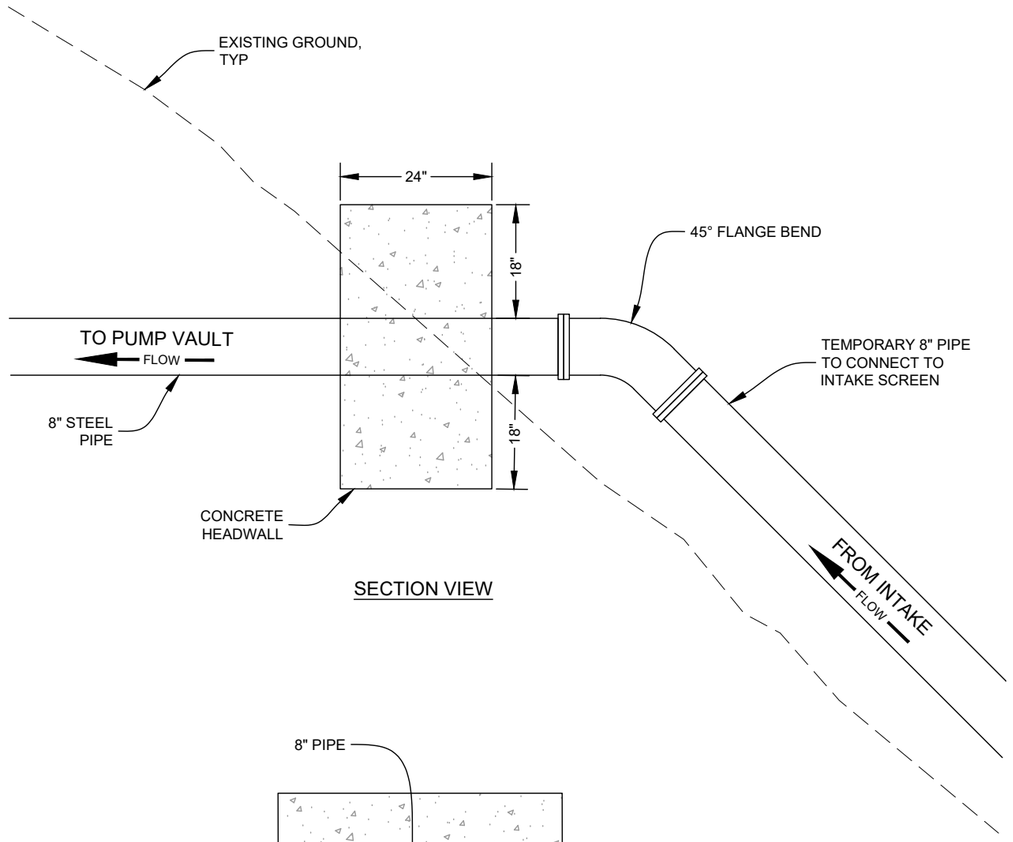
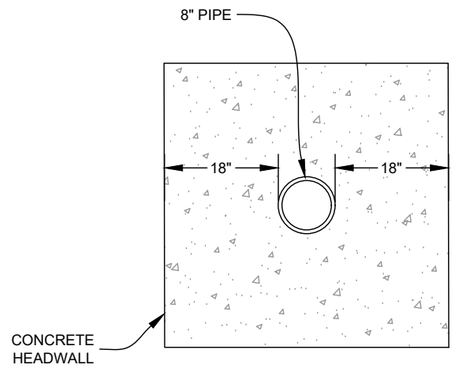


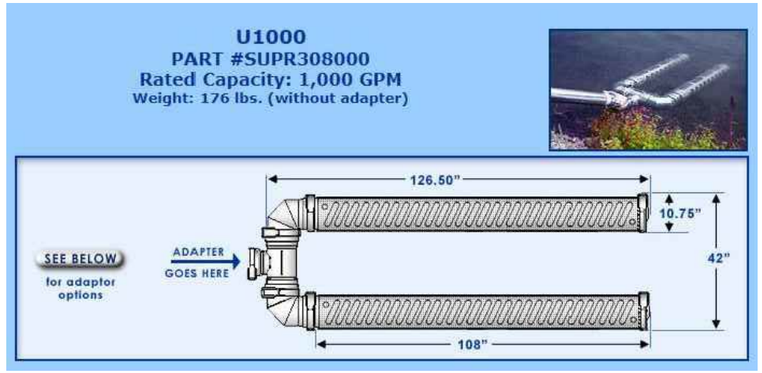
SECTION VIEW

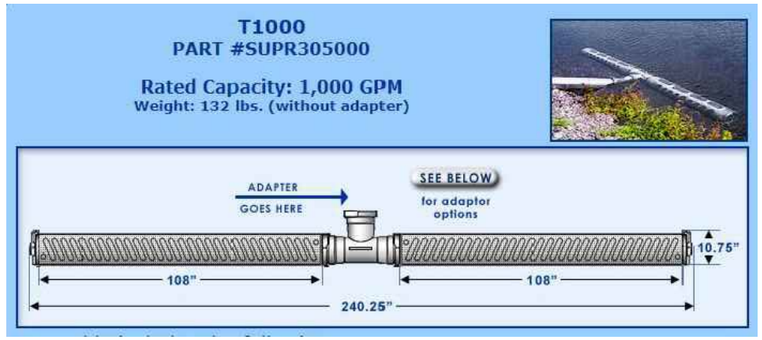


FRONT VIEW

1 SEASONAL PIPE CONNECTION DETAIL

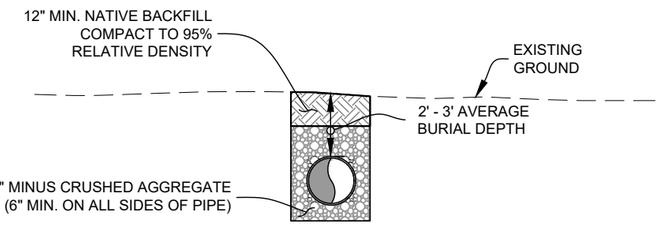
HORZ 1" = 2'
VERT 1" = 2'





2 INTAKE SCREEN DETAIL

NTS



3 TYPICAL PIPELINE SECTION

HORIZ 1" = 5'
VERT 1" = 5'

PERMIT

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PIPE AND SCREEN DETAILS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

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5.5

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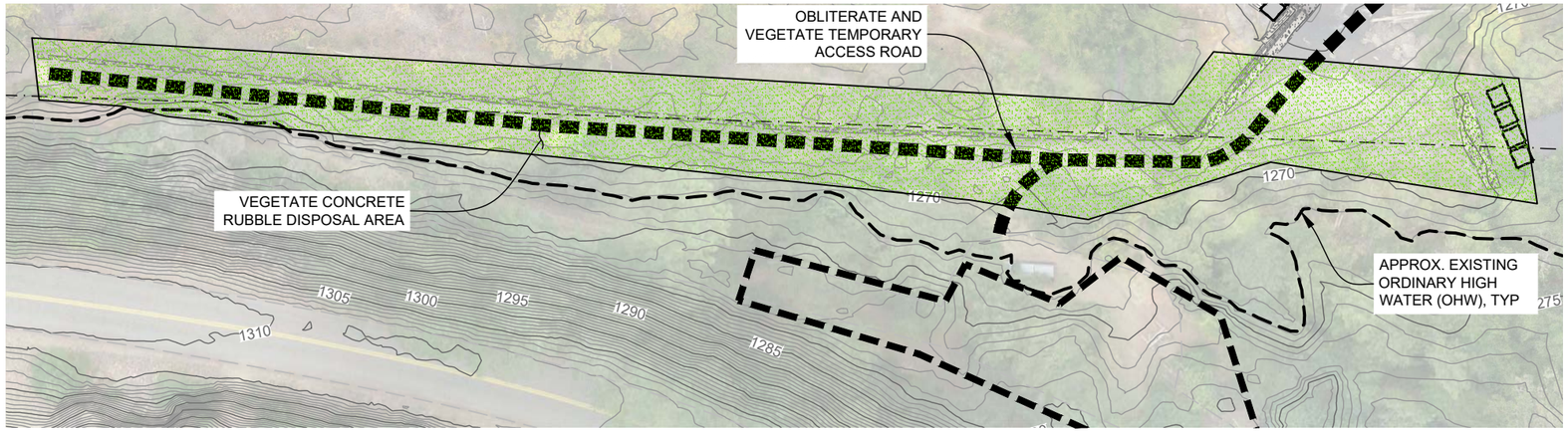
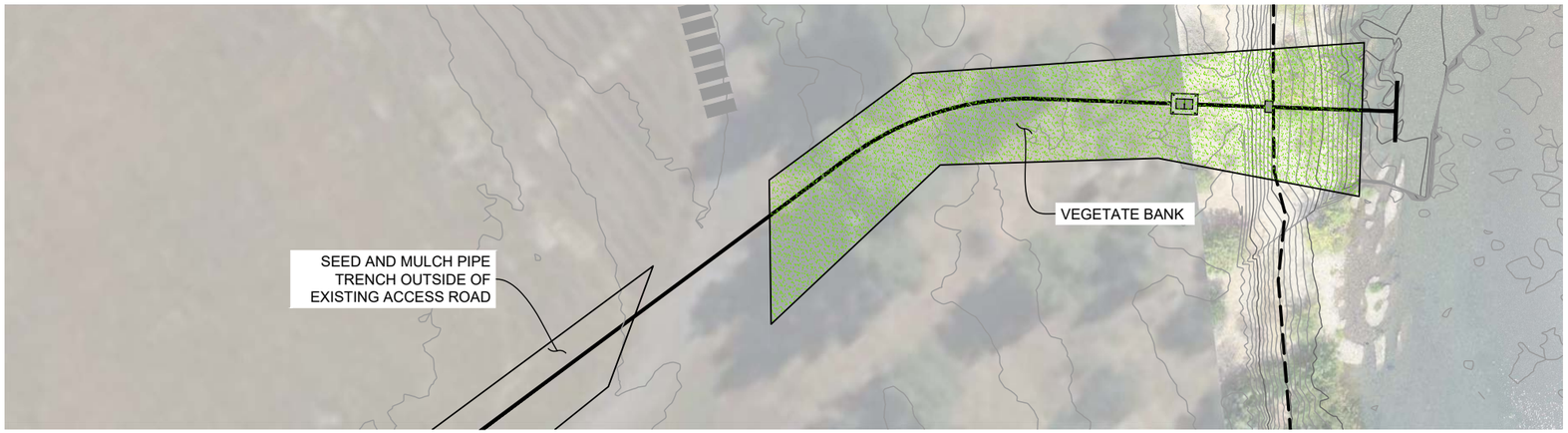


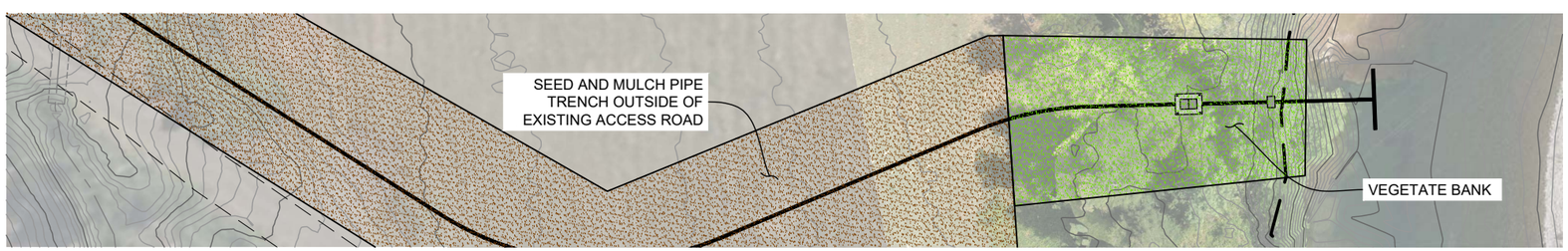
1 POMEROY DAM AND canal RESTORATION PLAN

1" = 50'



2 INTAKE A RESTORATION PLAN

1" = 50'



3 INTAKE B RESTORATION PLAN

1" = 50'

SITE RESTORATION NOTES

1. TEMPORARY ACCESS ROADS AND AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED WITH A COMBINATION OF EROSION CONTROL SEED, WEED-FREE STRAW MULCH, AND NATIVE VEGETATION. CONTRACTOR SHALL REMOVE ALL CONSTRUCTION MATERIALS, TEMPORARY FENCES AND FACILITIES, TRASH AND EQUIPMENT BROUGHT ON SITE TO COMPLETE THE PROJECT. AREAS WHERE CONSTRUCTION TRAFFIC ACCESSED AND MATERIALS WERE STAGED SHALL BE DECOMPACTED (SCARIFIED) PER RESTORATION PLAN.
2. ALL DAMAGED OR DISTURBED STREAM BANKS SHALL BE RESTORED TO THE PRE-PROJECT SLOPE AND GRADES AND MADE SUITABLE FOR REVEGETATION.
3. AFTER ALL TEMPORARY SITE SEEDING AND SITE STABILIZATION IS COMPLETE, LONG-TERM, PERMANENT REVEGETATION SHALL BE INSTALLED IN ACCORDANCE WITH THE DESIGNATED GROWING ZONE AND REVEGETATION SCHEDULE INCORPORATED IN THIS DRAWING SET.

RESTORATION SCHEDULE

ZONE	ZONE DESCRIPTION	ZONE AREA
POMEROY DAM AND CANAL	SEEDING, MULCHING AND PLANTING BANKS AND PLUGGED DIVERSION CANAL DISTURBED DURING DAM REMOVAL, EXCLUDING EXISTING ACCESS ROAD.	±0.4 ACRES
INTAKE A	SEEDING, MULCHING AND PLATNING BANK AT INTAKE (RESTORING ANY VEGETATION REMOVED DURING CONSTRUCTION) AND SEEDING AND MULCHING STAGING AREA (EXCLUDING EXISTING ACCESS ROAD).	±0.2 ACRES PLANTING AND ±2 ADDITIONAL ACRES SEEDING
INTAKE B	SEEDING, MULCHING AND PLATNING BANK AT INTAKE (RESTORING ANY VEGETATION REMOVED DURING CONSTRUCTION) AND SEEDING AND MULCHING STAGING AREA (EXCLUDING EXISTING ACCESS ROAD).	±0.1 ACRE PLANTING AND ± 1 ADDITIONAL ACRE SEEDING

PERMIT

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311 SW Jefferson Avenue
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541.738.2920
236 Wisconsin Avenue
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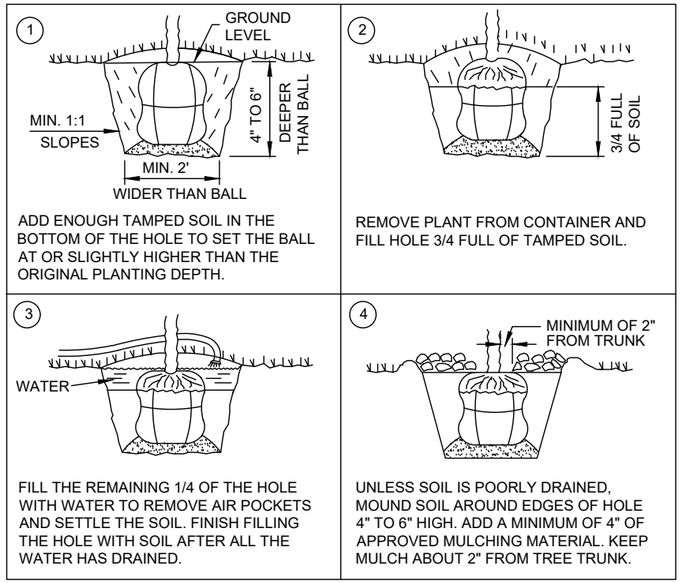
REVEGETATION PLAN

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
6.0



1 CONTAINER PLANTING DETAIL

NOT TO SCALE

REVEGETATION NOTES

GENERAL NOTES

1. STOCKPILE ALL WOODY MATERIAL, NATIVE VEGETATION, TOPSOIL, AND NATURAL RIVER MATERIAL DISPLACED DURING CONSTRUCTION AND USE FOR SITE RESTORATION. THE STOCKPILED MATERIALS SHALL BE INCORPORATED INTO COVER OF DISTURBED AREAS TO RESTORE THE SITE TO NATURAL CONDITIONS WHILE MINIMIZING THE POTENTIAL FOR EROSION.

2. ALL DISTURBED AREAS OUTSIDE OF THE EXISTING ACCESS ROAD LIMITS SHALL BE BROADCAST SEEDED WITH A TEMPORARY “EROSION CONTROL” SEED MIX AND COVERED WITH STERILE STRAW.
   - 2.1. THE EROSION CONTROL SEED MIX SHALL BE A NATIVE SEED MIX CONSISTING OF RED FESCUE, BLUE WILDRYE AND STERILE CEREAL RYES.
   - 2.2. THE SEED MIX SHALL BE APPLIED AT A RATE OF 30 POUNDS PER ACRE AND RAKED ONE-QUARTER INCH INTO THE SOIL AND COMPACTED WITH A 5,000 POUND OR LESS TRACKED VEHICLE AND
   - 2.3. STERILE STRAW MULCH SHALL BE APPLIED OVER SEEDED AREAS AT A RATE OF 2 TONS PER ACRE OR APPROXIMATELY 1-2 INCHES THICK.

3. ALL PLANT MATERIAL MUST BE CLASSIFIED AS NATIVE FROM THIS REGION AND NON-CLONAL IN ORIGIN. ALL NATIVE PLANT MATERIAL TO BE USED IN PLANTING AREAS SHALL ORIGINATE FROM PARENT SOURCES WITHIN 50 MILES OF SITE. SEED SOURCE MUST BE AS LOCAL AS POSSIBLE.

4. INSTALL TREE AND SHRUB SPECIES IN RANDOM GROUPINGS, AVOIDING LINEAR ROWS OR AS DIRECTED IN FIELD, WITHIN CLOSE PROXIMITY OF EXISTING PLANTINGS OR NEWLY PLANTED MATERIAL. THE INTENT IS TO REPLICATE NATURAL PLANT COMMUNITIES BY PROVIDING A LAYERED UNDERSTORY CANOPY WITH A MIXTURE OF TREES.

5. THE PLANTING AND SEEDING AREA IS TO COVERED WITH TOPSOIL. IF THIS TOPSOIL IS DEEMED BY PROJECT ENGINEER TO BE INADEQUATE, IMPORTED MATERIAL SHALL BE USED TO POCKET PLANT THE PLANTS IN UPLAND, RIPARIAN, EMERGENT, AND WETLAND SITES.

6. THOROUGHLY WATER ALL PLANTS IMMEDIATELY FOLLOWING INSTALLATION TO PROVIDE MAXIMUM SOIL CONTACT AND TO ELIMINATE AIR POCKETS. AFTER PLANTING EACH PLANT, PROVIDE A TWO (2) INCH LAYER OF MULCH AROUND DISTURBED AREA.

7. NO PESTICIDES, INCLUDING HERBICIDE, WILL BE ALLOWED WITHIN 150 FT OF THE WATER. MECHANICAL, HAND, OR OTHER METHODS MAY BE USED TO CONTROL WEEDS AND UNWANTED VEGETATION. FERTILIZER APPLICATION WITHIN 50 FT OF THE WATER IS NOT ALLOWED.

POMEROY DAM AND CANAL PLANTING SCHEDULE

COMMON NAME	GENUS AND SPECIES	MIN. ON-CENTER SPACING (FT)	MIN. SIZE	NUMBER
WHITE ALDER	*ALNUS RHOMBIFOLIA*	20	TALL 1 GALLON	16
SCOULER'S WILLOW	*SALIX SCOULERIANA*	20	TALL 1 GALLON	16
WESTERN HAZELNUT	*CORYLUS CORNUTA*	10	1 GALLON	31
RED-STEM CEANOTHUS	*CEANOTHUS SANGUINEUS*	10	1 GALLON	31
UMBRELLA PLANT	*DARMERA PELTATA*	10	4-IN POT	31
SULPHUR-FLOWER BUCKWHEAT	*ERIOGONUM UMBELLATUM*	5	4-IN POT	31
SMALL-FRUITED BULRUSH	*SCIRPUS MICROCARPUS*	5	4-IN POT	125
			TOTAL	**281**
NOTE: TORRENT SEDGE (*CAREX NUDATA*) IS ABUNDANT IN THE PROJECT AREA AND LIKELY TO REESTABLISH FROM THE SEEDBANK AND NEARBY INDIVIDUALS.			**SUBTOTAL TREES**	**63**
			SUBTOTAL SHRUBS	**62**
			SUBTOTAL GRASSES	**156**

INTAKE A PLANTING SCHEDULE

COMMON NAME	GENUS AND SPECIES	MIN. ON-CENTER SPACING (FT)	MIN. SIZE	NUMBER
SCOULER'S WILLOW	*SALIX SCOULERIANA*	10	TALL 1 GALLON	30
SULPHUR-FLOWER BUCKWHEAT	*ERIOGONUM UMBELLATUM*	5	4-IN POT	60
			TOTAL	**90**
NOTE: INTAKE A PLANTING SCHEDULE INCLUDES 2 ADDITIONAL ACRES OF EROSION CONTROL SEEDING AND WEED-FREE STRAW MULCH IN THE STAGING AREAS.			**SUBTOTAL TREES**	**30**
			SUBTOTAL GRASSES	**60**

INTAKE B PLANTING SCHEDULE

COMMON NAME	GENUS AND SPECIES	MIN. ON-CENTER SPACING (FT)	MIN. SIZE	NUMBER
SCOULER'S WILLOW	*SALIX SCOULERIANA*	10	TALL 1 GALLON	20
SULPHUR-FLOWER BUCKWHEAT	*ERIOGONUM UMBELLATUM*	5	4-IN POT	40
			TOTAL	**60**
NOTE: INTAKE B PLANTING SCHEDULE INCLUDES 1 ADDITIONAL ACRE OF EROSION CONTROL SEEDING AND WEED-FREE STRAW MULCH IN THE STAGING AREAS.			**SUBTOTAL TREES**	**20**
			SUBTOTAL GRASSES	**40**

REVEGETATION NOTES, CONTINUED

NATIVE PLANT CLUMP PLANTING NOTES

1. NATIVE PLANT CLUMPS SHALL BE SALVAGED FROM PROJECT AREA IF FEASIBLE. FILL IN ANY HOLES WHERE DONOR CLUMPS ARE EXTRACTED.

2. CLUMP PLANTINGS SHALL FOLLOW THE NATURAL RESOURCE CONSERVATION SERVICE (NRCS) PLANT MATERIALS TECHNICAL NOTE 42 (2003).

3. LOCATE AND UTILIZE YOUNG AND VIGOROUS (8' - 20' TALL) NATIVE PLANT CLUMPS IN CONSULTATION WITH THE PROJECT ENGINEER. DIG THE WILLOW CLUMP UTILIZING A TRACKHOE BUCKET AND OBTAIN AT LEAST 75% OF THE ROOT MASS. DO NOT ALLOW CLUMPS TO SIT MORE THEN 1 HOUR OR DRY OUT. TRANSPORT CLUMPS TO PLANTING SITE.

4. DIG A HOLE UTILIZING THE TRACKHOE BUCKET TO THE SAME SIZE AND SHAPE OF THE CLUMP. HOLE SHALL BE TO A DEPTH JUST ABOVE THE STANDING WATER TABLE AND NOT INTO THE WATER TABLE. PACK THE SOIL FIRMLY IN THE EXCAVATED HOLE UPON INSTALLATION.

CONTAINER PLANTING NOTES

1. CONTAINER PLANTS SHALL BE OF THE SIZE SPECIFIED IN THE PLANTING SCHEDULE (THIS DRAWING).

2. MINIMIZE THE TIME BETWEEN DELIVERY OF PLANTS AND INSTALLATION.

3. INSTALL CONTAINER PLANTS PER DETAIL 1 AND ON-CENTER SPACING THIS DRAWING.

4. ALTERNATE INSTALLATION PROCEDURES MAY BE USED UPON CONSULTATION WITH PROJECT ENGINEER.

PERMIT

RDG RIVER DESIGN GROUP
311 SW Jefferson Avenue
Corvallis, OR 97333
541.738.2920
236 Wisconsin Avenue
Whitefish, MT 59937
406.862.4927

REVEGETATION DETAILS

POMEROY DAM REMOVAL
CAVE JUNCTION, OR

NO.	DATE	BY	DESCRIPTION	CHK
*	1/26/24	TF	PERMIT	SW

PROJECT NUMBER
RDG-22-283

DRAWING NUMBER
6.1

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