UmaBirch Instream Design and Construction Oversight Project

Project Area 2 Umatilla River and Birch Creek Confluence Instream Enhancement and Floodplain Restoration

Implementation Plan

Issued for Construction

Prepared for:

Confederated Tribes of the Umatilla Indian Reservation
Fisheries Program-Umatilla River Basin
Department of Natural Resources
46411 Timíne Way
Pendleton, OR 97801

Prepared by:

19803 North Creek Parkway
Bothell, WA 98011
Tel 425-482-7600 Fax 425-482-7652

January 2026

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1. Introduction

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) have contracted Tetra Tech, Inc. (Tetra Tech) to provide engineering and technical services for the UmaBirch Instream Design and Construction Oversight Project (UmaBirch), which encompasses restoration actions throughout Birch Creek from river mile (RM) 0.0 to RM 0.7 and RM 1.8 to RM 2.7, the Umatilla River from RM 47.8 to RM 49.9, the entire Birch Creek alluvial fan, and the associated floodplain areas on both sides of Birch Creek and the Umatilla River (Figure 1).

Owing to its scale and complexity, UmaBirch was divided into four distinct project areas (PAs). This Implementation Plan is specific to the Project Area 2 (PA 2) Umatilla River and Birch Creek Confluence Instream Enhancement and Floodplain Restoration Project (project), which includes restoration actions throughout the Umatilla River and Birch Creek floodplains.[1] This submittal includes the following items to support construction in PA 2:

- Implementation Plan
- Appendix 1: Design Drawings
- Appendix 2: Construction Specifications
- Appendix 3: Bonneville Power Administration (BPA) Habitat Improvement Program (HIP) Conservation Measures

Section 2 provides an overview of construction implementation, including the schedule, materials, and actions. Section 3 provides an overview of best management practices (BMPs) and conservation measures for the project, and Section 4 lists references cited.

1.1 PROJECT LOCATION

The UmaBirch project is at the confluence of the Umatilla River and Birch Creek, adjacent to the town of Reith, Oregon and approximately 3 miles west of Pendleton, Oregon (Figure 1). PA 2 encompasses the Umatilla River from RM 48.7 to RM 49.7 and Birch Creek from RM 0.0 to RM 0.3, from immediately downstream of the Taylor Lane Bridge to the Birch Creek confluence (Figure 2).

[1] This Implementation Plan does not cover the United States Army Corps of Engineers (USACE) Pendleton 2A Levee setback and reconstruction activities. Refer to the Section 408 Request documentation for information on the proposed levee setback (Tetra Tech 2024a).

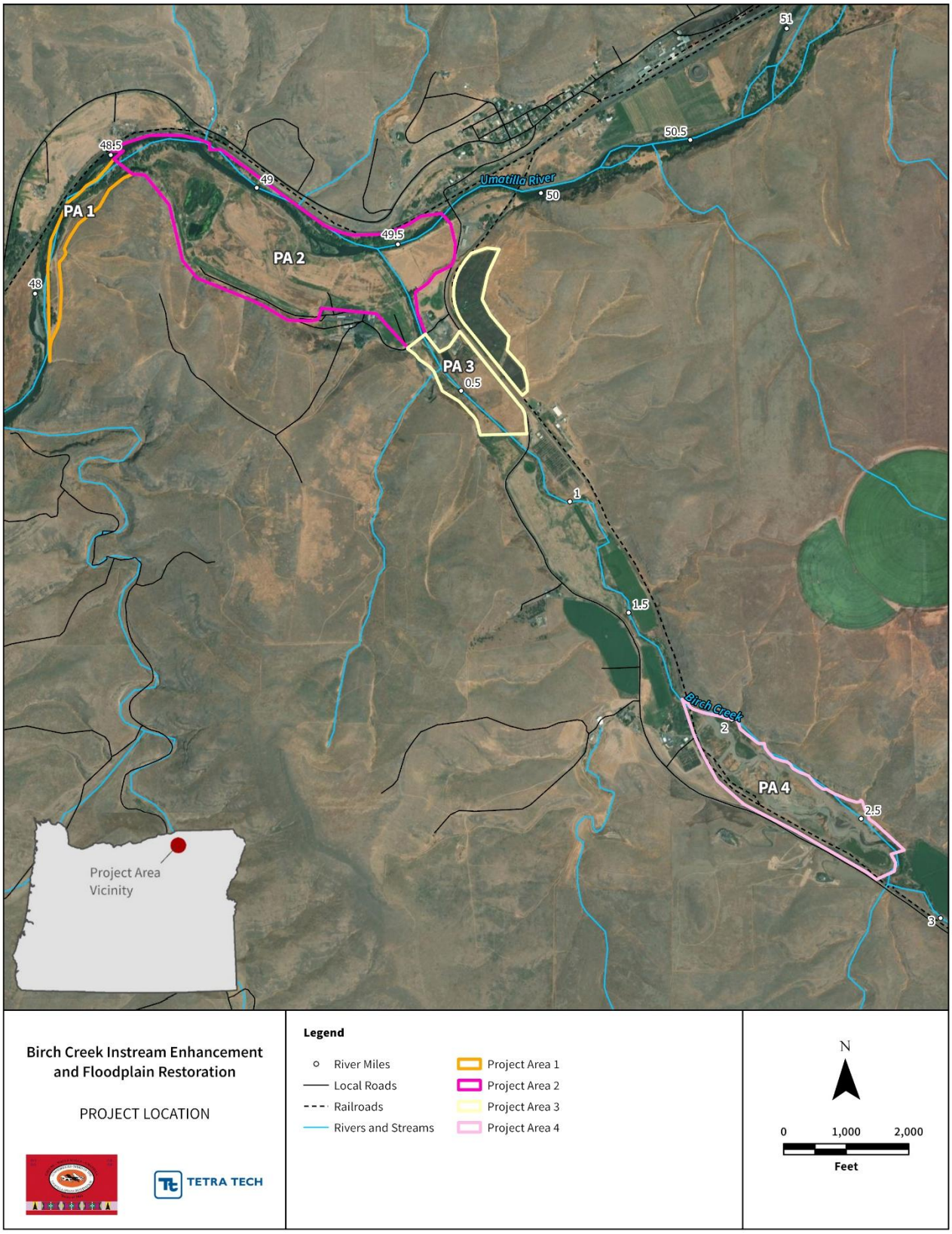

Figure 1. UmaBirch Project Area

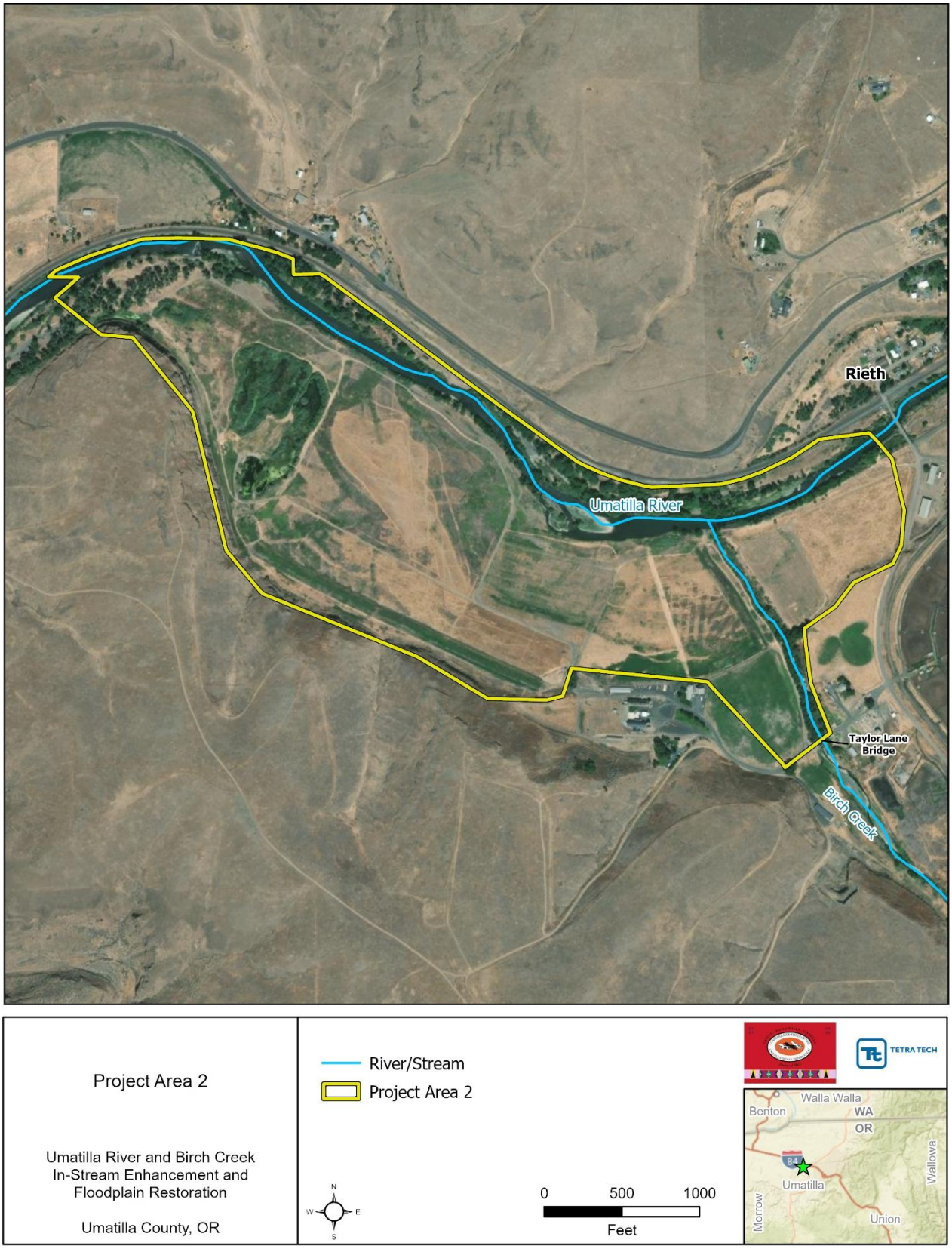

Figure 2. Project Area 2

1.2 PROJECT DESCRIPTION

The goals of the project are to improve instream habitat for fish species listed under the Endangered Species Act (ESA), as well as non-listed fish and other organisms that use aquatic and floodplain habitats; reestablish natural channel morphology and instream processes; and protect existing infrastructure. Project objectives include the following:

- Increased floodplain connectivity
- Increased instream structural complexity
- Improved sediment routing processes
- Increased floodplain storage and capacity
- Improved flow timing and duration
- Reduced or buffered temperatures
- Improved water quality
- Restored riparian vegetation condition
- Increased flooding inundation protection
- Increased habitat for terrestrial and avian wildlife
- Improved recreation access and opportunities
- Improved landowner operations

The project aims to achieve these goals and objectives by realigning Birch Creek and the Umatilla River through the historical floodplain, excavating and placing fill to improve floodplain connectivity and function, and creating recreation access. Refer to Tetra Tech (2024b) for additional details on objectives and associated metrics. The project comprises the following restoration actions described in the Design Drawings (Appendix 1) and Construction Specifications (Appendix 2):

- Excavation of 390,100 cubic yards (CY) of floodplain alluvium material to realign the Umatilla River and Birch Creek, remove existing berms, and create side channels, floodplain benching, distributary channels, and wetland ponds and potholes;
- Fill of 384,200 CY of floodplain alluvium material for existing channel fill, riparian islands, and access route maintenance, plus fill of 6,000 CY for large woody material (LWM) structure ballast, for a total fill of 390,100 CY;
- Installation of LWM, including 108 LWM structures (ten 22-Log Jam structures, five Revetment structures, twenty-three 22-Log Bank Habitat structures, twenty-three 10-

Log Habitat structures in the Birch Creek channel, forty 10-Log Structures in the floodplain, two Large Apex structures, and five Small Apex structures).

- Decommissioning of an existing irrigation point-of-diversion (POD) and associated utilities;
- Regrading of the existing access route; and
- Completion of seeding and planting of native grasses, shrubs, and trees.

The total extent of project disturbance is 137 acres in PA 2. Excavation and fill quantities have been designed to balance locally. Imported material includes trees with rootwads, slash and racking material, and boulders for the LWM structures. LWM structures will be placed in the new channel and across the floodplain. Planting and seeding will be performed by the CTUIR to promote restoration of the riparian plant community.

Potential impacts during construction include noise and dust, temporary turbidity releases to waterways, impacts to resident fish populations from salvage activities, possible spills from construction equipment, colonization of disturbed ground by invasive vegetation, short-term disturbance issues for landowners, and damage to existing vegetation along designated access routes. Overall impacts to all work areas will be minimized through incorporation of BPA HIP conservation measures and BMPs as defined by BPA (2025), as well as site-specific actions described in Section 3.2.

The project will be integrated with the efforts to set back and reconstruct the United States Army Corps of Engineers (USACE) Pendleton 2A Levee. This Implementation Plan does not cover the levee setback activities. The proposed levee setback design and approach is documented in the Section 408 Request submitted in December 2024 (Tetra Tech 2024a).

2. Project Implementation Overview

2.1 PROJECT SCHEDULE

The project schedule is driven primarily in-water work windows and the Pendleton Levee 2a setback project in PA 2 (Tetra Tech 2024a). Completion and certification of the levee setback is necessary before the PA 2 restoration project can be completed. This will affect construction sequencing and may result in work being phased over several years.

The Oregon Department of Fish and Wildlife (ODFW) guidelines for in-water work define the in-water work window as July 1 to September 30 for both the Umatilla River and Birch Creek (ODFW 2024). Work in the wetted channel, which is defined as the area in the channel that is below ordinary high water (OHW) and areas above OHW wetted by surface flow, will only occur during the in-water work window. Work in the floodplain and uplands (i.e., above OHW) can occur at any time without seasonal restriction and may be done concurrently with work in the wetted channel.

2.1.1 Construction Sequence

The construction sequence was developed to maintain adequate site access for vehicles and equipment throughout the project while also accommodating the construction and approval processes for the levee setback. The construction sequence also accounts for the in-water work window.

The project will consist of the following sequence of elements in the periods before and after completion of the levee setback, as described further in Section 2.1.1.1 and Section 2.1.1.2 and depicted on Sheets C-203 and C-204 in Appendix 1:

- Period before Pendleton 2a Levee setback and certification:
  - Mobilization and construction initiation activities;
  - Acquisition and stockpiling of materials;
  - Decommissioning of the POD; and
  - Construction of floodplain, terrace fill, and dry channel features in the area south of the new Umatilla River channel, between the downstream extent of PA 2 and the existing Birch Creek channel.
- Period after completion and regulatory approval of the Pendleton 2a levee setback:

- Completion of work in the wetted channel during the in-water work window (July 1 to September 30), including all in-water earthwork, fish salvage measures, flow diversions, and in-water LWM installation.
- Construction of remaining floodplain and terrace fill features and LWM; and
- Completion of site restoration and revegetation.

2.1.1.1 Period Before Completion of Pendleton 2a Levee Setback

Project work will begin with construction of floodplain and terrace fill features at the downstream extent of PA 2. Floodplain construction can begin outside of the ODFW in-water work window (i.e., between October 1 and June 30). Construction will proceed from downstream to upstream.

The new Birch Creek channel, new distributary channel, and other features south of the new Umatilla River channel will be constructed prior to the levee setback. Portions of the new Umatilla River channel will also be constructed at this time. The new channels will be constructed in the dry and will be kept isolated from active flow by leaving 100-foot earthen plugs in place at the connections. Excavated material will be temporarily stockpiled in the area north of the new Umatilla River channel to be later used as fill.

Floodplain, channel, and terrace fill construction will continue in the upstream direction in the area south of the new Umatilla River channel until each of the three new (dry) channels are approximately 100 feet from the existing Birch Creek channel. Then, during the in-water work window, once the Birch Creek and distributary channel construction is complete, the old Birch Creek channel will be isolated and dewatered, and fish salvage will be completed by the CTUIR. Flow will be reintroduced to the Birch Creek channel and distributary channel, and the old Birch Creek channel will be filled. It will be necessary to complete the levee setback construction and certification before the remaining restoration work can be completed.

The proposed construction sequence during this period is summarized as follows:

- Mobilize to site and complete construction initiation activities:
  - Attend kickoff meeting with the CTUIR, landowner, and Engineer;
  - Complete review of pre-construction staking, flagging of sensitive areas, and contractor submittals;

  - Complete and receive approval for all required contractor submittals and plans;
  - Install construction fencing where required;
  - Install construction area temporary erosion and sediment controls (TESC) BMPs;
  - Complete clearing and grubbing;
  - Construct temporary access routes and staging areas; and
- Acquire, haul, separate, and stockpile all required earth, rock, wood, and other materials in the designated staging area(s) as directed by CTUIR's Representative or Engineer.
- Complete POD decommissioning and removal.
- Construct floodplain and terrace fill features outside of wetted channel, starting at downstream end of PA 2 and moving upstream until reaching the existing Birch Creek:
  - Construct the new Birch Creek channel, distributary channel, and portions of the new Umatilla River channel, keeping channels isolated from flow by leaving minimum 100-foot earthen plugs in place at the connections with existing channels;
  - Construct floodplain benching, floodplain terrace fill, ponds, and wetlands and link channels in the area south of the new Umatilla River alignment;
  - Remove existing berms, metal, concrete, debris, or wood structures (e.g., fences), and decompact soils, and decommission existing roads;
  - Protect existing mature vegetation and relocate mature trees to the extent possible;
  - Complete access route maintenance; and
  - Construct floodplain LWM structures.
- Perform work in the wetted channel during the in-water work window (July 1 to September 30):
  - After the necessary channels are completed, divert Birch Creek flow into the new Birch Creek channel and distributary channel, and dewater old Birch Creek channel downstream of the new channel:

- Install temporary bridges or fish-excluded crossings as directed by the CTUIR;
- Install and monitor TESCs;
- Pre-wash new Birch Creek channel and pump turbid water to a CTUIR-approved location and monitor to ensure no turbid water returns to the stream;
- Install block nets and salvage fish in old Birch Creek downstream of new channel (work to be completed by CTUIR);
- Remove earthen plug to divert Birch Creek into the new Birch Creek channel and distributary channel;
- Install work area isolation at the old Birch Creek confluence with Umatilla River and immediately downstream of new channel to block flow in segment of old Birch Creek;
- Dewater old Birch Creek downstream of the new channel. Pump turbid water to a CTUIR-approved location and monitor to ensure no turbid water returns to the stream.

o Fill the dewatered segment of the old Birch Creek channel.

2.1.1.2 Period After Levee Setback Certification

After levee certification is obtained from USACE, the remaining work in the floodplain, uplands, and wetted channel will proceed. This includes completion of the floodplain/terrace fill placement, wetland creation, and LWM installation. The remaining floodplain and terrace fill construction can occur at any time of year.

Once the in-water work window begins (i.e., July 1 to September 30), work will commence in the wetted channel. During this period, the remaining stretch of the new Umatilla River channel will be constructed. After appropriate isolation, dewatering, and fish salvage is complete, the Umatilla River will be diverted into the new channel, and the old channel will then be filled. Other activities requiring work in the wetted channel, such as LWM installation, will also be completed during the in-water work window.

After completion of all work in floodplains and the wetted channel, the site will be restored and revegetated. CTUIR will perform the revegetation planting.

The proposed construction sequence during this period is summarized as follows:

- At any time of year, complete the new Umatilla River channel alignment in the dry, maintaining isolation from active flow;
- Perform work in the wetted channel during the in-water work window (July 1 to September 30):
    - Divert the Umatilla River into its new channel:
        - Install temporary bridges or fish-excluded crossings as directed by the CTUIR;
        - Install and monitor TESCs;
        - Install cofferdams, pumps and pump lines between existing and new Umatilla River channel to control water and assist fish salvage;
        - Install block nets and conduct fish salvage (work to be completed by CTUIR);
        - Install cofferdams and isolation measures in the existing Umatilla River to block flow from entering the portions of the existing channel that are to be filled (Sheet C-204, Appendix 1);
        - Pre-wash new Umatilla River channel and pump turbid water to a CTUIR-approved location and monitor to ensure no turbid water returns to the river;
        - Remove isolation measures to re-route flow into the new Umatilla River channel.
    - Fill the dewatered segment of old Umatilla River channel and restore backwater flow:
        - Place fill in the dewatered, isolated old channel, working downstream to upstream (or in alternate sequence determined beforehand); and
        - Remove pumps, cofferdams, temporary crossings, and TESCs.
    - Complete construction of instream LWM structures, habitat boulders, and any work requiring construction in the wetted channel;
- At any time of year, perform remaining floodplain and terrace fill construction:
    - Complete fill placement, wetland creation, and LWM installation in areas north of the new Umatilla River channel; and
    - Complete any other unfinished work.

- Complete site restoration activities and demobilize after completion of all other terrace fill, floodplain, and wetted channel work:
    - Decompact floodplains and all disturbed areas;
    - Conduct seeding and mulching to stabilize site;
    - Install herbaceous plantings and plant trees and shrubs in the fall (to be completed by CTUIR);
    - Remove remaining TESCs; and
    - Complete site cleanup and demobilization.

2.2 CONSTRUCTION MATERIAL QUANTITIES

The Project will require earthwork as well as placement of LWM and rock materials throughout the site. Excavation and fill quantities have been designed to balance locally using native fill, with the intent of avoiding the need to import or export fill materials. All LWM, boulders, and grade stabilization material will be imported to the site from off-site sources. Construction material quantities for soil associated with earthwork, rock materials, and wood materials (including LWM) are summarized respectively in Table 2-1, Table 2-2, and Table 2-3.

Streambed sediment and cobble will be sourced onsite from the floodplain alluvium. If existing substrates in the newly excavated channels are insufficient in terms of particle size or otherwise do not meet specifications for streambed sediment/cobble in Section 35 49 50 LWM AND CHANNEL STRUCTURES (Appendix 2), suitable material will be sourced locally from other onsite floodplain excavations. If native floodplain alluvium cannot be sourced locally, the Contractor shall furnish and import streambed sediment and cobbles per the Construction Specifications. The replacement material will be installed to a depth of 24 inches; this is excavation is factored into the earthwork quantities in Table 2-1.

The earthwork quantities in Table 2-1 are based on neatline quantities and, unless otherwise noted, represent the difference between existing and proposed grades as measured directly from the designs, without accounting for factors that may affect soil volume. Per the Federal Highway Administration (FHWA), the typical range of shrink and swell factors for heavy excavation is approximately 15 percent shrink to 5 percent swell (FHWA 2021). The contractor shall consider the earthwork activities that involve existing grade excavation, loose volume in trucks and/or stockpiles, and compacted in-place proposed grades. Contract quantities will only be adjusted if the variation in the bid items and actual work is 15 percent or more, as specified in Section 01 22 20 MEASUREMENT AND PAYMENT in Appendix 2.

If additional fill is needed because of compaction (including compaction of soils under access routes) or other factors, the contractor may propose additional excavation within the proposed wetland, beginning at the upstream end of the project.

Table 2-1. PA 2 Project Earthwork Summary

Item	Unit	Quantity
Excavation – Proposed Floodplain and Wetlands	CY	316,200[1/]
Excavation – Proposed Channels	CY	73,900[2/]
Fill – Existing Channel, Riparian Islands, and Access Road Maintenance	CY	384,100
LWM Structure Ballast Material	CY	6,000

CY = cubic yard
1/ Neatline quantity
2/ Neatline quantity, plus additional 35,900 CY of excavation that may be needed to excavate up to 2 feet below channel bed finished grade to accommodate 2-ft layer of streambed sediment/cobble

Table 2-2. PA 2 Project Rock Materials Summary

Item	Unit	Quantity
Ballast Boulders (2.5-foot diameter)	EA	225
Habitat Boulders (3.5-foot diameter)	EA	60

EA = each

Table 2-3. PA 2 Project Large Wood Materials Summary

Large Wood Material	Size (Diameter)	Length	Rootwad (Diameter)	Unit	Quantity
Whole Tree with Rootwad	18″ min.	40′ min.	4′ min.	EA	1,277
Logs without Rootwads or Branches	18″ min.	40′ min.	–	EA	348
Additional Logs	18″ min.	40′ min.	–	EA	50
Slash/Racking	2-10″	6-16′	–	CY	6,600
Vertical Wood Pilings	12-18″	40′ min.	–	EA	92

CY = cubic yards
EA = each
min. = minimum
″ = inches
′ = feet

2.3 PROJECT ACTIVITIES

Descriptions of the primary construction activities with references to corresponding Design Drawings (Appendix 1) and Construction Specifications (Appendix 2) are presented below.

2.3.1 Mobilization and Construction Initiation

The project will begin with mobilization and construction initiation activities. Mobilization includes procurement, field team selection and preparation, delivery of equipment and materials, pre-construction meetings (Section 01 31 19.13 PRE-CONSTRUCTION MEASUREMENT, Appendix 2), establishing protocols for construction support,

construction quality control measures, and progress meetings (Section 01 31 19.23 PROGRESS MEETINGS). Construction initiation activities will include:

- Installation of construction fencing where required;
- Installation of construction area BMPs;
- Construction of temporary access routes and staging areas;
- Installation of TESC (Sheets G-203 and C-291, Appendix 1); and
- Submission and approval of all required submittals and plans.

Preconstruction staking is required and will be performed by the Engineer or design firm representative. This staking effort will include the construction points listed on the Design Drawings (Sheet C-251 through C-252, Appendix 1). The construction contractor must have on-site survey capability and/or GPS-enabled equipment. Stakes damaged by the construction contractor shall be replaced at the expense of the construction contractor.

Required pre-construction submittals and plans are incidental pay items included within other bid items. They are described in the Construction Specifications (Section 01 33 00 SUBMITTAL PROCEDURES in Appendix 2) and are summarized in Table 2-4. For the project duration, all BMPs, access and staging areas, and TESCs must be maintained to function as intended and in accordance with the Construction Specifications (Appendix 2).

2.3.2 Work in the Floodplain and Uplands

Work in the floodplain and uplands will include LWM acquisition, hauling, and staging; floodplain excavation; channel excavation above OHW; terrace fill; and the installation of LWM structures in locations above OHW. The POD and associated infrastructure will also be removed from the upland area (Sheet C-203, Appendix 1). The access route maintenance will also be completed per Design Drawing Sheets C-241 and C-242 (Appendix 1).

Work in the floodplain will begin by clearing and grubbing for access routes, stockpile and staging areas, floodplain excavation areas, and the installation of temporary crossings. Suggested access routes are shown in the Design Drawings (Sheet C-202, Appendix 1), but the contractor will confirm all routes in the field with the CTUIR and the landowner before construction. All material excavated from the floodplain will be placed as designated in the Design Drawings. Concrete, metal, and other debris encountered during excavation will be removed and hauled to an approved off-site disposal facility. LWM structures (Sheets C-261 to C-267, Appendix 1) will be constructed where it is possible to avoid work in the wetted channel below the OHW. Some LWM will be placed atop the ground surface, and other LWM will be excavated and backfilled with floodplain excavation spoils.

Table 2-4. Contractor Submittal Log

Log No.	Description of Submittal	Type of Submittal	Requirement found in Specification No.	Additional Specification References
1	Submittal Schedule	Schedule	Section 01 33 00 1.02	
2	Construction Schedule	Schedule	Section 01 33 00 3.01	Specifications Section 01 14 20 1.02 and 1.05; Implementation Plan Section 2.1
3	Contract Schedule of Values	Schedule	Section 01 33 00 3.01	
4	Weed-free Material Source Certification	Material Certification	Section 01 33 00 3.01	HIP Terms and Conditions; Specifications Sections 01 35 43 2.03 and 3.04; Specifications Section 32 90 00 2.01
5	Spill Prevention Countermeasures and Control (SPCC) Plan	Plan	Section 01 33 00 3.01	HIP Terms and Conditions; Specifications Section 01 35 43 1.03; Implementation Plan Section 3.2
6	Oregon Department of Environmental Quality (ODEQ) 1200-C Permit	Permit	Section 01 33 00 3.01	Specifications Section 01 35 43 1.02
7	Erosion and Sediment Control (ESC) Plan	Plan	Section 01 33 00 3.01	HIP Terms and Conditions; Specifications Section 01 35 43 1.03; Implementation Plan Section 3.2
8	Storm Contingency Plan	Plan	Section 01 33 00 3.01	Specifications Section 01 35 43 1.02
9	Material Storage/Staging Plan	Plan	Section 01 33 00 3.01	HIP Terms and Conditions; Specifications Section 01 35 43 1.04 F.1; Implementation Plan Section 3.1
10	Dewatering and Work Area Isolation Plan	Plan	Section 01 33 00 3.01	HIP Terms and Conditions; Specifications Sections 01 35 43 1.05 H.1, 01 35 43 1.02, and 31 23 19 1.02
11	Excavation Plan	Plan	Section 01 33 00 3.01	Specifications Section 31 23 00
12	LWM, Boulder, Streambed, and Grade Stabilization Material	Material Compliance	Section 01 33 00 3.01	Specifications Section 35 49 50 Implementation Plan Section 2
13	Geotextile Manufacturer Certificate of Compliance	Material Certification	Section 01 33 00 3.01	Specifications Section 31 05 19.13

Log No.	Description of Submittal	Type of Submittal	Requirement found in Specification No.	Additional Specification References
14	Seed Certification	Material Certification	Section 01 33 00 3.01	Specifications Section 32 90 00 Implementation Plan Sections 2 and 3
15	Surveyor Credentials	Credential	Section 01 33 00 3.01	Specifications Section 01 71 23 1.02
16	Oregon Department of Forestry (ODF) Notification of Operation	Notice	Section 01 33 00 3.01	Specifications Section 01 35 43 1.03
17	Final Record Drawings	Drawings	Section 01 33 00 3.01	Specifications Sections 01 71 23 and 01 78 39

2.3.3 Work in the Wetted Channel

For both Birch Creek and the Umatilla River, work in the wetted channel will only take place during the ODFW-defined in-water work window of July 1 to September 30. This will include channel excavation and installation of the remaining LWM structures, and any associated excavation activities that requires work in the wetted channel.

Work in the wetted channel must follow appropriate methods for dewatering, bypass, fish salvage as defined in the Design Drawings (Sheets G-204 and C-281, Appendix 1) and Construction Specifications (Appendix 2), as well as BPA HIP Conservation Measures in the most current version of the BPA HIP Handbook (Appendix 3).

Any fish salvage will be done by the CTUIR or other qualified fish biologists at CTUIR's direction, by first isolating the work area and/or blocking the upstream and downstream extents of the work area and then capturing and releasing fish from the isolated area using trapping, hand capture, seining, electrofishing, or other prudent methods that minimize risk of injury to the animals. The contractor will provide at least three days advanced notice prior to dewatering or isolating any work area and will coordinate placement of LWM structures with the CTUIR in the immediate vicinity of fish salvage operations.

The CTUIR has not identified any mussel beds in the project area. However, if native mussels are encountered in excavation or fill areas, the contractor will pause work and notify the CTUIR. Coordination with the Xerces Society Freshwater Mussel Lead, U.S. Fish and Wildlife Society (USFWS), and BPA Environmental Compliance Lead is required prior to initiating mussel salvage. If needed, mussel salvage shall refer to methods in Blevins et al. (2017, 2019) and as directed by the CTUIR.

Construction of the LWM structures in the wetted channel will occur simultaneously with channel and floodplain excavation. An excavator will be used to construct the LWM structures in the wetted channel as the materials are delivered by a front-end loader or off-road haul truck. Installation of a typical structure will include surface placement or excavation of a trench in the floodplain or bank, installation of the log or rootwad, backfill of the trench with native fill, and bucket compaction. Each structure will have a unique installation procedure depending on the complexity of the structure and interaction with other logs, racking, rootwads, or ballast. These procedures are defined in the Design Drawings (Sheets C-261 to C-267, Appendix 1) and specifications (Section 35 01 60 Stream Restoration and Section 35 49 50 LWM and Channel Structures). All specifications for anchoring and securing LWM will follow the ODF and ODFW manual for placing LWM in streams (ODFW and ODF 2010).

Rewatering steps will include pre-washing areas of channel excavation, pumping the turbid water to an approved floodplain location with no turbid water returns to the river, and incrementally increasing flow in the channel over a period of hours. Pump capacity and discharge hose length shall be sufficient to dewater work areas without returning turbid water to the river. All pumps will be equipped with fish screens that meet National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) criteria (NMFS 2011). All pumps and generators used in or near streams will always have appropriate spill containment structures in place during use.

All material placed in the channel shall be compacted in lifts. Fines shall be washed in for each lift until voids within the placed matrix are minimized such that ponding occurs with little to no percolation losses. This method is employed to maintain surface flow in the river and prevent excess infiltration.

2.3.4 Revegetation and Cleanup

To the extent practicable, existing mature vegetation will be maintained. If necessary, and as directed by the CTUIR, existing vegetation will be removed by the contractor in clumps that preserves plant groupings, topsoil, and root systems. Existing vegetation clumps will be preserved, protected, and replanted as directed at no additional cost to CTUIR.

Following completion of all work activities, the contractor will decompact staging areas, access routes, and all other compacted areas to a minimum depth of 18 inches and a clod size no larger than 8 inches. All disturbed areas will be seeded per Specifications Section 32 90 00 Seeding to stabilize the disturbed soils.

3. Best Management Practices and Conservation Measures

3.1 STAGING AND STOCKPILE AREAS

Access to the site will be from Birch Creek Road, Taylor Lane, and existing private access routes. Temporary access routes will be established in the floodplain to enable channel crossings. All temporary access routes must be approved by the CTUIR and the landowner prior to installation. To minimize access-related disturbance and environmental impacts, construction vehicles will avoid thick vegetation and other sensitive areas as defined by the CTUIR or landowner. Construction staging will occur away from the wetted channel and only in designated areas approved by the CTUIR. All temporary staging, storing, or maintenance of equipment shall be more than 150 feet from any water body or wetland. If fueling or maintenance must be performed near any water body or wetland, it shall be conducted using secondary containment to capture potential fuel spills as described in the Construction Specifications, Appendix 2 (Section 01 35 43 Environmental Protection).

3.2 TESC MEASURES AND SITE STABILIZATION

TESC measures are included in the Construction Specifications in Section 01 35 43 Environmental Protection (Appendix 2). The minimum measures that must be installed are indicated in the Design Drawings in Appendix 1 (Sheets G-202 to G-205, C-291). The specified controls represent the minimum. The contractor is responsible for installing additional controls to prevent any sediment and sediment-laden water leaving the construction site.

3.3 BPA HIP MEASURES AND BMP IMPLEMENTATION

It is the contractor's responsibility to comply with all BPA HIP terms and conditions and conservation measures listed in the Design Drawings (Appendix 1 Sheets G-203 to G-205 and Appendix 3) and the following items described in Appendix 3:

- General Conservation Measures
- Category 1c – Headcut and Grade Stabilization (if needed)
- Category 2a – Improve Secondary Channel and Floodplain Connectivity
- Category 2b – Setback or Removal of Existing Berms, Dikes, and Levees
- Category 2c – Protect Streambanks Using Bioengineering Methods

- Category 2d – Install Habitat-Forming Instream Structures
- Category 2e – Riparian and Wetland Vegetation Planting
- Category 2f – Channel Reconstruction

The general environmental protection measures and BMPs to be implemented are outlined below:

- The contractor will secure the Project area at the end of every workday to help stabilize the work area to minimize impacts in case a high-water event occurs.
- The contractor will be required to prepare and implement an Erosion and Sediment Control Plan to keep sediment from entering the wetted channel during rain events.
- The contractor will be required to prepare an emergency spill containment kit that must always be available at the construction site, and they must prepare a Spill Prevention, Control, and Countermeasures (SPCC) Plan addressing prevention and cleanup of accidental spills. The SPCC Plan will align with all conservation measures and BMPs included in this Implementation Plan.
- TESC measures, which may include fiber wattles, straw bales, silt fences, jute matting, wood fiber mulch and soil binder, or geotextiles and geosynthetic fabric, will be in place before any significant alteration of the Project site and appropriately installed downslope of Project activity until site stabilization is complete.
    - If there is a potential for eroded sediment to enter the stream, sediment barriers will be installed and maintained for the duration of Project implementation.
    - 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.
    - Sediment will be removed from erosion control BMPs once it has reached one-third of the exposed height of the BMP.
    - Once the site is stabilized following construction, TESC BMPs will be removed.
    - Materials for emergency erosion control will be available at the work site, including a supply of sediment control materials and an oil-absorbing floating boom whenever surface water is present.

- Machinery used in the Project area will be clean, well-maintained, in good operating condition, and inspected daily for leaks. All equipment used in and adjacent to the stream channel and water will use biodegradable lubricants and fluids.
- To minimize potential for the introduction and spread of invasive species and pathogens, all vehicles, equipment, clothing, gear, and footwear will be thoroughly inspected, cleaned, and if necessary, decontaminated, before entering the site.
- Parking machinery, equipment, and vehicles in areas that contain noxious weeds will be avoided to the extent possible. Workers will check under vehicles and equipment before leaving the area and remove any plants or plant parts that may become lodged in the carriages. Workers will also check clothing and tools for weed seeds. If noxious weed plants or seeds are found during inspections, they will be incinerated at an approved location.
- The clearing limits associated with site access and construction will be marked with flagging in the field prior to vegetation removal and other construction activities to minimize disturbance to riparian vegetation and avoid disturbance to sensitive habitats.
- The contractor will minimize alteration or disturbance of streambanks and existing riparian vegetation. This will be done by revegetating banks that are disturbed during construction, covering all land areas that will be left undisturbed for more than seven days with an approved soil covering practice (e.g., seeding, mulching, plastic covering, crushed rock) whether at final grade or not, and marking in the field clearing limits associated with site access and construction.
- All construction staging and any machinery maintenance involving potential contaminants (e.g., fuel, oil, hydraulic fluid, etc.) will occur at an approved site at least 150 feet away from the wetted channel and only in designated areas. Hazardous spill clean-up materials and trained operators will be located on-site.
- Within the Project area, the necessary equipment will be maintained to pump out the work site if flows enter any construction area. The pump will be screened to prevent fish from entering the system. Pump screens will be designed in accordance with NMFS (2022) standards to avoid juvenile fish impingement or entrainment. Screen maintenance will be adequate to prevent injury or entrainment of juvenile fish. The screen will remain in place while the diversion or isolated work area is in place.

3.4 DEMOBILIZATION AND CLEAN-UP SCHEDULE

Demobilization will occur once work activities are completed, and all work has been found to be acceptable by the CTUIR. Equipment will be transported off the site and returned to the vendors as applicable. Unused materials will be returned to the supplier or transported off-site to a location approved by CTUIR. Demobilization and final site cleanup are scheduled for no later than December 1 in the year of construction completion.

4. References

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Blevins, E.L., L. McMullen, S. Jepsen, M. Blackburn, A. Code, and S.H. Black. 2017. Conserving the Gems of Our Waters: Best Management Practices for Protecting Native Weter Freshwater Mussels During Aquatic and Riparian Restoration, Construction, and Land Management Process and Activities. The Xerces Society, Portland, OR.

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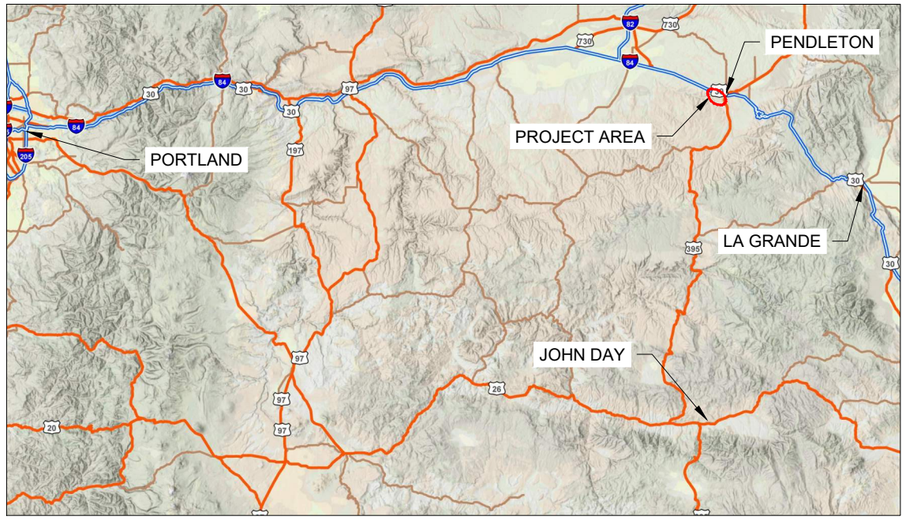
Tetra Tech. 2024a. UmaBirch In-stream Design and Construction Oversight Project, Section 408 #FY19-NO46 100 Percent Submittal. Bothell, WA.

Tetra Tech. 2024b. Project Area 2 Umatilla River and Birch Creek Confluence Instream Enhancement and Floodplain Restoration 90 Percent Basis of Design Report. Bothell, WA.

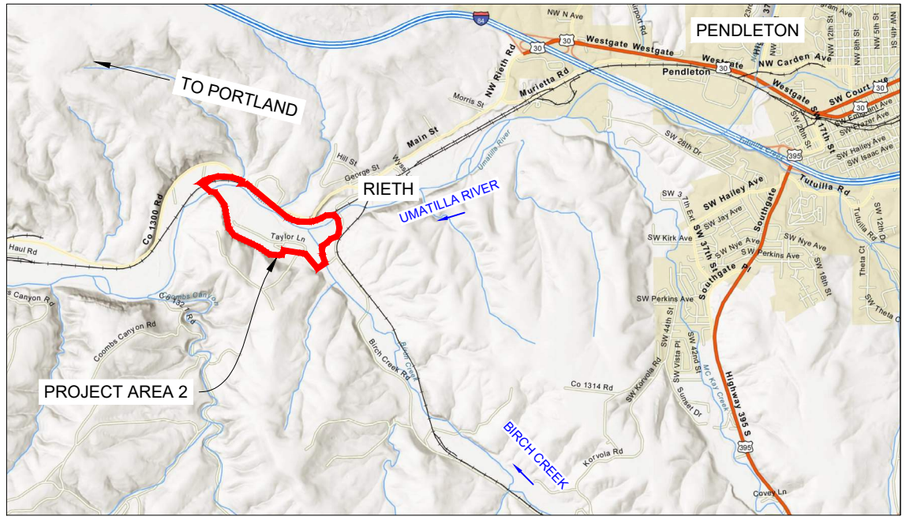
APPENDIX 1
DESIGN DRAWINGS

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

PROJECT AREA 2 UMATILLA RIVER AND BIRCH CREEK INSTREAM ENHANCEMENT AND FLOODPLAIN RESTORATION - 100 PERCENT DESIGN



LOCATION MAP
SCALE: NTS



VICINITY MAP
SCALE: NTS

SHEET LIST	
DWG #	**TITLE**
G-201	COVER SHEET
G-202	GENERAL NOTES
G-203 - G-205	GENERAL NOTES - HIP IV CONSERVATION METHODS
E-201	GENERAL OVERVIEW
E-202	EXISTING CONDITIONS OVERVIEW
C-201	PROPOSED CONDITIONS OVERVIEW
C-202	PROPOSED ACCESS & STAGING
C-203	PROPOSED POD & UTILITY DECOMMISSION PLAN
C-204 - C-205	PROPOSED CHANNEL BYPASS SEQUENCING PLAN
C-211 - C-214	PROPOSED CONDITIONS DETAILED OVERVIEW
C-221 - C-223	PROPOSED UMATILLA RIVER CHANNEL PROFILE & SECTIONS
C-224	PROPOSED BIRCH CREEK CHANNEL PROFILE & SECTIONS
C-225 - C-226	PROPOSED DISTRIBUTARY CHANNEL PROFILE & SECTIONS
C-231 - C-236	PROPOSED WETLANDS & LINK CHANNELS
C-241 - C-242	PROPOSED ACCESS ROUTE MAINTENANCE PROFILE & SECTIONS
C-243 - C-245	PROPOSED FLOODPLAIN TERRACE PROFILE & SECTIONS
C-251 - C-252	PROPOSED CONSTRUCTION POINTS
C-261 - C-267	LWM DETAILS
C-271	TYPICAL SECTIONS
C-281	FISH SALVAGE, DEWATERING, REWATERING DETAILS
C-291	TESC DETAILS
L-201 - L-205	PLANTING PLAN

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

COVER SHEET

DWG. NO.: G-201
CREATED: 1/19/26
SHEET: 1 of 50

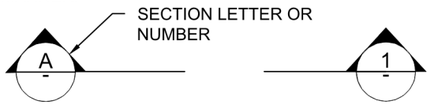
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\01-G201-G205 COVER PAGE AND NOTES.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:27 PM

ABBREVIATIONS

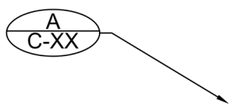
1H:1V	HORIZONTAL TO VERTICAL EXAGGERATION
µS	MICRO SECONDS
°C	DEGREE CELSIUS
%	PERCENT
Ø	DIAMETER
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APP	APPROVED BY
APPROX	APPROXIMATE
BMP	BEST MANAGEMENT PRACTICE
BPA	BONNEVILLE POWER ADMINISTRATION
CHK	CHECKED BY
CO	COUNTY
CP	CONTROL POINT
CPE	CORRUGATED POLYETHYLENE (SMOOTH INTERIOR)
CTUIR	CONFEDERATED TRIBES OF THE UMATILLA RESERVATION
CWA	CLEAN WATER ACT
CY	CUBIC YARDS
D	DEPTH
DBH	DIAMETER AT BREAST HEIGHT
DC	DIRECT CURRENT
DIA	DIAMETER
DWG	DRAWING
DRW	DRAWN BY
EC	ENVIRONMENTAL COMPLIANCE
EG	FOR EXAMPLE (LATIN: EXEMPLI GRATIA)
ENG	ENGINEERED BY
EQIV	EQUIVALENT
ESA	ENDANGERED SPECIES ACT
ETC	ET CETERA
EX	EXISTING
FT, '	FOOT
HARN	HIGH ACCURACY REFERENCE NETWORK
HEC-RAS	HYDRAULIC ENGINEERING CENTER RIVER ANALYSIS SYSTEM
HIP	HABITAT IMPROVEMENT PROGRAM
HUC	HYDROLOGIC UNIT CODE
HZ	HERTZ
ID	IDENTIFICATION
IE	THAT IS (LATIN: ID EST)
IN, "	INCH
L	LENGTH
LBS	POUNDS
LiDAR	LIGHT DETECTION AND RANGING
LT	LEFT
LWM	LARGE WOODY MATERIAL
M	METER
MAX	MAXIMUM
MI	MILE
MIN	MINIMUM
MJR	MAJOR
MNR	MINOR
MS	MILLISECONDS
N/A	NOT APPLICABLE
NAVD	NORTH AMERICAN VERTICAL DATUM OF 1988
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NMFS	NATIONAL MARINE FISHERIES SERVICE
NHPA	NATIONAL HISTORIC PRESERVATION ACT
NTS	NOT TO SCALE
PDC	PULSED DIRECT CURRENT
ODFW	OREGON DEPARTMENT OF FISH AND WILDLIFE
OHW	ORDINARY HIGH WATER
OWRD	OREGON WATER RESOURCES DEPARTMENT
OZ/SY	OUNCE PER SQUARE YARD
PREFAB	PREFABRICATED
PRO	PROPOSED
RT	RIGHT
STA	STATION
TEMP	TEMPORARY
TESC	TEMPORARY EROSION AND SEDIMENT CONTROL
TYP	TYPICAL
USFS	UNITED STATES FOREST SERVICE
UPRR	UNION PACIFIC RAILROAD
V	VOLTS
W/	WITH
WSEL	WATER SURFACE ELEVATION
XS	CROSS SECTION
YR	YEAR

SYMBOLS

SECTIONS ARE REFERENCED IN THE FOLLOWING MANNER:



CONSTRUCTION DETAILS ARE REFERENCED IN THE FOLLOWING MANNER:



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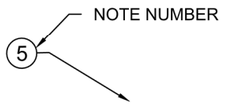

CONSTRUCTION SEQUENCING:

A. PERIOD BEFORE COMPLETION OF PENDLETON 2A LEVEE SETBACK:
   1. MOBILIZE AND COMPLETE CONSTRUCTION INITIATION (E.G., STAKING, FLAGGING, CLEARING, GRUBBING, FENCING, TESC, ACCESS ROUTES, STAGING AREAS, DEBRIS REMOVAL).
   2. ACQUIRE AND STOCKPILE EARTH, ROCK, WOOD, AND OTHER MATERIALS IN DESIGNATED STAGING AREA(S) AS DIRECTED BY CTUIR REPRESENTATIVE OR ENGINEER.
   3. WORKING IN THE DRY AND FROM DOWNSTREAM TO UPSTREAM, CONSTRUCT NEW CHANNELS, TERRACE FILL, AND FLOODPLAIN FEATURES IN AREAS BETWEEN THE DOWNSTREAM EXTENT OF PA 2, EXISTING BIRCH CREEK, AND NEW UMATILLA RIVER CHANNEL. CEASE CHANNEL CONSTRUCTION BEFORE REACHING EXISTING BIRCH CREEK; MAINTAIN ISOLATION FROM FLOW. STOCKPILE EXCAVATED MATERIAL IN THE FLOODPLAIN.
   4. CONSTRUCT ACCESS ROUTE MAITENANCE.
   5. CONSTRUCT LWM STRUCTURES OUTSIDE OF WETTED CHANNEL IN AREAS WEST OF EXISITING BIRCH CREEK.
   6. DECOMMISSION AND REMOVE THE EXISTING POINT OF DIVERSION.

B. ACTIVE PERIOD AFTER COMPLETION OF PENDLETON 2A LEVEE SETBACK:
   1. PERFORM WORK IN THE WETTED CHANNEL DURING IN-WATER WORK WINDOW FOR BIRCH CREEK AND UMATILLA RIVER (JULY 1 TO SEPTEMBER 30)
      1.1. DIVERT FLOW INTO NEW BIRCH CREEK CHANNEL AND DEWATER OLD BIRCH CREEK DOWNSTREAM OF NEW CHANNEL; APPLY REQUIRED ISOLATION, DEWATERING, AND FISH SALVAGE MEASURES.
      1.2. FILL THE DEWATERED SEGMENT OF THE OLD BIRCH CREEK CHANNEL AND CONSTRUCT THE REST OF THE NEW UMATILLA RIVER CHANNEL IN THE DRY.
      1.3. DIVERT THE UMATILLA RIVER INTO ITS NEW CHANNEL; APPLY REQUIRED ISOLATION, DEWATERING, AND FISH SALVAGE MEASURES
      1.4. FILL THE DEWATERED SEGMENT OF OLD UMATILLA RIVER AND COMPLETE ALL CONSTRUCTION IN WETTED CHANNEL (LWM, HABITAT BOULDERS, ETC.).
   2. AT ANY TIME OF YEAR, PERFORM REMAINING FLOODPLAIN AND TERRACE FILL OUTSIDE OF WETTED CHANNEL (E.G., FILL PLACEMENT, WETLAND CREATION, LWM).
   3. COMPLETE SITE RESTORATION ACTIVITIES (E.G., DECOMPACT DISTURBED AREAS, SEEDING AND MULCHING, SITE CLEANUP) AND DEMOBILIZE.

GENERAL NOTES:

A. HORIZONTAL PROJECTION: NAD83 OREGON STATE PLANES, NORTH ZONE, INTERNATIONAL FOOT.
B. VERTICAL PROJECTION: NAVD88.
C. PROJECT ALIGNMENT. ELEVATION, AND STATIONING BASED ON 2020 LiDAR TOPOGRAPHIC DATA BY QUANTUM SPATIAL. INC. AND SUPPLEMENTED BY BATHYMETRIC SURVEY CONDUCTED BY TETRA TECH IN JUNE 2021.
D. PROPOSED PROJECT DESIGN, CONSTRUCTION ACTIVITIES, AND MATERIALS SUBJECT TO APPROVAL BY LANDOWNER.
E. AERIAL IMAGERY PROVIDED BY QUANTUM SPATIAL. INC, 2020, AND GOOGLE EARTH, 2019.

GENERAL CONSTRUCTION NOTES:

A. THE CONTRACTOR SHALL CONSTRUCT THE RESTORATION DESIGN ELEMENTS IN ACCORDANCE WITH THE PLANS STAMPED "ISSUED FOR CONSTRUCTION". THESE PLANS WILL BE PROVIDED TO THE CONTRACTOR BY THE CONTRACTING AGENCY PRIOR TO CONSTRUCTION. WORK SHALL NOT BE DONE WITHOUT THE CURRENT SET OF APPROVED CONSTRUCTION PLANS.
B. THE CONTRACTOR SHALL COMPLY WITH THE MOST RECENT AND APPLICABLE BPA HIP TERMS & CONDITIONS.
C. CONTRACTOR SHALL CONTACT THE OREGON UTILITY NOTIFICATION CENTER 1-800-332-2344 (OR 811) BEFORE ANY EXCAVATION WORK BEGINS.
D. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND EFFICIENT MANNER TO ENSURE TIMELY COMPLETION OF THE PROJECT.
E. ALL WORK WITHIN THE ACTIVE CHANNEL SHALL OCCUR WITHIN THE ALLOWABLE FISH WINDOW (JULY 1 - SEPTEMBER 30).
F. ALL CONSTRUCTION ACTIVITIES SHALL MINIMIZE DISTURBANCE TO AND MAXIMIZE RE-USE OF EXISTING RIPARIAN VEGETATION.
G. THE CONTRACTOR SHALL PROTECT ALL CONTROL POINTS DURING CONSTRUCTION ACTIVITIES.
H. CONTRACTOR SHALL PROVIDE AN EROSION AND SEDIMENT CONTROL AND DEWATERING PLAN TO OWNER WITHIN TEN (10) DAYS OF NOTICE TO PROCEED.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

GENERAL NOTES

DWG. NO.: G-202
CREATED: 1/19/26
SHEET: 2 of 50

HIP GENERAL CONSERVATION MEASURES APPLICABLE TO ALL ACTIONS

THE ACTIVITIES COVERED UNDER THE HIP ARE INTENDED TO PROTECT AND RESTORE FISH AND WILDLIFE HABITAT WITH LONG-TERM BENEFITS TO ESA-LISTED SPECIES. THE FOLLOWING GENERAL CONSERVATION MEASURES (DEVELOPED IN COORDINATION WITH USFWS AND NMFS) WILL BE APPLIED TO ALL ACTIONS OF THIS PROJECT.

PROJECT DESIGN AND SITE PREPARATION.

1. STATE AND FEDERAL PERMITS.

A. ALL APPLICABLE REGULATORY PERMITS AND OFFICIAL PROJECT AUTHORIZATIONS WILL BE OBTAINED BEFORE PROJECT IMPLEMENTATION.

B. THESE PERMITS AND AUTHORIZATIONS INCLUDE, BUT ARE NOT LIMITED TO, NATIONAL ENVIRONMENTAL POLICY ACT, NATIONAL HISTORIC PRESERVATION ACT, THE APPROPRIATE STATE AGENCY REMOVAL AND FILL PERMIT, USACE CLEAN WATER ACT (CWA) 404 PERMITS, CWA SECTION 401 WATER QUALITY CERTIFICATIONS, AND FEMA NO-RISE ANALYSES.

2. TIMING OF IN-WATER WORK.

A. APPROPRIATE STATE (OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW), WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW), IDAHO DEPARTMENT OF FISH AND GAME (IDFG), AND MONTANA FISH WILDLIFE AND PARKS (MFWP)) GUIDELINES FOR TIMING OF IN-WATER WORK WINDOWS (IWW) WILL BE FOLLOWED.

B. CHANGES TO ESTABLISHED WORK WINDOWS WILL BE APPROVED BY REGIONAL STATE BIOLOGISTS AND BPA'S EC LEAD.

C. BULL TROUT. FOR AREAS WITH DESIGNATED IN-WATER WORK WINDOWS FOR BULL TROUT OR AREAS KNOWN TO HAVE BULL TROUT, PROJECT PROPONENTS WILL CONTACT THE APPROPRIATE USFWS FIELD OFFICE TO INSURE THAT ALL REASONABLE IMPLEMENTATION MEASURES ARE CONSIDERED AND AN APPROPRIATE IN-WATER WORK WINDOW IS BEING USED TO MINIMIZE PROJECT EFFECTS.

D. LAMPREY. WORKING IN STREAM OR RIVER CHANNELS THAT CONTAIN PACIFIC LAMPREY WILL BE AVOIDED FROM MARCH 1 TO JULY 1 FOR REACHES <5,000 FEET IN ELEVATION AND FROM MARCH 1 TO AUGUST 1 FOR REACHES >5,000 FEET. IF EITHER TIMEFRAME IS INCOMPATIBLE WITH OTHER OBJECTIVES, THE AREA WILL BE SURVEYED FOR NESTS AND LAMPREY PRESENCE, AND AVOIDED IF POSSIBLE. IF LAMPREYS ARE KNOWN TO EXIST, THE PROJECT SPONSOR WILL UTILIZE DEWATERING AND SALVAGE PROCEDURES (SEE FISH SALVAGE AND ELECTROFISHING SECTIONS) TO MINIMIZE ADVERSE EFFECTS.

E. THE IN-WATER WORK WINDOW WILL BE PROVIDED IN THE CONSTRUCTION PLANS.

3. CONTAMINANTS.

A. EXCAVATION OF MORE THAN 20 CUBIC YARDS WILL REQUIRE A SITE VISIT AND DOCUMENTED ASSESSMENT FOR POTENTIAL CONTAMINANT SOURCES. THE SITE ASSESSMENT WILL BE STORED WITH PROJECT FILES OR AS AN APPENDIX TO THE BASIS OF DESIGN REPORT.

B. THE SITE ASSESSMENT WILL SUMMARIZE:

1. THE SITE VISIT, CONDITION OF THE PROPERTY, AND IDENTIFICATION OF ANY AREAS USED FOR VARIOUS INDUSTRIAL PROCESSES;
2. AVAILABLE RECORDS, SUCH AS FORMER SITE USE, BUILDING PLANS, AND RECORDS OF ANY PRIOR CONTAMINATION EVENTS;
3. INTERVIEWS WITH KNOWLEDGEABLE PEOPLE, SUCH AS SITE OWNERS, OPERATORS, OCCUPANTS, NEIGHBORS, OR LOCAL GOVERNMENT OFFICIALS; AND
4. THE TYPE, QUANTITY, AND EXTENT OF ANY POTENTIAL CONTAMINATION SOURCES.

4. SITE LAYOUT AND FLAGGING.

A. CONSTRUCTION AREAS TO BE CLEARLY FLAGGED PRIOR TO CONSTRUCTION.

B. AREAS TO BE FLAGGED WILL INCLUDE:

1. SENSITIVE RESOURCE AREAS, SUCH AS AREAS BELOW ORDINARY HIGH WATER, SPAWNING AREAS, SPRINGS, AND WETLANDS;
2. EQUIPMENT ENTRY AND EXIT POINTS;
3. ROAD AND STREAM CROSSING ALIGNMENTS;
4. STAGING, STORAGE, AND STOCKPILE AREAS; AND
5. NO-SPRAY AREAS AND BUFFERS.

5. TEMPORARY ACCESS ROADS AND PATHS.

A. EXISTING ACCESS ROADS AND PATHS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER AND LENGTH OF TEMPORARY ACCESS ROADS AND PATHS THROUGH RIPARIAN AREAS AND FLOODPLAINS WILL BE MINIMIZED.

B. VEHICLE USE AND HUMAN ACTIVITIES, INCLUDING WALKING, IN AREAS OCCUPIED BY TERRESTRIAL ESA-LISTED SPECIES WILL BE MINIMIZED.

C. TEMPORARY ACCESS ROADS AND PATHS WILL NOT BE BUILT ON SLOPES WHERE GRADE, SOIL, OR OTHER FEATURES SUGGEST A LIKELIHOOD OF EXCESSIVE EROSION OR FAILURE. IF SLOPES ARE STEEPER THAN 30%, THEN THE ROAD WILL BE DESIGNED BY A CIVIL ENGINEER WITH EXPERIENCE IN STEEP ROAD DESIGN.

D. THE REMOVAL OF RIPARIAN VEGETATION DURING CONSTRUCTION OF TEMPORARY ACCESS ROADS WILL BE MINIMIZED. WHEN TEMPORARY VEGETATION REMOVAL IS REQUIRED, VEGETATION WILL BE CUT AT GROUND LEVEL (NOT GRUBBED).

E. AT PROJECT COMPLETION, ALL TEMPORARY ACCESS ROADS AND PATHS WILL BE OBLITERATED, AND THE SOIL WILL BE STABILIZED AND REVEGETATED. 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.

F. HELICOPTER FLIGHT PATTERNS WILL BE ESTABLISHED IN ADVANCE AND LOCATED TO AVOID TERRESTRIAL ESA-LISTED SPECIES AND THEIR OCCUPIED HABITAT DURING SENSITIVE LIFE STAGES.

6. TEMPORARY STREAM CROSSINGS.

A. EXISTING STREAM CROSSINGS OR BEDROCK WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER OF TEMPORARY STREAM CROSSINGS WILL BE MINIMIZED.

B. TEMPORARY BRIDGES AND CULVERTS WILL BE INSTALLED TO ALLOW FOR EQUIPMENT AND VEHICLE CROSSING OVER PERENNIAL STREAMS DURING CONSTRUCTION. TREATED WOOD SHALL NOT BE USED ON TEMPORARY BRIDGE CROSSINGS OR IN LOCATIONS IN CONTACT WITH OR DIRECTLY OVER WATER.

C. FOR PROJECTS THAT REQUIRE EQUIPMENT AND VEHICLES TO CROSS IN THE WET:

1. THE LOCATION AND NUMBER OF ALL WET CROSSINGS SHALL BE APPROVED BY THE BPA EC LEAD AND DOCUMENTED IN THE CONSTRUCTION PLANS;
2. VEHICLES AND MACHINERY SHALL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL WHENEVER POSSIBLE;
3. NO STREAM CROSSINGS WILL OCCUR 300 FEET UPSTREAM OR 100 FEET DOWNSTREAM OF AN EXISTING REDD OR SPAWNING FISH; AND
4. AFTER PROJECT COMPLETION, TEMPORARY STREAM CROSSINGS WILL BE OBLITERATED AND BANKS RESTORED.

7. STAGING, STORAGE, AND STOCKPILE AREAS.

A. STAGING AREAS (USED FOR CONSTRUCTION EQUIPMENT STORAGE, VEHICLE STORAGE, FUELING, SERVICING, AND HAZARDOUS MATERIAL STORAGE) WILL BE 150 FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND. STAGING AREAS CLOSER THAN 150 FEET WILL BE APPROVED BY THE EC LEAD.

B. NATURAL MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION, SUCH AS LARGE WOOD, GRAVEL, AND BOULDERS, MAY BE STAGED WITHIN 150 FEET IF CLEARLY INDICATED IN THE PLANS THAT AREA IS FOR NATURAL MATERIALS ONLY.

C. ANY LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL DISPLACED BY CONSTRUCTION WILL BE STOCKPILED FOR USE DURING SITE RESTORATION AT A SPECIFICALLY IDENTIFIED AND FLAGGED AREA.

D. ANY MATERIAL NOT USED IN RESTORATION, AND NOT NATIVE TO THE FLOODPLAIN, WILL BE DISPOSED OF OUTSIDE THE 100-YEAR FLOODPLAIN.

8. EQUIPMENT.

A. MECHANIZED EQUIPMENT AND VEHICLES WILL BE SELECTED, OPERATED, AND MAINTAINED IN A MANNER THAT MINIMIZES ADVERSE EFFECTS ON THE ENVIRONMENT (E.G., MINIMALLY-SIZED, LOW PRESSURE TIRES; MINIMAL HARD-TURN PATHS FOR TRACKED VEHICLES; TEMPORARY MATS OR PLATES WITHIN WET AREAS OR ON SENSITIVE SOILS).

B. EQUIPMENT WILL BE STORED, FUELED, AND MAINTAINED IN A CLEARLY IDENTIFIED STAGING AREA THAT MEETS STAGING AREA CONSERVATION MEASURES.

C. EQUIPMENT WILL BE REFUELED IN A VEHICLE STAGING AREA OR IN AN ISOLATED HARD ZONE, SUCH AS A PAVED PARKING LOT OR ADJACENT, ESTABLISHED ROAD (THIS MEASURE APPLIES ONLY TO GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN 5 GALLONS).

D. BIODEGRADABLE LUBRICANTS AND FLUIDS WILL BE USED ON EQUIPMENT OPERATING IN AND ADJACENT TO THE STREAM CHANNEL AND LIVE WATER.

E. EQUIPMENT WILL BE INSPECTED DAILY FOR FLUID LEAKS BEFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION WITHIN 150 FEET OF ANY NATURAL WATER BODY OR WETLAND.

F. EQUIPMENT WILL BE THOROUGHLY CLEANED BEFORE OPERATION BELOW ORDINARY HIGH WATER, AND AS OFTEN AS NECESSARY DURING OPERATION, TO REMAIN GREASE FREE.

9. EROSION CONTROL.

A. TEMPORARY EROSION CONTROL MEASURES INCLUDE:

1. TEMPORARY EROSION CONTROLS WILL BE IN PLACE BEFORE ANY SIGNIFICANT ALTERATION OF THE ACTION SITE AND APPROPRIATELY INSTALLED DOWNSLOPE OF PROJECT ACTIVITY WITHIN THE RIPARIAN BUFFER AREA UNTIL SITE REHABILITATION IS COMPLETE;
2. IF THERE IS A POTENTIAL FOR ERODED SEDIMENT TO ENTER THE STREAM, SEDIMENT BARRIERS WILL BE INSTALLED AND MAINTAINED FOR THE DURATION OF PROJECT IMPLEMENTATION;
3. TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE SEDGE MATS, FIBER WATTLES, SILT FENCES, JUTE MATTING, WOOD FIBER MULCH AND SOIL BINDER, OR GEOTEXTILES AND GEOSYNTHETIC FABRIC;
4. 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;
5. SEDIMENT WILL BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL; AND
6. ONCE THE SITE IS STABILIZED AFTER CONSTRUCTION, TEMPORARY EROSION CONTROL MEASURES WILL BE REMOVED.

B. EMERGENCY EROSION CONTROLS. THE FOLLOWING MATERIALS FOR EMERGENCY EROSION CONTROL WILL BE AVAILABLE AT THE WORK SITE:

1. A SUPPLY OF SEDIMENT CONTROL MATERIALS; AND
2. AN OIL-ABSORBING FLOATING BOOM WHENEVER SURFACE WATER IS PRESENT.

10. DUST ABATEMENT.

A. THE PROJECT SPONSOR WILL DETERMINE THE APPROPRIATE DUST CONTROL MEASURES BY CONSIDERING SOIL TYPE, EQUIPMENT USAGE, PREVAILING WIND DIRECTION, AND THE EFFECTS CAUSED BY OTHER EROSION AND SEDIMENT CONTROL MEASURES.

B. WORK WILL BE SEQUENCED AND SCHEDULED TO REDUCE EXPOSED BARE SOIL SUBJECT TO WIND EROSION.

C. DUST-ABATEMENT ADDITIVES AND STABILIZATION CHEMICALS (TYPICALLY MAGNESIUM CHLORIDE, CALCIUM CHLORIDE SALTS, OR LIGNINSULFONATE) WILL NOT BE APPLIED WITHIN 25 FEET OF WATER OR A STREAM CHANNEL AND WILL BE APPLIED SO AS TO MINIMIZE THE LIKELIHOOD THAT THEY WILL ENTER STREAMS. APPLICATIONS OF LIGNINSULFONATE WILL BE LIMITED TO A MAXIMUM RATE OF 0.5 GALLONS PER SQUARE YARD OF ROAD SURFACE, ASSUMING MIXED 50:50 WITH WATER.

D. APPLICATION OF DUST ABATEMENT CHEMICALS WILL BE AVOIDED DURING OR JUST BEFORE WET WEATHER, AND AT STREAM CROSSINGS OR OTHER AREAS THAT COULD RESULT IN UNFILTERED DELIVERY OF THE DUST ABATEMENT MATERIALS TO A WATERBODY (TYPICALLY THESE WOULD BE AREAS WITHIN 25 FEET OF A WATERBODY OR STREAM CHANNEL; DISTANCES MAY BE GREATER WHERE VEGETATION IS SPARSE OR SLOPES ARE STEEP).

E. SPILL CONTAINMENT EQUIPMENT WILL BE AVAILABLE DURING APPLICATION OF DUST ABATEMENT CHEMICALS.

F. PETROLEUM-BASED PRODUCTS WILL NOT BE USED FOR DUST ABATEMENT.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL 12 2005
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

GENERAL NOTES - HIP IV CONSERVATION METHODS

DWG. NO.: G-203
CREATED: 1/19/26
SHEET: 3 of 50

PROJECT DESIGN AND SITE PREPARATION (CONTINUED).

11. SPILL PREVENTION, CONTROL, AND COUNTER MEASURES.

A. A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES WILL BE AVAILABLE ON-SITE.

B. WRITTEN PROCEDURES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES WILL BE POSTED AT THE WORK SITE.

C. SPILL CONTAINMENT KITS (INCLUDING INSTRUCTIONS FOR CLEANUP AND DISPOSAL) ADEQUATE FOR THE TYPES AND QUANTITY OF HAZARDOUS MATERIALS USED AT THE SITE WILL BE AVAILABLE AT THE WORK SITE.

D. WORKERS WILL BE TRAINED IN SPILL CONTAINMENT PROCEDURES AND WILL BE INFORMED OF THE LOCATION OF SPILL CONTAINMENT KITS.

E. ANY WASTE LIQUIDS GENERATED AT THE STAGING AREAS WILL BE TEMPORARILY STORED UNDER AN IMPERVIOUS COVER, SUCH AS A TARPAULIN, UNTIL THEY CAN BE PROPERLY TRANSPORTED TO AND DISPOSED OF AT A FACILITY THAT IS APPROVED FOR RECEIPT OF HAZARDOUS MATERIALS.

F. PUMPS USED ADJACENT TO WATER SHALL USE SPILL CONTAINMENT SYSTEMS.

12. INVASIVE SPECIES CONTROL.

A. PRIOR TO ENTERING THE SITE, ALL VEHICLES AND EQUIPMENT WILL BE POWER WASHED, ALLOWED TO FULLY DRY, AND INSPECTED TO MAKE SURE NO PLANTS, SOIL, OR OTHER ORGANIC MATERIAL ADHERES TO THE SURFACE.

B. WATERCRAFT, WADERS, BOOTS, AND ANY OTHER GEAR TO BE USED IN OR NEAR WATER WILL BE INSPECTED FOR AQUATIC INVASIVE SPECIES.

C. WADING BOOTS WITH FELT SOLES ARE NOT TO BE USED DUE TO THEIR PROPENSITY FOR AIDING IN THE TRANSFER OF INVASIVE SPECIES UNLESS DECONTAMINATION PROCEDURES HAVE BEEN APPROVED BY THE EC LEAD.

WORK AREA ISOLATION AND FISH SALVAGE.

1. WORK AREA ISOLATION.

A. ANY WORK AREA WITHIN THE WETTED CHANNEL WILL BE ISOLATED FROM THE ACTIVE STREAM WHENEVER ESA-LISTED FISH ARE REASONABLY CERTAIN TO BE PRESENT, OR IF THE WORK AREA IS LESS THAN 300-FEET UPSTREAM FROM KNOWN SPAWNING HABITATS.

B. WORK AREA ISOLATION AND FISH SALVAGE ACTIVITIES WILL COMPLY WITH THE IN-WATER WORK WINDOW.

C. DESIGN PLANS WILL INCLUDE ALL ISOLATION ELEMENTS AND AREAS (COFFER DAMS, PUMPS, DISCHARGE AREAS, FISH SCREENS, FISH RELEASE AREAS, ETC.).

D. WORK AREA ISOLATION AND FISH CAPTURE ACTIVITIES WILL OCCUR DURING PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING CONDITIONS APPROPRIATE TO MINIMIZE STRESS AND DEATH OF SPECIES PRESENT.

2. FISH SALVAGE.

A. MONITORING AND RECORDING WILL TAKE PLACE FOR DURATION OF SALVAGE. THE SALVAGE REPORT WILL BE COMMUNICATED TO AGENCIES VIA THE PROJECT COMPLETION FORM (PCF).

B. SALVAGE ACTIVITIES SHOULD TAKE PLACE DURING CONDITIONS TO MINIMIZE STRESS TO FISH SPECIES, TYPICALLY PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES WHICH OCCUR IN THE MORNING VERSUS LATE IN THE DAY.

C. SALVAGE OPERATIONS WILL FOLLOW THE ORDERING, METHODS, AND CONSERVATION MEASURES SPECIFIED BELOW:

1. SLOWLY REDUCE WATER FROM THE WORK AREA TO ALLOW SOME FISH TO LEAVE VOLITIONALLY.
2. BLOCK NETS WILL BE INSTALLED AT UPSTREAM AND DOWNSTREAM LOCATIONS AND MAINTAINED IN A SECURED POSITION TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.
3. BLOCK NETS WILL BE SECURED TO THE STREAM CHANNEL BED AND BANKS UNTIL FISH CAPTURE AND TRANSPORT ACTIVITIES ARE COMPLETE. BLOCK NETS MAY BE LEFT IN PLACE FOR THE DURATION OF THE PROJECT TO EXCLUDE FISH AS LONG AS PASSAGE REQUIREMENTS ARE MET.
4. NETS WILL BE MONITORED HOURLY DURING IN-STREAM DISTURBANCE.
5. IF BLOCK NETS REMAIN IN PLACE MORE THAN ONE DAY, THE NETS WILL BE MONITORED AT LEAST DAILY TO ENSURE THEY ARE SECURED AND FREE OF ORGANIC ACCUMULATION. IF BULL TROUT ARE PRESENT, NETS ARE TO BE CHECKED EVERY 4 HOURS FOR FISH IMPINGEMENT.
6. CAPTURE FISH THROUGH SEINING AND RELOCATE TO STREAMS.
7. WHILE DEWATERING, ANY REMAINING FISH WILL BE COLLECTED BY HAND OR DIP NETS.
8. SEINES WITH A MESH SIZE TO ENSURE CAPTURE OF THE RESIDING ESA-LISTED FISH WILL BE USED.
9. MINNOW TRAPS WILL BE LEFT IN PLACE OVERNIGHT AND USED IN CONJUNCTION WITH SEINING.
10. ELECTROFISH TO CAPTURE AND RELOCATE FISH NOT CAUGHT DURING SEINING PER ELECTROFISH CONSERVATION MEASURES.
11. CONTINUE TO SLOWLY DEWATER STREAM REACH.
12. COLLECT ANY REMAINING FISH IN COLD-WATER BUCKETS AND RELOCATED TO THE STREAM.
13. LIMIT THE TIME FISH ARE IN A TRANSPORT BUCKET.
14. MINIMIZE PREDATION BY TRANSPORTING COMPARABLE SIZES IN BUCKETS.
15. BUCKET WATER TO BE CHANGED EVERY 15 MINUTES OR AERATED.
16. BUCKETS WILL BE KEPT IN SHADED AREAS OR COVERED.
17. DEAD FISH WILL NOT BE STORED IN TRANSPORT BUCKETS, BUT WILL BE LEFT ON THE STREAM BANK TO AVOID MORTALITY COUNTING ERRORS.

D. SALVAGE GUIDELINES FOR BULL TROUT, LAMPREY, AND NATIVE FISH.

1. CONDUCT SITE SURVEY TO ESTIMATE SALVAGE NUMBERS.
2. PRE-SELECT SITE(S) FOR RELEASE.
3. SALVAGE OF BULL TROUT WILL NOT TAKE PLACE WHEN WATER TEMPERATURES EXCEED 15 DEGREES CELSIUS.
4. IF DRAWDOWN LESS THAN 48 HOURS, SALVAGE OF LAMPREY MAY NOT BE NECESSARY IF TEMPERATURES SUPPORT SURVIVAL IN SEDIMENTS.
5. SALVAGE LAMPREY BY ELECTROFISHING (SEE ELECTROFISHING FOR LARVAL LAMPREY SETTINGS AND LARVAL LAMPREY DRY SHOCKING SETTINGS).
6. SALVAGE BONY FISH AFTER LAMPREY WITH NETS OR ELECTROFISHING (SEE ELECTROFISHING FOR APPROPRIATE SETTINGS).
7. REGULARLY INSPECT DEWATERED SITE SINCE LAMPREY LIKELY TO EMERGE AFTER DEWATERING.

3. ELECTROFISHING.

A. INITIAL SITE SURVEY AND INITIAL SETTINGS.

1. IDENTIFY SPAWNING ADULTS AND ACTIVE REDDS TO AVOID.
2. RECORD WATER TEMPERATURE. ELECTROFISHING WILL NOT OCCUR WHEN WATER TEMPERATURES ARE ABOVE 18 DEGREES CELSIUS.
3. IF POSSIBLE, A BLOCK NET WILL BE PLACED DOWNSTREAM AND CHECKED REGULARLY TO CAPTURE STUNNED FISH THAT DRIFT DOWNSTREAM.
4. INITIAL SETTINGS WILL BE 100 VOLTS, PULSE WIDTH OF 500 MICRO SECONDS, AND PULSE RATE OF 30 HERTZ.
5. RECORDS FOR CONDUCTIVITY, WATER TEMPERATURE, AIR TEMPERATURE, ELECTROFISHING SETTINGS, ELECTROFISHER MODEL, ELECTROFISHER CALIBRATION, FISH CONDITIONS, FISH MORTALITIES, AND TOTAL CAPTURE RATES WILL BE INCLUDED IN THE SALVAGE LOG BOOK.

B. ELECTROFISHING TECHNIQUE.

1. SAMPLING WILL BEGIN USING STRAIGHT DC. POWER WILL REMAIN ON UNTIL THE FISH IS NETTED WHEN USING STRAIGHT DC. GRADUALLY INCREASE VOLTAGE WHILE REMAINING BELOW MAXIMUM LEVELS.
2. MAXIMUM VOLTAGE WILL BE 1100 VOLTS WHEN CONDUCTIVITY IS <100 MILLISECONDS, 800 VOLTS WHEN CONDUCTIVITY IS BETWEEN 100 AND 300 MILLISECONDS, AND 400 VOLTS WHEN CONDUCTIVITY IS >300 MILLISECONDS.
3. IF FISH CAPTURE IS NOT SUCCESSFUL USING STRAIGHT DC, THE ELECTROFISHER WILL BE SET TO INITIAL VOLTAGE FOR PDC. VOLTAGE, PULSE WIDTH, AND PULSE FREQUENCY WILL BE GRADUALLY INCREASED WITHIN MAXIMUM VALUES UNTIL CAPTURE IS SUCCESSFUL.
4. MAXIMUM PULSE WIDTH IS 5 MILLISECONDS. MAXIMUM PULSE RATE IS 70 HERTZ
5. ELECTROFISHING WILL NOT OCCUR IN ONE AREA FOR AN EXTENDED PERIOD.
6. THE ANODE WILL NOT INTENTIONALLY COME INTO CONTACT WITH FISH. THE ZONE FOR POTENTIAL INJURY OF 0.5 M FROM THE ANODE WILL BE AVOIDED.
7. SETTINGS WILL BE LOWERED IN SHALLOWER WATER SINCE VOLTAGE GRADIENTS LIKELY TO INCREASE.
8. ELECTROFISHING WILL NOT OCCUR IN TURBID WATER WHERE VISIBILITY IS POOR (I.E. UNABLE TO SEE THE BED OF THE STREAM).
9. OPERATIONS WILL IMMEDIATELY STOP IF MORTALITY OR OBVIOUS FISH INJURY IS OBSERVED. ELECTROFISHING SETTINGS WILL BE REEVALUATED.

C. SAMPLE PROCESSING.

1. FISH SHALL BE SORTED BY SIZE TO AVOID PREDATION DURING CONTAINMENT.
2. SAMPLERS WILL REGULARLY CHECK CONDITIONS OF FISH HOLDING CONTAINERS, AIR PUMPS, WATER TRANSFERS, ETC.
3. FISH WILL BE OBSERVED FOR GENERAL CONDITIONS AND INJURIES
4. EACH FISH WILL BE COMPLETELY REVIVED BEFORE RELEASE. ESA-LISTED SPECIES WILL BE PRIORITIZED FOR SUCCESSFUL RELEASE.

D. BULL TROUT ELECTROFISHING.

1. ELECTROFISHING FOR BULL TROUT WILL ONLY OCCUR FROM MAY 1 TO JULY 31. NO ELECTROFISHING WILL OCCUR IN ANY BULL TROUT OCCUPIED HABITAT AFTER AUGUST 15. IN FMO HABITATS ELECTROFISHING MAY OCCUR ANY TIME.
2. ELECTROFISHING OF BULL TROUT WILL NOT OCCUR WHEN WATER TEMPERATURES EXCEED 15 DEGREES CELSIUS.

E. LARVAL LAMPREY ELECTROFISHING.

1. PERMISSION FROM EC LEAD WILL BE OBTAINED IF LARVAL LAMPREY ELECTROFISHER IS NOT ONE OF FOLLOWING PRE-APPROVED MODELS: ABP-2 "WISCONSIN", SMITH-ROOT LR-24, OR SMITH-ROOT APEX BACKPACK.
2. LARVAL LAMPREY SAMPLING WILL INCORPORATE 2-STAGE METHOD: "TICKLE" AND "STUN".
3. FIRST STAGE: USE 125 VOLT DC WITH A 25 PERCENT DUTY CYCLE APPLIED AT A SLOW RATE OF 3 PULSES PER SECOND. IF TEMPERATURES ARE BELOW 10 DEGREES CELSIUS, VOLTAGE MAY BE INCREASED GRADUALLY (NOT TO EXCEED 200 VOLTS). BURSTED PULSES (THREE SLOW AND ONE SKIPPED) RECOMMENDED TO INCREASE EMERGENCE.
4. SECOND STAGE (OPTIONAL FOR EXPERIENCED NETTERS): IMMEDIATELY AFTER LAMPREY EMERGE, USE A FAST PULSE SETTING OF 30 PULSES PER SECOND.
5. USE DIP NETS FOR VISIBLE LAMPREY. SIENES AND FINE MESH NET SWEEPS MAY BE USED IN POOR VISIBILITY.
6. SAMPLING WILL OCCUR SLOWLY (>60 SECONDS PER METER) STARTING AT UPSTREAM AND WORKING DOWNSTREAM.
7. MULTIPLE SWEEPS TO OCCUR WITH 15 MINUTES BETWEEN SWEEPS.
8. POST-DRAWDOWN "DRY-SHOCKING" WILL BE APPLIED IF LARVAL LAMPREY CONTINUE TO EMERGE. ANODES TO BE PLACED ONE METER APART TO SAMPLE ONE SQUARE METER AT A TIME FOR AT LEAST 60 SECONDS. FOR TEMPERATURES LESS THAN 10 DEGREES CELSIUS, MAXIMUM VOLTAGE MAY BE GRADUALLY INCREASED TO 400 VOLTS (DRY-SHOCKING ONLY).

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 20 16
JEREMY S. ANDREWS
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YAKAMA - WALLA WALLA - UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
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PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

GENERAL NOTES - HIP IV
CONSERVATION METHODS

DWG. NO.: G-204
CREATED: 1/19/26
SHEET: 4 of 50

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PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:29 PM

WORK AREA ISOLATION AND FISH SALVAGE (CONTINUED).

4. DEWATERING.

A. DEWATERING WILL OCCUR AT A RATE SLOW ENOUGH TO ALLOW SPECIES TO NATURALLY MIGRATE OUT OF THE WORK AREA.

B. WHERE A GRAVITY FEED DIVERSION IS NOT POSSIBLE, A PUMP MAY BE USED. PUMPS WILL BE INSTALLED TO AVOID REPETITIVE DEWATERING AND REWATERING.

C. WHEN FISH ARE PRESENT, PUMPS WILL BE SCREENED IN ACCORDANCE WITH NMFS FISH SCREEN CRITERIA. NMFS ENGINEERING REVIEW AND APPROVAL WILL BE OBTAINED FOR PUMPS EXCEEDING 3 CUBIC FEET PER SECOND.

D. DISSIPATION OF FLOW ENERGY AT THE BYPASS OUTFLOW WILL BE PROVIDED TO PREVENT DAMAGE TO THE STREAM CHANNEL AND RIPARIAN VEGETATION.

E. SEEPAGE WATER WILL BE PUMPED TO A TEMPORARY STORAGE AND TREATMENT SITE INTO UPLAND AREAS TO ALLOW WATER TO PERCOLATE THROUGH SOIL AND VEGETATION PRIOR TO REENTERING THE STREAM CHANNEL.

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES.

1. FISH PASSAGE.

A. FISH PASSAGE WILL BE PROVIDED FOR ADULT AND JUVENILE FISH LIKELY TO BE PRESENT DURING CONSTRUCTION UNLESS PASSAGE DID NOT EXIST BEFORE CONSTRUCTION, THE STREAM IS NATURALLY IMPASSABLE, OR PASSAGE WILL NEGATIVELY IMPACT ESA-LISTED SPECIES OR THEIR HABITAT.

B. FISH PASSAGE ALTERNATIVES WILL BE APPROVED BY THE BPA EC LEAD UNDER ADVISEMENT BY THE NMFS HABITAT BIOLOGIST.

2. CONSTRUCTION AND DISCHARGE WATER.

A. SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE.

B. DIVERSIONS WILL NOT EXCEED 10% OF THE AVAILABLE FLOW.

C. CONSTRUCTION DISCHARGE WATER WILL BE COLLECTED AND TREATED TO REMOVE DEBRIS, NUTRIENTS, SEDIMENT, PETROLEUM HYDROCARBONS, METALS, AND OTHER POLLUTANTS.

3. TIME AND EXTENT OF DISTURBANCE.

A. EARTHWORK REQUIRING IN-STREAM MECHANIZED EQUIPMENT (INCLUDING DRILLING, EXCAVATION, DREDGING, FILLING, AND COMPACTING) WILL BE COMPLETED AS QUICKLY AS POSSIBLE.

B. MECHANIZED EQUIPMENT WILL WORK FROM TOP OF BANK UNLESS WORK FROM ANOTHER LOCATION WILL RESULT IN LESS HABITAT DISTURBANCE (TURBIDITY, VEGETATION DISTURBANCE, ETC.).

4. CESSATION OF WORK.

A. PROJECT OPERATIONS WILL CEASE WHEN HIGH FLOW CONDITIONS MAY RESULT IN INUNDATION OF THE PROJECT AREA (FLOOD EFFORTS TO DECREASE DAMAGES TO NATURAL RESOURCES PERMITTED).

B. WATER QUALITY LEVELS EXCEEDED. SEE CWA SECTION 401 WATER QUALITY CERTIFICATION AND TURBIDITY MEASURES.

5. SITE RESTORATION.

A. DISTURBED AREAS, STREAM BANKS, SOILS, AND VEGETATION WILL BE CLEANED UP AND RESTORED TO IMPROVED OR PRE-PROJECT CONDITIONS.

B. PROJECT-RELATED WASTE WILL BE REMOVED.

C. TEMPORARY ACCESS ROADS AND STAGING WILL BE DECOMPACTED AND RESTORED. SOILS WILL BE LOOSENED IF NEEDED FOR REVEGETATION OR WATER INFILTRATION.

D. THE PROJECT SPONSOR WILL RETAIN THE RIGHT OF REASONABLE ACCESS TO THE SITE TO MONITOR AND MAINTAIN THE SITE OVER THE LIFE OF THE PROJECT.

6. REVEGETATION.

A. PLANTING AND SEEDING WILL OCCUR PRIOR TO OR AT THE BEGINNING OF THE FIRST GROWING SEASON AFTER CONSTRUCTION.

B. A MIX OF NATIVE SPECIES (INVASIVE SPECIES NOT ALLOWED) APPROPRIATE TO THE SITE WILL BE USED TO REESTABLISH VEGETATION, PROVIDE SHADE, AND REDUCE EROSION. REESTABLISHED VEGETATION SHOULD BE AT LEAST 70% OF PRE-PROJECT CONDITIONS WITHIN THREE YEARS.

C. VEGETATION SUCH AS WILLOWS, SEDGES, OR RUSH MATS WILL BE SALVAGED FROM DISTURBED OR ABANDONED AREAS TO BE REPLANTED.

D. SHORT-TERM STABILIZATION MEASURE MAY INCLUDE THE USE OF NON-NATIVE STERILE SEED MIX (WHEN NATIVE NOT AVAILABLE), WEED-FREE CERTIFIED STRAW, OR OTHER SIMILAR TECHNIQUES.

E. SURFACE FERTILIZER WILL NOT BE APPLIED WITHIN 50 FEET OF ANY STREAM, WATER BODY, OR WETLAND.

F. FENCING WILL BE INSTALLED AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.

G. INVASIVE PLANTS WILL BE REMOVED OR CONTROLLED UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED (TYPICALLY THREE YEARS POST-CONSTRUCTION).

7. SITE ACCESS AND IMPLEMENTATION MONITORING.

A. THE PROJECT SPONSOR WILL PROVIDE CONSTRUCTION MONITORING DURING IMPLEMENTATION TO ENSURE ALL CONSERVATION MEASURES ARE ADEQUATELY FOLLOWED, EFFECTS TO LISTED SPECIES ARE NOT GREATER THAN PREDICTED, AND INCIDENTAL TAKE LIMITATIONS ARE NOT EXCEEDED.

B. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL SUBMIT THE (PCF) WITHIN 30 DAYS OF PROJECT COMPLETION.

8. CWA SECTION 401 WATER QUALITY CERTIFICATION.

A. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL COMPLETE AND RECORD WATER QUALITY OBSERVATIONS (SEE TURBIDITY MONITORING) TO ENSURE IN-WATER WORK IS NOT DEGRADING WATER QUALITY.

B. DURING CONSTRUCTION, APPROPRIATE STATE WATER QUALITY PROVISIONS PROVIDED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, WASHINGTON DEPARTMENT OF ECOLOGY, AND IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY WILL BE FOLLOWED.

STAGED REWATERING PLAN.

A. WHEN REINTRODUCING WATER TO DEWATERED AREAS AND NEWLY CONSTRUCTED CHANNELS, A STAGED REWATERING PLAN WILL BE APPLIED.

B. THE FOLLOWING WILL BE APPLIED TO ALL REWATERING EFFORTS. COMPLEX REWATERING EFFORTS MAY REQUIRE ADDITIONAL NOTES OR A DEDICATED SHEET IN THE CONSTRUCTION DETAILS.

1. TURBIDITY MONITORING PROTOCOL WILL BE APPLIED TO REWATERING EFFORTS.
2. PRE-WASH THE AREA BEFORE REWATERING. TURBID WASH WATER WILL BE DETAINED AND PUMPED TO THE FLOODPLAIN OR SEDIMENT CAPTURE AREAS RATHER THAN DISCHARGING TO FISH-BEARING STREAMS.
3. INSTALL SEINE NETS AT UPSTREAM END TO PREVENT FISH FROM MOVING DOWNSTREAM UNTIL 2/3 OF TOTAL FLOW IS RESTORED TO THE CHANNEL.
4. STARTING IN EARLY MORNING INTRODUCE 1/3 OF NEW CHANNEL FLOW OVER PERIOD OF 1-2 HOURS.
5. INTRODUCE SECOND THIRD OF FLOW OVER NEXT 1 TO 2 HOURS AND BEGIN FISH SALVAGE OF BYPASS CHANNEL IF FISH ARE PRESENT.
6. REMOVE UPSTREAM SEINE NETS ONCE 2/3 FLOW IN REWATERED CHANNEL AND DOWNSTREAM TURBIDITY IS WITHIN ACCEPTABLE RANGE (LESS THAN 40 NTU OR LESS THAN 10% BACKGROUND).
7. INTRODUCE FINAL THIRD OF FLOW ONCE FISH SALVAGE EFFORTS ARE COMPLETE AND DOWNSTREAM TURBIDITY VERIFIED TO BE WITHIN ACCEPTABLE RANGE.
8. INSTALL PLUG TO BLOCK FLOW INTO OLD CHANNEL OR BYPASS. REMOVE ANY REMAINING SEINE NETS.
9. IN LAMPREY SYSTEMS, LAMPREY SALVAGE AND DRY SHOCKING MAY BE NECESSARY.

TURBIDITY MONITORING.

A. RECORD THE READING, LOCATION, AND TIME FOR THE BACKGROUND READING APPROXIMATELY 100 FEET UPSTREAM OF THE PROJECT AREA USING A RECENTLY CALIBRATED TURBIDIMETER OR VIA VISUAL OBSERVATION (SEE THE HIP HANDBOOK TURBIDITY MONITORING SECTION FOR A VISUAL OBSERVATION KEY).

B. RECORD THE TURBIDITY READING, LOCATION, AND TIME AT THE MEASUREMENT COMPLIANCE LOCATION POINT.

1. 50 FEET DOWNSTREAM FOR STREAMS LESS THAN 30 FEET WIDE.
2. 100 FEET DOWNSTREAM FOR STREAMS BETWEEN 30 AND 100 FEET WIDE.
3. 200 FEET DOWNSTREAM FOR STREAMS GREATER THAN 100 FEET WIDE.
4. 300 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR LOCATIONS SUBJECT TO TIDAL OR COASTAL SCOUR.

C. TURBIDITY SHALL BE MEASURED (BACKGROUND LOCATION AND COMPLIANCE POINTS) EVERY 4 HOURS WHILE WORK IS BEING IMPLEMENTED.

D. IF THERE IS A VISIBLE DIFFERENCE BETWEEN A COMPLIANCE POINT AND THE BACKGROUND, THE EXCEEDANCE WILL BE NOTED IN THE PCF. ADJUSTMENTS OR CORRECTIVE MEASURES WILL BE TAKEN IN ORDER TO REDUCE TURBIDITY.

E. IF EXCEEDANCES OCCUR FOR MORE THAN TWO CONSECUTIVE MONITORING INTERVALS (AFTER 8 HOURS), THE ACTIVITY WILL STOP UNTIL THE TURBIDITY LEVEL RETURNS TO BACKGROUND. THE BPA EC LEAD WILL BE NOTIFIED OF ALL EXCEEDANCES AND CORRECTIVE ACTIONS AT PROJECT COMPLETION.

F. IF TURBIDITY CONTROLS (COFFER DAMS, WADDLES, FENCING, ETC.) ARE DETERMINED INEFFECTIVE, CREWS WILL BE MOBILIZED TO MODIFY AS NECESSARY. OCCURRENCES WILL BE DOCUMENTED IN THE PCF.

G. FINAL TURBIDITY READINGS, EXCEEDANCES, AND CONTROL FAILURES WILL BE SUBMITTED TO THE BPA EC LEAD USING PCF.

TETRA TECH
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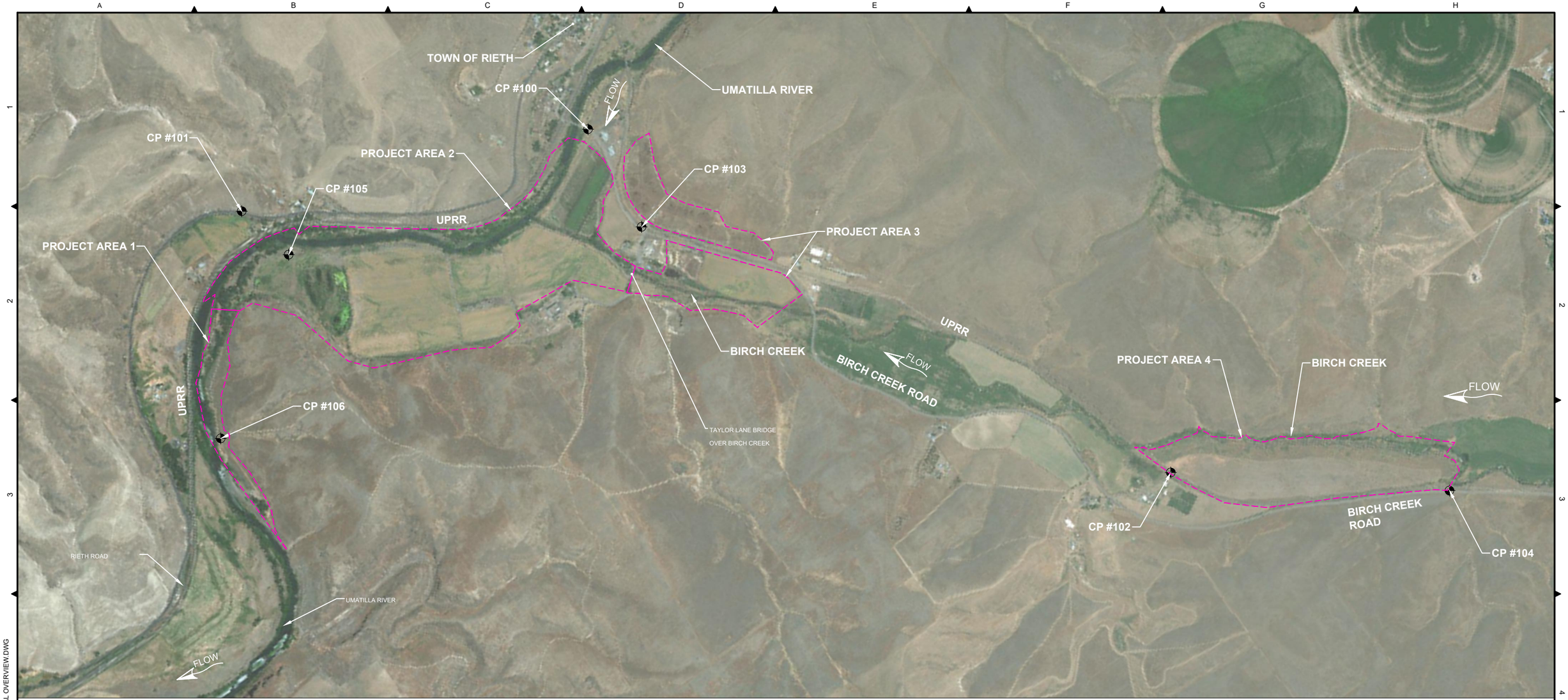
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

GENERAL NOTES - HIP IV
CONSERVATION METHODS

DWG. NO.: G-205
CREATED: 1/19/26
SHEET: 5 of 50



CONTROL POINTS TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	729832.28	8617228.00	967.4	
101	731598.17	8612789.10	964.4	
102	721572.08	8620994.98	1035.4	DESTROYED
103	728346.97	8617064.95	985.3	
104	719227.39	8623920.51	1083.9	
105	730758.89	8612971.30	943.7	
106	729262.42	8610809.93	945.5	

0 1300' 2600'

LEGEND
- PROJECT AREA BOUNDARY
- CONTROL POINT (CP #XXX)

NOTES:
1. OVERVIEW OF ALL PROJECT AREAS.

TETRA TECH
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19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL. 12, 2026
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

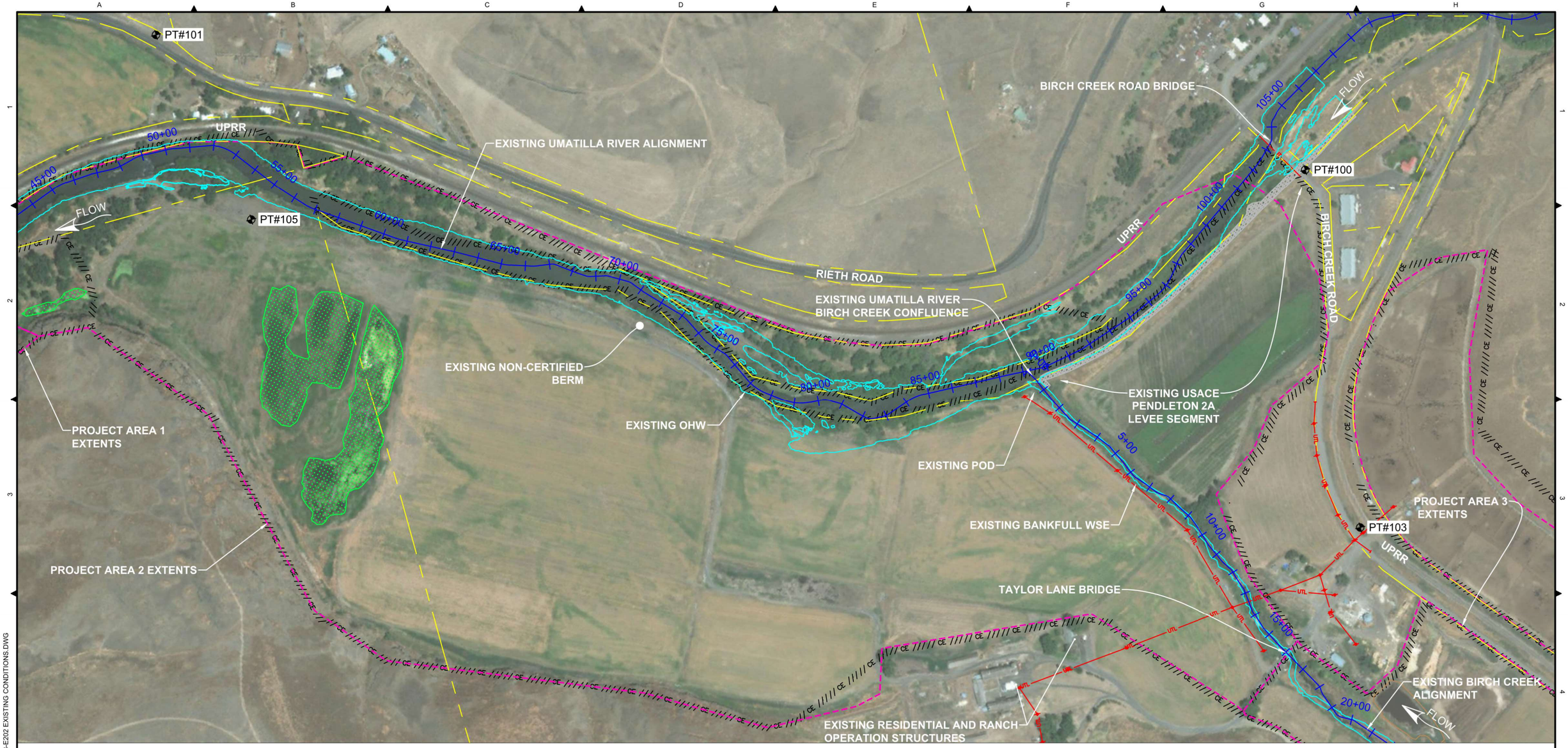
REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

GENERAL OVERVIEW

DWG. NO.: E-201
CREATED: 1/19/26
SHEET: 6 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\02-E201 GENERAL OVERVIEW.DWG
PLOT DETAILS: SINKS, NATHAN January 7, 2026 2:51 PM



0' 200' 400' 800'

LEGEND
- EXISTING CHANNEL ALIGNMENT
- PROPERTY BOUNDARY
- EXISTING OHW
- EXISTING WETLAND
- EXISTING LEVEE
- // CE // CONSERVATION EASEMENT BOUNDARY
- PROJECT AREA BOUNDARY
- EXISTING UTILITIES
- PT# SURVEY CONTROL POINT

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www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL 12 2016 JEREMY S. ANDREWS EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

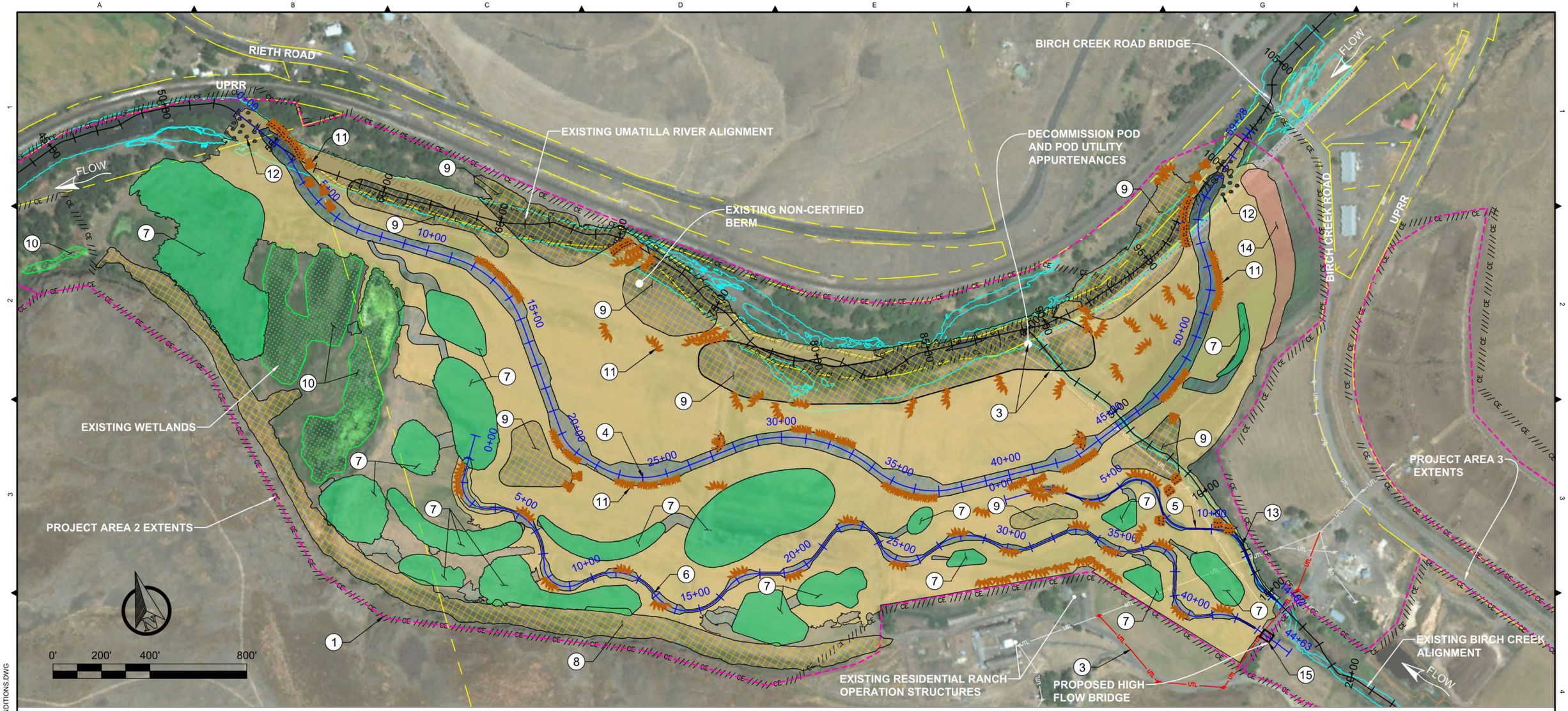
EXISTING CONDITIONS OVERVIEW

DWG. NO.: E-202

CREATED: 1/19/26

SHEET: 7 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\03-E202 EXISTING CONDITIONS.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 5:14 PM



LEGEND

- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- POWER POLE
- POWER/COMM UTILITY
- CONSERVATION EASEMENT BOUNDARY
- PROJECT AREA BOUNDARY
- EXISTING WETLAND
- PROPOSED POWER POLE
- PROPOSED POWER/COMM UTILITY
- PROPOSED ALIGNMENT
- PROPOSED SETBACK LEVEE
- PROPOSED FLOODPLAIN BENCHING
- PROPOSED FLOODPLAIN TERRACE
- PROPOSED CHANNEL
- PROPOSED WETLAND
- PROPOSED HABITAT BOULDER
- PROPOSED LWM

NOTES:

1. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
2. SEE SHEETS C-204 - C-205 FOR PROPOSED BYPASS SEQUENCING PLAN.
3. PROPOSED POD AND UTILITY DECOMMISSION - SEE SHEET C-203.
4. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
5. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
6. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
7. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
8. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.
9. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
10. PRESERVE AND PROTECT EXISTING WETLANDS.
11. PROPOSED LARGE WOODY MATERIAL. SEE SHEETS C-261 - C-267 FOR DETAILS.
12. INSTALL HABITAT BOULDERS PER DETAIL ON SHEET C-271.
13. PRESERVE AND PROTECT EXISTING FISH TRAP DURING CONSTRUCTION. IF NECESSARY TO TEMPORARILY MOVE OR MODIFY TRAP TO ACCOMMODATE CONSTRUCTION, COORDINATE ADJUSTMENTS WITH OWNER OR OWNER'S REPRESENTATIVE.
14. PROPOSED LEVEE REMOVAL AND SETBACK LEVEE PER SEPARATE LEVEE SETBACK PROJECT. SEE LEVEE SETBACK PROJECT 100% DESIGN DRAWINGS FOR DETAILS.
15. PROPOSED HIGH FLOW FLOOD RELIEF BRIDGE PER SEPARATE UMABIRCH PROJECT AREA 3 PROJECT. SEE PROJECT AREA 3 100% DESIGN DRAWINGS FOR DETAILS.

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www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

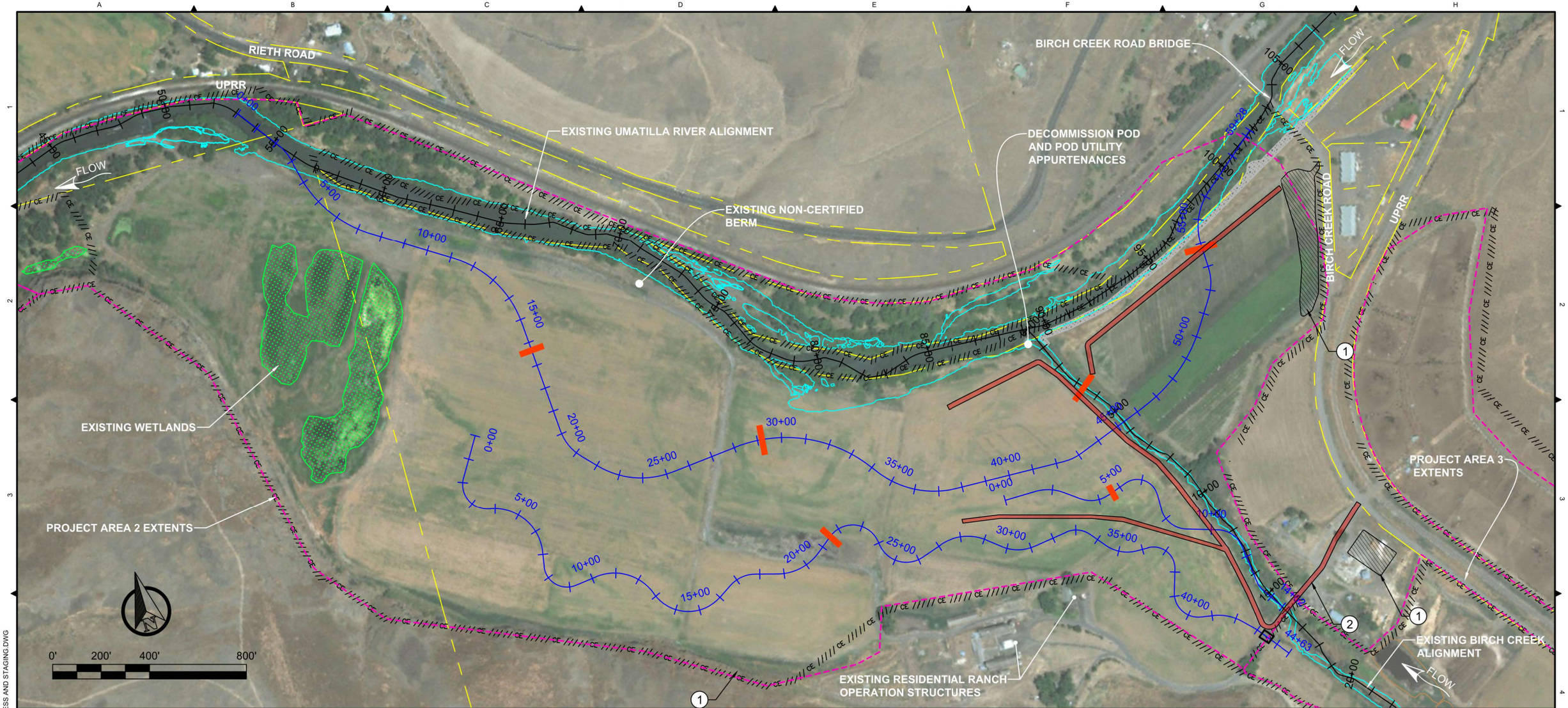
PROPOSED CONDITIONS OVERVIEW

DWG. NO.: C-201

CREATED: 1/19/26

SHEET: 8 of 50

Z:\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\04-C201 PROPOSED CONDITIONS.DWG
PLOT DETAILS: KHALAF, ADAM January 27, 2026 1:56 PM



LEGEND

- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- // CE // CONSERVATION EASEMENT BOUNDARY
- PROJECT AREA BOUNDARY
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED STAGING AREA
- PROPOSED ACCESS ROUTE
- PROPOSED TEMPORARY BRIDGE/CROSSING

NOTES:

1. PROPOSED TEMPORARY STAGING AREA.
2. PROPOSED ACCESS ROUTE TO SITE. MAINTAIN ROAD ACCESS TO ADJACENT RESIDENTS AND PROPERTY OWNERS.

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19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL. 12, 2016
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

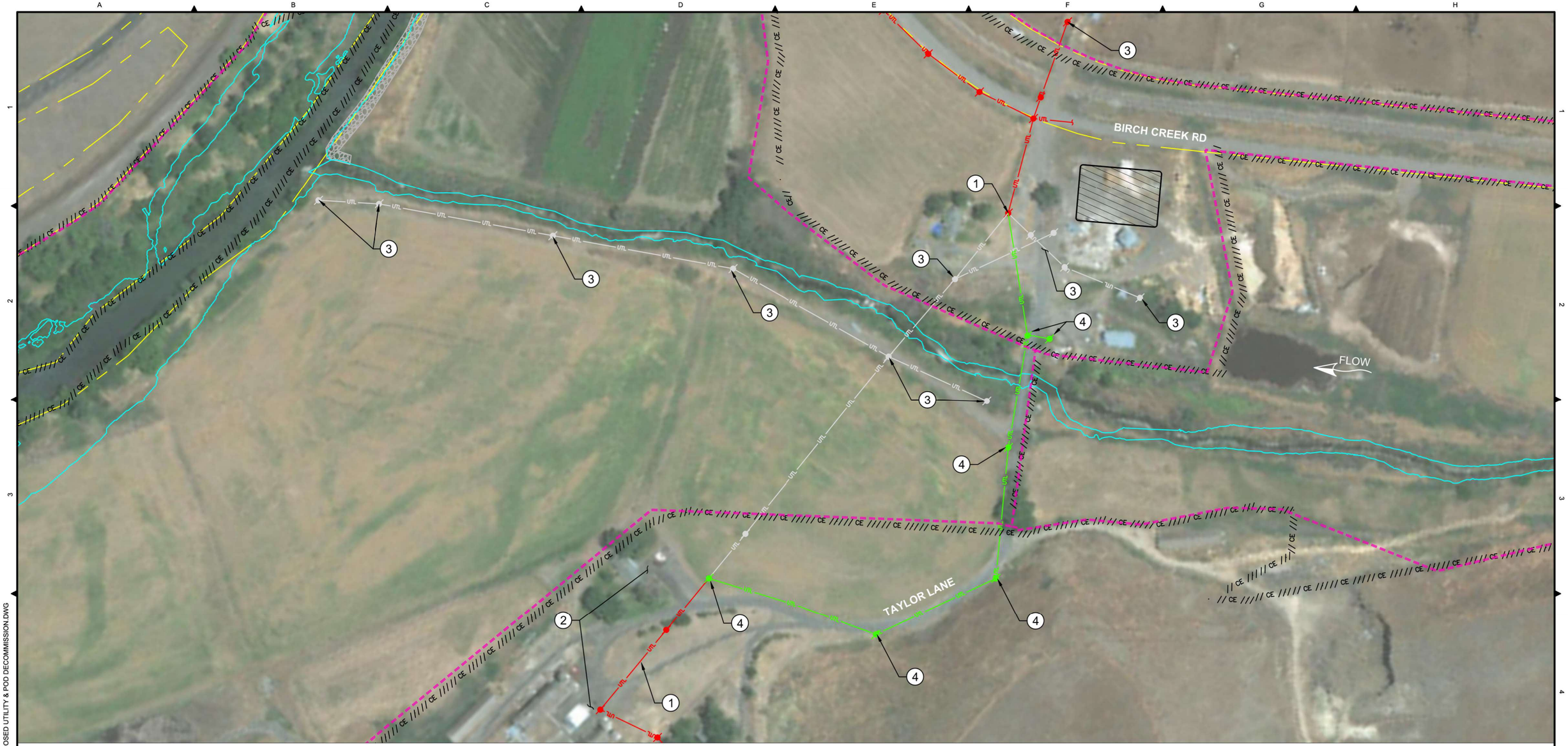
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED ACCESS & STAGING

DWG. NO.: C-202
CREATED: 1/19/26
SHEET: 9 of 50

Z:\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\04-C202 PROPOSED ACCESS AND STAGING.DWG
PLOT DETAILS: KHALAF, ADAM January 27, 2026 1:54 PM



0' 100' 200' 400'

LEGEND

- EXISTING PROPERTY LINE
- EXISTING OHW
- // CE // CONSERVATION EASEMENT BOUNDARY
- EXISTING POWER POLE
- EXISTING POWER/COMM UTILITY
- EXISTING POWER POLES REMOVED
- EXISTING POWER/COMM UTILITY REMOVED
- PROPOSED POWER POLE
- PROPOSED POWER/COMM UTILITY
- PROJECT AREA BOUNDARY
- PROPOSED STAGING AREA

NOTES

1. PRESERVE AND PROTECT EXISTING UTILITY LINES AND STRUCTURES.
2. EXISTING RESIDENTIAL RANCH OPERATION STRUCTURES.
3. UTILITY COMPANY TO DECOMMISSION AND REMOVE EXISTING POD AND ASSOCIATED OVERHEAD POWER LINES AND POLES; CONTRACTOR NOT RESPONSIBLE FOR UTILITY REMOVAL.
4. UTILITY COMPANY TO INSTALL PROPOSED UTILITY INFRASTRUCTURE; CONTRACTOR NOT RESPONSIBLE FOR UTILITY INSTALLATION.

TETRA TECH
www.tetratech.com
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Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JULY 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

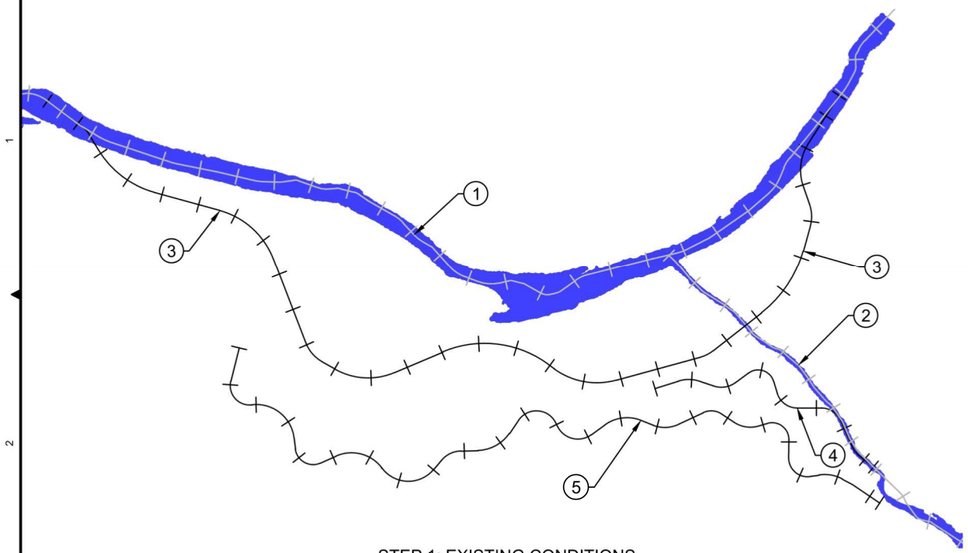
PROPOSED POD & UTILITY DECOMMISION PLAN

DWG. NO.: C-203

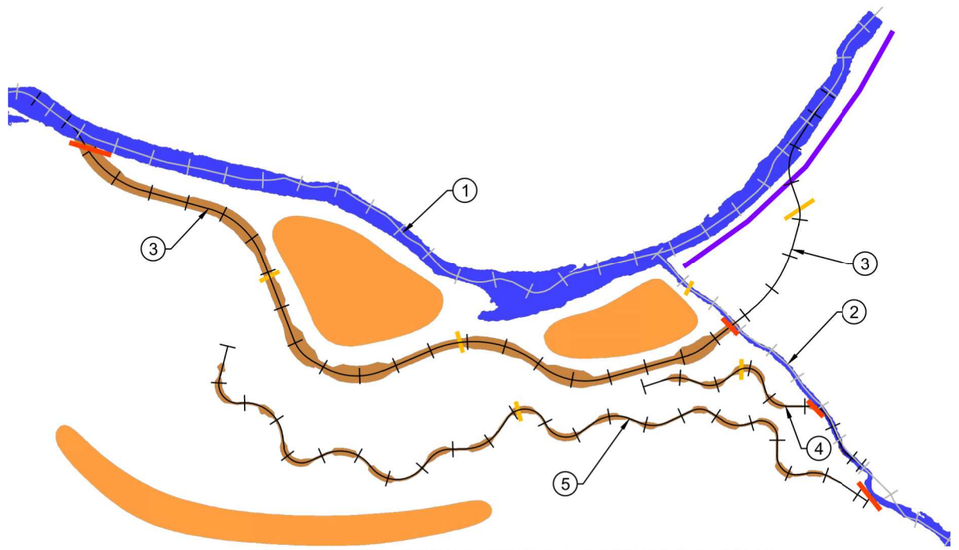
CREATED: 1/19/26

SHEET: 10 of 50

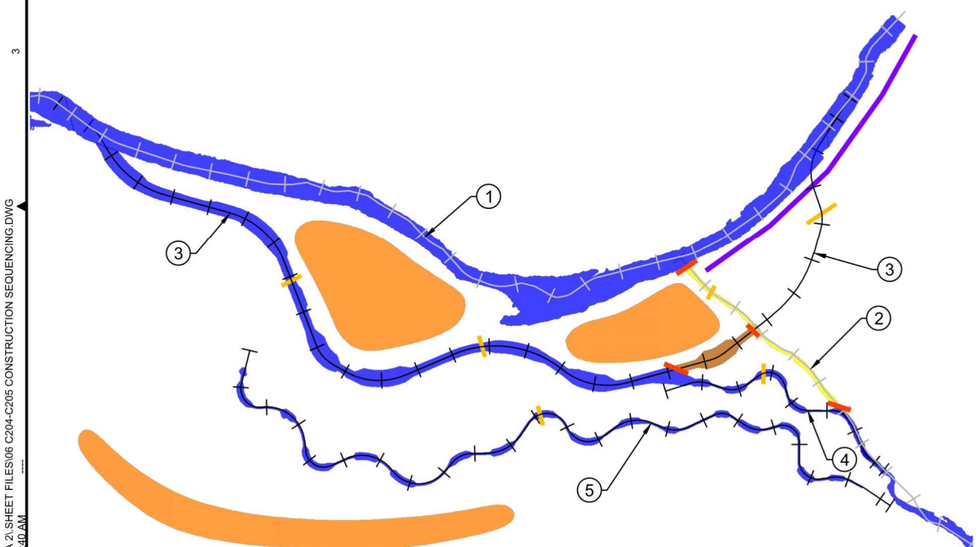
Z:\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\05-C203 PROPOSED UTILITY & POD DECOMMISSION.DWG
PLOT DETAILS: KHALAF, ADAM January 27, 2026 1:53 PM



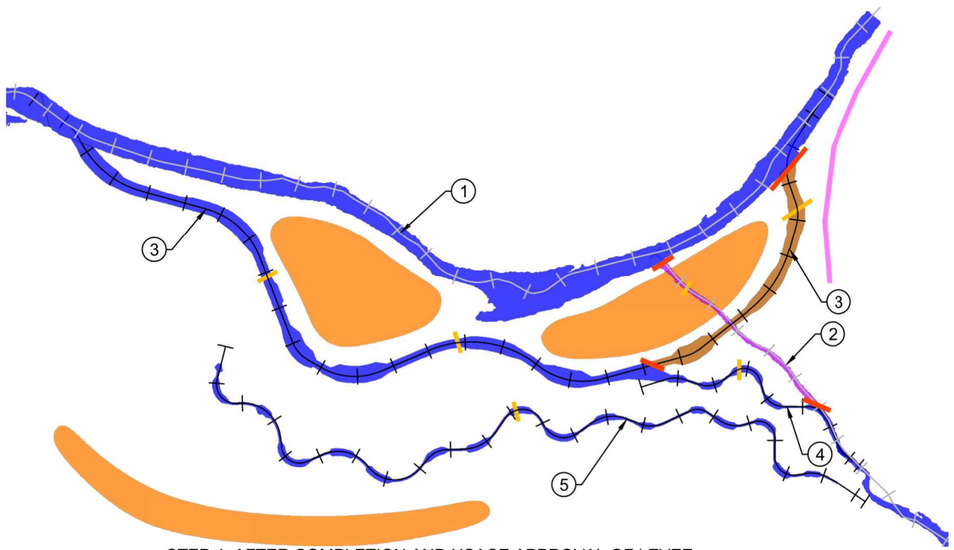
STEP 1: EXISTING CONDITIONS



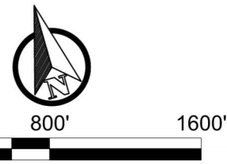
STEP 2: CONSTRUCT NEW CHANNELS. CONSTRUCT FLOODPLAIN FEATURES ON SOUTH SIDE OF NEW UMATILLA RIVER CHANNEL WORK DOWNSTREAM TO UPSTREAM IN THE DRY. STOCKPILE EXCAVATED MATERIAL IN FLOODPLAIN.



STEP 3: DURING IN-WATER WORK WINDOW, DIVERT BIRCH CREEK INTO NEW CHANNEL AND DISTRIBUTARY CHANNEL. ISOLATE THE EXISTING BIRCH CREEK CHANNEL PER FISH SALVAGE, DEWATERING, AND REWATERING DETAILS (SHEET C-281). NUMBER AND LOCATION OF DEWATERING SEGMENTS TO BE COORDINATED IN THE FIELD WITH OWNER'S REPRESENTATIVE. COMPLETE WETLANDS AND FLOODPLAIN FEATURES TO PROVIDE FISH PASSAGE.



STEP 4: AFTER COMPLETION AND USACE APPROVAL OF LEVEE SETBACK PROJECT AND DURING IN-WATER WORK WINDOW, CONSTRUCT NEW UMATILLA RIVER CHANNEL IN THE DRY. FILL THE DEWATERED SEGMENT OF OLD BIRCH CREEK.



LEGEND

- EXISTING ALIGNMENT
- PROPOSED ALIGNMENT
- CHANNEL FLOW
- PROPOSED CHANNEL - DRY
- LIMITED FLOW / DEFISHING
- COMPLETED CHANNEL WITH FILL AND BACKWATER FLOW
- STOCKPILE MATERIAL
- CHANNEL PLUG
- TEMPORARY BRIDGE/CROSSING
- EXISTING LEVEE
- PROPOSED LEVEE SETBACK

NOTES:

1. EXISTING UMATILLA RIVER CHANNEL.
2. EXISTING BIRCH CREEK CHANNEL.
3. PROPOSED UMATILLA RIVER CHANNEL.
4. PROPOSED BIRCH CREEK CHANNEL.
5. PROPOSED DISTRIBUTARY CHANNEL.
6. NUMBER AND LOCATION OF TEMPORARY BRIDGES/CROSSINGS TO BE DETERMINED IN FIELD.
7. CONTRACTOR TO COORDINATE ALL BYPASS SEQUENCING STEPS AND ANY NEEDED INTERMEDIATE ACTIONS WITH OWNER'S REPRESENTATIVE.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2018
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

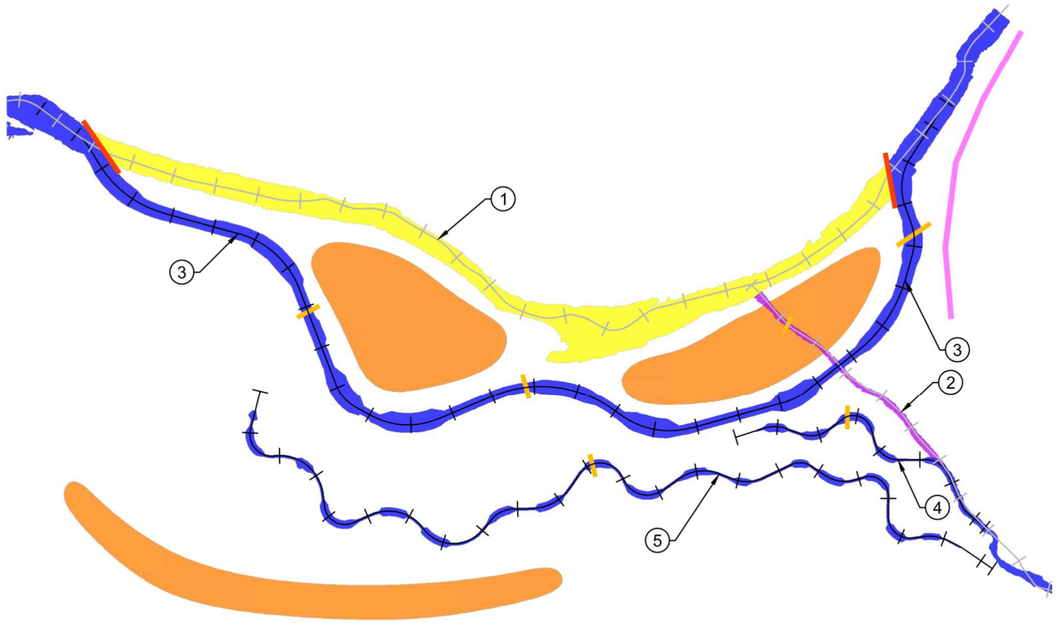
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

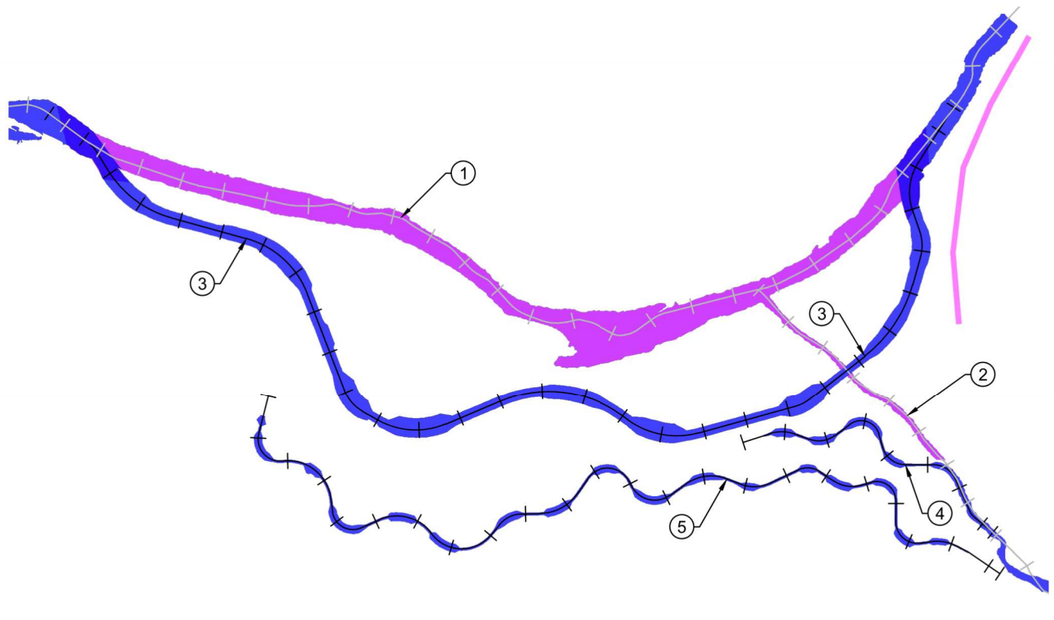
PROPOSED CHANNEL BYPASS SEQUENCING PLAN

DWG. NO.: C-204
CREATED: 1/19/26
SHEET: 11 of 50

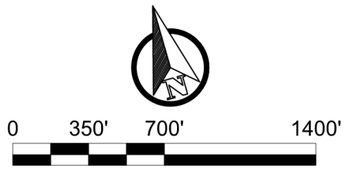
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\06 C204-C205 CONSTRUCTION SEQUENCING.DWG
PLOT DETAILS: SINKS, NATHAN January 14, 2026 9:40 AM



STEPS 5: DURING IN-WATER WORK WINDOW, DIVERT UMATILLA RIVER INTO THE NEW CHANNEL. ISOLATE THE EXISTING UMATILLA RIVER CHANNEL PER THE FISH SALVAGE, DEWATERING, AND REWATERING DETAILS ON SHEET C-281. CONTRACTOR TO WORK FROM DOWNSTREAM TO UPSTREAM. NUMBER AND LOCATION OF DEWATERING SEGMENTS TO BE COORDINATED IN THE FIELD WITH OWNER'S REPRESENTATIVE.



STEP 6: FILL THE DEWATERED SEGMENT OF THE UMATILLA RIVER AND RESTORE BACKWATER FLOW, WORKING DOWNSTREAM TO UPSTREAM. PLACE FILL IN SEGMENTS TO BE COORDINATED IN FIELD WITH OWNER'S REPRESENTATIVE. COMPLETE REMAINING IN-WATER AND FLOODPLAIN CONSTRUCTION TASKS.



LEGEND

- EXISTING ALIGNMENT
- PROPOSED ALIGNMENT
- CHANNEL FLOW
- PROPOSED CHANNEL - DRY
- LIMITED FLOW / DEFISHING
- CHANNEL FILL
- CHANNEL PLUG
- TEMPORARY BRIDGE/CROSSING
- PROPOSED LEVEE SETBACK

NOTES:

1. EXISTING UMATILLA RIVER CHANNEL.
2. EXISTING BIRCH CREEK CHANNEL.
3. PROPOSED UMATILLA RIVER CHANNEL.
4. PROPOSED BIRCH CREEK CHANNEL.
5. PROPOSED DISTRIBUTARY CHANNEL.
6. NUMBER AND LOCATION OF TEMPORARY BRIDGES/CROSSINGS TO BE DETERMINED IN FIELD.

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19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2015
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED CHANNEL BYPASS SEQUENCING PLAN

DWG. NO.: C-205

CREATED: 1/19/26

SHEET: 12 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\06 C204-C205 CONSTRUCTION SEQUENCING.DWG
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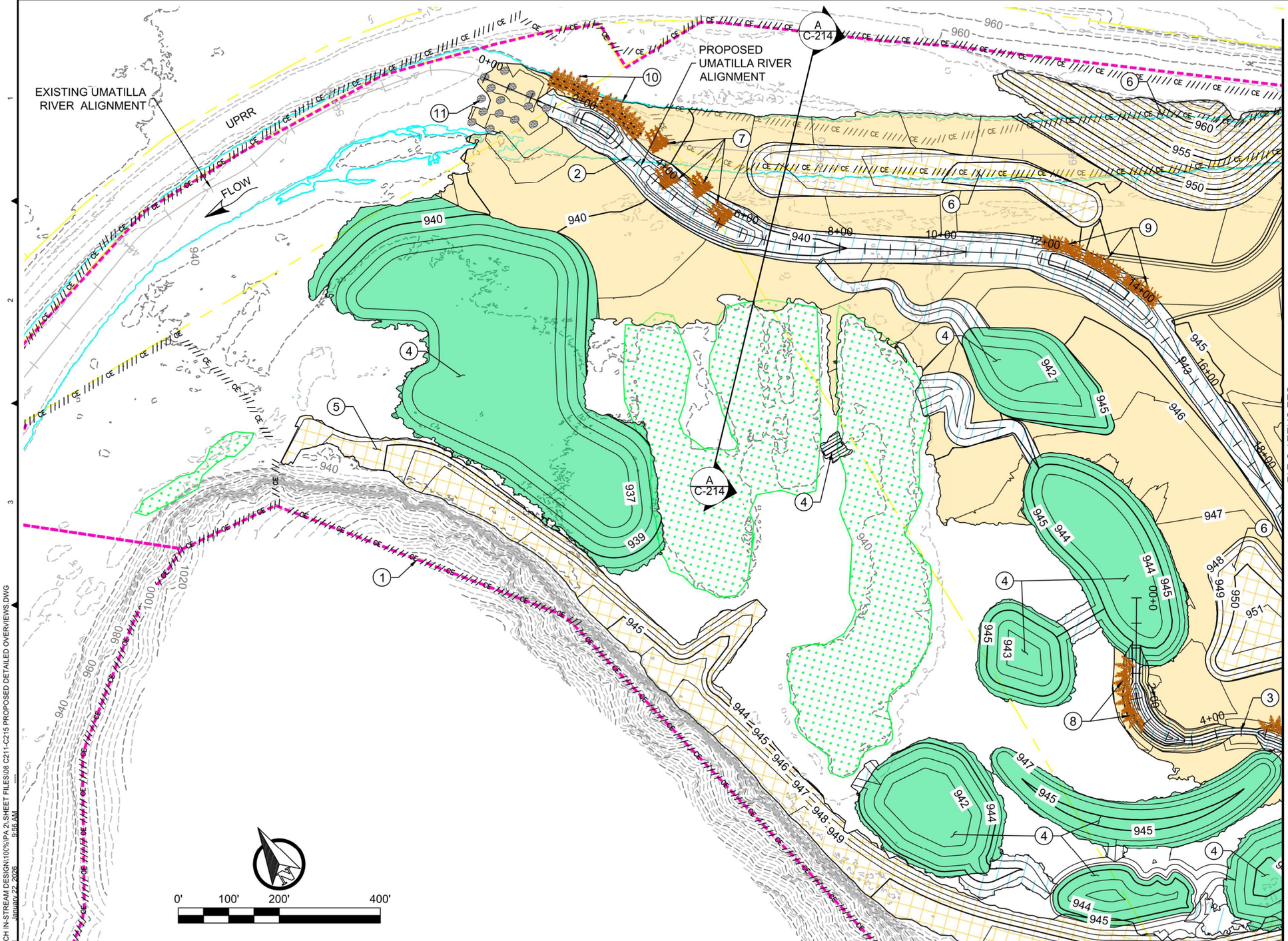

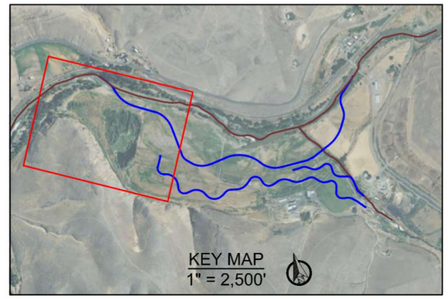

SEE SHEET C-212

LEGEND

- EXISTING 5-FOOT CONTOUR
- EXISTING 20-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- CONSERVATION EASEMENT BOUNDARY
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED FLOODPLAIN BENCHING
- PROPOSED FLOODPLAIN TERRACE
- PROPOSED CHANNEL
- PROPOSED WETLAND
- PROPOSED LWM
- PROPOSED HABITAT BOULDERS

NOTES:

1. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
2. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
3. PROPOSED DISTRIBUTARY CREEK CHANNEL - SEE SHEETS C-225 - C-226.
4. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
5. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.
6. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
7. INSTALL 22-LOG JAM STRUCTURE PER DETAILS ON SHEET C-261.
8. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
9. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
10. INSTALL REVETMENT STRUCTURE PER DETAILS ON SHEETS C-264 - C-265.
11. INSTALL HABITAT BOULDERS PER DETAILS ON SHEET C-271.

TETRA TECH
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OREGON
JEREMY S. ANDREWS
JUL 12 2016
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

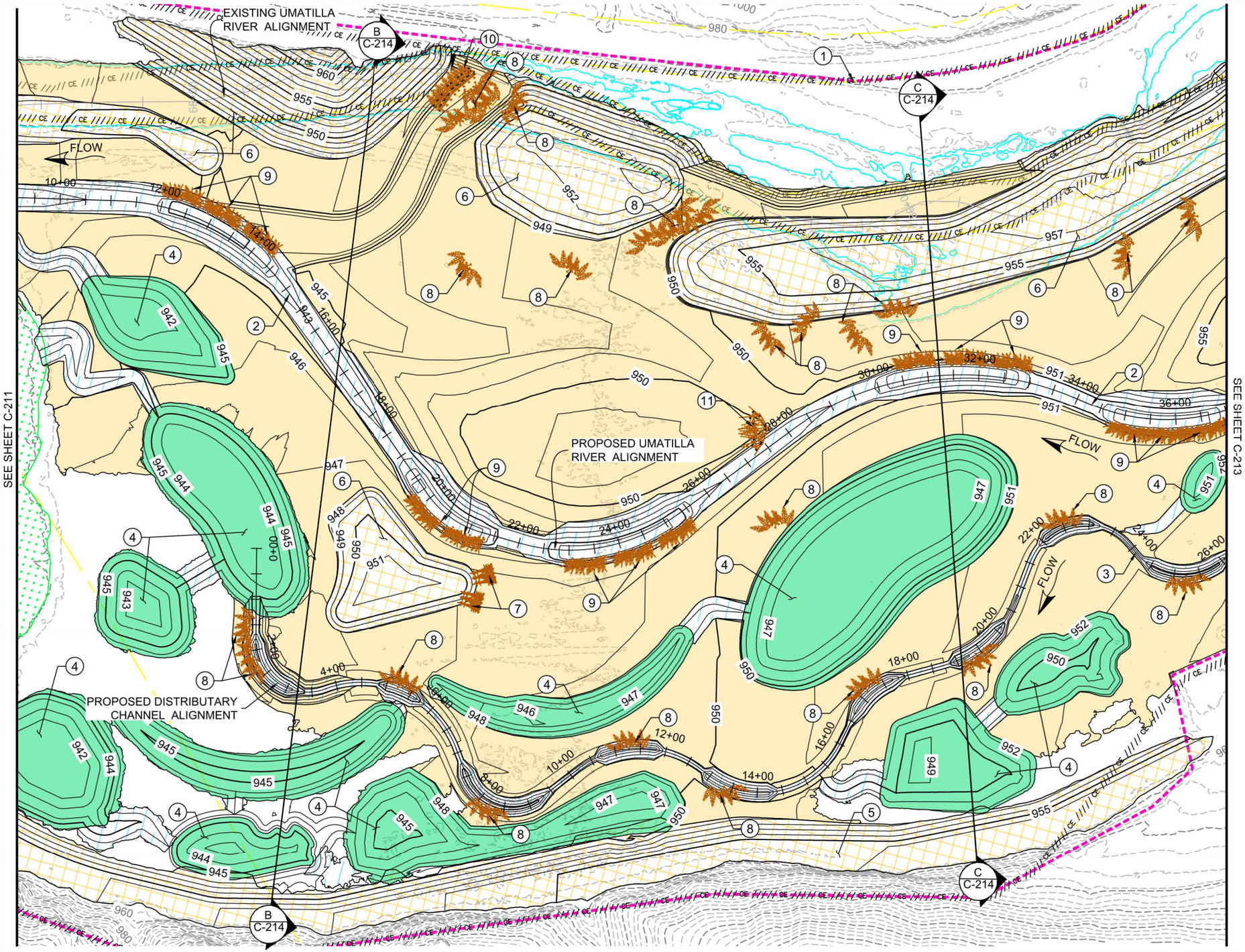
PLAN SHEET SIZE ANSI B (11" X 17")

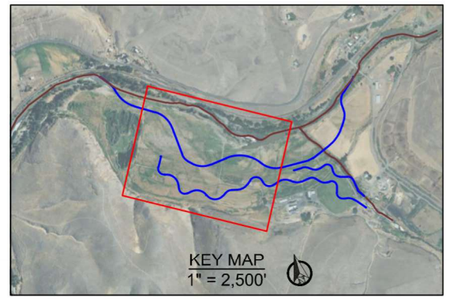
CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED CONDITIONS
DETAILED OVERVIEW

DWG. NO.: C-211
CREATED: 1/19/26
SHEET: 13 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\10%\PA 2\SHEET FILES\08 C211-C215 PROPOSED DETAILED OVERVIEWS.DWG
PLOT DETAILS: SINKS, NATHAN January 22, 2026 9:56 AM





LEGEND

- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- PROJECT AREA BOUNDARY
- CONSERVATION EASEMENT BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED FLOODPLAIN BENCHING
- PROPOSED FLOODPLAIN TERRACE
- PROPOSED CHANNEL
- PROPOSED WETLAND
- PROPOSED LWM

NOTES:

1. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
2. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
3. PROPOSED DISTRIBUTARY CREEK CHANNEL - SEE SHEETS C-225 - C-226.
4. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
5. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.
6. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
7. INSTALL 22-LOG JAM STRUCTURE PER DETAILS ON SHEET C-261.
8. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
9. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
10. INSTALL REVETMENT STRUCTURE PER DETAILS ON SHEETS C-264 - C-265.
11. INSTALL LARGE APEX STRUCTURE PER DETAILS ON SHEET C-266.

0' 100' 200' 400'

TETRA TECH
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19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL. 12, 2016 JEREMY S. ANDREWS EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED CONDITIONS DETAILED OVERVIEW

DWG. NO.: C-212

CREATED: 1/19/26

SHEET: 14 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%PPA 2\ SHEET FILES\08 C211-C215 PROPOSED DETAILED OVERVIEWS.DWG
PLOT DETAILS: SINKS, NATHAN January 22, 2026 9:18 AM

SEE SHEET C-212

PROPOSED UMATILLA RIVER ALIGNMENT

FLOW

D C-214

E C-214

UPPR

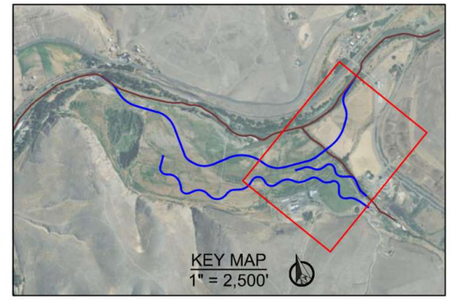
EXISTING UMATILLA RIVER ALIGNMENT

FLOW

BIRCH CREEK ROAD

PROPOSED BIRCH CREEK ALIGNMENT

PROPOSED DISTRIBUTARY CHANNEL ALIGNMENT



LEGEND

- EXISTING 5-FOOT CONTOUR
- EXISTING 20-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING POWER POLE
- EXISTING POWER/COMM UTILITY
- CONSERVATION EASEMENT BOUNDARY
- PROJECT AREA BOUNDARY
- PROPOSED POWER POLE
- PROPOSED POWER/COMM UTILITY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED SETBACK LEVEE
- PROPOSED FLOODPLAIN BENCHING
- PROPOSED FLOODPLAIN TERRACE
- PROPOSED CHANNEL
- PROPOSED WETLAND
- PROPOSED LWM
- PROPOSED HABITAT BOULDERS

NOTES:

1. PROPOSED PROJECT AREA BOUNDARY - SEE SHEET E-201 FOR OVERVIEW.
2. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
3. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
4. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
5. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-234.
6. PROPOSED POD DECOMMISSION - SEE SHEET C-203.
7. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
8. INSTALL 22-LOG JAM STRUCTURE PER DETAILS ON SHEET C-261.
9. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
10. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE B PER DETAILS ON SHEET C-262.
11. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
12. INSTALL REVETMENT STRUCTURE PER DETAILS ON SHEETS C-264 - C-265.
13. INSTALL LARGE APEX STRUCTURE PER DETAILS ON SHEET C-266.
14. INSTALL SMALL APEX STRUCTURE PER DETAILS ON SHEET C-267.
15. INSTALL HABITAT BOULDERS PER DETAIL SHEET C-271.
16. PROTECT AND PRESERVE EXISTING FISH TRAP. IF NECESSARY TO MOVE OR MODIFY TRAP TO ACCOMMODATE WORK, COORDINATE ADJUSTMENTS WITH OWNER OR OWNER'S REPRESENTATIVE.
17. PROPOSED LEVEE REMOVAL AND SETBACK LEVEE PER SEPARATE LEVEE SETBACK PROJECT. SEE LEVEE SETBACK PROJECT 100% DESIGN DRAWINGS FOR DETAILS.

0' 100' 200' 400'

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19803 North Creek Parkway
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Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JERMEY S. ANDREWS JUL 12 20'25 EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

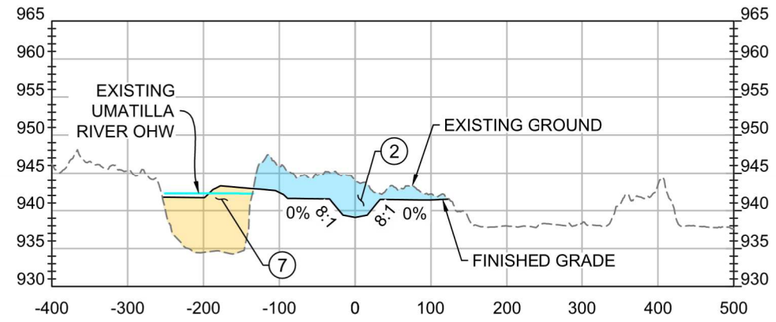
PROPOSED CONDITIONS
DETAILED OVERVIEW

DWG. NO.: C-213

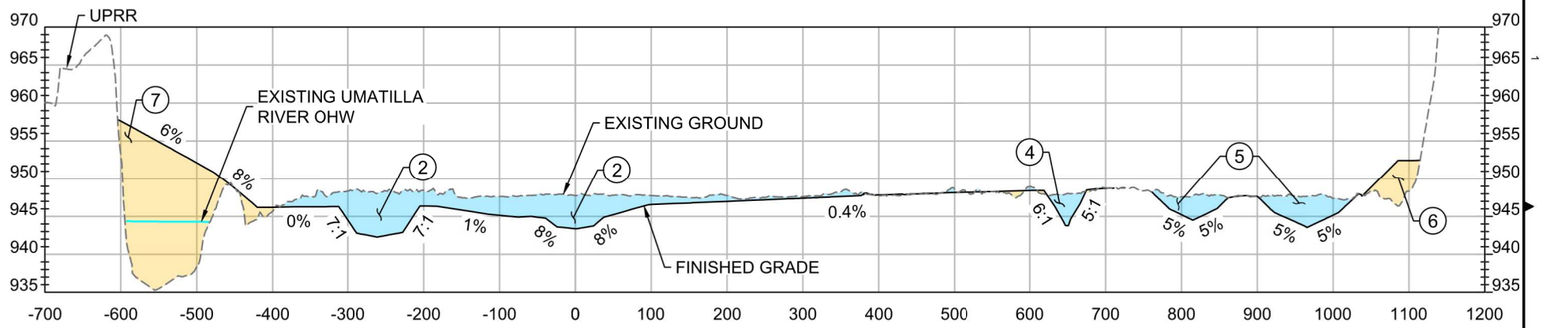
CREATED: 1/19/26

SHEET: 15 of 50

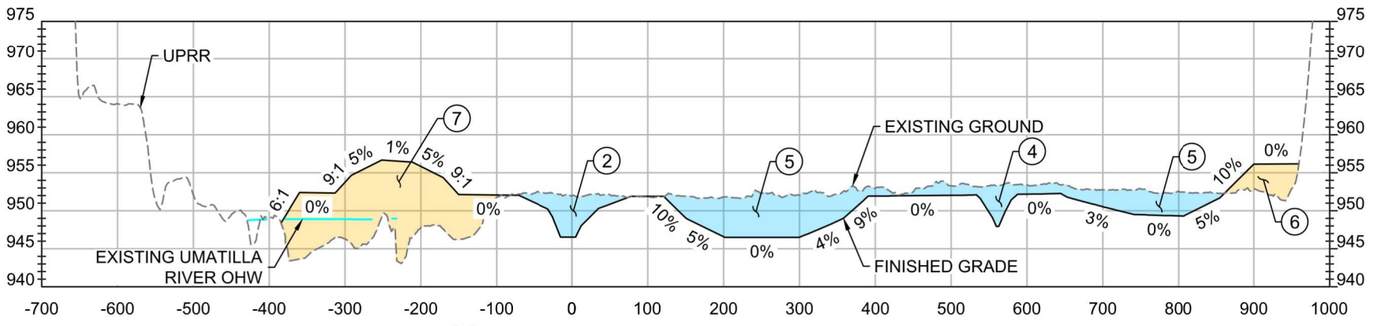
Z:\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\08 C211-C215 PROPOSED DETAILED OVERVIEWS.DWG
PLOT DETAILS: KHOLAF, ADAM January 27, 2026 1:40 PM



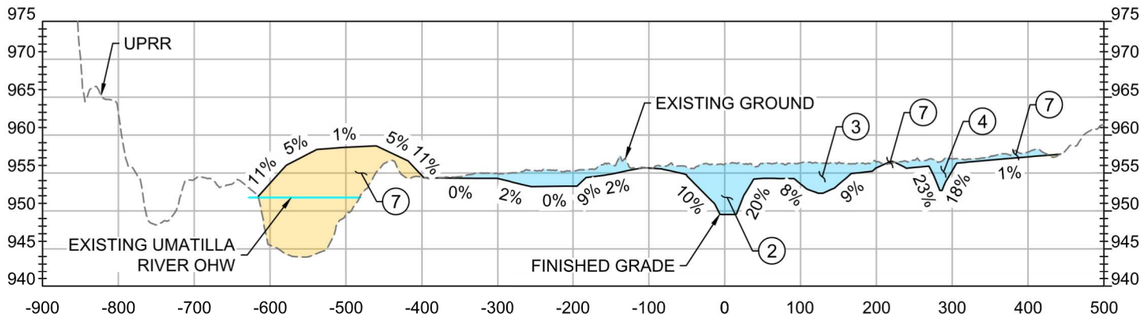
A C-211 PROPOSED CONDITIONS SECTION
1"=200' (1H:10V)



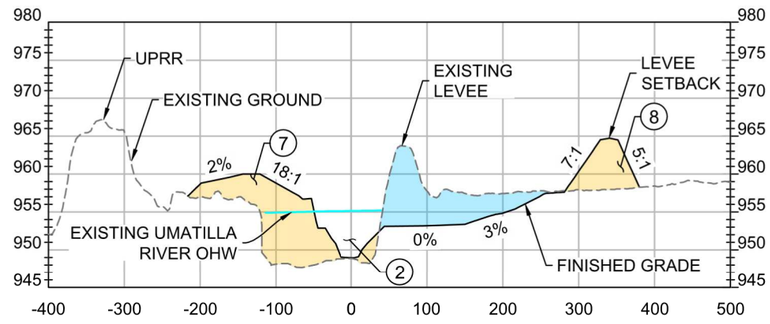
B C-212 PROPOSED CONDITIONS SECTION
1"=200' (1H:10V)



C C-212 PROPOSED CONDITIONS SECTION
1"=200' (1H:10V)



D C-213 PROPOSED CONDITIONS SECTION
1"=200' (1H:10V)



E C-213 PROPOSED CONDITIONS SECTION
1"=200' (1H:10V)

LEGEND
- EXISTING GROUND
- FINISHED GRADE
- EXISTING OHW
- PROPOSED CUT
- PROPOSED FILL

NOTES:
1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
3. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
4. PROPOSED DISTRIBUTARY CREEK CHANNEL - SEE SHEETS C-225 - C-226.
5. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
6. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.
7. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245
8. PROPOSED LEVEE REMOVAL AND SETBACK LEVEE PER SEPARATE LEVEE SETBACK PROJECT. SEE LEVEE SETBACK PROJECT 100% DESIGN DRAWINGS FOR DETAILS.

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REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL. 12, 2016 EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

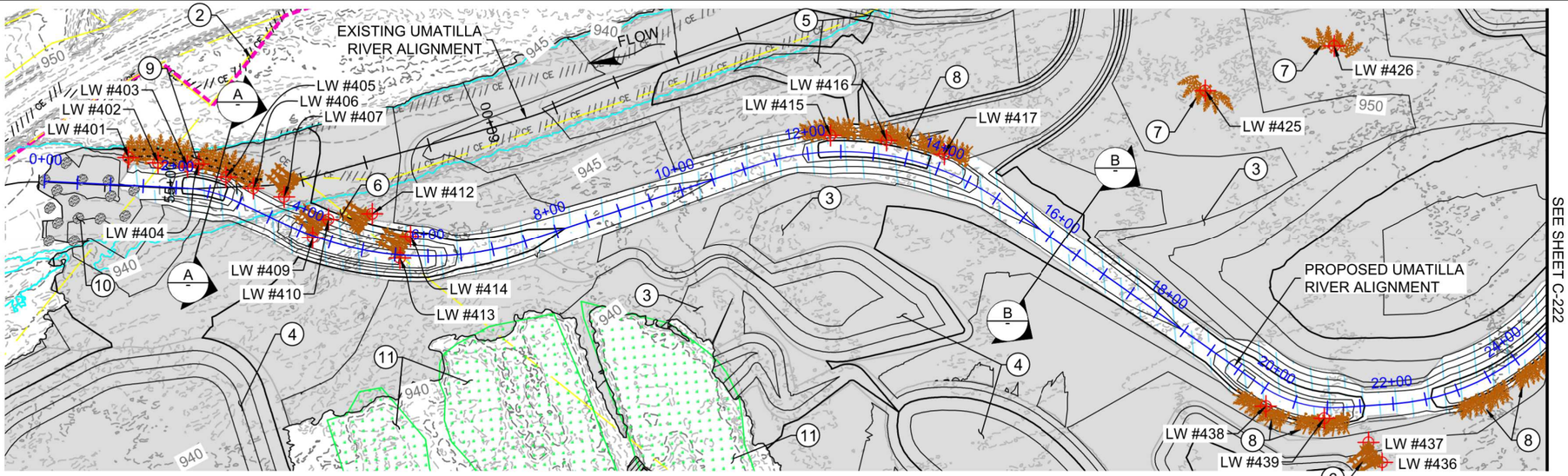
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED CONDITIONS DETAILED OVERVIEW

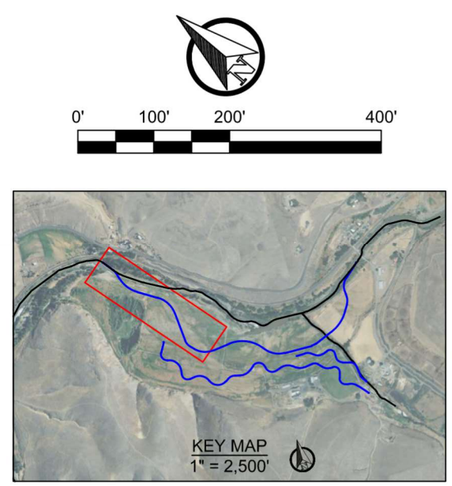
DWG. NO.: C-214
CREATED: 1/19/26
SHEET: 16 of 50

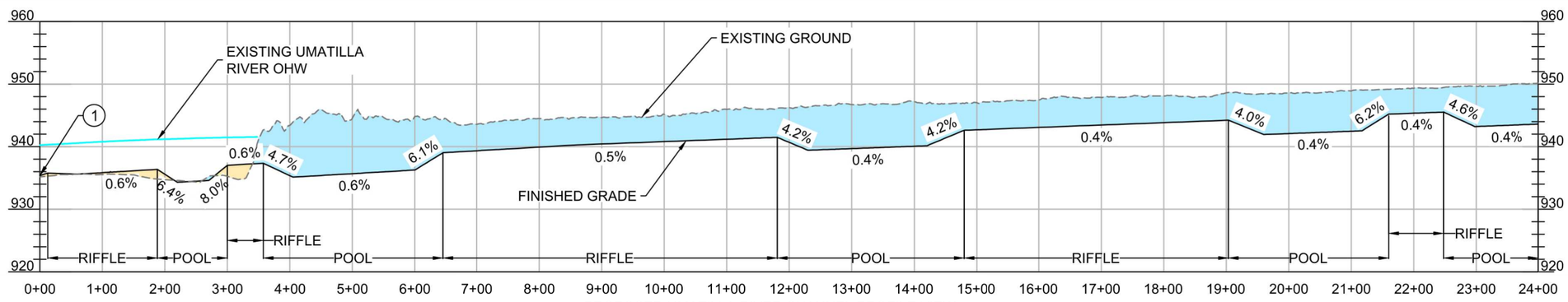
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\08 C211-C215 PROPOSED DETAILED OVERVIEWS.DWG
PLOT DETAIL: SINKS, NATHAN January 21, 2026 3:52 PM



PROPOSED UMATILLA RIVER CHANNEL PLAN VIEW

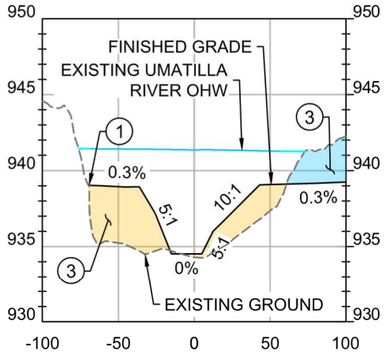
1" = 200'





PROPOSED UMATILLA RIVER CHANNEL PROFILE VIEW

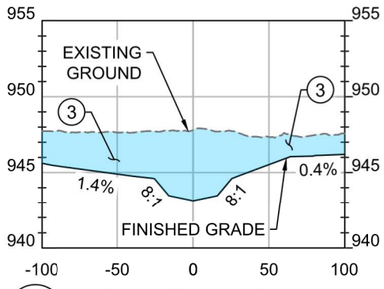
1"=200' (1H:10V)



A

PROPOSED CHANNEL SECTION

1"=100' (1H:10V)



B

PROPOSED CHANNEL SECTION

1"=100' (1H:10V)

LEGEND

- EXISTING 1-FOOT CONTOUR
- EXISTING 5-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING WETLAND
- CONSERVATION EASEMENT BOUNDARY
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED UMATILLA RIVER CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE
- PROPOSED LWM
- PROPOSED HABITAT BOULDER
- PROPOSED LWM CONSTRUCTION POINT (LW #XXX)

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-215.
4. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
5. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
6. INSTALL 22-LOG JAM STRUCTURE PER DETAILS ON SHEET C-261.
7. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
8. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
9. INSTALL REVETMENT STRUCTURES PER DETAILS ON SHEETS C-264 - C-265.
10. INSTALL HABITAT BOULDERS PER DETAILS ON SHEET C-271.
11. PRESERVE AND PROTECT EXISTING WETLAND.
12. SEE SHEET C-271 FOR CHANNEL POOL AND RIFFLE SECTIONS.
13. FOR CONSTRUCTION POINT COORDINATES SEE SHEETS C-251 - C-252.

TETRA TECH
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Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2010
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

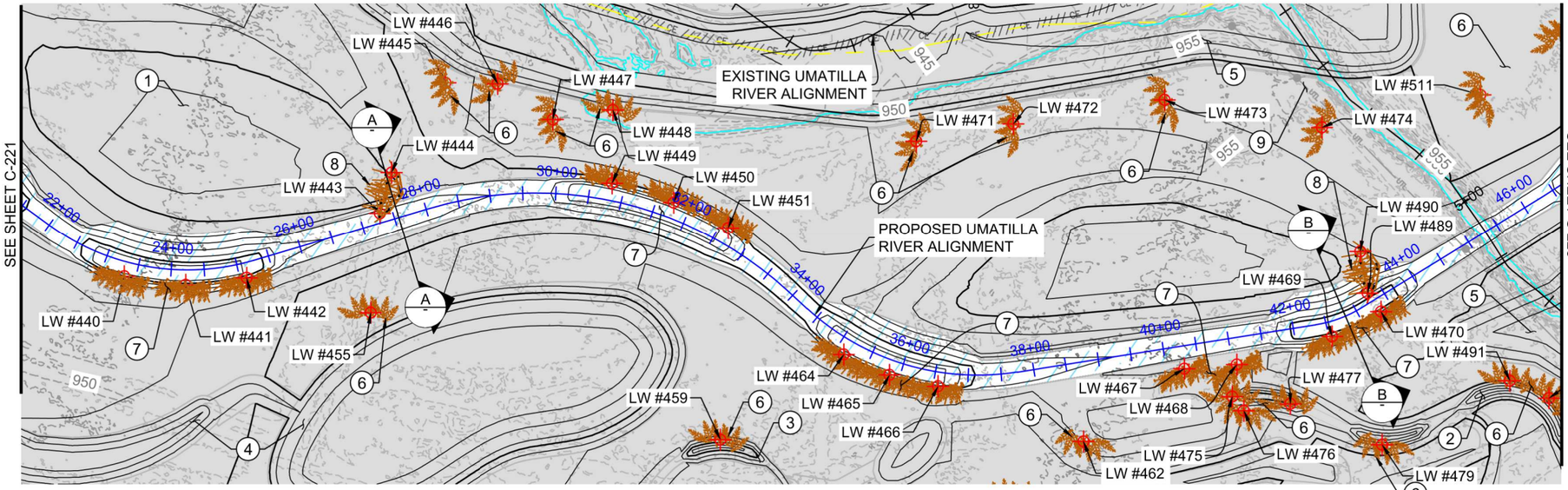
PROPOSED UMATILLA RIVER CHANNEL PROFILE & SECTIONS

DWG. NO.: C-221

CREATED: 1/19/26

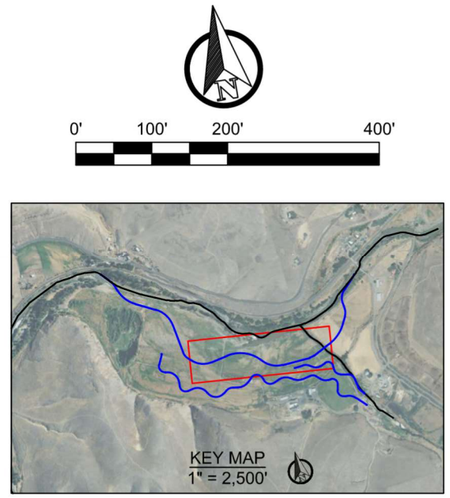
SHEET: 17 of 50

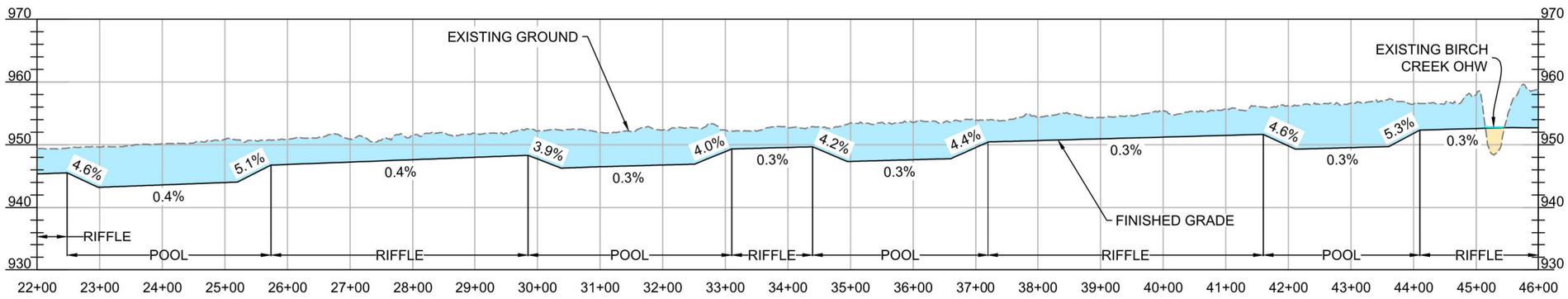
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\09 C221-C223 UMATILLA RIVER PROFILE AND SECTIONS.DWG
PLOT DETAILS: SINKS, NATHAN January 22, 2026 2:09 PM



PROPOSED UMATILLA RIVER CHANNEL PLAN VIEW

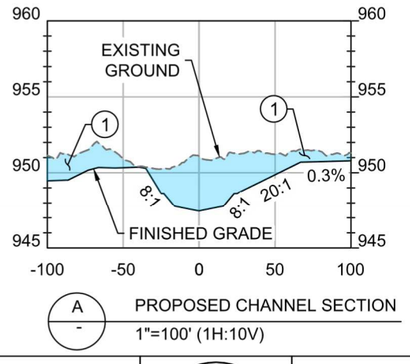
1" = 200'





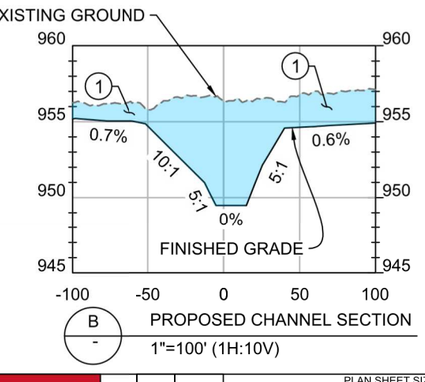
PROPOSED UMATILLA RIVER CHANNEL PROFILE VIEW

1"=200' (1H:10V)



PROPOSED CHANNEL SECTION

1"=100' (1H:10V)



PROPOSED CHANNEL SECTION

1"=100' (1H:10V)

LEGEND

- EXISTING 1-FOOT CONTOUR
- EXISTING 5-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING POWER POLE
- EXISTING POWER/COMM UTILITY
- CONSERVATION EASEMENT BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED UMATILLA RIVER CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE
- PROPOSED LWM
- PROPOSED LWM CONSTRUCTION POINT (LW #XXX)

NOTES:

1. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-215.
2. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
3. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
4. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
5. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
6. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
7. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
8. INSTALL LARGE APEX STRUCTURES PER DETAILS ON SHEET C-266.
9. PROPOSED POD AND OVERHEAD POWER DECOMISSION, SEE SHEET C-203.
10. SEE SHEET C-271 FOR CHANNEL POOL AND RIFFLE SECTIONS.
11. FOR CONSTRUCTION POINT COORDINATES SEE SHEETS C-251 - C-252.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL 12 2016 JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

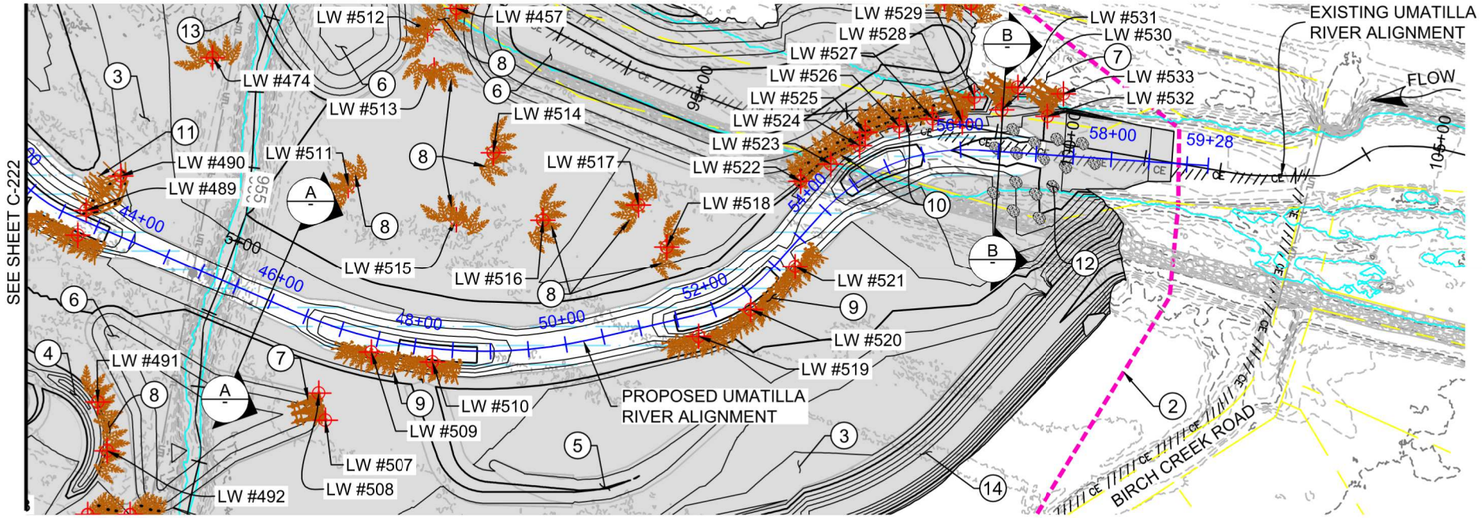
CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED UMATILLA RIVER CHANNEL PROFILE & SECTIONS

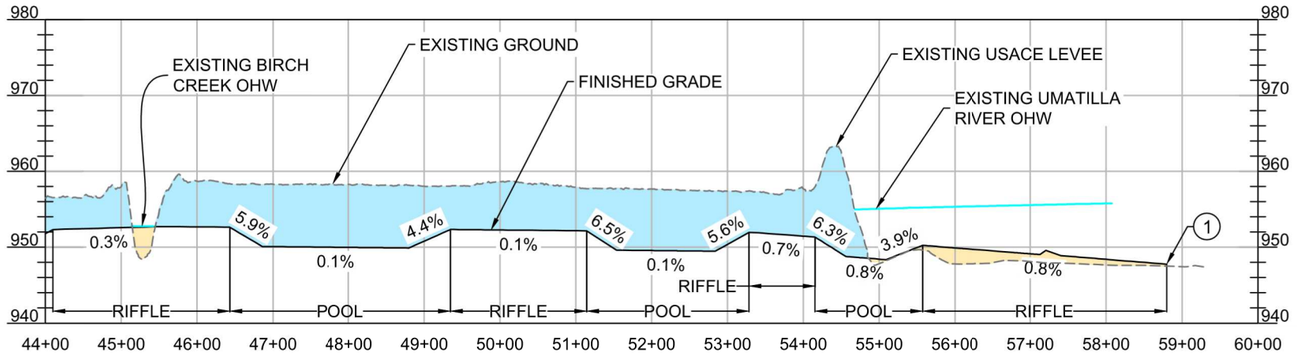
DWG. NO.: C-222

CREATED: 1/19/26

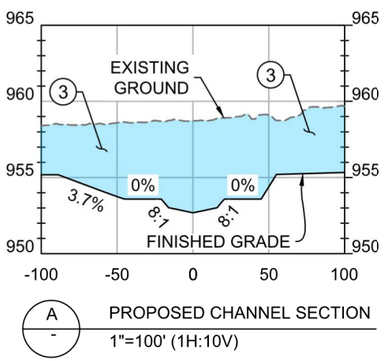
SHEET: 18 of 50



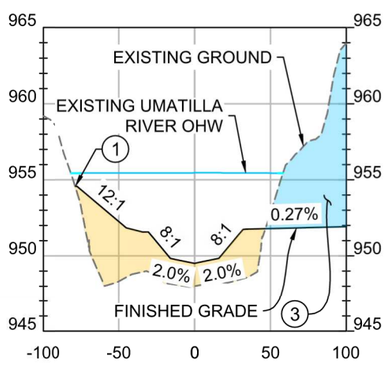
PROPOSED UMATILLA RIVER CHANNEL PLAN VIEW
1" = 200'



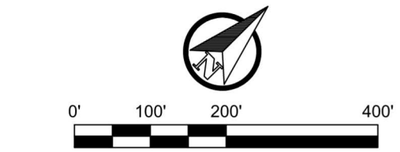
PROPOSED UMATILLA RIVER CHANNEL PROFILE VIEW
1"=200' (1H:10V)

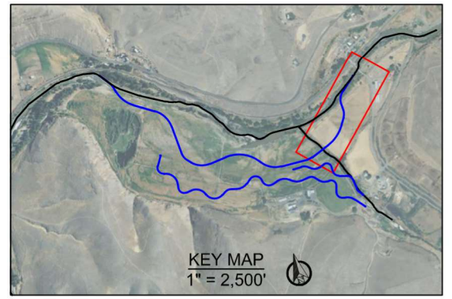


A
-
PROPOSED CHANNEL SECTION
1"=100' (1H:10V)



B
-
PROPOSED CHANNEL SECTION
1"=100' (1H:10V)





LEGEND

- EXISTING 1-FOOT CONTOUR
- EXISTING 5-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- CONSERVATION EASEMENT BOUNDARY
- POWER POLE
- POWER/COMM UTILITY
- EXISTING LEVEE
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED UMATILLA RIVER CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE
- PROPOSED LWM
- PROPOSED HABITAT BOULDERS
- PROPOSED LWM CONSTRUCTION POINT (LW #XXX)

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY - SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-215.
4. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
5. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
6. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
7. INSTALL 22-LOG JAM STRUCTURE PER DETAILS ON SHEET C-261.
8. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
9. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
10. INSTALL REVETMENT STRUCTURE PER DETAILS ON SHEETS C-264 - C-265.
11. INSTALL LARGE APEX STRUCTURES PER DETAILS ON SHEET C-266.
12. INSTALL HABITAT BOULDERS PER DETAILS ON SHEET C-271.
13. PROPOSED POD AND OVERHEAD POWER DECOMISSION - SEE SHEET C-203.
14. PROPOSED LEVEE SETBACK - SEE SEPARATE 100% DESIGN PA2 PROPOSED LEVEE SETBACK PLAN SET.
15. SEE SHEET C-271 FOR CHANNEL POOL AND RIFFLE SECTIONS.
16. FOR CONSTRUCTION POINT COORDINATES SEE SHEETS C-251 - C-252.

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Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JEREMY S. ANDREWS
JUL. 9, 2018
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CTUIR - WALLA WALLA - UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

PLAN SHEET SIZE ANSI B (11" X 17")

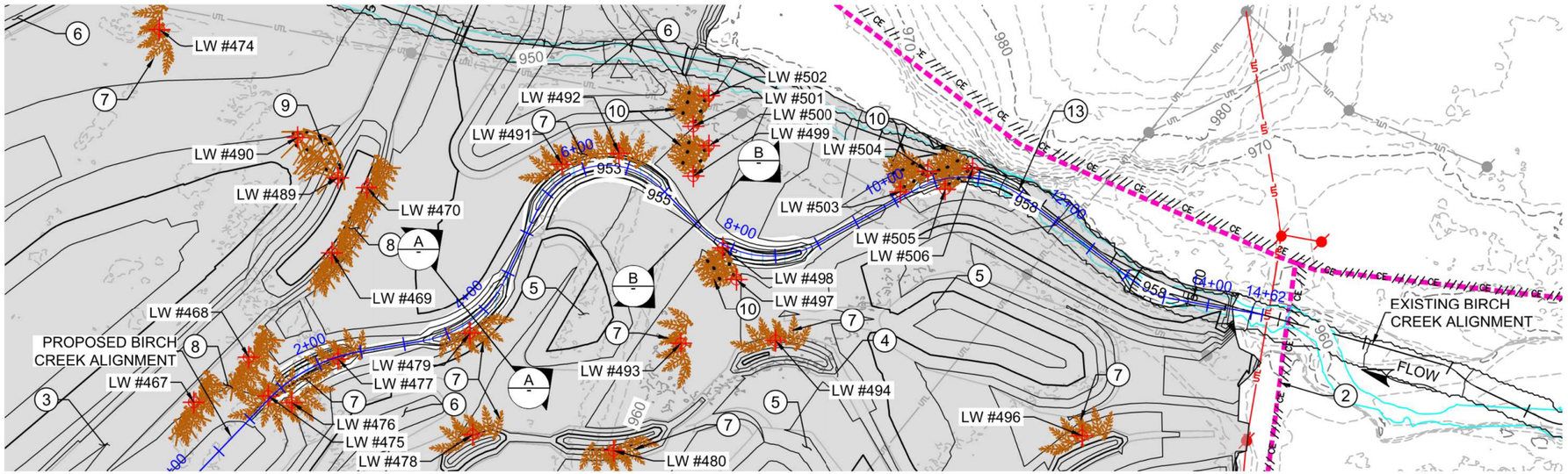
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

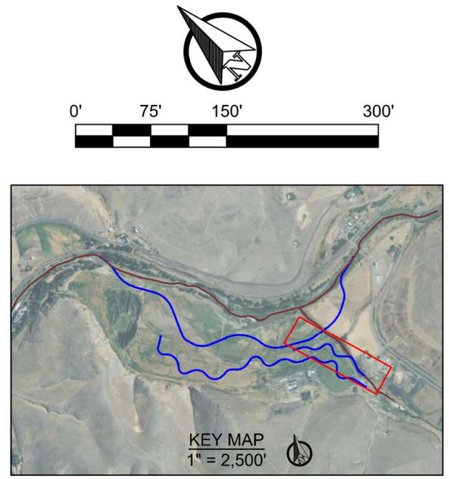
PROPOSED UMATILLA RIVER CHANNEL PROFILE & SECTIONS

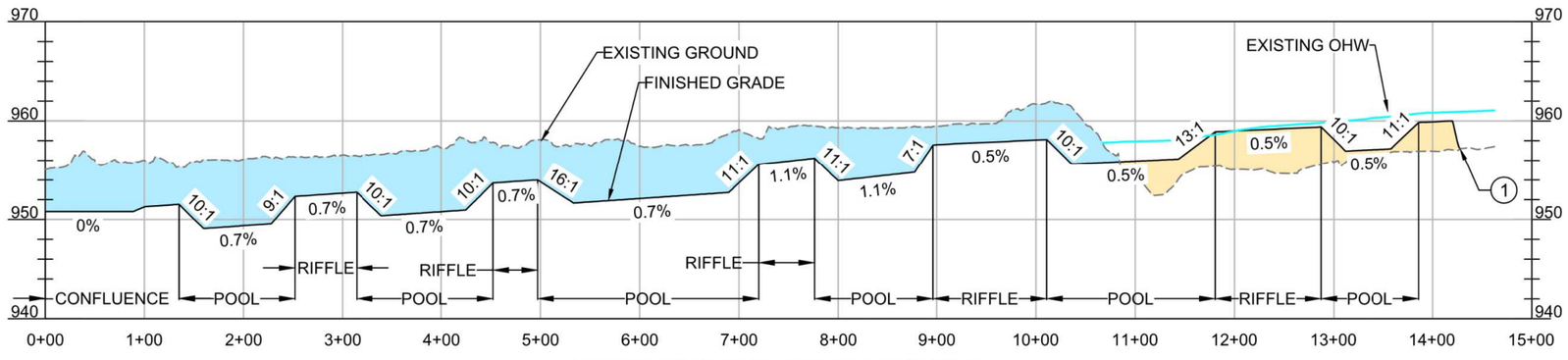
DWG. NO.: C-223
CREATED: 1/19/26
SHEET: 19 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\09 C221-C223 UMATILLA RIVER PROFILE AND SECTIONS.DWG
PLOT DETAILS: SINKS, NATHAN January 22, 2026 2:03 PM

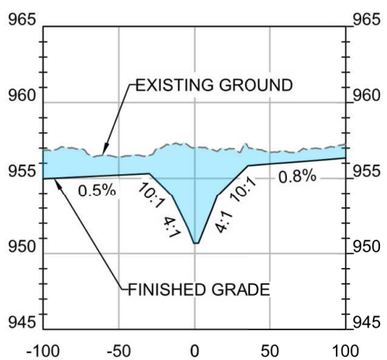


PROPOSED BIRCH CREEK CHANNEL PLAN VIEW
1" = 150'

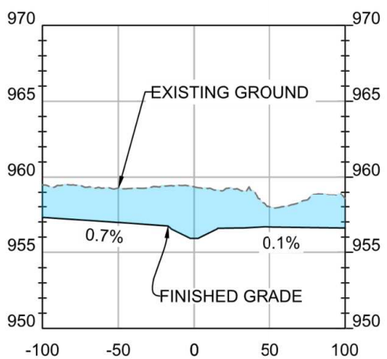




PROPOSED BIRCH CREEK CHANNEL PROFILE VIEW
1"=150' (1H:10V)



A
PROPOSED CHANNEL SECTION
1"=100' (1H:10V)



B
PROPOSED CHANNEL SECTION
1"=100' (1H:10V)

LEGEND

- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING POWER POLE
- EXISTING POWER/COMM UTILITY
- PROJECT AREA BOUNDARY
- CONSERVATION EASEMENT BOUNDARY
- PROPOSED POWER POLE
- PROPOSED POWER/COMM UTILITY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED BIRCH CREEK CHANNEL
- PROPOSED FILL
- PROPOSED CUT
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C221 - C-223.
4. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
5. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
6. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
7. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
8. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
9. INSTALL LARGE APEX STRUCTURE PER DETAILS ON SHEET C-266.
10. INSTALL SMALL APEX STRUCTURE PER DETAILS ON SHEET C-267.
11. SEE SHEET C-271 FOR CHANNEL POOL AND RIFFLE SECTIONS.
12. FOR CONSTRUCTION POINT COORDINATES SEE SHEET C-251 - C-252.
13. PROTECT AND PRESERVE EXISTING FISH TRAP. IF NECESSARY TO MOVE OR MODIFY TRAP TO ACCOMMODATE WORK, COORDINATE ADJUSTMENTS WITH OWNER OR OWNER'S REPRESENTATIVE.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE - WALLA WALLA - UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

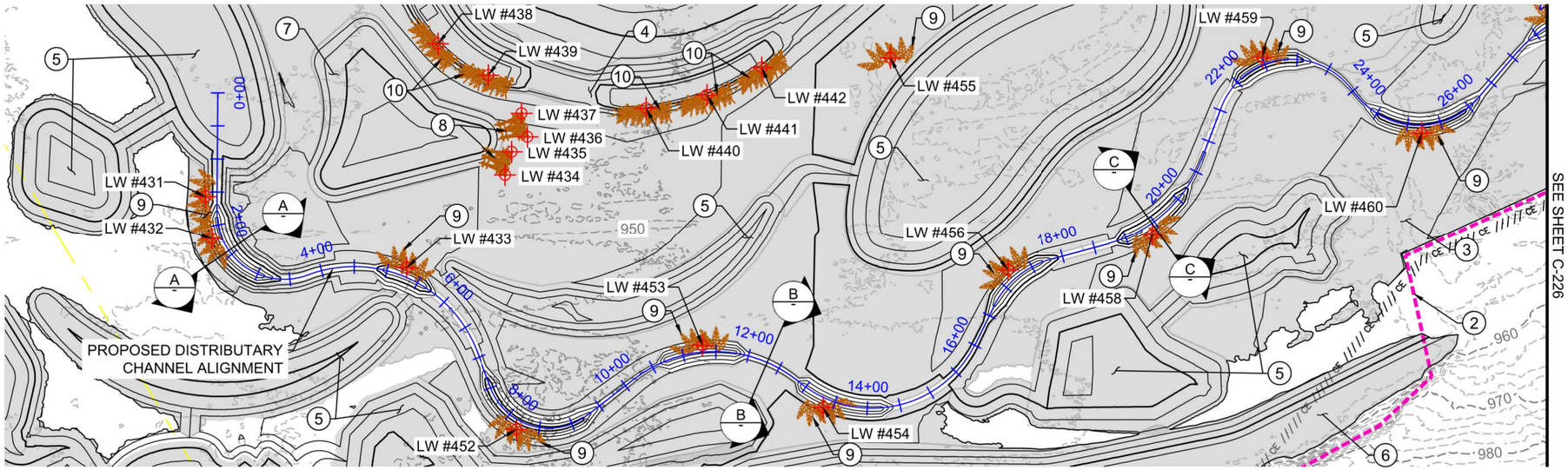
PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

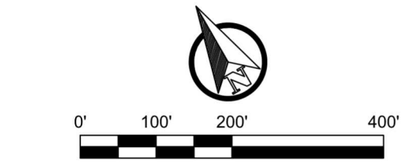
PROPOSED BIRCH CREEK CHANNEL PROFILE & SECTIONS

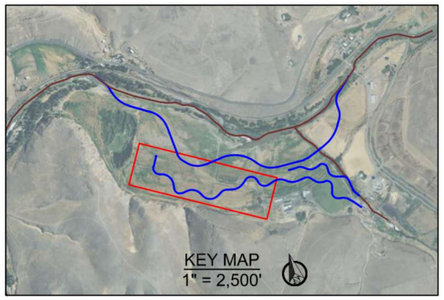
DWG. NO.: C-224
CREATED: 1/19/26
SHEET: 20 of 50

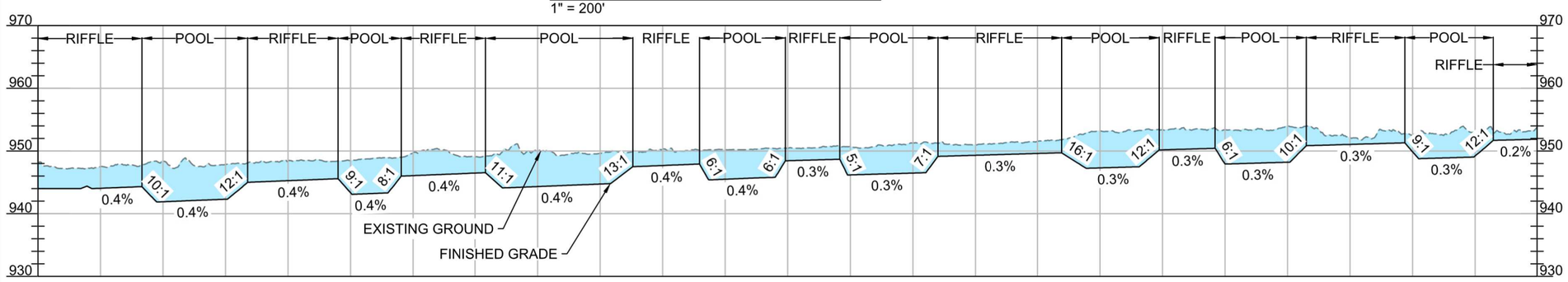
Z:\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\10 C224 BIRCH CREEK PROFILE AND SECTIONS.DWG
PLOT DETAILS: KHALAF, ADAM
January 27, 2026
1:54 PM



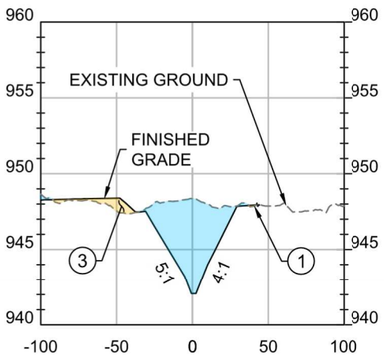
PROPOSED DISTRIBUTARY CHANNEL PLAN VIEW
1" = 200'



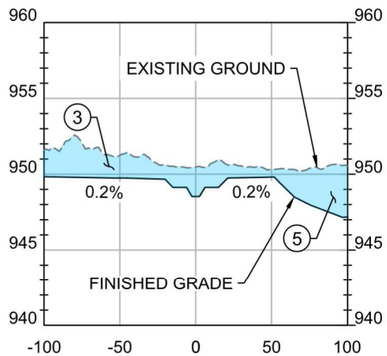




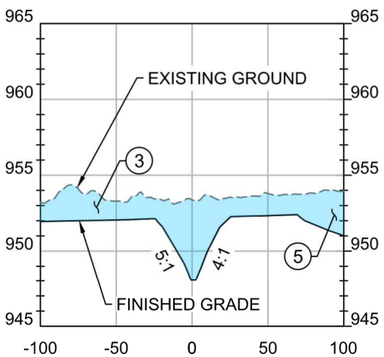
PROPOSED DISTRIBUTARY CHANNEL PROFILE VIEW
1"=200' (1H:10V)



A
PROPOSED CHANNEL SECTION
1"=100' (1H:10V)



B
PROPOSED CHANNEL SECTION
1"=100' (1H:10V)



C
PROPOSED CHANNEL SECTION
1"=100' (1H:10V)

LEGEND

- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- PROJECT AREA BOUNDARY
- CONSERVATION EASEMENT BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED DISTRIBUTARY CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE
- PROPOSED LWM
- PROPOSED LWM CONSTRUCTION POINT (LW #XXX)

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214.
4. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C221 - C-223.
5. PROPOSED WETLANDS AND LINK CHANNELS- SEE SHEETS C-231 - C-236.
6. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.
7. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
8. INSTALL 22-LOG JAM STRUCTURE PER DETAILS ON SHEET C-261.
9. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
10. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
11. SEE SHEET C-271 FOR TYPICAL CHANNEL POOL AND RIFFLE SECTIONS.
12. FOR CONSTRUCTION POINT COORDINATES SEE SHEETS C-251 - C-252.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

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JEREMY S. ANDREWS
EXPIRES: 12/31/2027

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CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
CAYUSE · WALLA WALLA · UMATILLA
Treaty of 1855

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

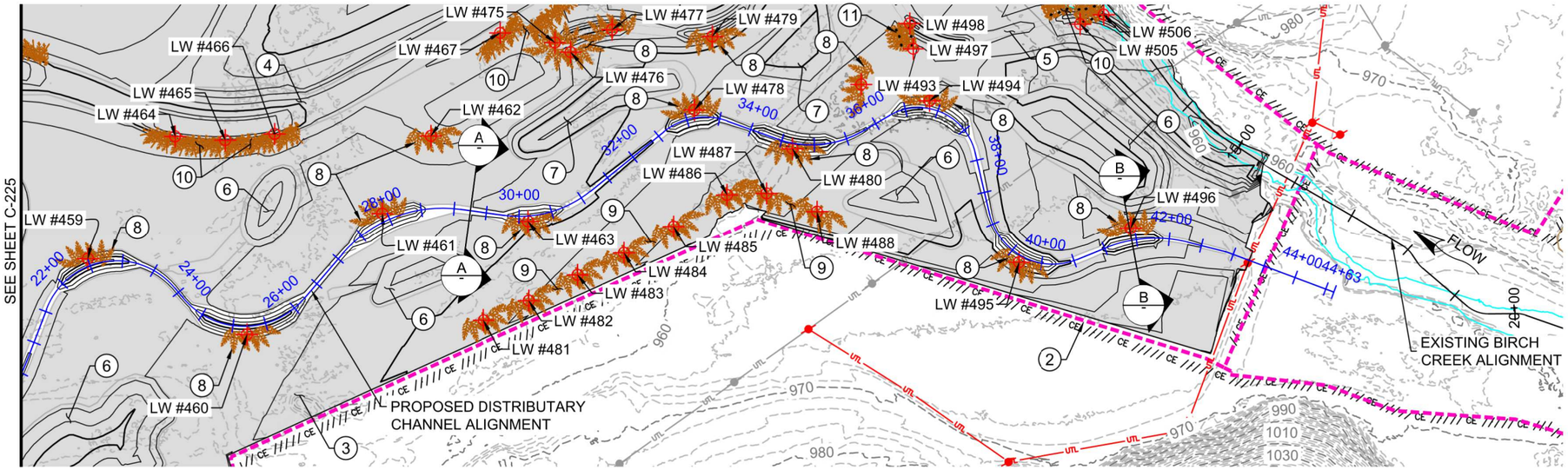
PROPOSED DISTRIBUTARY CHANNEL PROFILE & SECTIONS

DWG. NO.: C-225

CREATED: 1/19/26

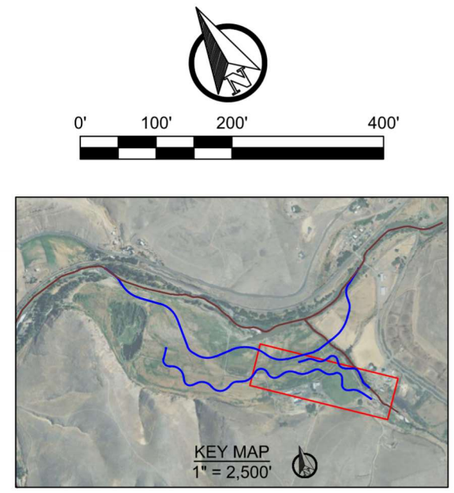
SHEET: 21 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\11 C225-C226 DISTRIBUTARY PROFILE AND SECTIONS.DWG
PLOT DETAILS: SINKS, NATHAN January 22, 2026 2:19 PM

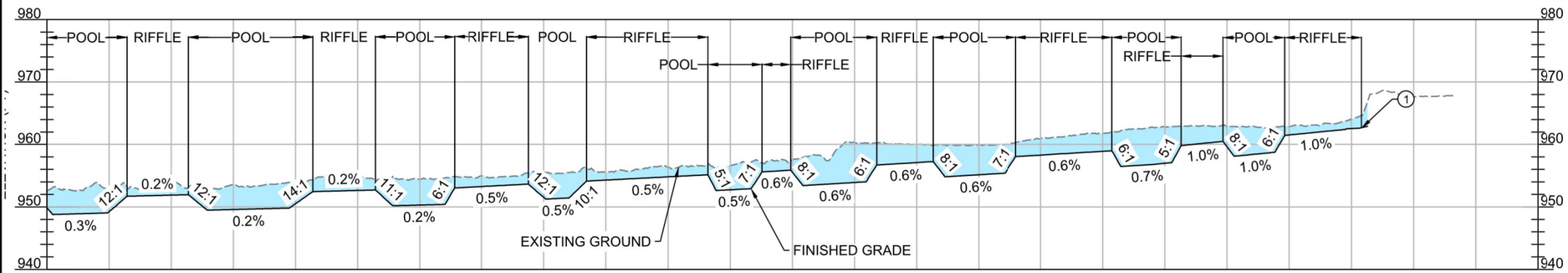


PROPOSED DISTRIBUTARY CHANNEL PLAN VIEW

1" = 200'

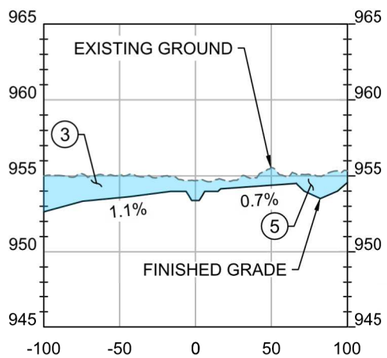


0' 100' 200' 400'



PROPOSED DISTRIBUTARY CHANNEL PROFILE VIEW

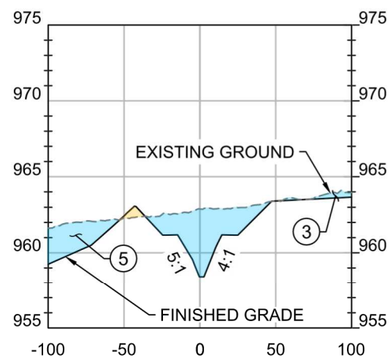
1"=200' (1H:10V)



A

PROPOSED CHANNEL SECTION

1"=100' (1H:10V)



B

PROPOSED CHANNEL SECTION

1"=100' (1H:10V)

LEGEND

- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING POWER POLE
- EXISTING POWER/COMM UTILITY
- PROJECT AREA BOUNDARY
- CONSERVATION EASEMENT BOUNDARY
- PROPOSED POWER POLE
- PROPOSED POWER/COMM UTILITY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED DISTRIBUTARY CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE
- PROPOSED LWM
- PROPOSED LWM CONSTRUCTION POINT (LW #XXX)

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214.
4. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
5. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
6. PROPOSED WETLANDS AND LINK CHANNELS - SEE SHEETS C-231 - C-236.
7. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
8. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE A PER DETAILS ON SHEET C-262.
9. INSTALL 10-LOG BANK HABITAT STRUCTURE TYPE B PER DETAILS ON SHEET C-262.
10. INSTALL 22-LOG BANK HABITAT STRUCTURE PER DETAILS ON SHEET C-263.
11. INSTALL SMALL APEX STRUCTURE PER DETAILS ON SHEET C-267.
12. SEE SHEET C-271 FOR CHANNEL POOL AND RIFFLE SECTIONS.
13. FOR CONSTRUCTION POINT COORDINATES SEE SHEETS C-251 - C-252.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL 12 2016 EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CTUIR – WALLA WALLA – UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED DISTRIBUTARY CHANNEL PROFILE & SECTIONS

DWG. NO.: C-226

CREATED: 1/19/26

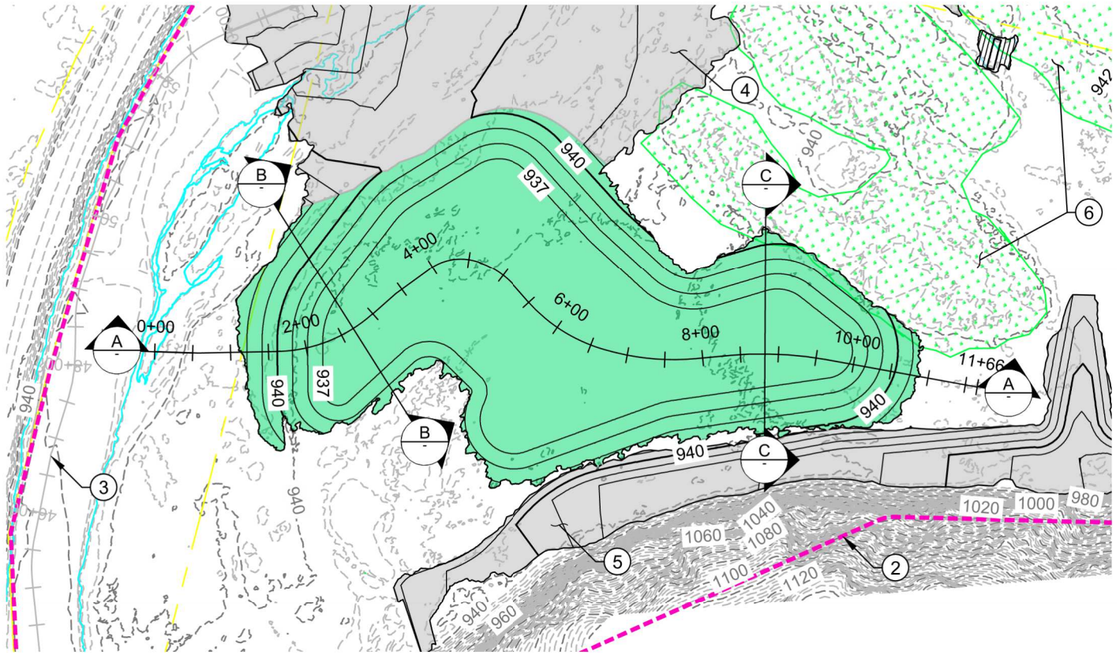
SHEET: 22 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\111 C225-C226 DISTRIBUTARY PROFILE AND SECTIONS.DWG
PLOT DETAILS: SINKS, NATHAN January 22, 2026 2:26 PM

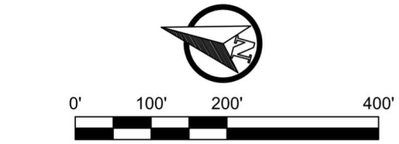
LEGEND

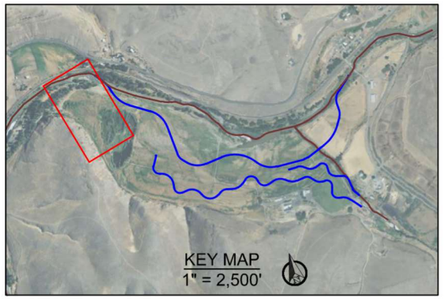
- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED WETLAND
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE

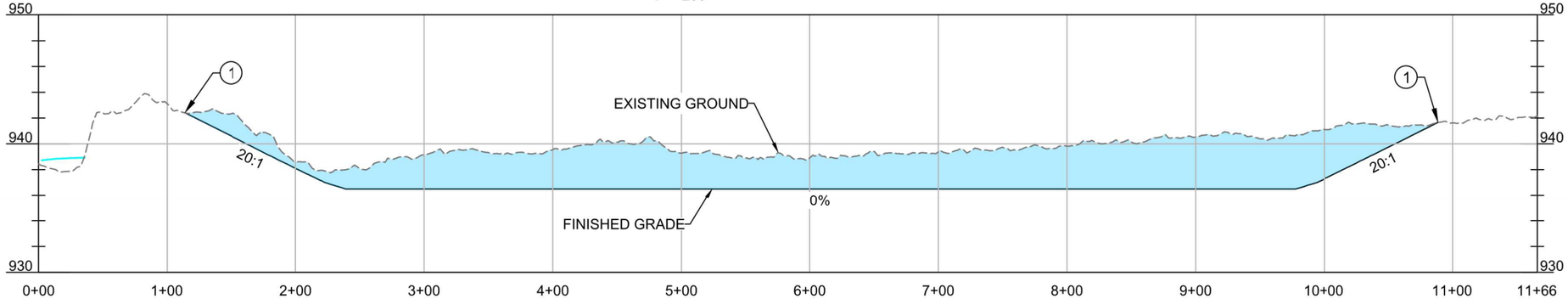
NOTES:
1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. EXISTING UMATILLA RIVER CHANNEL.
4. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214 FOR OVERALL GRADING PLAN VIEWS.
5. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.
6. PRESERVE AND PROTECT EXISTING WETLANDS.



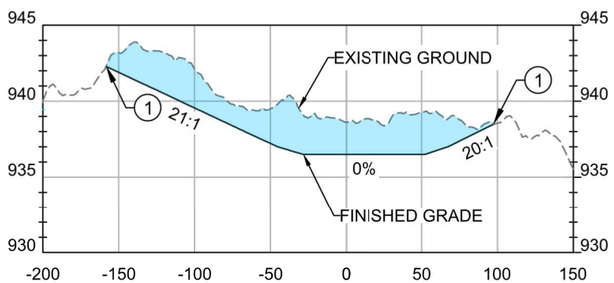
WETLAND AND LINK CHANNEL PLAN VIEW
1" = 200'



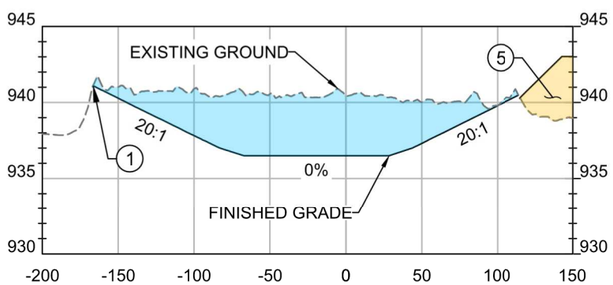




A — PROPOSED WETLAND SECTION
1"=100' (1H:10V)



B — PROPOSED WETLAND SECTION
1"=100' (1H:10V)



C — PROPOSED WETLAND SECTION
1"=100' (1H:10V)

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL 12, 2016
JEREMY S. ANDREMS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

PLAN SHEET SIZE ANSI B (11" X 17")

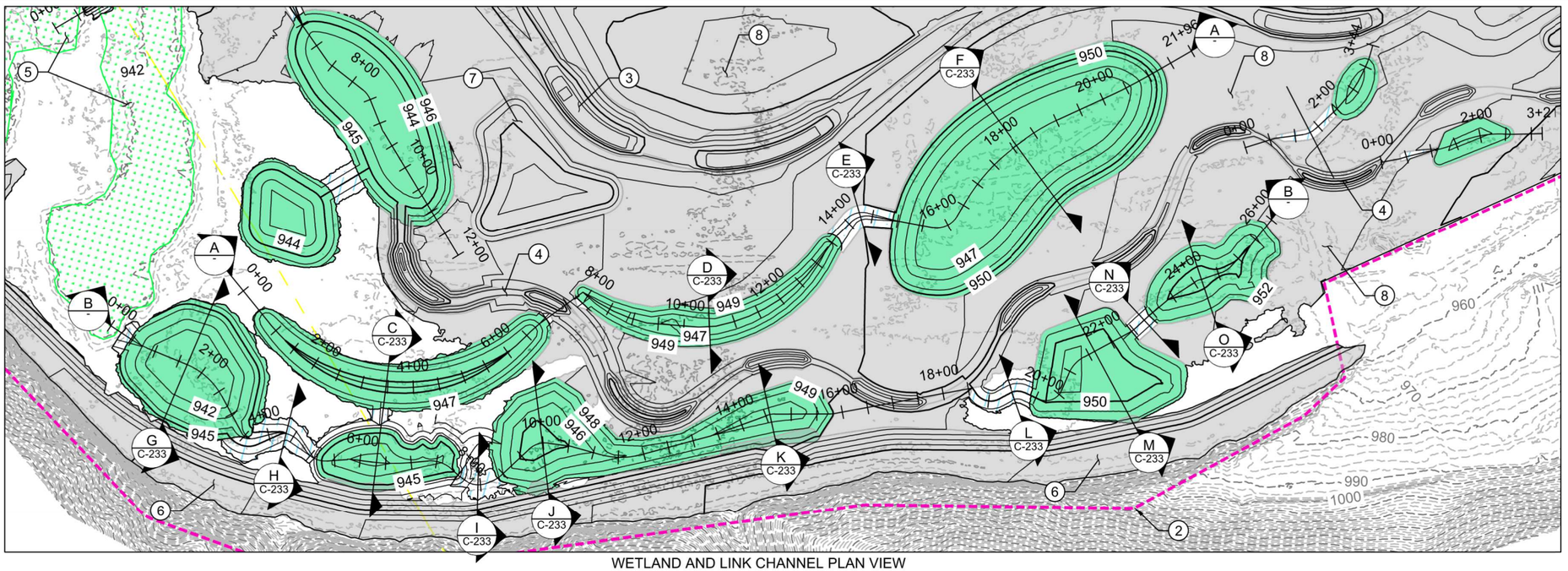
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

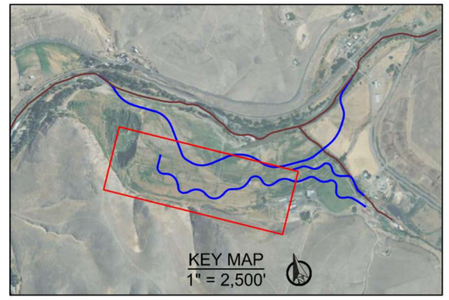
PROPOSED WETLANDS & LINK CHANNELS

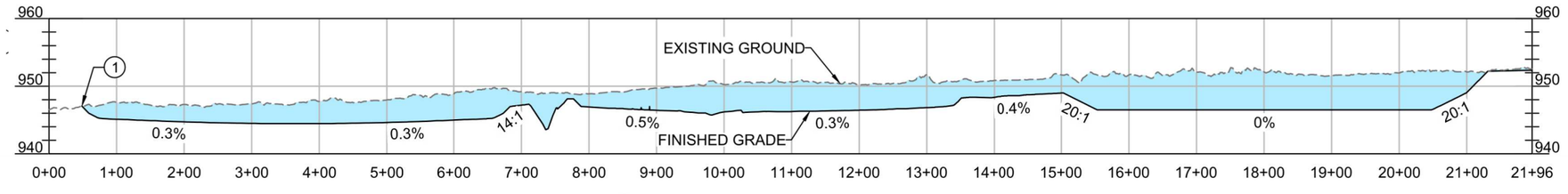
DWG. NO.: C-231
CREATED: 1/19/26
SHEET: 23 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\12A C231-C233 WETLANDS AND LINK CHANNELS SHEETS.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 1:26 PM

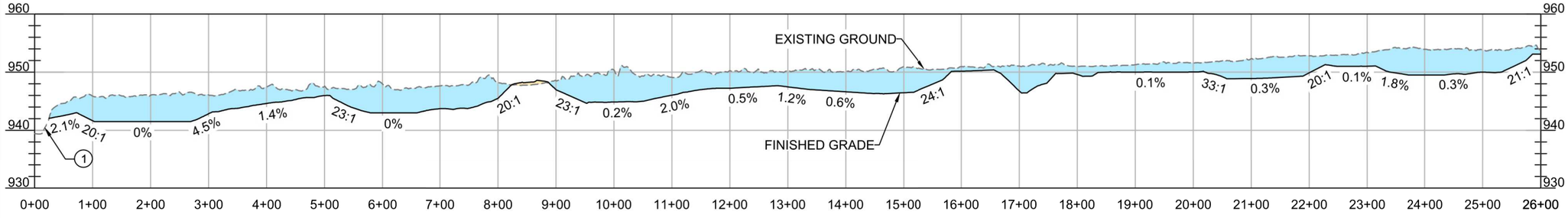


WETLAND AND LINK CHANNEL PLAN VIEW
1" = 250'





A — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



B — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)

NOTES:
1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
4. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
5. PRESERVE AND PROTECT EXISTING WETLANDS.
6. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.
7. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
8. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214 FOR OVERALL GRADING PLAN VIEWS.

LEGEND
- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED WETLAND
- PROPOSED CUT
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE

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Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

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JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

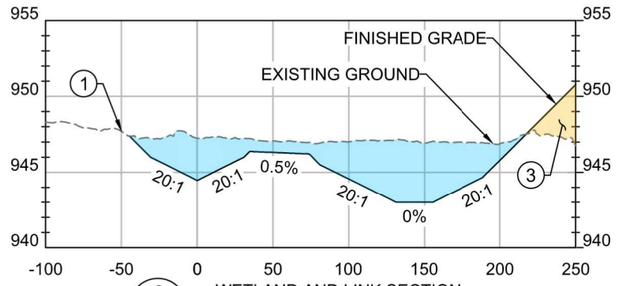
REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

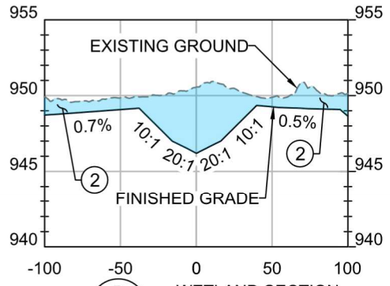
PROPOSED WETLANDS & LINK CHANNELS

DWG. NO.: C-232
CREATED: 1/19/26
SHEET: 24 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%PA 2\ SHEET FILES\12A C231-C233 WETLANDS AND LINK CHANNELS SHEETS.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 1:30 PM



C C-232 WETLAND AND LINK SECTION
1"=100' (1H:10V)



D C-232 WETLAND SECTION
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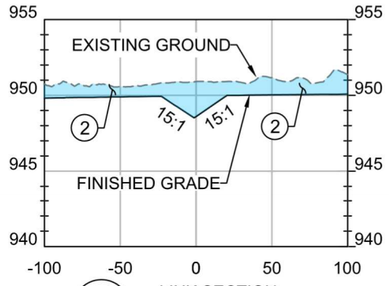

E C-232 LINK SECTION
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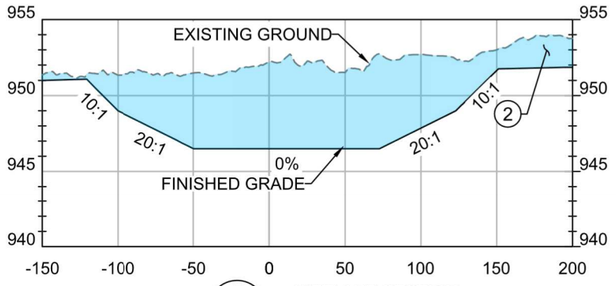

F C-232 WETLAND SECTION
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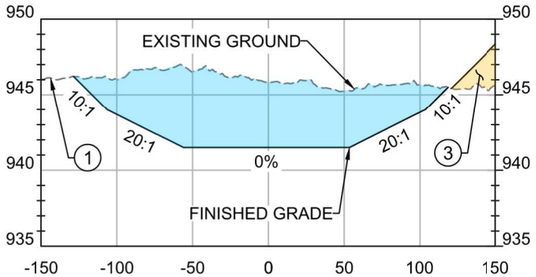

G C-232 WETLAND SECTION
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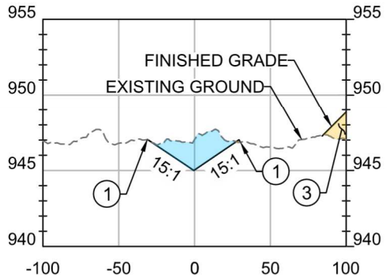
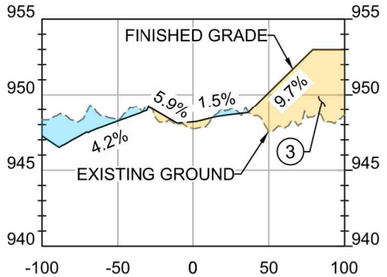
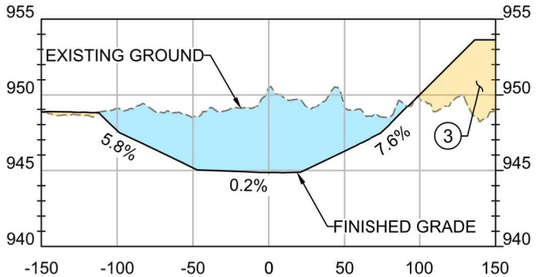


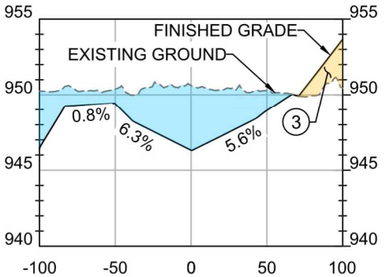
H C-232 LINK SECTION
1"=100' (1H:10V)



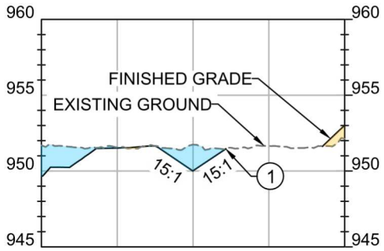
I C-232 LINK SECTION
1"=100' (1H:10V)



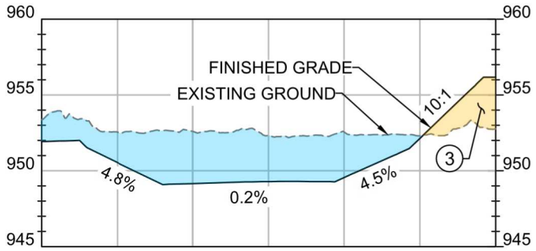
J C-232 WETLAND SECTION
1"=100' (1H:10V)



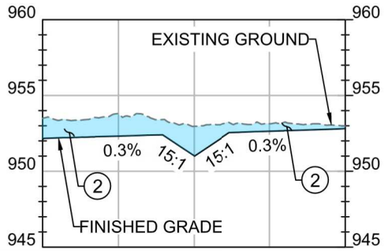
K C-232 WETLAND SECTION
1"=100' (1H:10V)



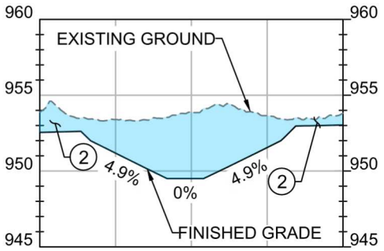
L C-232 LINK SECTION
1"=100' (1H:10V)



M C-232 WETLAND SECTION
1"=100' (1H:10V)



N C-232 LINK SECTION
1"=100' (1H:10V)



O C-232 WETLAND SECTION
1"=100' (1H:10V)

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- PROPOSED CUT
- PROPOSED FILL

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214 FOR OVERALL GRADING PLAN VIEWS.
3. PROPOSED ACCESS ROUTE MAINTENANCE - SEE SHEETS C-241 - C-242.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JEREMY S. ANDREWS
JUL. 9, 2026
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

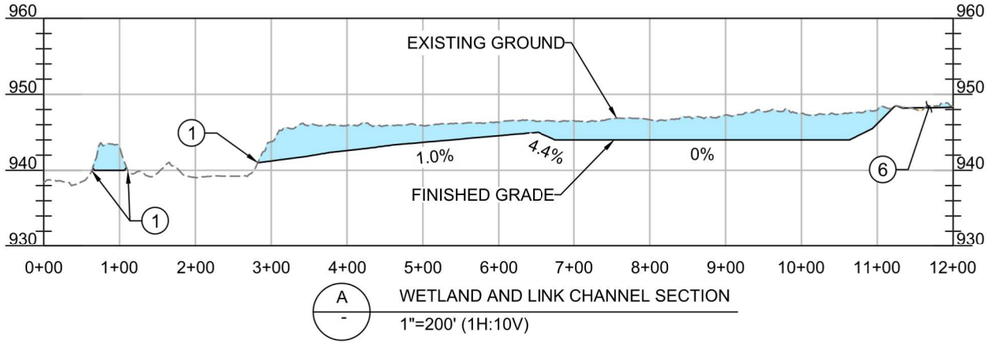
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

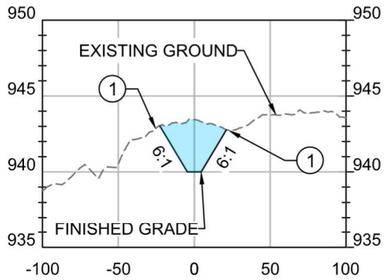
PROPOSED WETLANDS & LINK CHANNELS

DWG. NO.: C-233
CREATED: 1/19/26
SHEET: 25 of 50

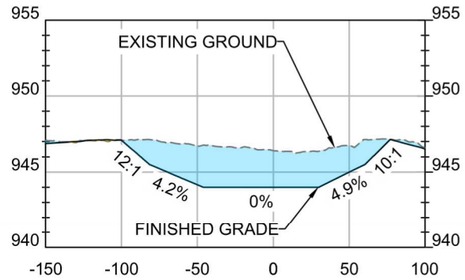
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\12A C231-C233 WETLANDS AND LINK CHANNELS SHEETS.DWG
PLOT DETAILS: SINKS, NATHAN — January 21, 2026 — 1:31 PM



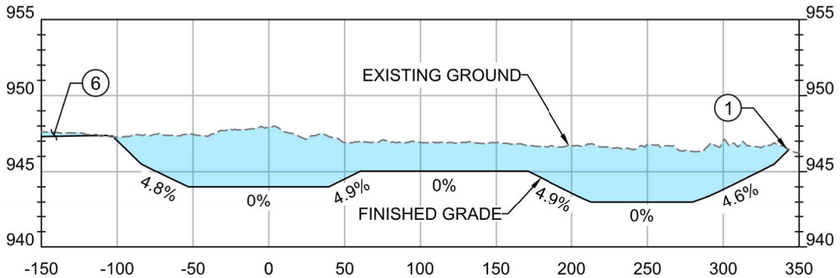
A WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



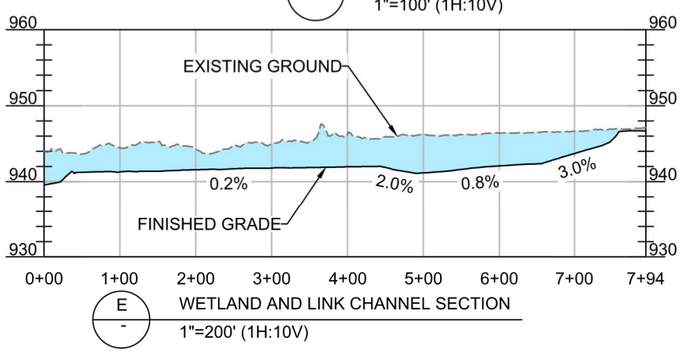
B LINK SECTION
1"=100' (1H:10V)



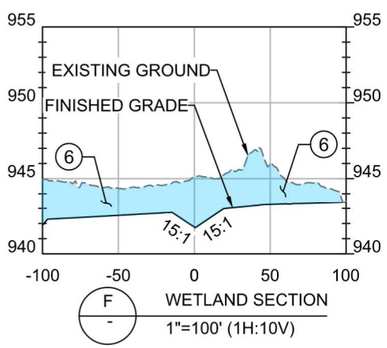
C LINK SECTION
1"=100' (1H:10V)



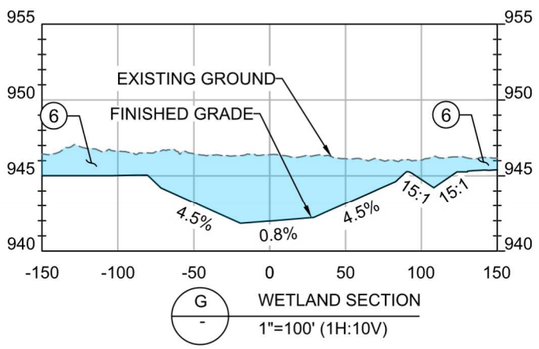
D WETLAND SECTION
1"=100' (1H:10V)



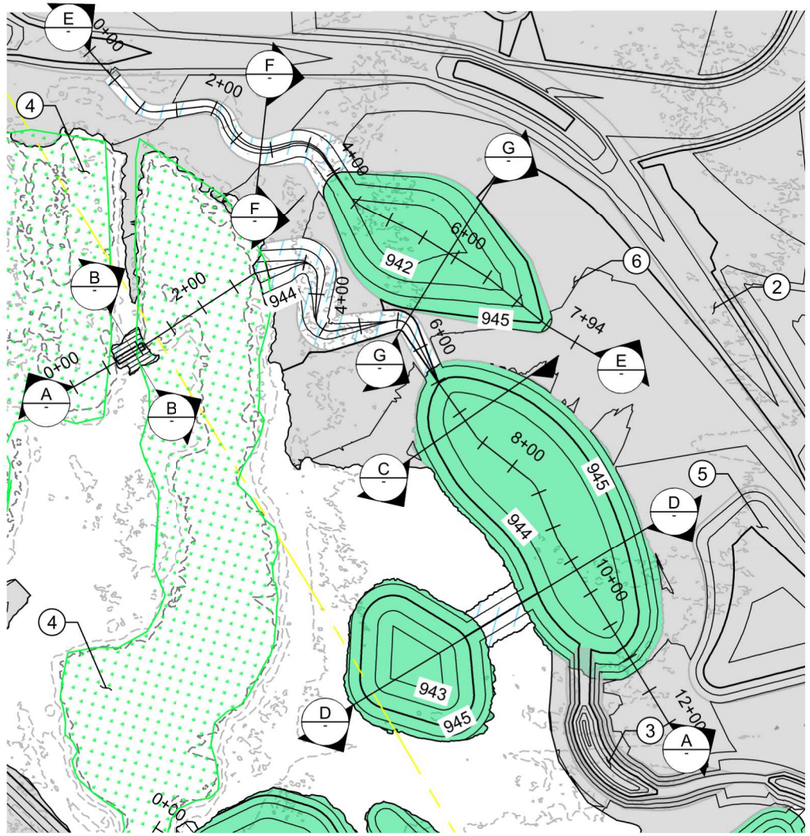
E WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



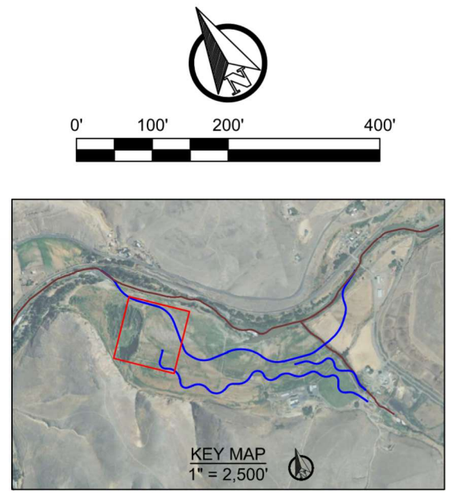
F WETLAND SECTION
1"=100' (1H:10V)



G WETLAND SECTION
1"=100' (1H:10V)



WETLAND AND LINK CHANNEL PLAN VIEW
1" = 200'



LEGEND

- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED WETLAND
- PROPOSED LINK CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
3. PROPOSED SIDE AND DISTRIBUTARY CHANNELS - SEE SHEETS C-225 - C-226.
4. PRESERVE AND PROTECT EXISTING WETLANDS.
5. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
6. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214 FOR OVERALL GRADING PLAN VIEWS.

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Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JERMEY S. ANDREWS
JUL. 9, 2018
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

YAKAMA · WALLA WALLA · UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED WETLANDS AND LINK CHANNELS

DWG. NO.: C-234

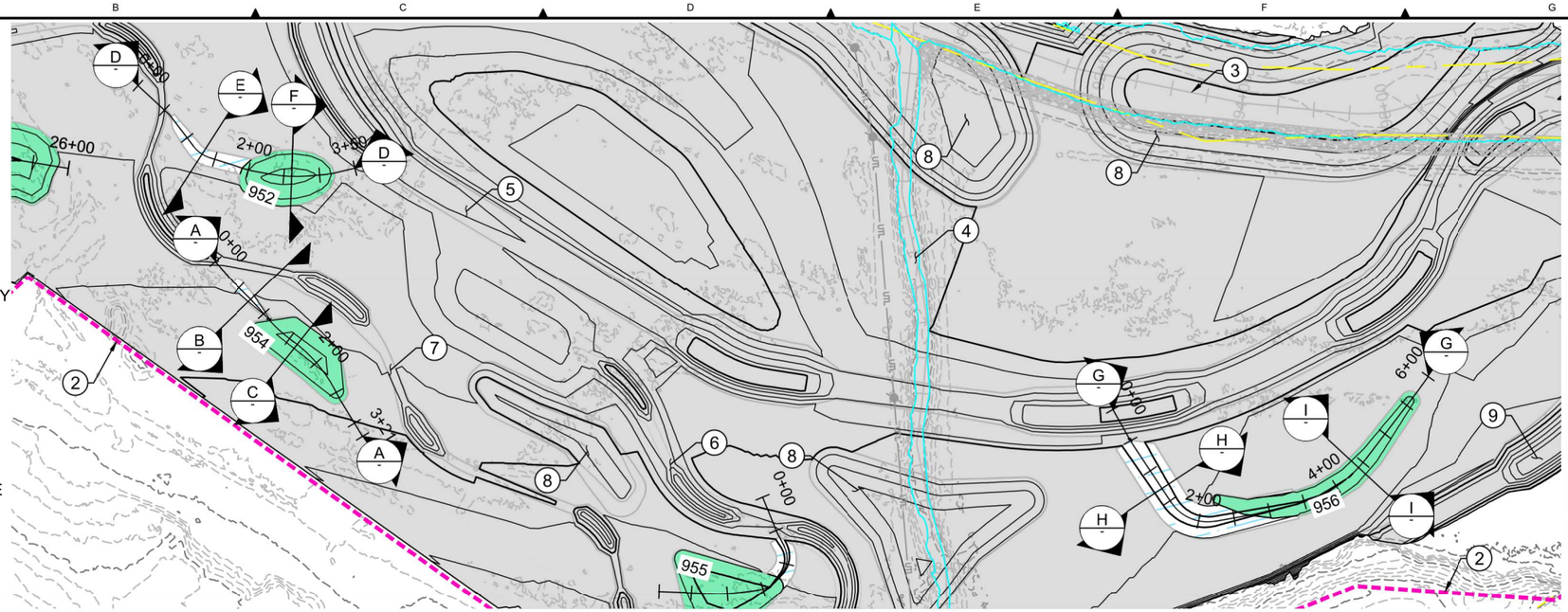
CREATED: 1/19/26

SHEET: 26 of 50

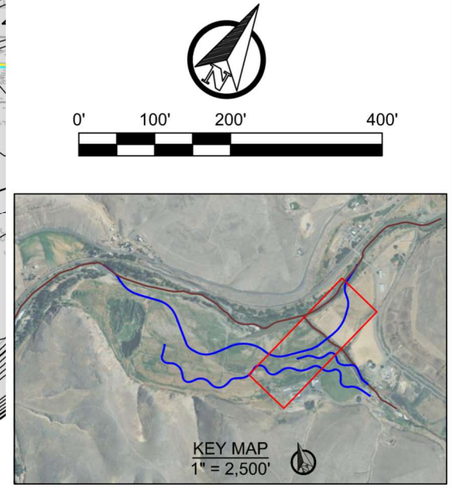
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\12B C234-C236 WETLANDS AND LINK CHANNELS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 11:55 AM

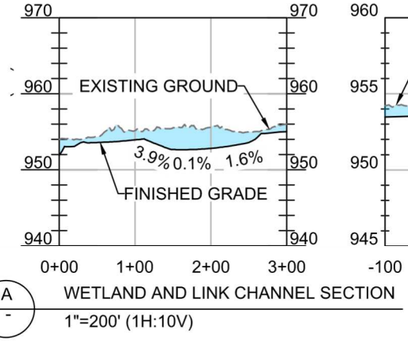
LEGEND

- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING POWER POLE
- EXISTINGPOWER/COMM UTILITY
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED WETLAND
- PROPOSED LINK CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE

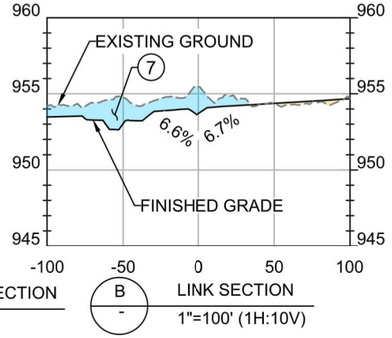


WETLAND AND LINK CHANNEL PLAN VIEW
1" = 200'

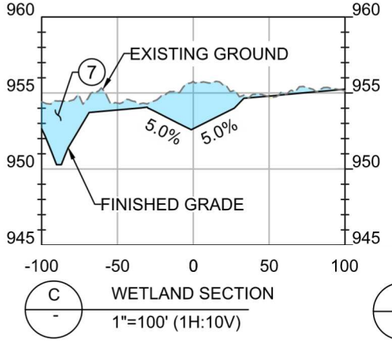




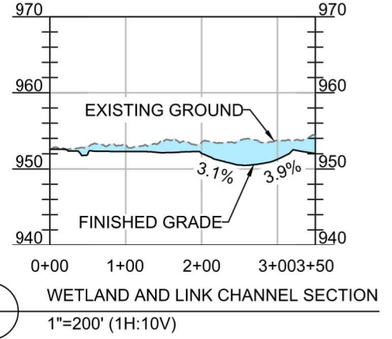
A — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



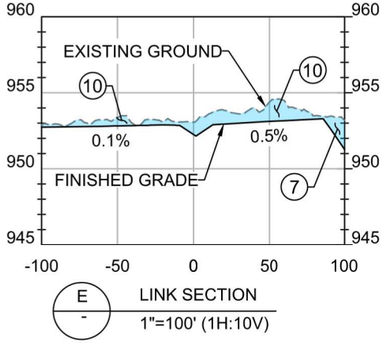
B — LINK SECTION
1"=100' (1H:10V)



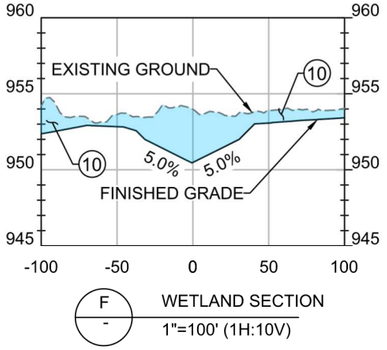
C — WETLAND SECTION
1"=100' (1H:10V)



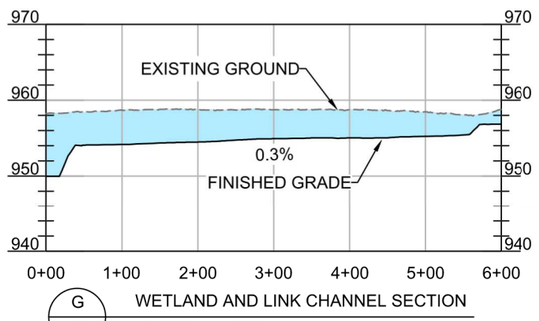
D — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



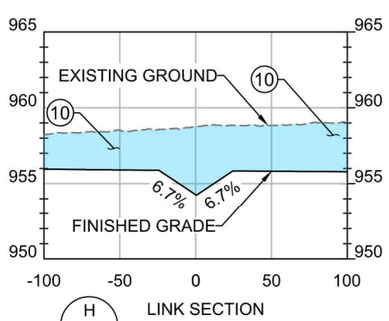
E — LINK SECTION
1"=100' (1H:10V)



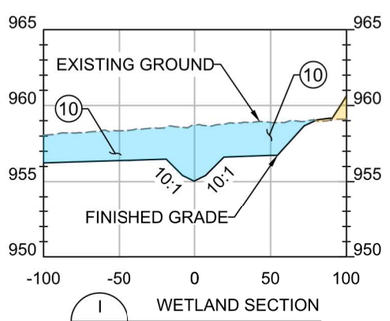
F — WETLAND SECTION
1"=100' (1H:10V)



G — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



H — LINK SECTION
1"=100' (1H:10V)



I — WETLAND SECTION
1"=100' (1H:10V)

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. EXISTING UMATILLA RIVER CHANNEL.
4. EXISTING BIRCH CREEK CHANNEL.
5. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
6. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
7. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
8. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
9. PROPOSED LEVEE REMOVAL AND SETBACK LEVEE PER SEPARATE LEVEE SETBACK PROJECT. SEE LEVEE SETBACK PROJECT 100% DESIGN DRAWINGS FOR DETAILS.
10. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214 FOR OVERALL GRADING PLAN VIEWS.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
9139255
OREGON
JULY 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CTUIR — CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION — Treaty of 1855

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

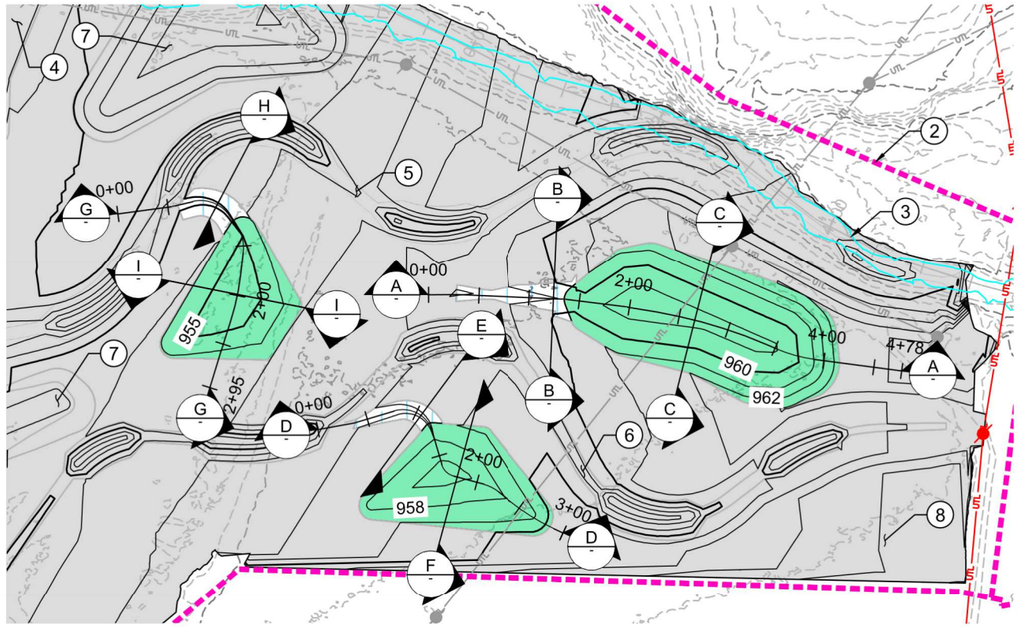
CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED WETLANDS AND LINK CHANNELS

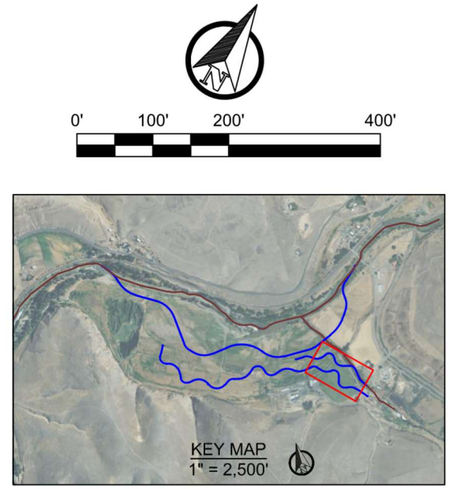
DWG. NO.: C-235
CREATED: 1/19/26
SHEET: 27 of 50

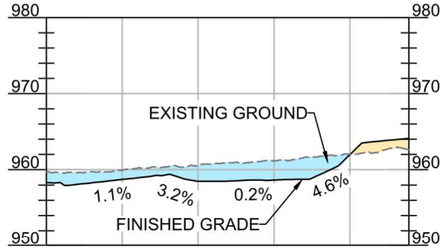
LEGEND

- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING POWER POLE
- EXISTING POWER/COMM UTILITY
- PROPOSED POWER POLE
- PROPOSED POWER/COMM UTILITY
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED WETLAND
- PROPOSED LINK CHANNEL
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE

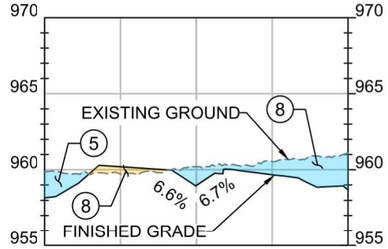


WETLAND AND LINK CHANNEL PLAN VIEW
1" = 150'

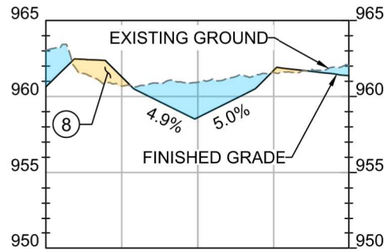




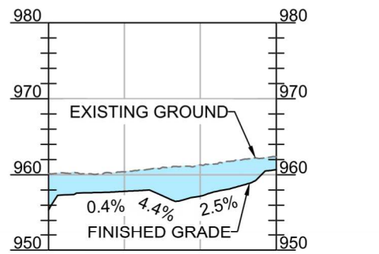
A — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



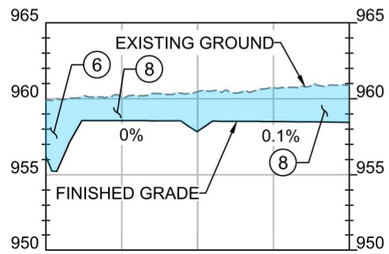
B — LINK SECTION
1"=100' (1H:10V)



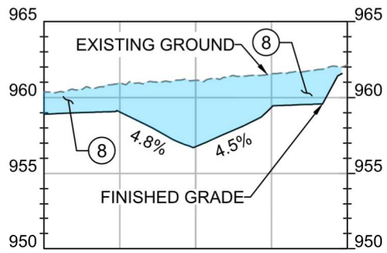
C — WETLAND SECTION
1"=100' (1H:10V)



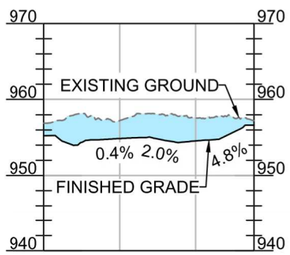
D — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



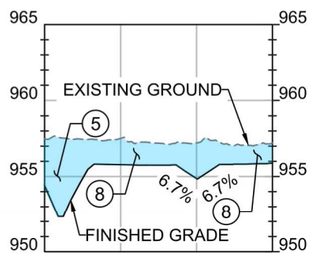
E — LINK SECTION
1"=100' (1H:10V)



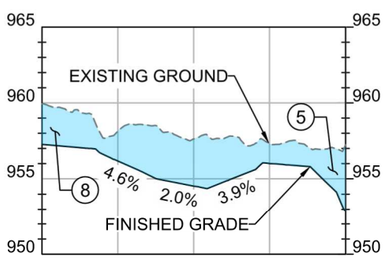
F — WETLAND SECTION
1"=100' (1H:10V)



G — WETLAND AND LINK CHANNEL SECTION
1"=200' (1H:10V)



H — LINK SECTION
1"=100' (1H:10V)



I — WETLAND SECTION
1"=100' (1H:10V)

NOTES:
1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. EXISTING BIRCH CREEK CHANNEL.
4. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
5. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
6. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
7. PROPOSED FLOODPLAIN TERRACE - SEE SHEETS C-243 - C-245.
8. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-208 - C-211 FOR OVERALL GRADING PLAN VIEWS.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL 12 2016
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

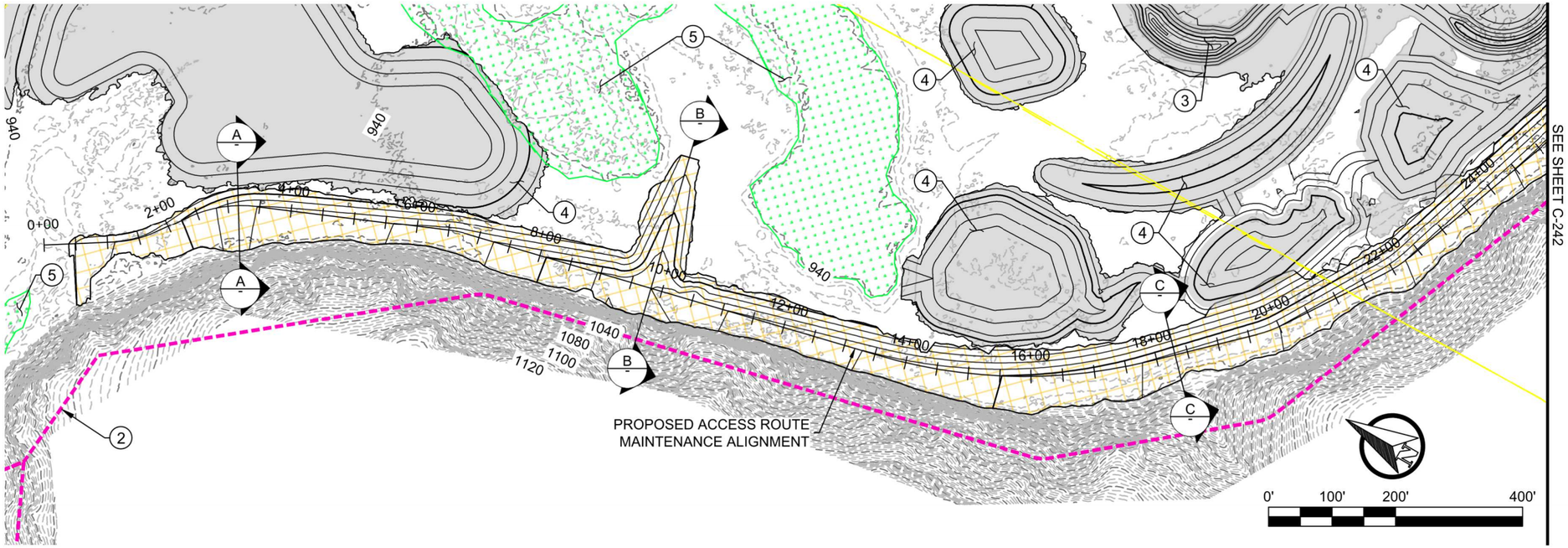
PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

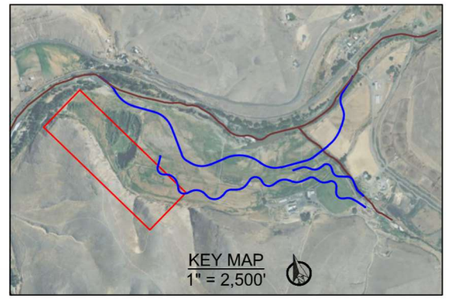
PROPOSED WETLANDS AND LINK CHANNELS

DWG. NO.: C-236
CREATED: 1/19/26
SHEET: 28 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\10%\PA 2\SHEET FILES\12B C234-C236 WETLANDS AND LINK CHANNELS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 11:51 AM

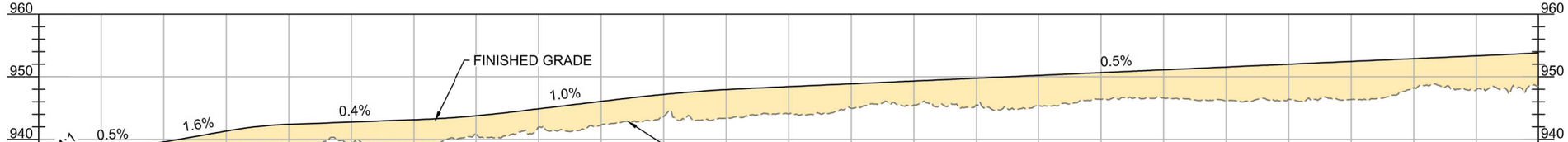


ACCESS ROUTE MAINTENANCE PLAN VIEW
1" = 200'



LEGEND

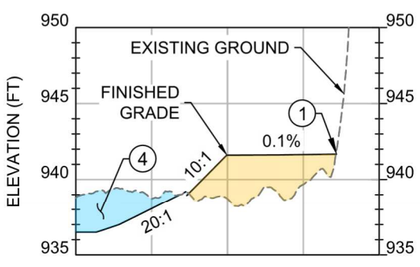
- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING WETLAND
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED ACCESS ROUTE MAINTENANCE
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE



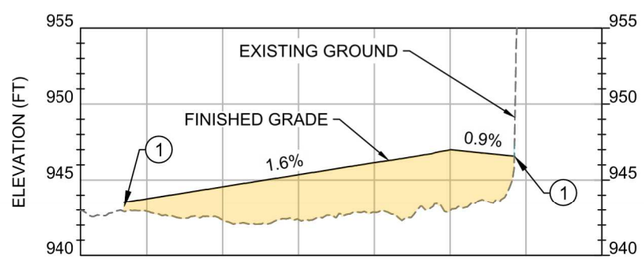
ACCESS ROUTE MAINTENANCE PROFILE
1" = 200' (1H:10V)

NOTES:

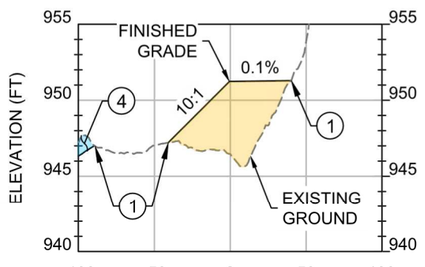
1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
4. PROPOSED WETLANDS - SEE SHEETS C-231 - C-236.
5. PRESERVE AND PROTECT EXISTING WETLANDS.



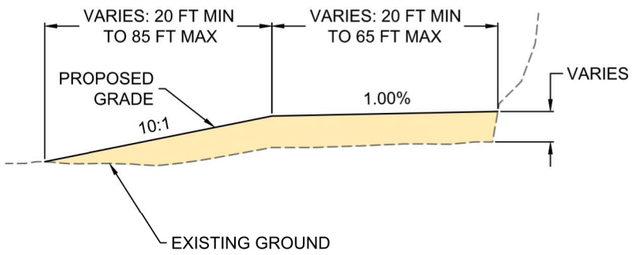
A — ACCESS ROUTE SECTION
1"=100' (1H:10V)



B — ACCESS ROUTE SECTION
1"=100' (1H:10V)



C — ACCESS ROUTE SECTION
1"=100' (1H:10V)



D — TYPICAL ACCESS ROUTE SECTION
NOT TO SCALE

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2019
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

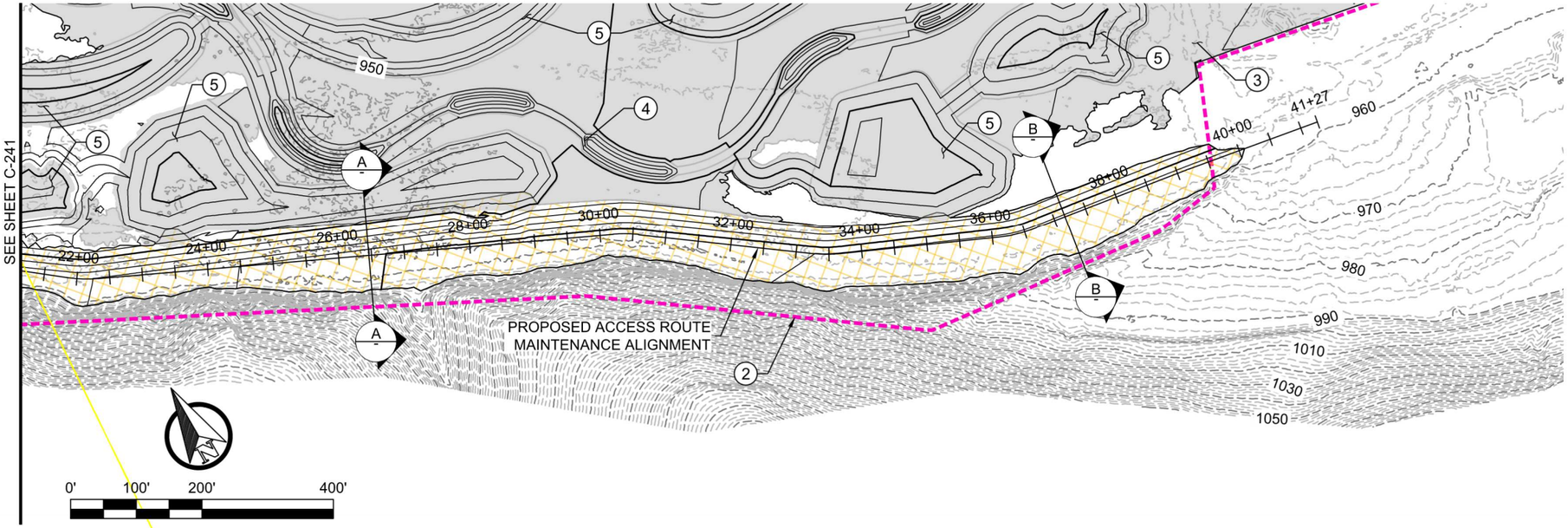
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

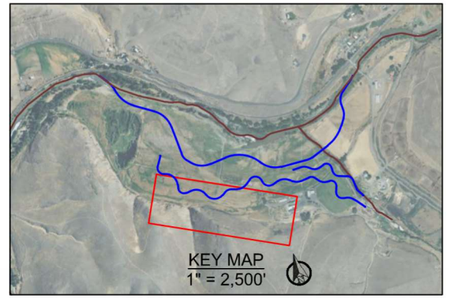
PROPOSED ACCESS ROUTE MAINTENANCE PROFILES & SECTIONS

DWG. NO.: C-241
CREATED: 1/19/26
SHEET: 29 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\13 C10 OUTDOOR REC PROFILE AND SECTIONS.DWG
PLOT DETAILS: SINKS, NATHAN — January 21, 2026 — 10:46 AM

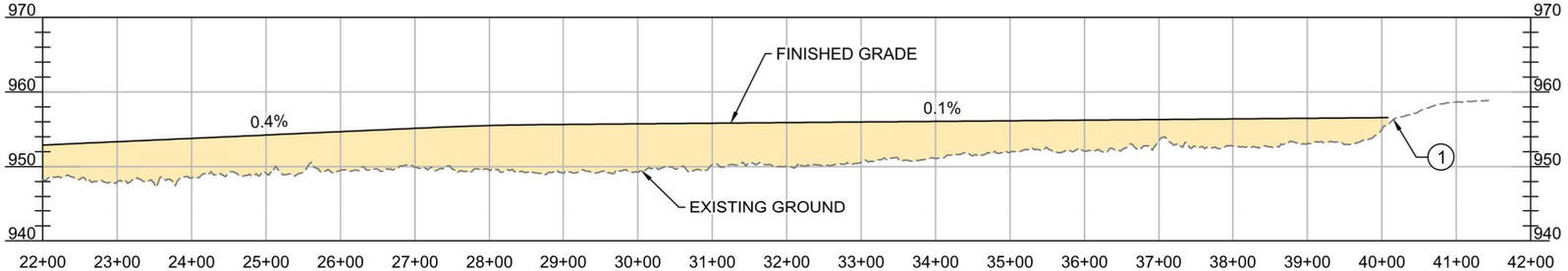


ACCESS ROUTE MAINTENANCE PLAN VIEW
1" = 200'



LEGEND

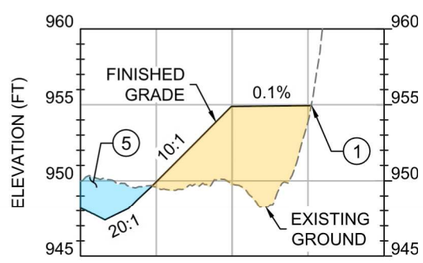
- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED ACCESS ROUTE MAINTENANCE
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE



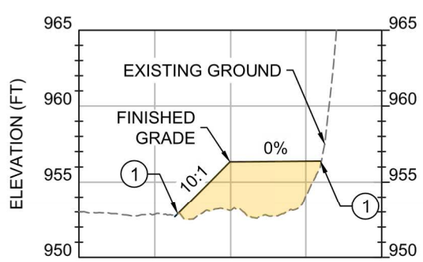
ACCESS ROUTE MAINTENANCE PROFILE
1" = 200' (1H:10V)

NOTES:

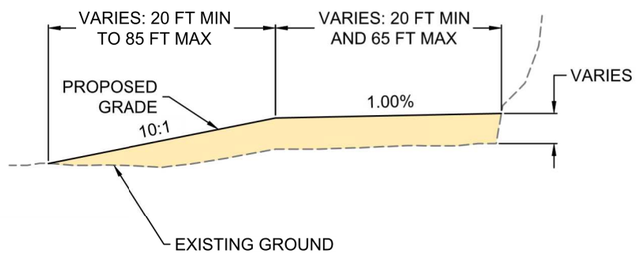
1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214 FOR OVERALL GRADING PLAN VIEWS.
4. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
5. PROPOSED WETLANDS - SEE SHEETS C-231 - C-236.



A
ACCESS ROUTE SECTION
1"=100' (1H:10V)



B
ACCESS ROUTE SECTION
1"=100' (1H:10V)



C
TYPICAL ACCESS ROUTE SECTION
NOT TO SCALE

TETRA TECH
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19803 North Creek Parkway
Bothell, Washington 98011
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REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL 9, 2018
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

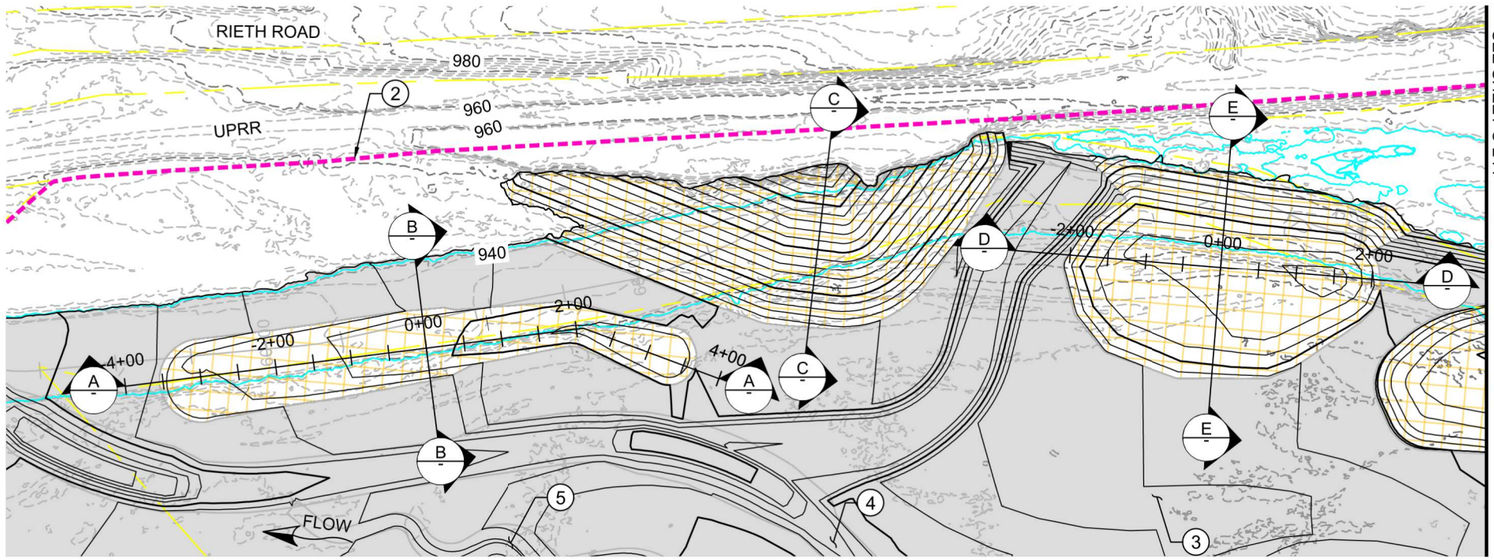
ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")						
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

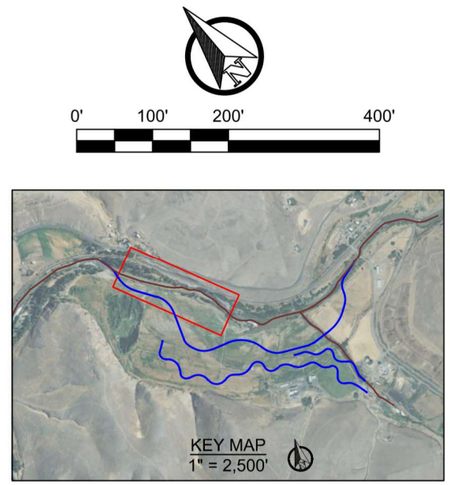
CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED ACCESS ROUTE MAINTENANCE PROFILES & SECTIONS

DWG. NO.: C-242
CREATED: 1/19/26
SHEET: 30 of 50

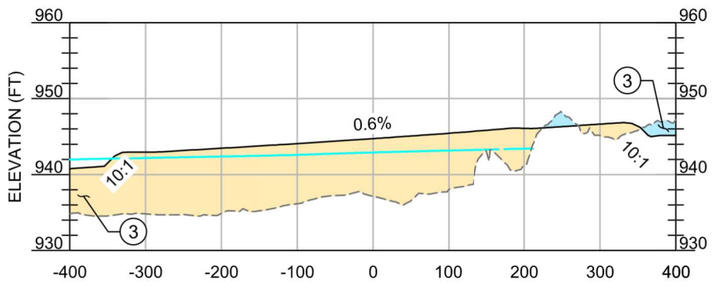


PROPOSED FLOODPLAIN TERRACE PLAN VIEW
1" = 200'

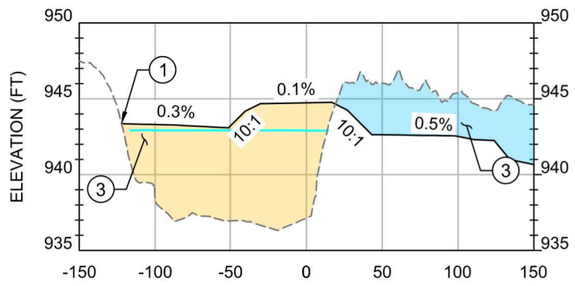


LEGEND

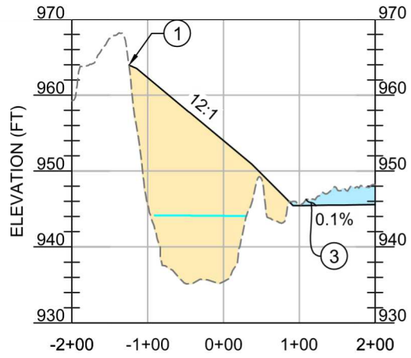
- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- PROJECT AREA BOUNDARY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED FLOODPLAIN TERRACE
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE



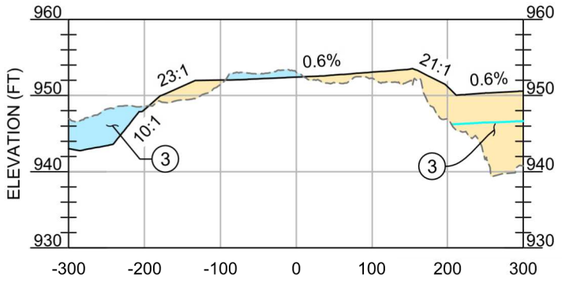
A — PROPOSED FLOODPLAIN TERRRACE PROFILE VIEW
1"=200' (1H:10V)



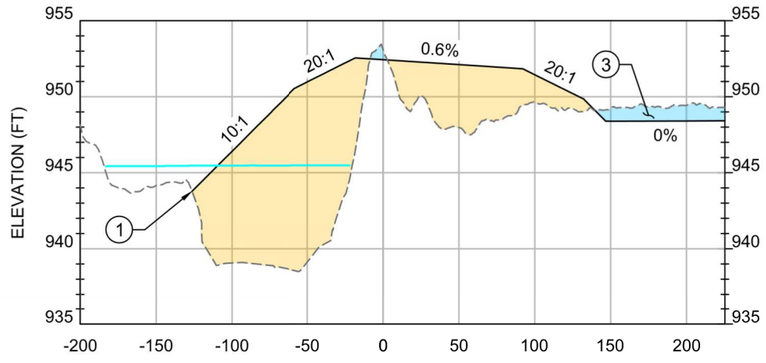
B — PROPOSED FLOODPLAIN TERRRACE SECTION VIEW
1"=100' (1H:10V)



C — PROPOSED FLOODPLAIN TERRRACE SECTION VIEW
1"=200' (1H:10V)



D — PROPOSED FLOODPLAIN TERRRACE PROFILE VIEW
1"=200' (1H:10V)



E — PROPOSED FLOODPLAIN TERRRACE SECTION VIEW
1"=100' (1H:10V)

NOTES:

1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214.
4. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
5. PROPOSED WETLANDS AND LINK CHANNELS- SEE SHEETS C-231 - C-236.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA
CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

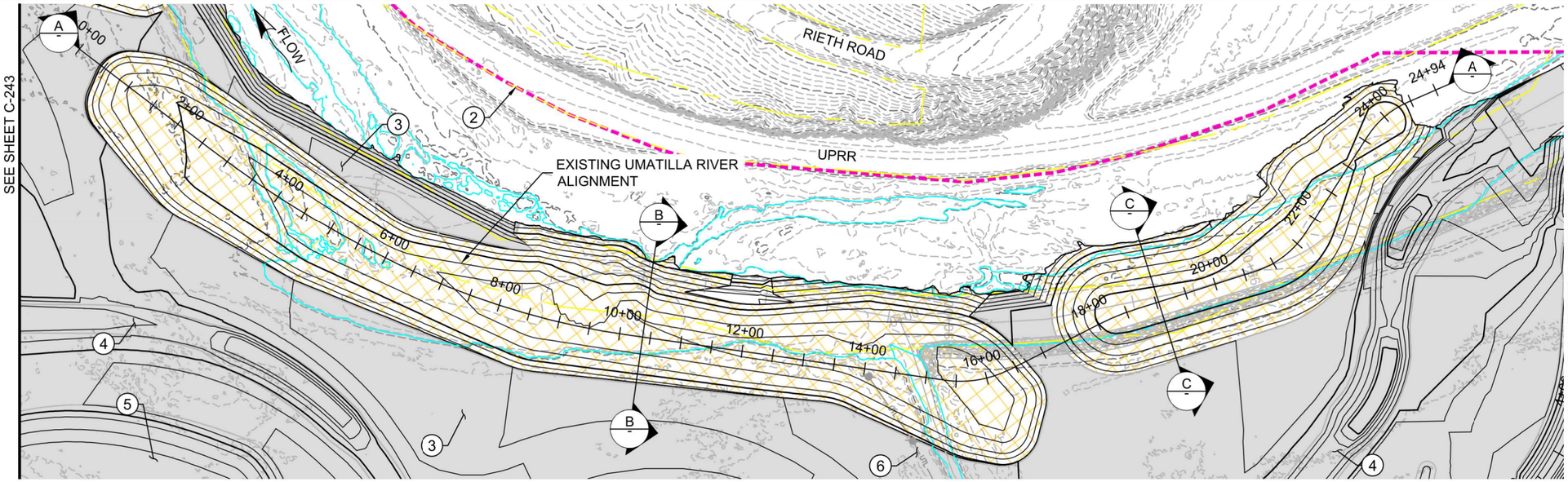
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

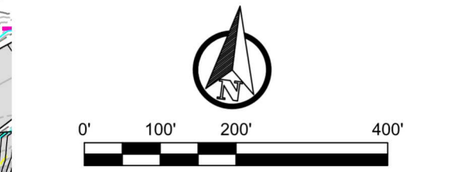
PROPOSED FLOODPLAIN TERRACE PROFILE & SECTIONS

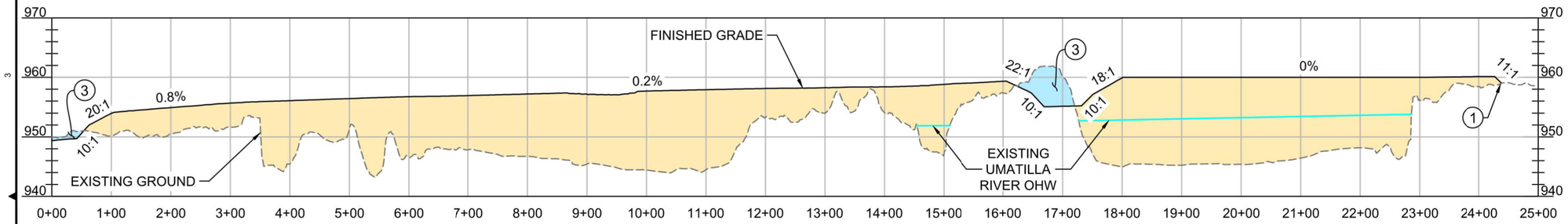
DWG. NO.: C-243
CREATED: 1/19/26
SHEET: 31 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\10C%\PA 2\SHEET FILES\14 C11 FLOODPLAIN TERRACE.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 10:22 AM

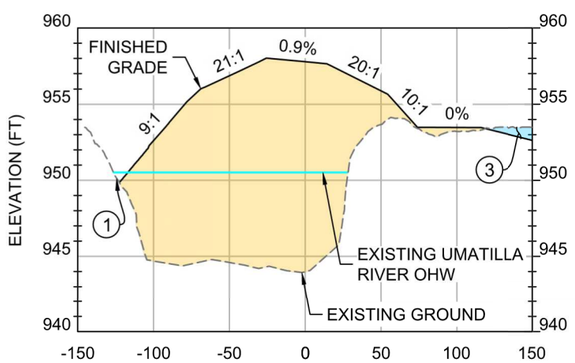


PROPOSED FLOODPLAIN TERRACE PLAN VIEW
1" = 200'



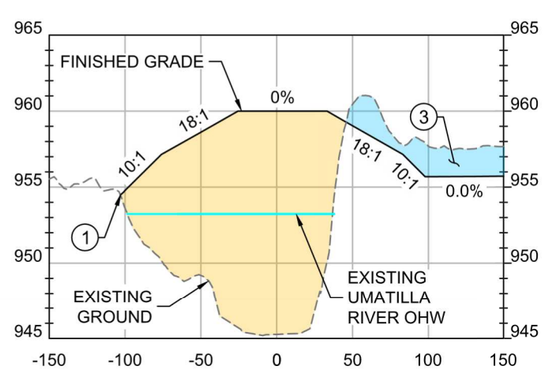


A — PROPOSED FLOODPLAIN TERRACE PROFILE
1"=200' (1H:10V)



B — PROPOSED FLOODPLAIN TERRACE SECTION
1"=100' (1H:10V)

NOTES:
1. DAYLIGHT PROPOSED FINISHED GRADE TO MATCH EXISTING GROUND.
2. PROPOSED PROJECT AREA BOUNDARY. SEE SHEET E-201 FOR OVERVIEW.
3. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214.
4. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
5. PROPOSED WETLANDS AND LINK CHANNELS- SEE SHEETS C-231 - C-236.
6. PROPOSED POD DECOMISSION. SEE SHEET C-203.



C — PROPOSED FLOODPLAIN TERRACE SECTION
1"=100' (1H:10V)

LEGEND
- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- POWER POLE
- POWER/COMM UTILITY
- PROJECT AREA BOUNDARY
- EXISTING LEVEE
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED FLOODPLAIN TERRACE
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
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REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2018
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

PLAN SHEET SIZE ANSI B (11" X 17")

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

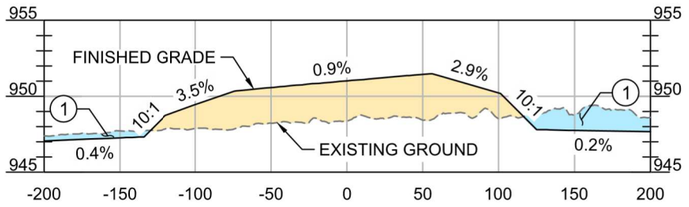
PROPOSED FLOODPLAIN TERRACE PROFILE & SECTIONS

DWG. NO.: C-244
CREATED: 1/19/26
SHEET: 32 of 50

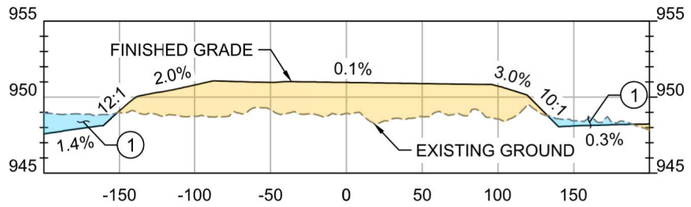
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\14 C11 FLOODPLAIN TERRACE.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 10:21 AM

LEGEND

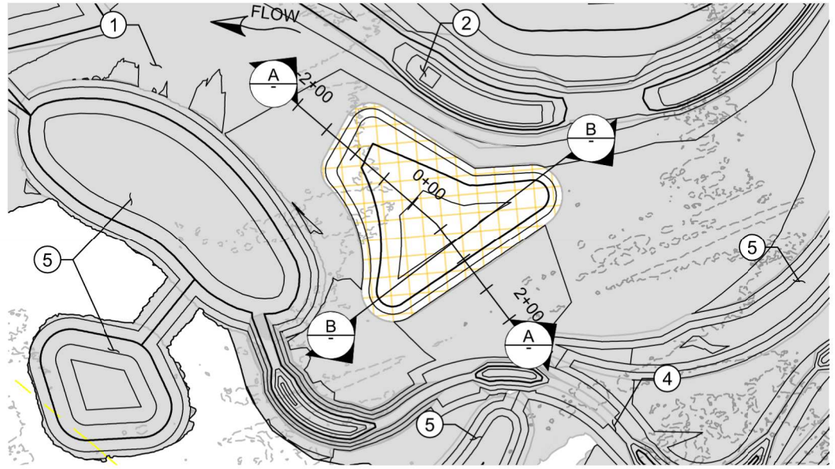
- EXISTING 2-FOOT CONTOUR
- EXISTING 10-FOOT CONTOUR
- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- EXISTING OHW
- EXISTING POWER POLE
- EXISTING POWER/COMM UTILITY
- PROPOSED 1-FOOT CONTOUR
- PROPOSED 5-FOOT CONTOUR
- PROPOSED ALIGNMENT
- PROPOSED FLOODPLAIN TERRACE
- PROPOSED CUT
- PROPOSED FILL
- SEE NOTE FOR PROJECT ELEMENT SHEET REFERENCE



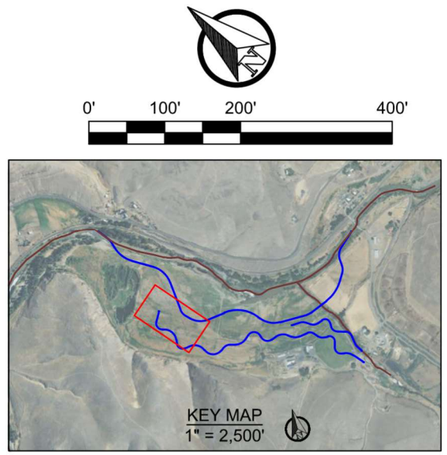
A — PROPOSED FLOODPLAIN TERRACE PROFILE
1"=100' (1H:10V)



B — PROPOSED FLOODPLAIN TERRACE SECTION
1"=100' (1H:10V)

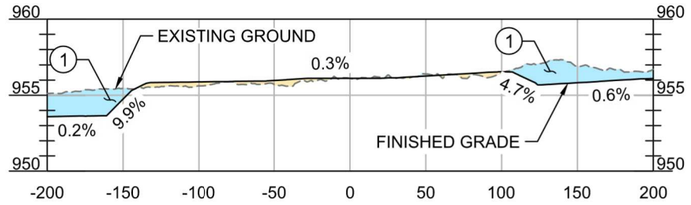


PROPOSED FLOODPLAIN TERRACE PLAN VIEW
1" = 200'



NOTES:

1. PROPOSED FLOODPLAIN BENCHING - SEE SHEETS C-211 - C-214.
2. PROPOSED UMATILLA RIVER CHANNEL - SEE SHEETS C-221 - C-223.
3. PROPOSED BIRCH CREEK CHANNEL - SEE SHEET C-224.
4. PROPOSED DISTRIBUTARY CHANNEL - SEE SHEETS C-225 - C-226.
5. PROPOSED WETLANDS AND LINK CHANNELS- SEE SHEETS C-231 - C-236.



C — PROPOSED FLOODPLAIN TERRACE SECTION
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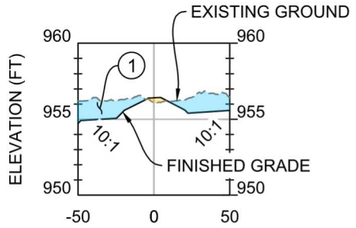

D — PROPOSED FLOODPLAIN TERRACE SECTION
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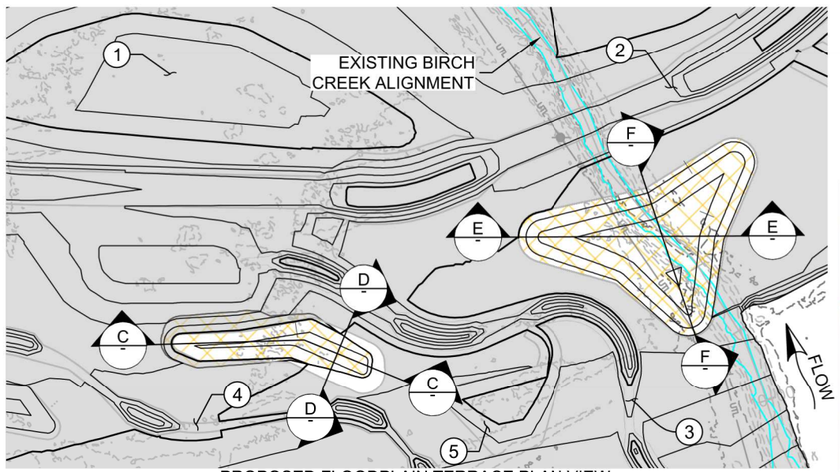
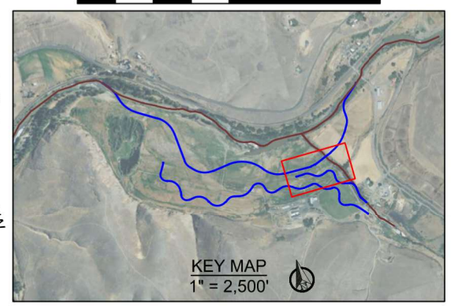
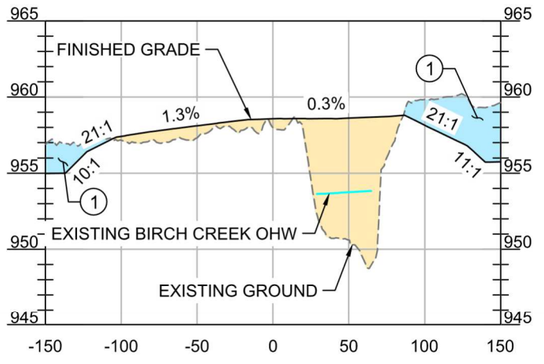


PROPOSED FLOODPLAIN TERRACE PLAN VIEW
1" = 200'





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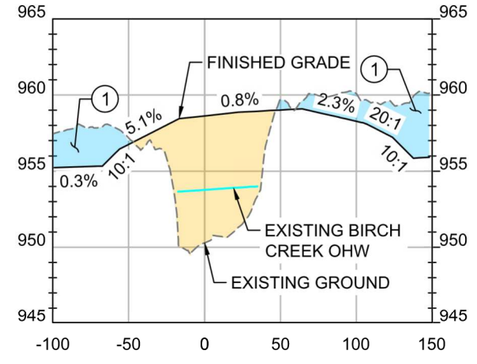
1"=100' (1H:10V)



F — PROPOSED FLOODPLAIN TERRACE SECTION
1"=100' (1H:10V)

TETRA TECH
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Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER — 91392PE — OREGON — JEREMY S. ANDREWS — JUL. 12, 2016 — EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION — CAYUSE · WALLA WALLA · UMATILLA — Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED FLOODPLAIN TERRACE PROFILE & SECTIONS

DWG. NO.: C-245

CREATED: 1/19/26

SHEET: 33 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\14 C11 FLOODPLAIN TERRACE.DWG
PLOT DETAILS: SINKS, NATHAN — January 21, 2026 — 10:19 AM

PROPOSED LWM CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
401	730954.49	8613094.96	REVETMENT
402	730914.75	8613117.58	REVETMENT
403	730876.94	8613141.99	REVETMENT
404	730866.32	8613155.77	REVETMENT
405	730822.08	8613167.34	REVETMENT
406	730779.24	8613181.13	REVETMENT
407	730734.95	8613201.14	22-LOG JAM
408	730734.38	8613237.79	22-LOG JAM
409	730662.07	8613181.48	22-LOG JAM
410	730661.50	8613218.13	22-LOG JAM
411	730613.55	8613230.91	22-LOG JAM
412	730616.18	8613267.48	22-LOG JAM
413	730540.52	8613242.43	22-LOG JAM
414	730549.46	8613277.98	22-LOG JAM
415	730159.52	8613805.56	22-LOG HABITAT
416	730089.47	8613854.51	22-LOG HABITAT
417	730008.88	8613894.85	22-LOG HABITAT
418	730063.64	8614333.69	REVETMENT
419	730072.90	8614378.47	REVETMENT
420	730084.46	8614421.96	REVETMENT
421	730022.86	8614356.35	10-LOG HABITAT TYPE A
422	730023.01	8614419.22	10-LOG HABITAT TYPE A
423	730061.70	8614418.52	10-LOG HABITAT TYPE A

PROPOSED LWM CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
424	729998.91	8614461.75	10-LOG HABITAT TYPE A
425	729766.77	8614223.56	10-LOG HABITAT TYPE A
426	729660.43	8614400.99	10-LOG HABITAT TYPE A
427	729633.99	8614559.54	10-LOG HABITAT TYPE A
428	729651.82	8614636.05	10-LOG HABITAT TYPE A
429	729618.74	8614607.05	10-LOG HABITAT TYPE A
430	729625.17	8614671.91	10-LOG HABITAT TYPE A
431	729364.49	8613494.64	10-LOG HABITAT TYPE A
432	729304.55	8613471.34	10-LOG HABITAT TYPE A
433	729118.53	8613704.54	10-LOG HABITAT TYPE A
434	729165.42	8613905.26	22-LOG JAM
435	729190.94	8613931.58	22-LOG JAM
436	729198.54	8613963.70	22-LOG JAM
437	729233.80	8613973.74	22-LOG JAM
438	729388.60	8613915.82	22-LOG HABITAT
439	729308.76	8613958.80	22-LOG HABITAT
440	729146.12	8614141.17	22-LOG HABITAT
441	729117.08	8614231.02	22-LOG HABITAT
442	729111.55	8614323.96	22-LOG HABITAT
443	729173.42	8614540.26	LARGE APEX
444	729231.18	8614568.45	LARGE APEX
445	729351.04	8614672.54	10-LOG HABITAT
446	729335.29	8614751.30	10-LOG HABITAT TYPE A

PROPOSED LWM CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
447	729267.56	8614824.38	10-LOG HABITAT TYPE A
448	729265.98	8614916.90	10-LOG HABITAT TYPE A
449	729157.02	8614896.09	22-LOG HABITAT
450	729111.84	8614983.36	22-LOG HABITAT
451	729059.29	8615057.95	22-LOG HABITAT
452	728822.15	8613727.26	10-LOG HABITAT TYPE A
453	728791.26	8614035.08	10-LOG HABITAT TYPE A
454	728618.71	8614146.61	10-LOG HABITAT TYPE A
455	729026.70	8614500.19	10-LOG HABITAT TYPE A
456	728658.87	8614493.69	10-LOG HABITAT TYPE A
457	729326.37	8616155.19	10-LOG HABITAT TYPE A
458	728595.51	8614710.89	10-LOG HABITAT TYPE A
459	728744.83	8614990.32	10-LOG HABITAT TYPE A
460	728524.60	8615141.87	10-LOG HABITAT TYPE A
461	728581.17	8615411.57	10-LOG HABITAT TYPE A
462	728646.33	8615534.02	10-LOG HABITAT TYPE A
463	728460.10	8615597.67	10-LOG HABITAT TYPE A
464	728839.51	8615197.75	22-LOG HABITAT
465	728796.78	8615260.62	22-LOG HABITAT
466	728767.24	8615330.20	22-LOG HABITAT
467	728728.21	8615703.78	22-LOG HABITAT
468	728720.48	8615783.46	22-LOG HABITAT
469	728737.52	8615933.42	22-LOG HABITAT

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REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PROPOSED CONSTRUCTION POINTS

DWG. NO.: C-251
CREATED: 1/19/26
SHEET: 34 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\15 C251-C252 CONSTRUCTION POINTS.DWG
PLOT DETAILS: SINKS, NATHAN January 19, 2026 5:09 PM

PROPOSED LWM CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
470	728761.63	8616013.25	22-LOG HABITAT
471	729139.39	8615362.19	10-LOG HABITAT TYPE A
472	729139.64	8615511.80	10-LOG HABITAT TYPE A
473	729135.46	8615745.41	10-LOG HABITAT TYPE A
474	729052.81	8615973.53	10-LOG HABITAT TYPE A
475	728673.97	8615768.18	10-LOG HABITAT TYPE A
476	728649.83	8615781.69	10-LOG HABITAT TYPE A
477	728647.81	8615853.25	10-LOG HABITAT TYPE A
478	728479.85	8615900.65	10-LOG HABITAT TYPE A
479	728562.75	8615979.59	10-LOG HABITAT TYPE A
480	728355.01	8616000.15	10-LOG HABITAT TYPE A
481	728363.81	8615463.95	10-LOG HABITAT TYPE B
482	728354.95	8615538.34	10-LOG HABITAT TYPE B
483	728351.73	8615621.88	10-LOG HABITAT TYPE B
484	728345.70	8615699.55	10-LOG HABITAT TYPE B
485	728342.73	8615784.98	10-LOG HABITAT TYPE B
486	728343.98	8615879.12	10-LOG HABITAT TYPE B
487	728315.93	8615932.42	10-LOG HABITAT TYPE B
488	728253.75	8615984.86	10-LOG HABITAT TYPE B
489	728792.63	8615997.87	LARGE APEX
490	728856.90	8615997.98	LARGE APEX
491	728624.50	8616187.52	10-LOG HABITAT TYPE A
492	728588.01	8616241.55	10-LOG HABITAT TYPE A

PROPOSED LWM CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
493	728386.95	8616139.29	10-LOG HABITAT TYPE A
494	728313.70	8616216.60	10-LOG HABITAT TYPE A
495	728033.68	8616211.48	10-LOG HABITAT TYPE A
496	727993.70	8616385.29	10-LOG HABITAT TYPE A
497	728394.12	8616234.55	SMALL APEX
498	728429.92	8616249.03	SMALL APEX
499	728510.66	8616282.50	SMALL APEX
500	728522.58	8616319.23	SMALL APEX
501	728550.16	8616322.20	SMALL APEX
502	728562.08	8616358.93	SMALL APEX
503	728332.85	8616435.36	SMALL APEX
504	728327.49	8616473.61	SMALL APEX
505	728299.37	8616473.08	SMALL APEX
506	728294.01	8616511.33	SMALL APEX
507	728819.87	8616416.66	22-LOG JAM
508	728838.69	8616385.20	22-LOG JAM
509	728926.17	8616396.13	22-LOG HABITAT
510	728974.53	8616462.76	22-LOG HABITAT
511	729059.74	8616218.97	10-LOG HABITAT
512	729279.72	8616148.30	10-LOG HABITAT
513	729248.42	8616192.20	10-LOG HABITAT
514	729226.50	8616324.17	10-LOG HABITAT TYPE A
515	729129.61	8616352.24	10-LOG HABITAT

PROPOSED LWM CONSTRUCTION POINT TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
516	729209.78	8616433.30	10-LOG HABITAT TYPE A
517	729313.05	8616508.21	10-LOG HABITAT TYPE A
518	729300.25	8616573.67	10-LOG HABITAT TYPE A
519	729246.40	8616687.16	22-LOG HABITAT
520	729319.89	8616710.64	22-LOG HABITAT
521	729401.47	8616711.89	22-LOG HABITAT
522	729486.30	8616637.55	REVETMENT
523	729530.40	8616649.66	REVETMENT
524	729574.39	8616659.13	REVETMENT
525	729592.19	8616651.76	REVETMENT
526	729629.49	8616678.22	REVETMENT
527	729667.59	8616702.17	REVETMENT
528	729691.92	8616732.86	22-LOG JAM
529	729726.56	8616720.86	22-LOG JAM
530	729740.22	8616758.11	22-LOG JAM
531	729776.41	8616752.31	22-LOG JAM
532	729777.40	8616807.28	22-LOG JAM
533	729813.60	8616801.48	22-LOG JAM
534	729790.18	8616601.19	22-LOG HABITAT
535	729810.74	8616630.79	22-LOG HABITAT

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EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA
CONFEDERATED TRIBES OF THE
UMATILLA INDIAN RESERVATION
Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

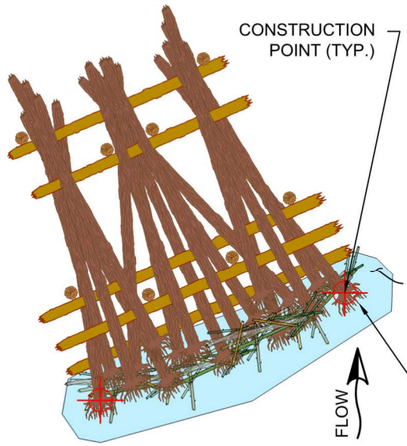
PROPOSED CONSTRUCTION POINTS

DWG. NO.: C-252

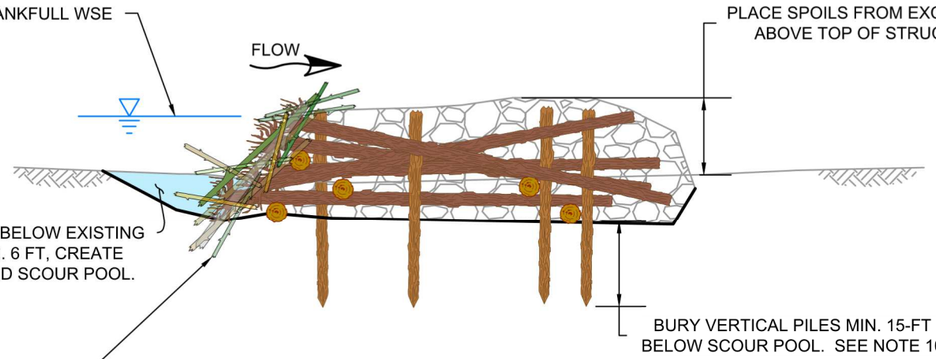
CREATED: 1/19/26

SHEET: 35 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\15 C251-C252 CONSTRUCTION POINTS.DWG
PLOT DETAILS: SINKS, NATHAN January 19, 2026 5:09 PM



22-LOG JAM STRUCTURE - PLAN VIEW
NTS



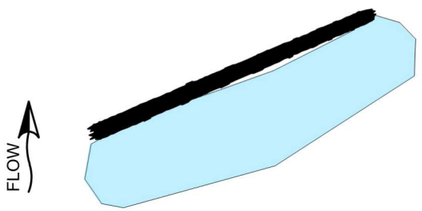
22-LOG JAM STRUCTURE - SECTION VIEW
NTS

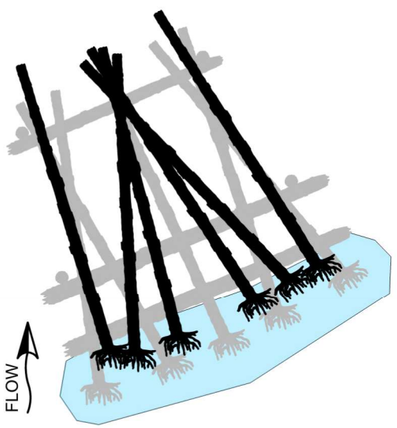
CONSTRUCTION QUANTITIES:

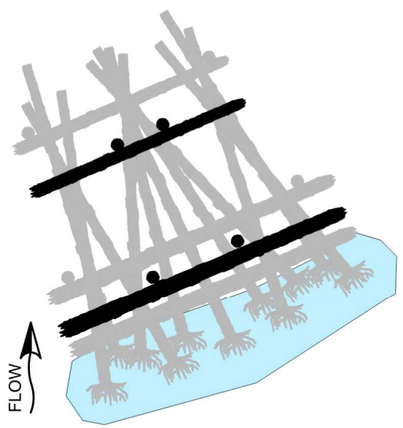
COMPONENT	DESCRIPTION	QUANTITY
LOG WITH ROOTWAD	18"+ DBH, 40 FT MIN, 4' MIN ROOTWAD	17
LOG WITHOUT ROOTWAD	18"+ DBH, 40 FT MIN	5
VERTICAL PILING	12-18" DBH, 40 FT MIN	8
SLASH/RACKING MATERIAL	MISC. (4-10" DBH, 6-16')	48
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	126 CY

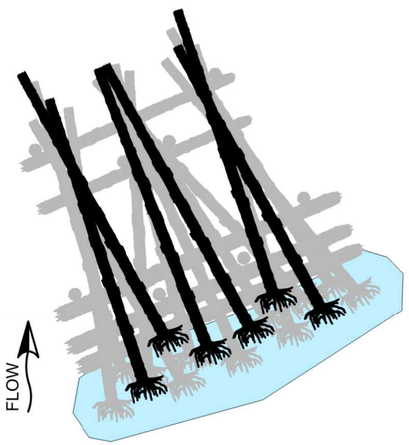
22-LOG JAM STRUCTURE NOTES:

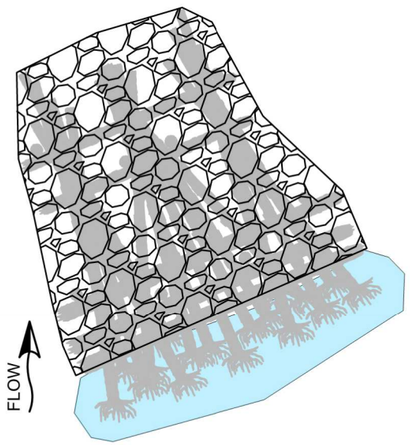
1. INSTALL TEMPORARY COFFERDAM TO ISOLATE WORK AREA.
2. FISH SALVAGE TO BE SUPERVISED BY QUALIFIED FISH BIOLOGIST.
3. EXCAVATE TRENCH TO A MINIMUM OF 6 FT DEPTH AND 6 FT WIDTH TO COMPLETELY BURY BOTTOM LAYER OF STRUCTURE AND DEVELOP SCOUR POOL.
4. BASE LOG PLACED IN SEQUENCE #1 DOES NOT REQUIRE A ROOTWAD.
5. SECURE BASE LOGS PLACED IN SEQUENCE #3 AND #5 WITH VERTICAL PILINGS.
6. LOGS PLACED IN SEQUENCE #2, #4, AND #6 SHALL BE PLACED AT BACK OF STRUCTURE AND PUSHED FORWARD INTO PLACE. LOGS TO BE INTERTWINED WITH PREVIOUSLY PLACED LOGS AS MUCH AS POSSIBLE TO DEVELOP COMPLEX JAM.
7. PLACE RACKING MATERIAL IN FRONT OF STRUCTURE TO PROMOTE A SEAL AT THE FACE OF THE JAM.
8. SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES. BACKFILL STRUCTURE AFTER SEQUENCE #4 AND AGAIN AFTER SEQUENCE #6. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET. ADDITIONAL ALLUVIAL FLOODPLAIN MATERIAL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN. BALLAST MATERIAL MAY BE HARVESTED FROM EXISTING EXPOSED GRAVEL BARS AS DIRECTED BY OWNER. BALLAST MATERIAL INCIDENTAL TO STRUCTURE COST.
9. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.
10. IF BEDROCK IS ENCOUNTERED, PLACE 190 CY OF SOIL BALLAST IN LIEU OF VERTICAL PILES. COORDINATE SOIL BALLAST IN THE FIELD WITH OWNER'S REPRESENTATIVE.
11. BURY STRUCTURE A MINIMUM OF 4 FT. ADDITIONAL BACKFILL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN.
12. PLANT 15 TO 25 WILLOW STAKES IN STRUCTURE TO COMPLETE CONSTRUCTION.











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YAKAMA · WALLA WALLA · UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

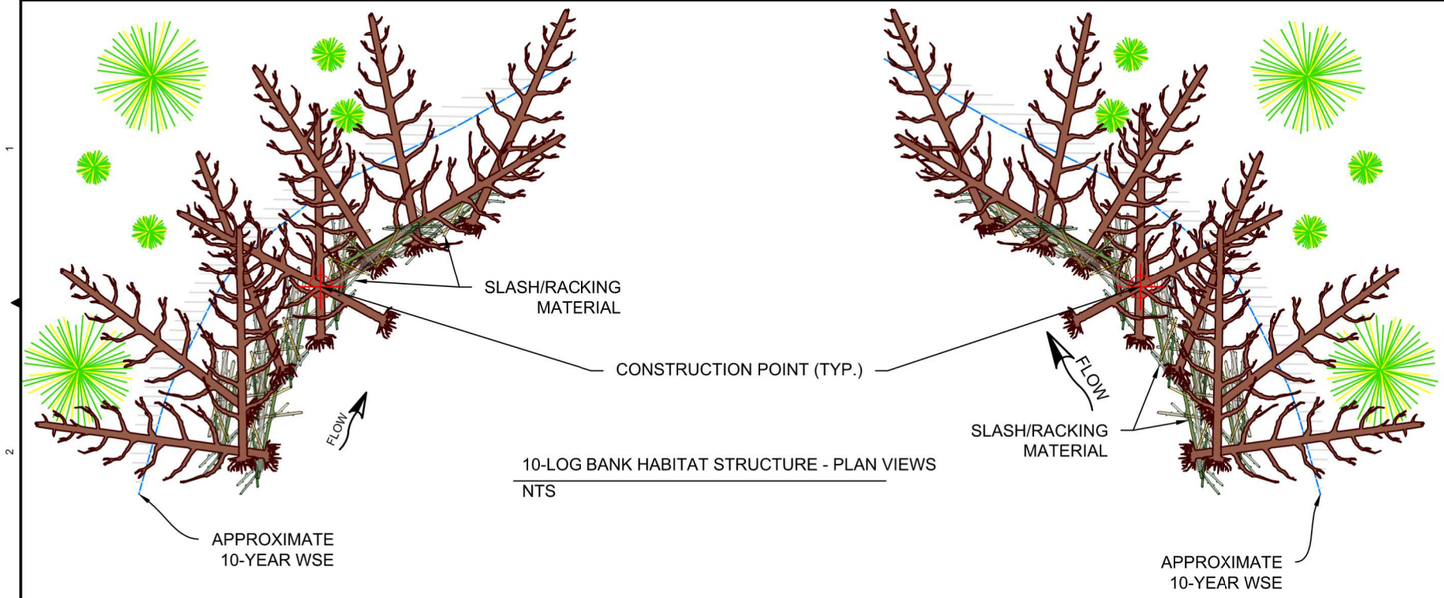
PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

LWM DETAILS
22-LOG JAM STRUCTURE

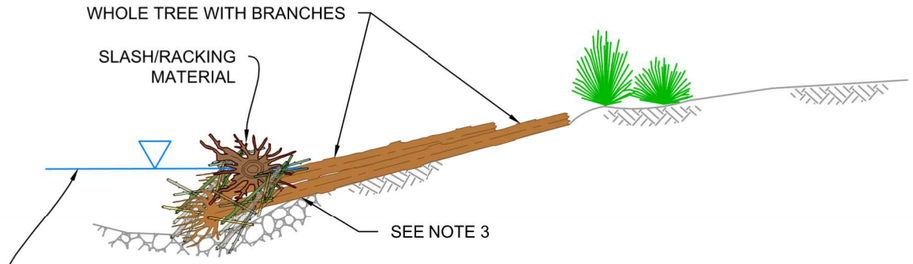
DWG. NO.: C-261
CREATED: 1/19/26
SHEET: 36 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\16 C261-C267 LWD DETAIL SHEETS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN
January 21, 2026
4:34 PM



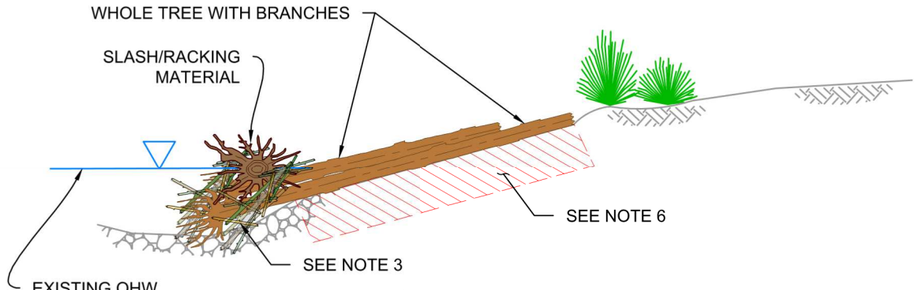
10-LOG BANK HABITAT STRUCTURE - PLAN VIEWS

NTS



10-LOG BANK HABITAT STRUCTURE - SECTION VIEW - TYPE A

NTS



10-LOG BANK HABITAT STRUCTURE - SECTION VIEW - TYPE B

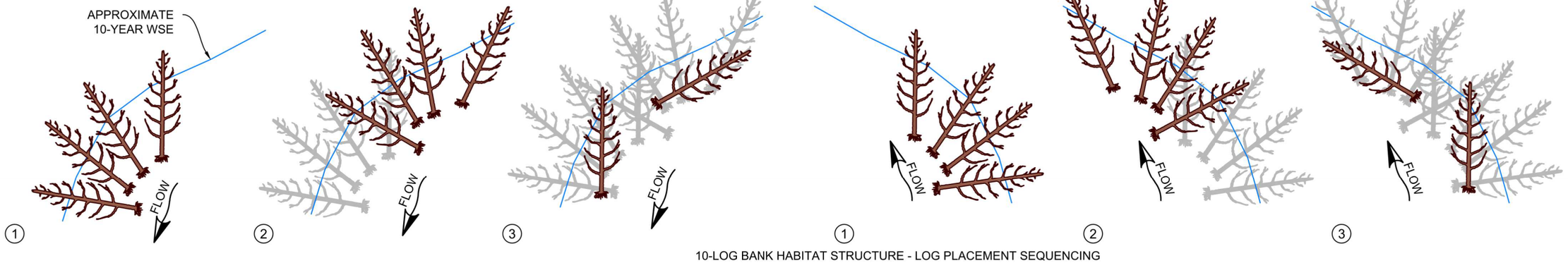
NTS

10-LOG BANK HABITAT STRUCTURE NOTES:

1. INSTALL TEMPORARY COFFERDAM TO ISOLATE WORK AREA.
2. FISH SALVAGE TO BE SUPERVISED BY QUALIFIED FISH BIOLOGIST.
3. ADD SLASH/RACKING MATERIAL TO HELP STABILIZE KEY MEMBERS AND FILL INTERSTITIAL SPACE. RACKING MATERIAL MAY CONSIST OF TOPS AND LIMBS OF WHOLE TREES, CLEARED EXISTING TREE VEGETATION, AND/OR SMALL WHOLE TREES WITH ROOTWADS.
4. THERE ARE (23) 10-LOG BANK HABITAT STRUCTURES TO BE INSTALLED IN THE PROPOSED BIRCH CREEK OR DISTRIBUTARY CHANNEL BANKS AND SHALL BE:
   a. PLACE ROOTWAD IN WETTED CHANNEL, MINIMAL TRENCHING OUTSIDE THE WETTED CHANNEL MAY BE REQUIRED. DETERMINATION WILL BE MADE IN THE FIELD AND AS DIRECTED BY ENGINEER OR OWNER'S REPRESENTATIVE.
   b. ANY SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES OR PLACED AS DIRECTED BY ENGINEER OR OWNER'S REPRESENTATIVE. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET.
   c. APPROXIMATE 10-YEAR WSE WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND MAY VARY AT EACH STRUCTURE LOCATION. FINAL CONFIGURATION OF STRUCTURES SHALL FOLLOW THE SEQUENCE BELOW AND IN COORDINATION WITH OWNER'S REPRESENTATIVE AS DIRECTED IN THE FIELD.
5. THERE ARE (40) 10-LOG BANK HABITAT STRUCTURES TO BE INSTALL AS FLOODPLAIN ROUGHNESS IN THE THE BIRCH CREEK AND UMATILLA RIVER FLOODPLAIN. STRUCTURE INSTALLATION SHALL BE IN COORDINATION WITH OWNER'S REPRESENTATIVE AS DIRECTED IN THE FIELD.
6. FOR TYPE B STRUCTURES (SEE SHEETS C-226, C-252), COMPACT SOIL TO FIRM AND UNYIELDING STATE AT A MINIMUM DEPTH OF 3 FEET. SOIL SHALL BE UNIFORM, FREE OF ORGANIC MATERIAL, AND FREE FROM PARTICLES LARGER THAN 3 INCHES. COORDINATE SOIL COMPACTION IN THE FIELD WITH THE ENGINEER.

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	18" MIN. DBH, 40' MIN, 4' MIN ROOTWAD	10
SLASH/RACKING MATERIAL	MISC. (4-10" DBH, 6-16')	44 CY



10-LOG BANK HABITAT STRUCTURE - LOG PLACEMENT SEQUENCING

NTS

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL. 12, 2016 JEREMY S. ANDREWS EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

LWM DETAILS

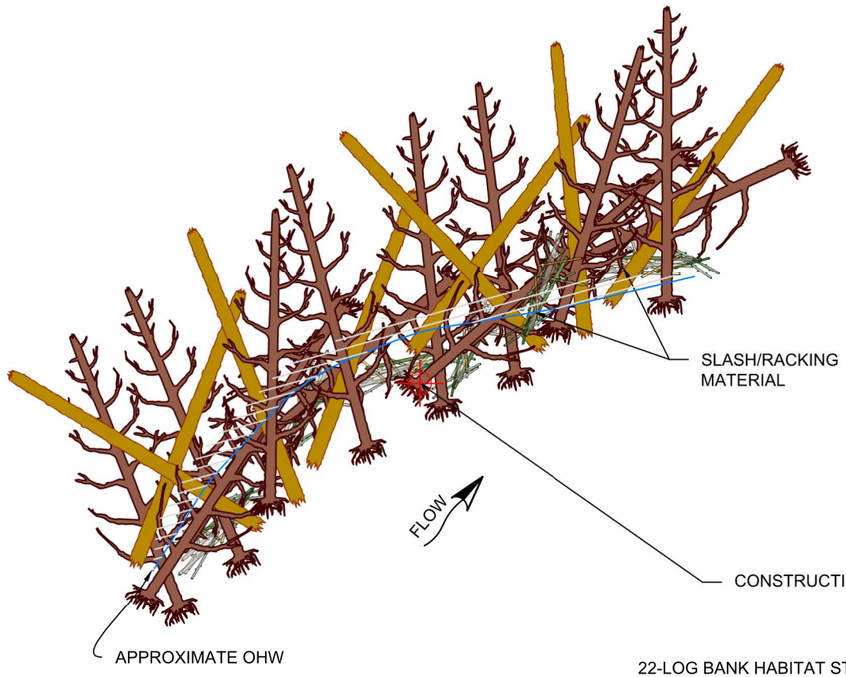
10-LOG BANK HABITAT STRUCTURE

DWG. NO.: C-262

CREATED: 1/19/26

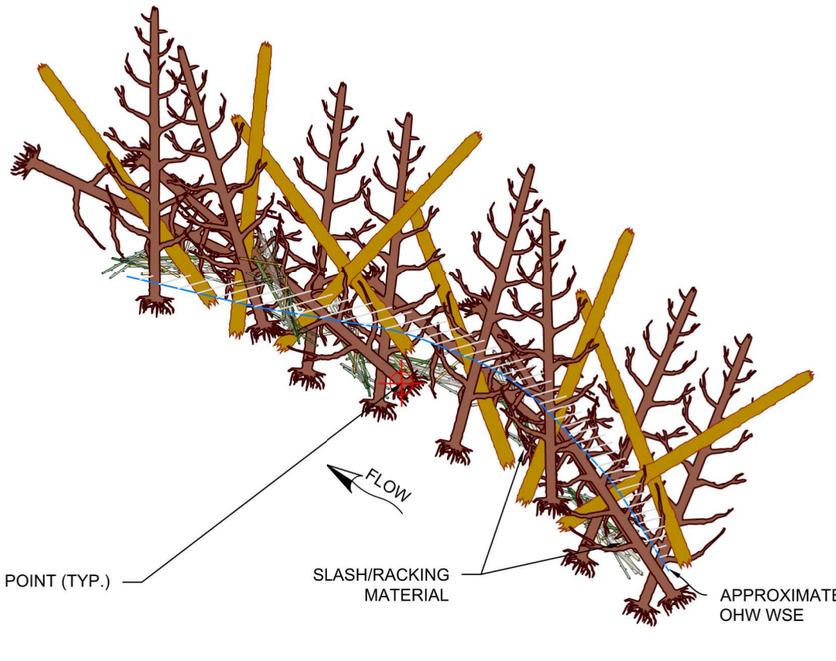
SHEET: 37 of 50

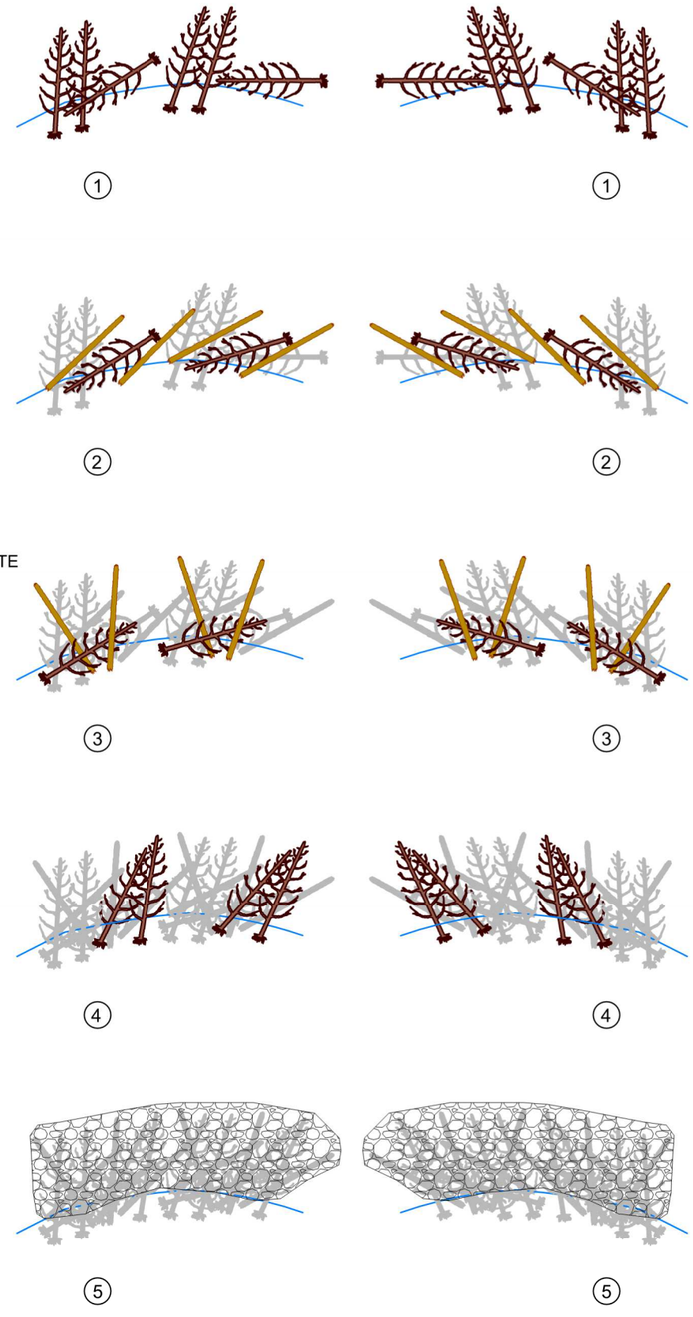
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\16 C261-C267 LWD DETAIL SHEETS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:36 PM



22-LOG BANK HABITAT STRUCTURE - PLAN VIEWS

NTS



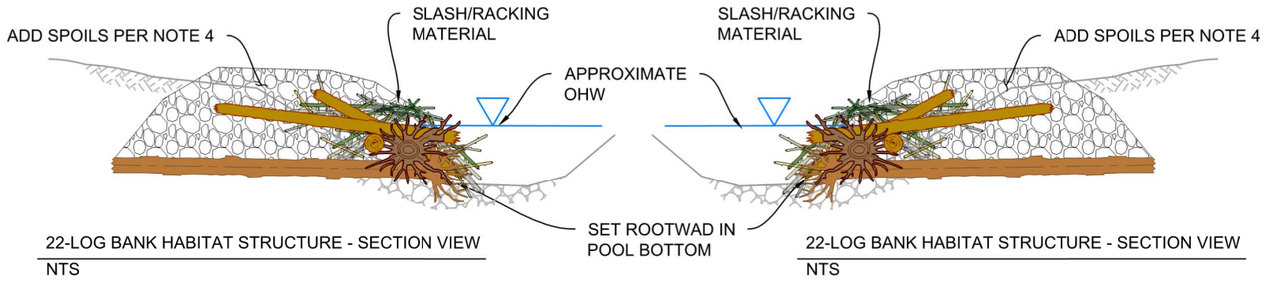


11-LOG BANK HABITAT STRUCTURE NOTES:

1. INSTALL TEMPORARY COFFERDAM TO ISOLATE WORK AREA.
2. FISH SALVAGE TO BE SUPERVISED BY QUALIFIED FISH BIOLOGIST.
3. PARTIAL BURIAL OF TREES WILL BE REQUIRED. DETERMINATION WILL BE MADE IN THE FIELD AND AS DIRECTED BY ENGINEER OR OWNER'S REPRESENTATIVE.
4. ANY SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES OR AS DIRECTED IN THE FIELD BY ENGINNER OR OWNER'S REPRESENTATIVE. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET.
5. APPROXIMATE OHW WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND MAY VARY AT EACH STRUCTURE LOCATION. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.
6. ADD SLASH/RACKING MATERIAL TO HELP STABILIZE KEY MEMBERS AND FILL INTERSTITIAL SPACE. RACKING MATERIAL MAY CONSIST OF TOPS AND LIMBS OF WHOLE TREES, CLEARED EXISTING TREE VEGETATION, AND/OR SMALL WHOLE TREES WITH ROOTWADS.

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	18" MIN. DBH, 40' MIN, 4' MIN ROOTWAD	14
LOG WITHOUT ROOTWAD	18" MIN. DBH, 40' MIN	8
SLASH/RACKING MATERIAL	MISC. (4-10" DBH, 6-16')	88 CY
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	155 CY



22-LOG BANK HABITAT STRUCTURE - SECTION VIEW

NTS

22-LOG BANK HABITAT STRUCTURE - SECTION VIEW

NTS

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2015
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

LWM DETAILS

22-LOG BANK HABITAT STRUCTURE

DWG. NO.: C-263

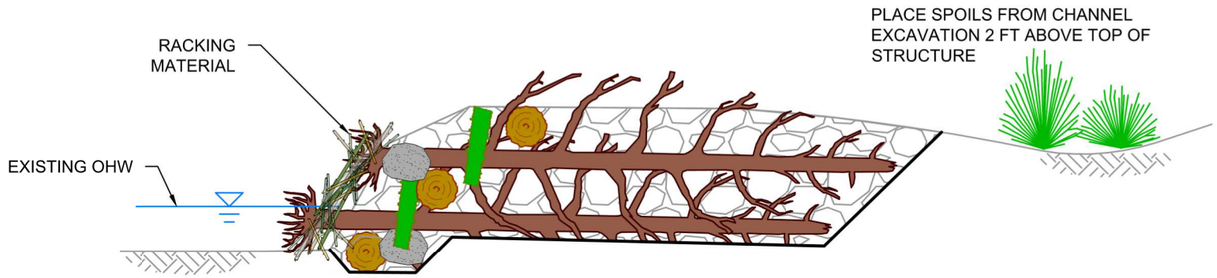
CREATED: 1/19/26

SHEET: 38 of 50

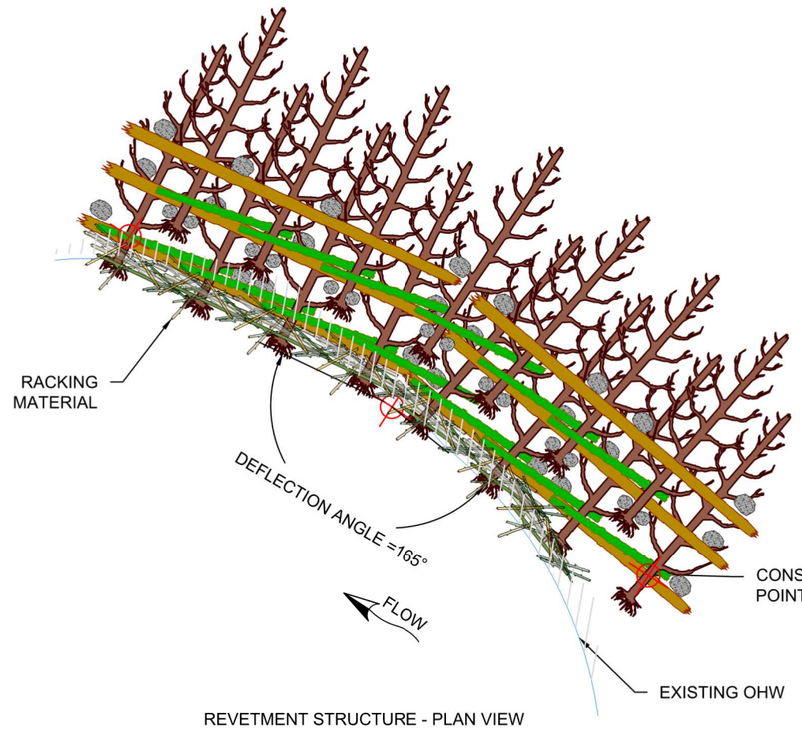
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\10%\PA 2\ SHEET FILES\16 C261-C267 LWD DETAIL SHEETS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:37 PM

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	18"+ DBH, 40' MIN, 4' MIN ROOTWAD	15
LOG WITHOUT ROOTWAD	18"+ DBH, 40' MIN	6
LOG WITHOUT ROOTWAD	18"+ DBH, 20-30'	13
SLASH/RACKING MATERIAL	MISC. (4-10" DBH, 6-16')	168
BOULDER	2-3' DIA.	38
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	114 CY



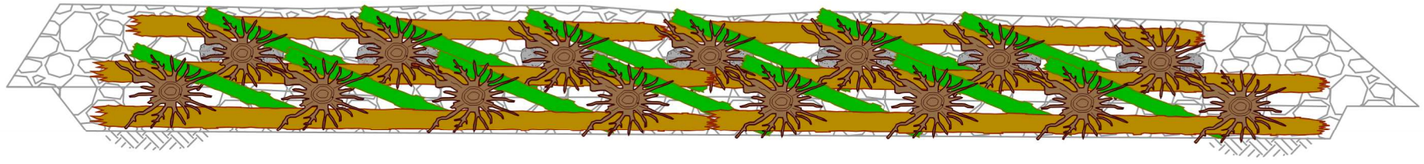
REVETMENT STRUCTURE - SECTION VIEW (SIDE)
NTS



REVETMENT STRUCTURE - PLAN VIEW
NTS

REVETMENT STRUCTURE NOTES:

1. SEE SHEET C-265 FOR REVETMENT STRUCTURE CONSTRUCTION SEQUENCE.
2. SUITABLE SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET. ADDITIONAL ALLUVIAL FLOODPLAIN MATERIAL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN. BALLAST MATERIAL INCIDENTAL TO STRUCTURE COST.
3. ADD SLASH/RACKING MATERIAL TO HELP STABILIZE KEY MEMBERS AND FILL INTERSTITIAL SPACE. RACKING MATERIAL MAY CONSIST OF TOPS AND LIMBS OF WHOLE TREES, CLEARED EXISTING TREE VEGETATION, AND/OR SMALL WHOLE TREES WITH ROOTWADS.
4. BANKFULL LOCATION WITH RESPECT TO STRUCTURE LOCATION IS A TYPICAL REPRESENTATION AND MAY VARY AT EACH STRUCTURE LOCATION. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.



REVETMENT STRUCTURE - SECTION VIEW (FRONT)
NTS

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

LWM DETAILS
REVETMENT STRUCTURE

DWG. NO.: C-264
CREATED: 1/19/26
SHEET: 39 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\16 C261-C267 LWD DETAIL SHEETS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:37 PM

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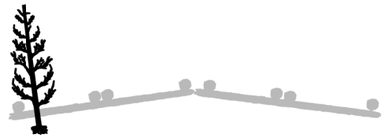

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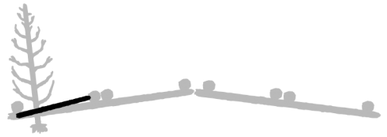

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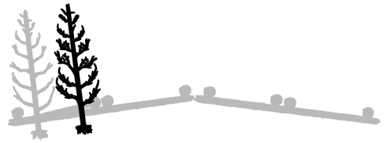

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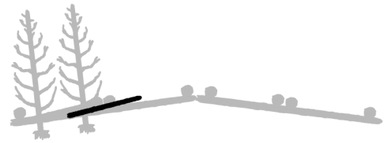

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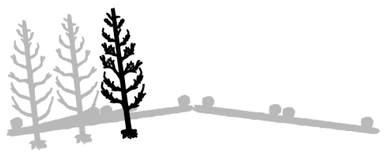

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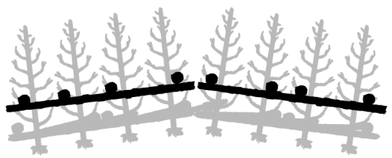

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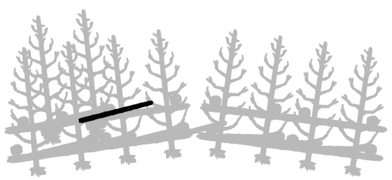
⑦ — ⑮ → FOR STEPS 7 -15, REPEAT LOG PLACEMENT AS SHOWN ON STEPS 2-6.

⑳



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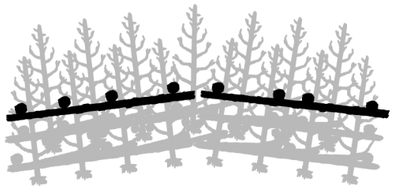

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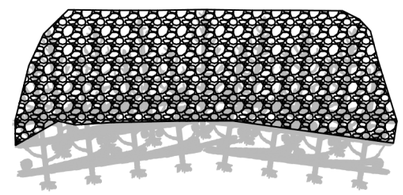

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㉒ — ㉙ → FOR STEPS 22 -29, REPEAT LOG PLACEMENT AS SHOWN ON STEPS 18-21.

TETRA TECH
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19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2018
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION
Treaty of 1855

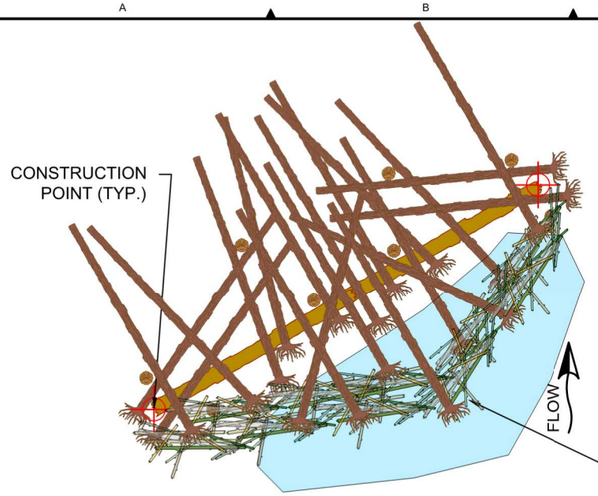
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

LWM DETAILS
REVETMENT STRUCTURE

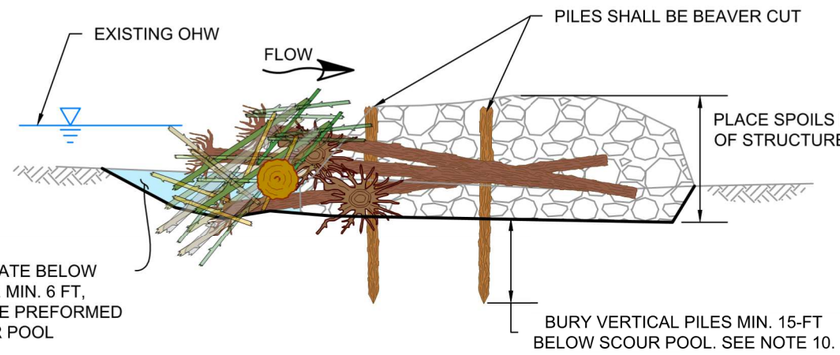
DWG. NO.: C-265
CREATED: 1/19/26
SHEET: 40 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\16 C261-C267 LWD DETAIL SHEETS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:38 PM



LARGE APEX STRUCTURE - PLAN VIEW

NTS



LARGE APEX STRUCTURE - SECTION VIEW

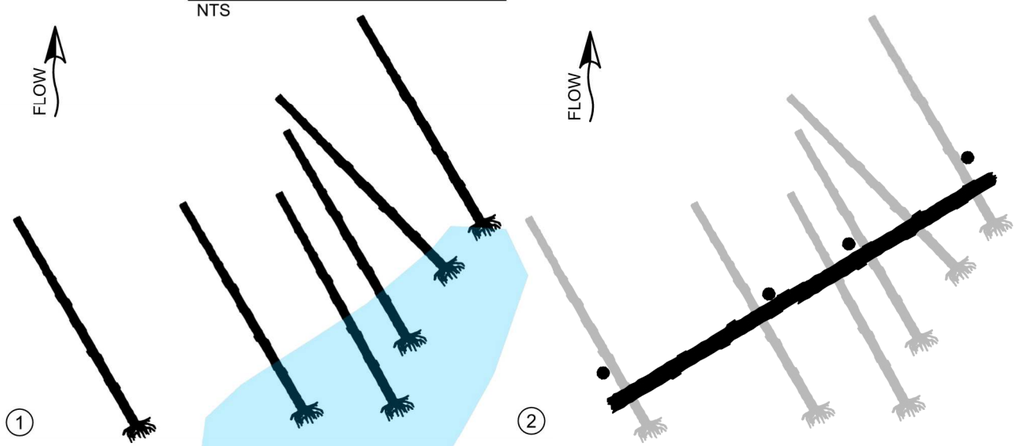
NTS

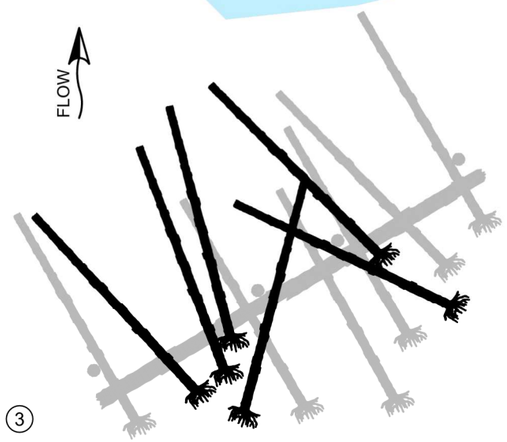
CONSTRUCTION QUANTITIES:

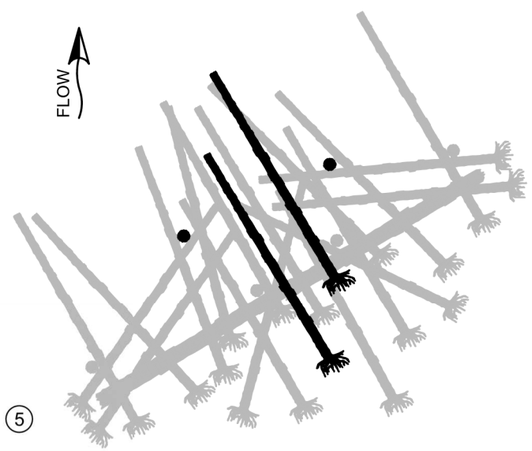
COMPONENT	DESCRIPTION	QUANTITY
LOG WITH ROOTWAD	18"+ DBH, 40 FT MIN, 4' MIN ROOTWAD	20
LOG WITHOUT ROOTWAD	18"+ DBH, 40 FT MIN	2
VERTICAL PILING	12" - 18" DBH, 40 FT MIN	6
SLASH/RACKING MATERIAL	MISC. (4-10" DBH, 6'-16')	120
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	179 CY

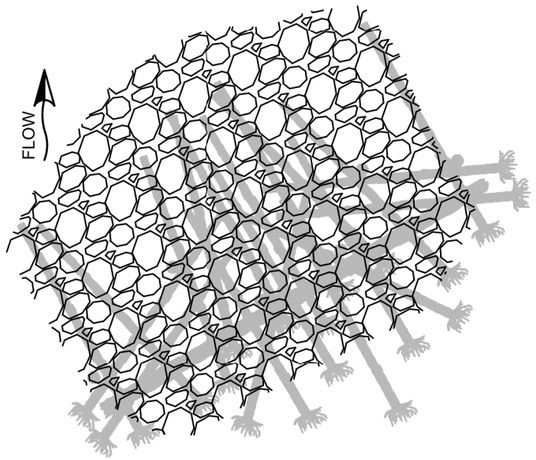
LARGE APEX STRUCTURE NOTES:

1. INSTALL TEMPORARY COFFERDAM TO ISOLATE WORK AREA.
2. FISH SALVAGE TO BE SUPERVISED BY QUALIFIED FISH BIOLOGIST.
3. EXCAVATE TRENCH A MINIMUM OF 6 FT DEEP AND 6 FT WIDE TO COMPLETELY BURY BOTTOM LAYER OF STRUCTURE AND DEVELOP SCOUR POOL. EXCAVATE UPSTREAM PORTION OF TRENCH TO PROVIDE ELEVATED TIPS OF TREES IN SEQUENCE #1 WHEN ROOTWADS ARE PLACED IN TRENCH.
4. LOGS PLACED IN SEQUENCE #1 SHALL BE PLACED SO THAT THE ROOTWADS ARE IN THE DEEPEST PORTION OF THE UPSTREAM POOL.
5. BASE LOG PLACED IN SEQUENCE #2 DOES NOT REQUIRE A ROOTWAD. PLACE BASE LOG DOWNSTREAM OF SEQUENCE #1 ROOTWADS. PLACE VERTICAL PILINGS TO LOCK BASE LOG IN PLACE.
6. LOGS PLACED IN SEQUENCE #4 SHALL BE PLACED AT BACK OF STRUCTURE AND PUSHED FORWARD INTO PLACE. LOGS TO BE INTERTWINED WITH PREVIOUSLY PLACED LOGS AS MUCH AS POSSIBLE TO DEVELOP COMPLEX JAM.
7. LOGS PLACED IN SEQUENCE #5 SHALL BE PLACE SO TIPS OF LOGS ARE UNDER SEQUENCE #1 LOG TIPS. PLACE VERTICAL PILINGS TO LOCK LOGS IN PLACE.
8. SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES. BACKFILL STRUCTURE AFTER SEQUENCE #3 AND AGAIN AFTER SEQUENCE #6. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET. ADDITIONAL ALLUVIAL FLOODPLAIN MATERIAL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN. BALLAST MATERIAL INCIDENTAL TO STRUCTURE COST.
9. PLANT 15 TO 25 WILLOW STAKES ABOVE RACKING TO COMPLETE CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR PLANTING WILLOW STAKES.
10. IF BEDROCK IS ENCOUNTERED, PLACE 185 CY OF SOIL BALLAST IN LIEU OF VERTICAL PILES. COORDINATE SOIL BALLAST IN THE FIELD WITH OWNER'S REPRESENTATIVE.
11. FINAL CONFIGURATION OF STRUCTURE SHALL BE AS DIRECTED IN FIELD.









TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 9, 2015
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

YAKAMA · WALLA WALLA · UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

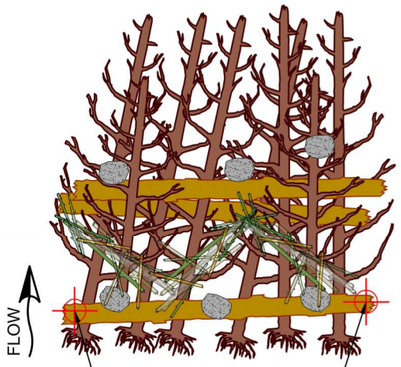
LWM DETAILS
LARGE APEX STRUCTURE

DWG. NO.: C-266

CREATED: 1/19/26

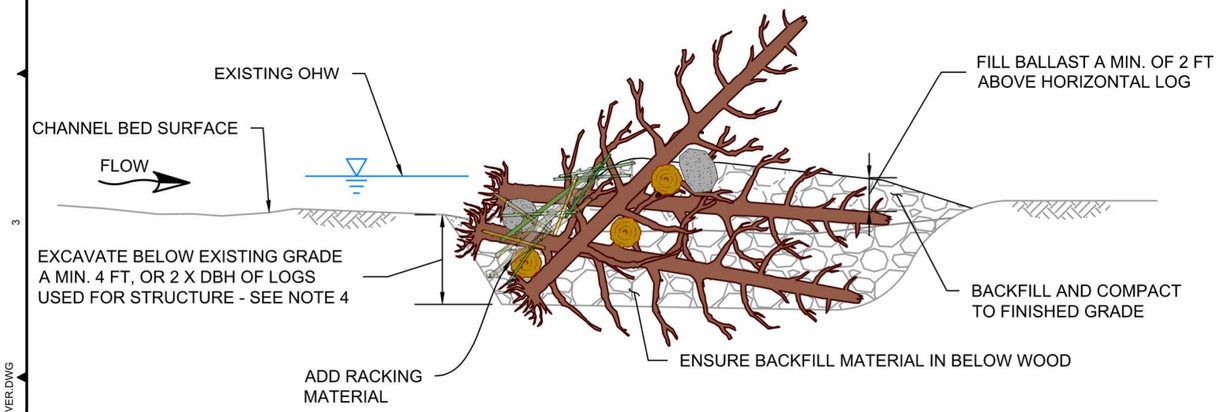
SHEET: 41 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\10C%\PA 2\ SHEET FILES\16 C261-C267 LWD DETAIL SHEETS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:39 PM



SMALL APEX STRUCTURE - PLAN VIEW

NTS

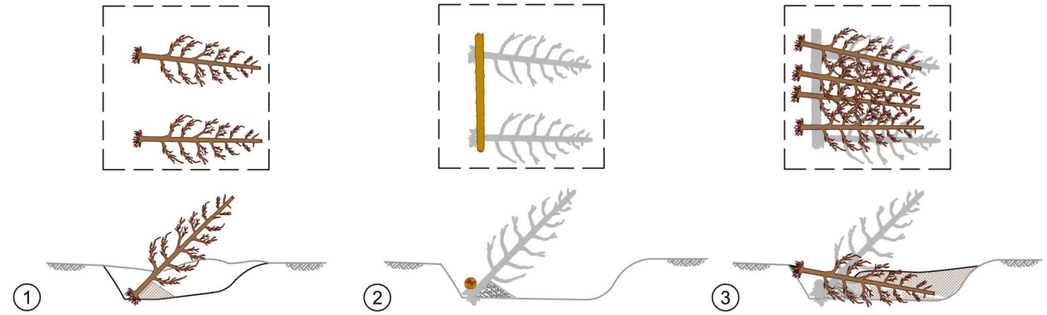


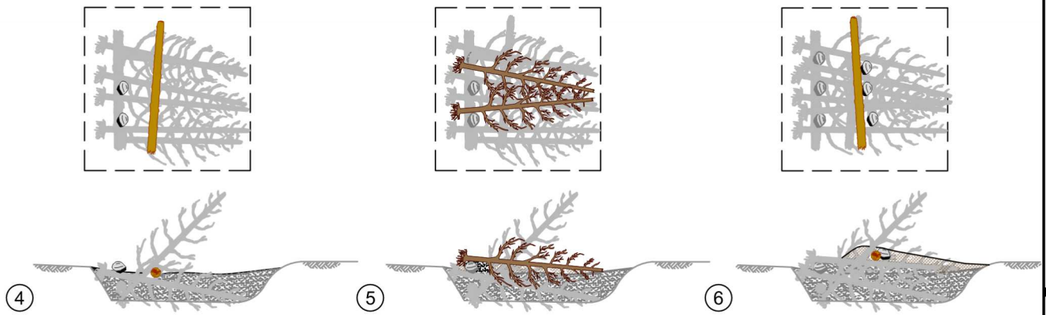
SMALL APEX STRUCTURE - SECTION VIEW

NTS

CONSTRUCTION QUANTITIES:

COMPONENT	DESCRIPTION	QUANTITY
WHOLE TREE WITH ROOTWAD	18"+ DBH, 40' MIN, 4' MIN ROOTWAD	8
LOG WITHOUT ROOTWAD	18"+ DBH, 40' MIN	3
BOULDER	2-3' DIA.	7
SLASH/RACKING MATERIAL	MISC. (4-10" DBH, 6-16')	16
BALLAST	SPOILS/FLOODPLAIN ALLUVIUM	126 CY





SMALL APEX STRUCTURE - LOG PLACEMENT SEQUENCING

NTS

SMALL APEX STRUCTURE NOTES:

1. INSTALL TEMPORARY COFFERDAM UPSTREAM OF STRUCTURE AS NEEDED.
2. FISH SALVAGE TO BE DONE BY QUALIFIED FISH BIOLOGIST. CONSTRUCTION WORK IN THE IMMEDIATE VICINITY OF SALVAGE EFFORTS WILL BE DELAYED (TYPICALLY 2 TO 24 HOURS) DURING SALVAGE. DELAYS MAY BE LONGER IN SOME CASES. SEE G-304 FOR FISH SALVAGE DETAILS.
3. A QUANTITY OF 6 ROCKS (24" TO 36" DIA) SHALL BE USED IN STRUCTURE CONSTRUCTION.
4. EXCAVATE TRENCH TO COMPLETELY BURY BOTTOM LAYER OF STRUCTURE. EXCAVATE UPSTREAM PORTION OF TRENCH TO PROVIDE ELEVATED TIPS OF LOGS IN SEQUENCE #1 WHEN ROOTWADS ARE PLACED IN TRENCH.
5. ONE BASE LOG PLACED IN SEQUENCE #2 DOES NOT REQUIRE ROOTWAD.
6. PLACE SMALLER DIAMETER LOGS WITH ROOTWADS ON BOTTOM LAYER OF STRUCTURE.
7. SPOILS FROM EXCAVATION SHALL BE USED TO BACKFILL STRUCTURE AS CONSTRUCTION PROGRESSES. MATERIAL SHALL BE COMPACTED WITH EXCAVATOR BUCKET.
8. ADD SLASH/RACKING MATERIAL TO HELP STABILIZE KEY MEMBERS AND FILL INTERSTITIAL SPACE. RACKING MATERIAL MAY CONSIST OF TOPS AND LIMBS OF WHOLE TREES, CLEARED EXISTING TREE VEGETATION, AND/OR SMALL WHOLE TREES WITH ROOTWADS.
9. BURY STRUCTURE A MINIMUM OF 2 FT. ADDITIONAL BACKFILL MAY BE NEEDED TO BURY STRUCTURE AS SHOWN.
10. PLANT 15 TO 25 WILLOW STAKES IN STRUCTURE TO COMPLETE CONSTRUCTION. OWNER SHALL BE RESPONSIBLE FOR PLANTING WILLOW STAKES.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JUL. 12, 2016 JEREMY S. ANDREWS EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION — CAYUSE · WALLA WALLA · UMATILLA — Treaty of 1855

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

PLAN SHEET SIZE ANSI B (11" X 17")

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

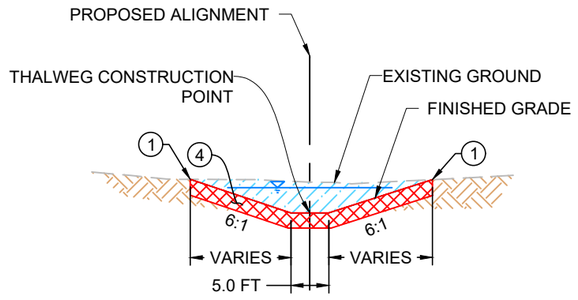
LWM DETAILS
SMALL APEX STRUCTURE

DWG. NO.: C-267

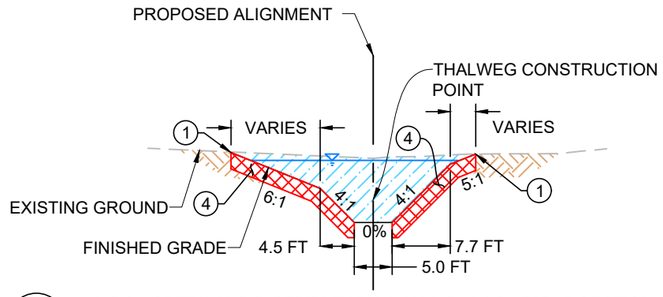
CREATED: 1/19/26

SHEET: 42 of 50

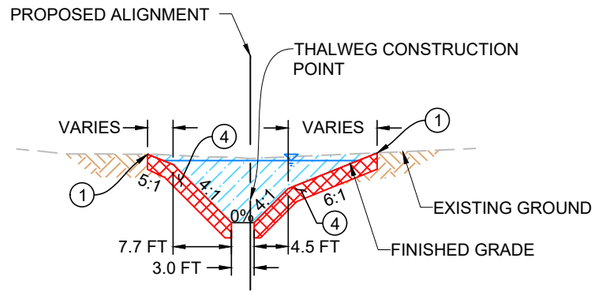
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\16 C261-C267 LWD DETAIL SHEETS_RECOVER.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:39 PM



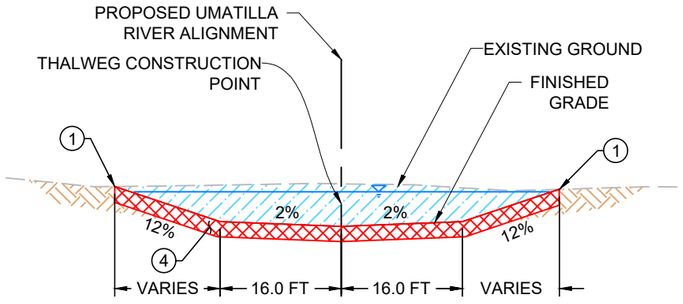
A - BIRCH CREEK AND DISTRIBUTARY CHANNEL RIFFLE SECTION (TYP.)
SCALE 1"= 20', 1H:2V



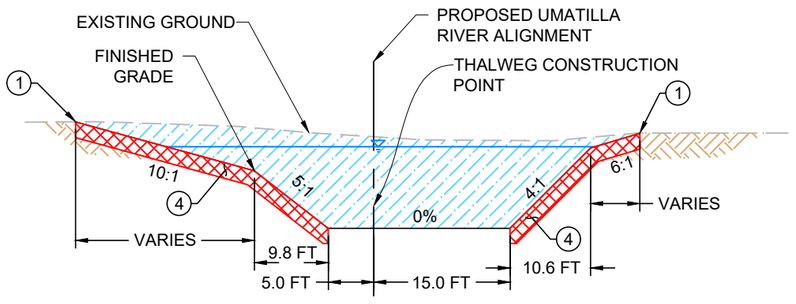
B - BIRCH CREEK AND DISTRIBUTARY CHANNEL POOL RIGHT SECTION (TYP.)
SCALE 1"= 20', 1H:2V



C - BIRCH CREEK AND DISTRIBUTARY CHANNEL POOL LEFT SECTION (TYP.)
SCALE 1"= 20', 1H:2V



D - PROPOSED UMATILLA RIVER CHANNEL RIFFLE SECTION (TYP.)
SCALE 1"= 20', 1H:2V



E - PROPOSED UMATILLA RIVER CHANNEL POOL RIGHT SECTION (TYP.)
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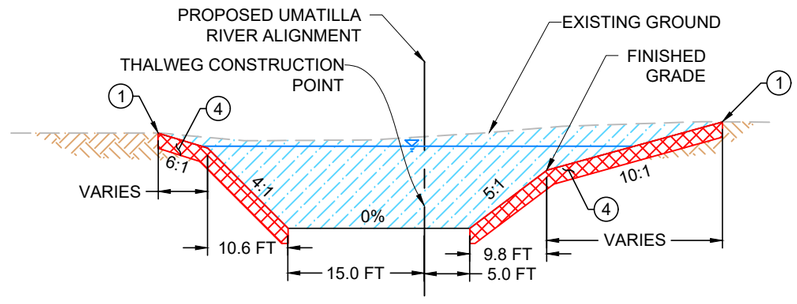
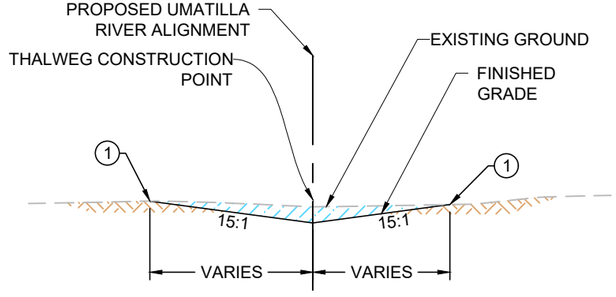
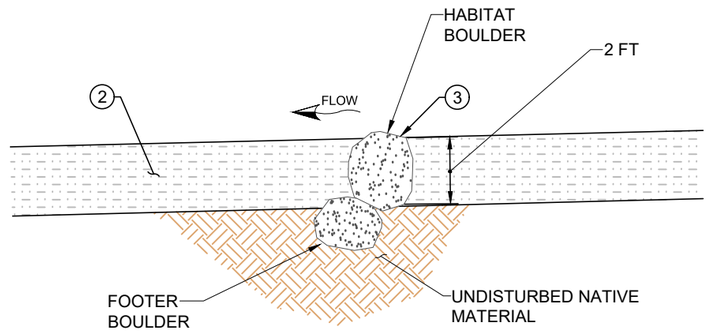


F - PROPOSED UMATILLA RIVER CHANNEL POOL LEFT SECTION (TYP.)
SCALE 1"= 20', 1H:2V



G - PROPOSED LINK CHANNEL SECTION (TYP.)
SCALE 1"= 20', 1H:2V



H - PROPOSED HABITAT BOULDER DETAIL (TYP.)
NOT TO SCALE

LEGEND

- EXISTING GROUND
- EXISTING OHW
- FINISHED GRADE
- PROPOSED OHW
- EXISTING UNDISTURBED SOIL
- PROPOSE NEW CHANNEL EXCAVATION
- PROPOSED STREAMBED
- PROPOSED OVEREXCAVATION

NOTES:

1. DAYLIGHT PROPOSED FINISH GRADE TO MATCH EXISTING GROUND.
2. PROPOSED UMATILLA RIVER PROFILE - SEE SHEETS C-211 - C-213 FOR DETAILS.
3. PROPOSED 3.5 FT HABITAT BOULDERS. SEE SPECIFICATIONS FOR MATERIAL REQUIREMENTS.
4. IF EXISTING STREAMBED MATERIAL DOES NOT MEET SPECIFICATIONS, COORDINATE WITH OWNER OR OWNER'S REPRESENTATIVE TO IDENTIFY ALTERNATIVE SEDIMENT SOURCE. IF REPLACEMENT MATERIAL MUST BE INSTALLED, OVER-EXCAVATE BED ADDITIONAL 2 FT AND INSTALL 2-FT LAYER OF APPROVED MATERIAL TO FINISHED GRADE AS INDICATED ON TYPICAL SECTIONS.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CTUIR - WALLA WALLA - UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

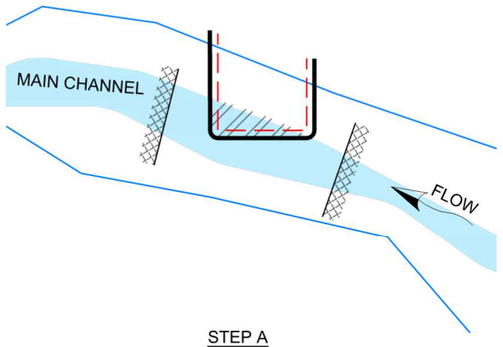
REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

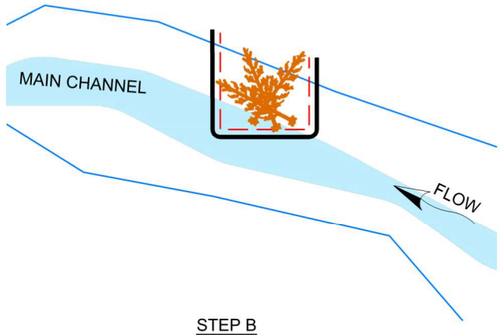
TYPICAL SECTIONS

DWG. NO.: C-271
CREATED: 1/19/26
SHEET: 43 of 50

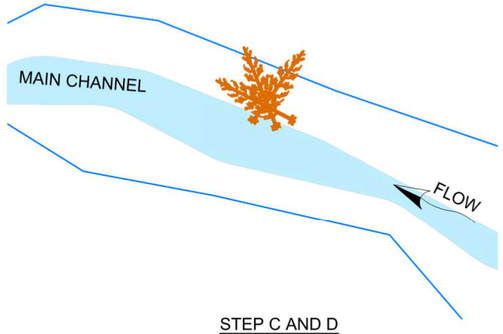
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\17 C271 TYPICAL SECTIONS.DWG
PLOT DETAILS: SINKS, NATHAN January 27, 2026 12:53 PM



STEP A

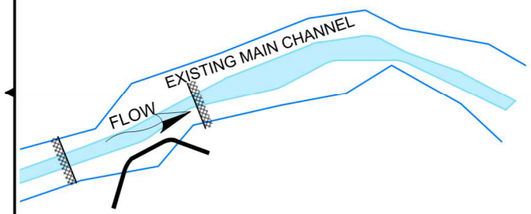


STEP B

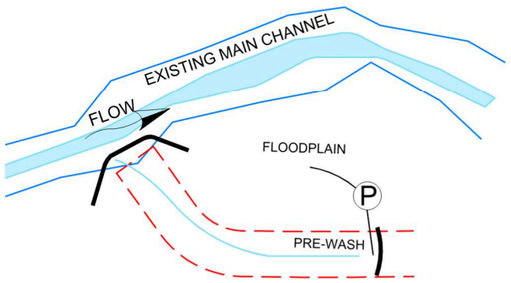


STEP C AND D

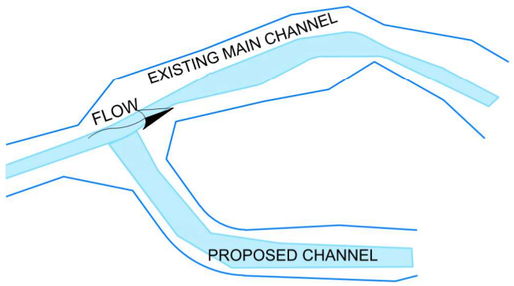
LARGE WOOD INSTALLATION WITH LOCAL ISOLATION (TYP.)
(NOT TO SCALE)



STEP A

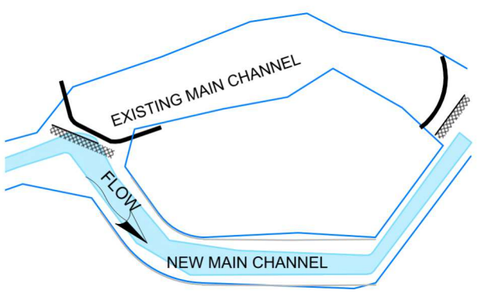


STEP B AND C

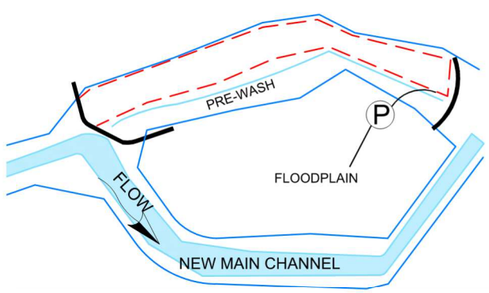


STEP D

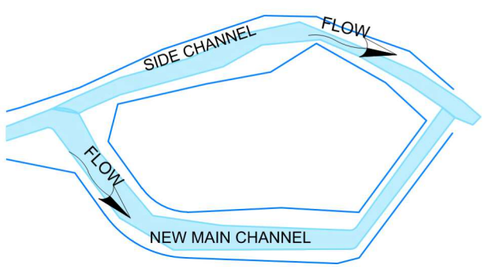
PROPOSED CHANNEL (TYP.)
(NTS)



STEP A



STEP B AND C



STEP D

PROPOSED SIDE CHANNEL FILL (TYP.)
(NTS)

GENERAL FISH SALVAGE AND DEWATERING STEPS

CONSTRUCTION SHALL OCCUR IN THE FOLLOWING GENERAL STEPS, WHICH CORRESPOND TO THE STEPS SHOWN ON THIS PLAN SHEET AND IN ACCORDANCE WITH HIP GUIDELINES.

A) ISOLATION AND SALVAGE:
ESTABLISH LIMITS OF EXCAVATION, STAGING AREAS AND ACCESS ROADS. INSTALL AND MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES. ESTABLISH WORK AREA ISOLATION AS SHOWN ON THIS SHEET.

B) DEWATERING AND INSTALLATION:
INSTALL COFFERDAM AND DEWATER ISOLATED WORK AREA. ALL ISOLATION WORK AND DEWATERING ACTIVITIES SHALL BE IN ACCORDANCE WITH HIP GUIDELINES. EXCAVATE AND INSTALL LARGE WOOD STRUCTURES AND CHANNEL EXCAVATION AS SHOWN ON THE THE CONSTRUCTION PLAN SHEETS AND IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

C) REWATERING:
WHEN NECESSARY PERFORM STAGED REWATERING PROCESS WITH THE RECENTLY EXCAVATED CHANNEL. PREWASH EXCAVATED CHANNEL AND DETAIN AND RELEASE TURBID WATER TO THE FLOODPLAIN RATHER THAN FISH BEARING WATER. SLOWLY REWATER THE CONSTRUCTION SITE TO PREVENT SUDDEN RELEASE OF SUSPENDED SEDIMENT.

D) SITE RESTORATION:
STREAMBANKS AND DISTURBED AREA SHALL BE RESTORED AS NECESSARY USING ONSITE NATIVE MATERIAL AND ALL PROJECT WASTE MATERIAL REMOVED.

GENERAL FISH SALVAGE NOTES:

1. PROPOSED PROJECT DESIGN, CONSTRUCTION ACTIVITIES, AND MATERIALS SUBJECT TO APPROVAL BY OWNER.
2. CONTRACTOR TO PROVIDE EROSION AND SEDIMENT CONTROL PLAN PER PROJECT PLAN AND SPECIFICATIONS.
3. CONTRACTOR TO PROVIDE DEWATERING PLAN PER PROJECT PLANS AND SPECIFICATIONS.
4. THE CONTRACTOR SHALL CONSTRUCT THE RESTORATION DESIGN ELEMENTS IN ACCORDANCE WITH THE PLANS STAMPED "ISSUED FOR CONSTRUCTION" AS PROVIDED TO THE CONTRACTOR BY THE OWNER PRIOR TO CONSTRUCTION.
5. ALL WORK WITHIN THE ACTIVE CHANNEL SHALL OCCUR WITHIN THE ALLOWABLE FISH WINDOW. ALL CONSTRUCTION ACTIVITIES SHALL MINIMIZE DISTURBANCE TO AND MAXIMIZE RE-USE OF EXISTING RIPARIAN VEGETATION.
6. ALL TEMPORARY ACCESS ROUTES SHALL BE LAID OUT TO MINIMIZE DISTURBANCE TO EXISTING VEGETATION AND FINAL LOCATION WILL BE VERIFIED BY OWNER.
7. ALL EROSION CONTROL MEASURES ARE TO INDICATE WHAT IS EXPECTED IN SIMILAR GEOMORPHIC CONDITIONS. CHANNEL CONDITIONS MAY DIFFER DURING CONSTRUCTION AND FIELD ADJUSTMENT SHALL BE COORDINATED WITH PROJECT OWNER AND SHALL CONFORM TO NEPA AND ARBO II GUIDELINES.
8. OWNER SHALL BE RESPONSIBLE FOR FISH SALVAGE EFFORTS.
9. CONSTRUCTION WORK IN THE IMMEDIATE VICINITY OF FISH SALVAGE EFFORTS SHALL BE DELAYED (TYPICALLY 2 TO 24 HOURS) DURING SALVAGE. DELAYS MAY BE LONGER IN SOME CASES.

LEGEND:
- TOP OF BANK
- LOW FLOW LINE
- FISH BLOCK NET
- GRADING LIMITS
- COFFER DAM
- (P) PUMP

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL 12 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

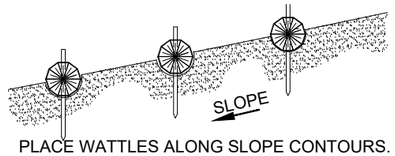
REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

FISH SALVAGE, DEWATERING & REWATERING DETAILS

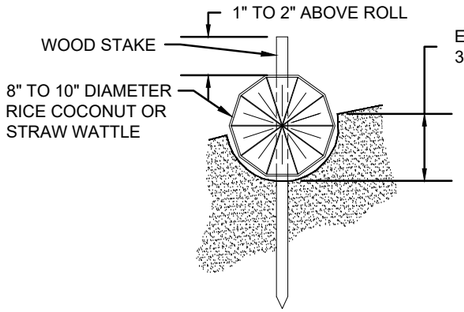
DWG. NO.: C-281
CREATED: 1/19/26
SHEET: 44 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\18 C281 DEWATERING_REWATERING.DWG
PLOT DETAILS: SINKS, NATHAN January 7, 2026 11:27 AM

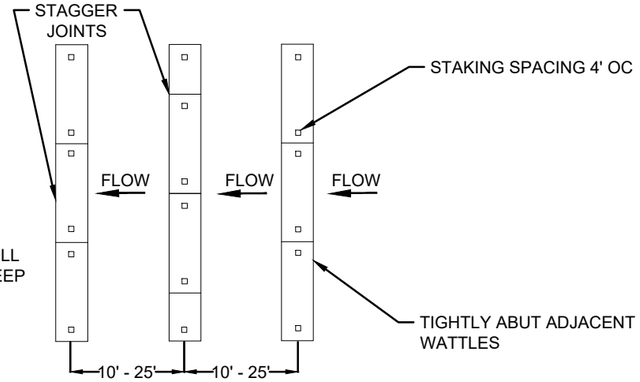


PLACE WATTLES ALONG SLOPE CONTOURS.

PROFILE



SECTION

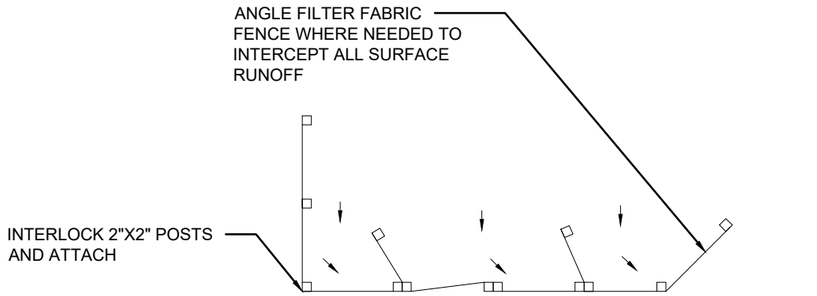


PLAN VIEW

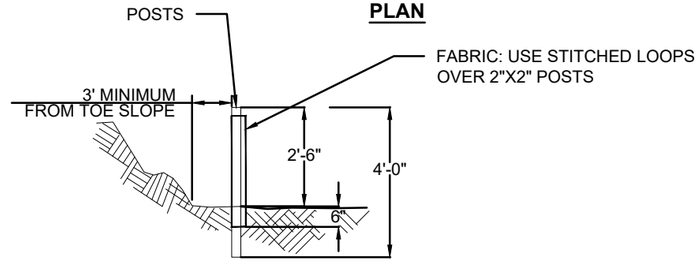
FIBER ROLLS/WATTLES NOTES:

1. STAKES SHALL BE 1"X2" WOODEN STAKES.
2. ADDITIONAL STAKES MAY BE INSTALLED ON DOWNHILL SIDE OF WATTLES, ON STEEP SLOPES OR HIGHLY EROSIVE SOILS
3. FIBER ROLLS OR WATTLES TO BE INSTALLED EVERY 10' TO 25'.

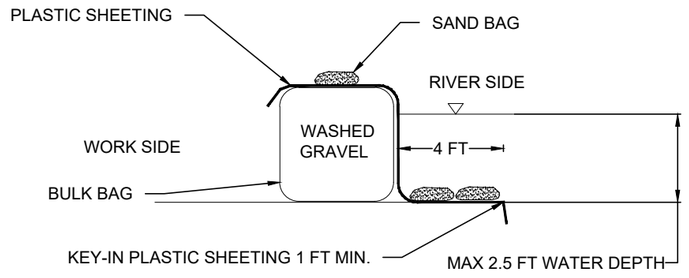
FIBER ROLLS/WATTLES - TYPICAL DETAIL
NTS



PLAN



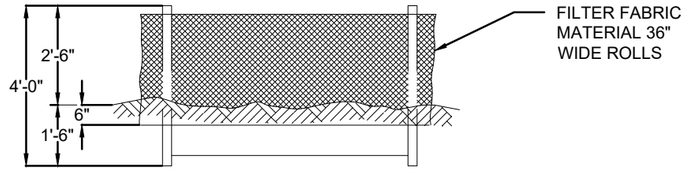
PROFILE



TEMPORARY COFFERDAM SECTION TYPICAL DETAIL
NTS

COFFERDAM NOTES:

1. ALL WORK IN CHANNEL SHALL ONLY OCCUR DURING THE APPLICABLE IN-WATER WORK WINDOWS.
2. IN-WATER WORK AREAS SHALL BE ISOLATED BY COFFERDAMS.
3. ISOLATED AREAS REQUIRE FISH SALVAGE ACTIVITIES PRIOR TO THE INITIATION OF CONSTRUCTION.
4. FISH SALVAGE TO BE PERFORMED BY QUALIFIED FISH BIOLOGIST.
5. FILL BULK BAG WITH WASHED GRAVEL.
6. SAND BAGS, ECO-BLOCKS, OR SIMILAR MAY BE SUBSTITUTED FOR WASHED GRAVEL BULK BAGS.



TEMPORARY SILT FENCE TYPICAL DETAIL
NTS

SEDIMENT FENCE NOTES:

1. SEDIMENT FENCE SHALL BE INSTALLED ON A LINE OF EQUAL ELEVATION.
2. BOTTOM EDGE OF SEDIMENT FENCE SHALL BE BURIED MIN 6".
3. POSTS MAY BE 2"X2" FIR, PINE OR STEEL.
4. POSTS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.
5. COMPACT BOTH SIDES OF FILTER FABRIC TRENCH.
6. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATION REACHES 1/3 OF THE MEASURE HEIGHT. SEDIMENT SHALL BE DISPOSED OF TO AN AREA THAT CAN BE PERMANENTLY STABILIZED.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2026
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

CAYUSE · WALLA WALLA · UMATILLA CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION Treaty of 1855

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

TESC DETAILS

DWG. NO.: C-291

CREATED: 1/19/26

SHEET: 45 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\19 C291 DETAILS_TESC.DWG
PLOT DETAILS: SINKS, NATHAN January 23, 2026 9:28 AM

0 200' 400' 800'

LEGEND

- EXISTING PROPERTY LINE
- EXISTING ALIGNMENT
- POWER POLE
- POWER/COMM UTILITY
- PROJECT AREA BOUNDARY
- PROPOSED ALIGNMENT
- EXISTING WETLAND
- PROPOSED UPLAND LIVE PLANT AND SEED ZONE
- PROPOSED UPLAND SEED ZONE
- PROPOSED RIPARIAN LIVE PLANT AND SEED ZONE
- PROPOSED RIPARIAN SEED ZONE
- PROPOSED FLOODPLAIN LIVE PLANT AND SEED ZONE
- PROPOSED FLOODPLAIN SEED ZONE
- PROPOSED WETLAND LIVE PLANT AND SEED ZONE

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

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ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

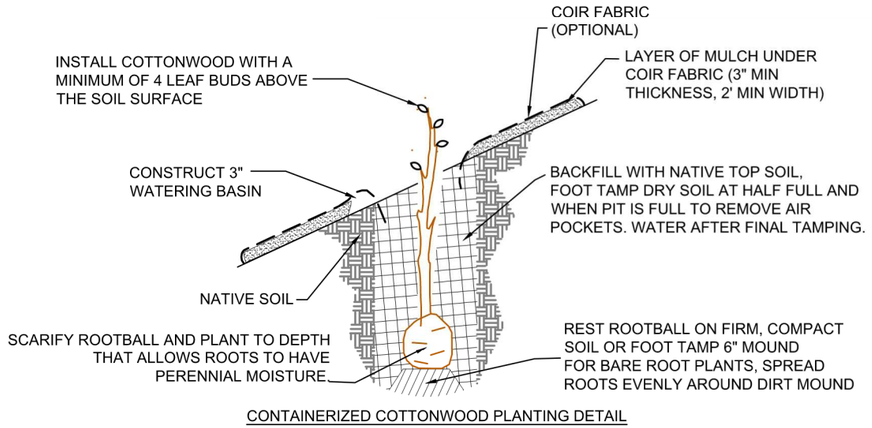
PLANTING PLAN

DWG. NO.: L-201

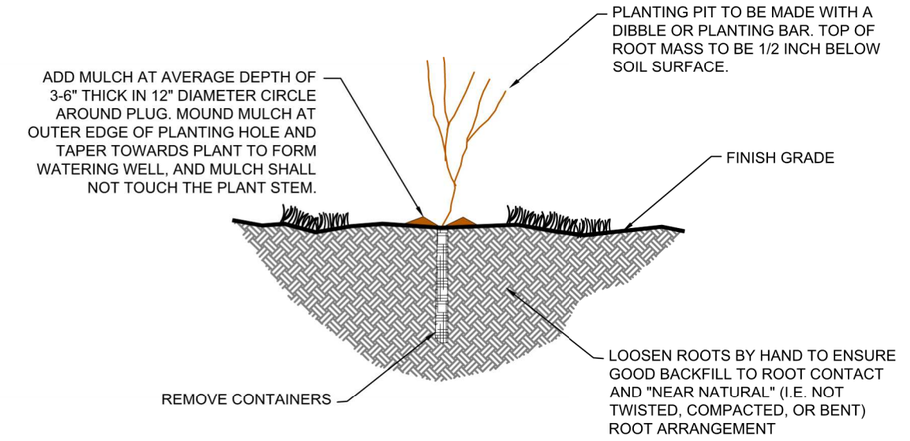
CREATED: 1/19/26

SHEET: 46 of 50

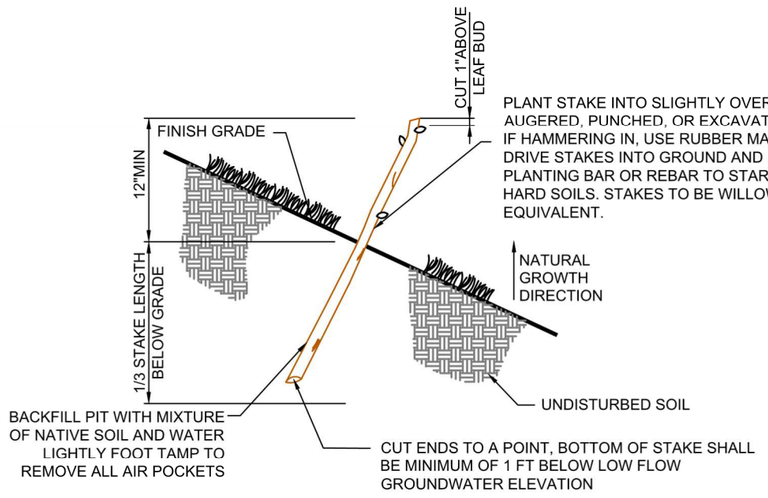
Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\ SHEET FILES\20 L201-L204 PLANTING PLAN.DWG
PLOT DETAILS: SINKS, NATHAN January 22, 2026 12:00 PM



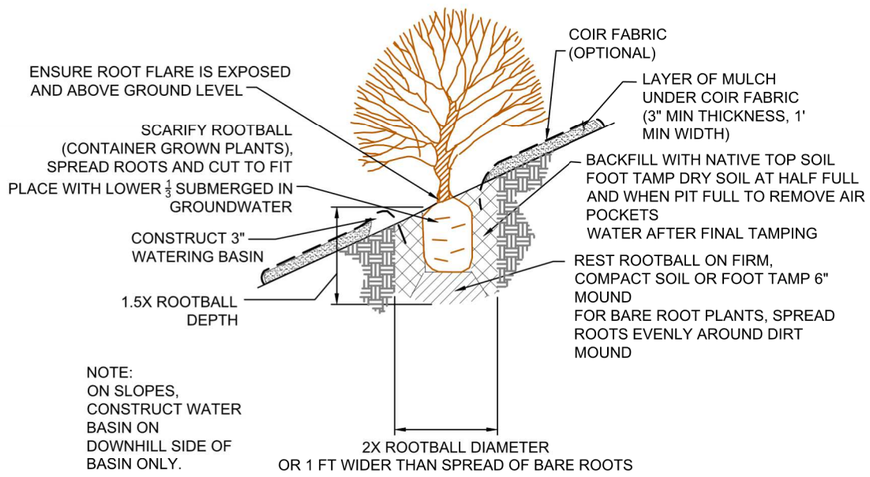
CONTAINERIZED COTTONWOOD PLANTING DETAIL



PLUG PLANTING DETAIL



LIVE STAKE PLANTING DETAIL



SHRUB AND TREE PLANTING DETAIL

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
913925
OREGON
JUL. 9, 2015
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	PLAN SHEET SIZE ANSI B (11" X 17") REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

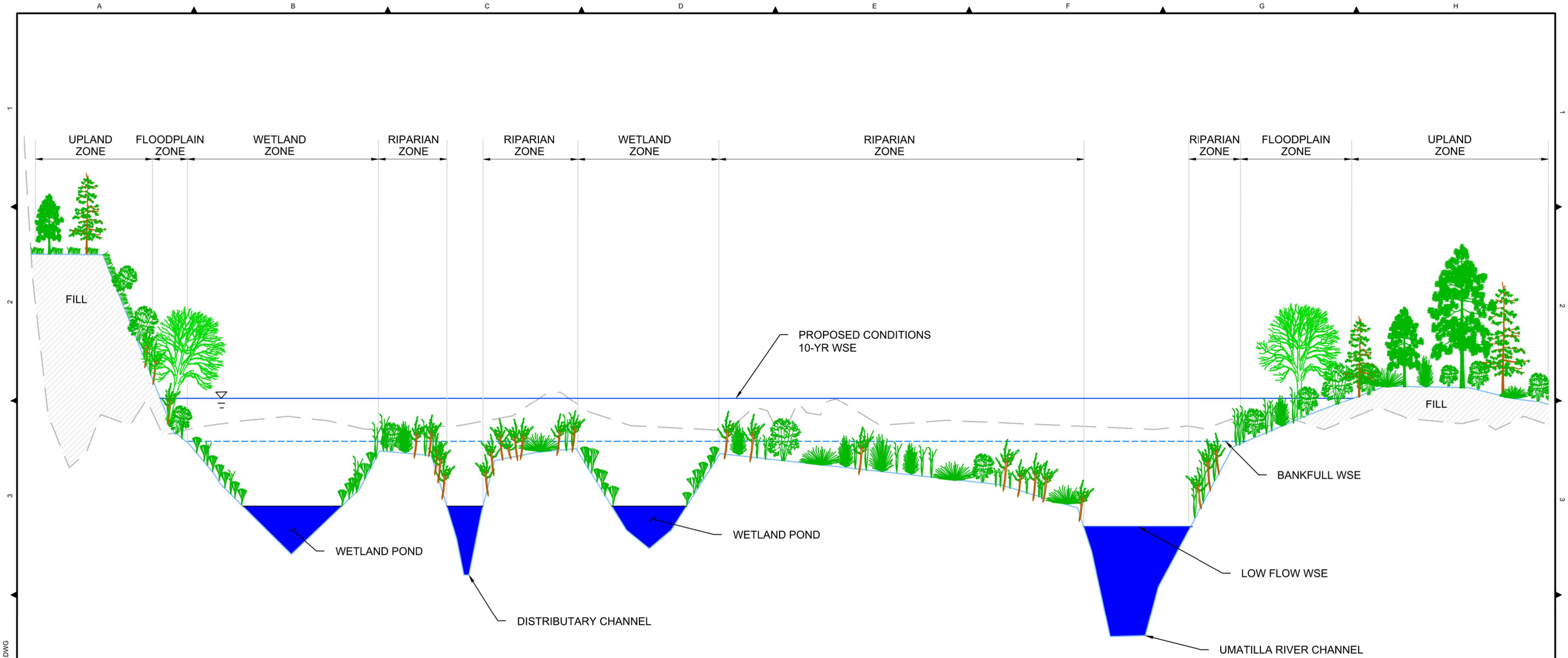
CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PLANTING PLAN

DWG. NO.: L-202

CREATED: 1/19/26

SHEET: 47 of 50



PROPOSED PLANTING PLAN TYPICAL CROSS SECTION

NTS

NOTE:

1. SEE SHEET L-201 PLANTING LOCATIONS.
2. CROSS SECTION SHOWS LIVE PLANTS INSTALLED ACROSS ENTIRE WORK AREA FOR GRAPHICAL REPRESENTATION OF LONG-TERM SITE TRAJECTORY. LIVE PLANTINGS TO BE INSTALLED ON A PORTION OF THE WORK AREAS AS SHOWN ON PLAN VIEW ON SHEET C-201.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JUL. 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PLANTING PLAN

DWG. NO.: L-203

CREATED: 1/19/26

SHEET: 48 of 50

Z:\PROJECTS\194-6817 UMABIRCH IN-STREAM DESIGN\100%\PA 2\SHEET FILES\20 L201-L204 PLANTING PLAN.DWG
PLOT DETAILS: SINKS, NATHAN January 21, 2026 4:52 PM

WETLAND PLANTING ZONE								
10.9 ACRES								
GROWTH HABIT	SCIENTIFIC NAME	INDICATOR STATUS[1]	COMMON NAME	PERCENT COMPOSITION	PROPAGATION METHOD	SIZE	SPACING (FEET O.C.)[3]	QUANTITY
SHRUB	*SALIX LUCIDA SSP. LASIANDRA*	FACW	PACIFIC WILLOW	25%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	8	1,863
	SALIX AMYGDALOIDES	FACW	PEACH-LEAF WILLOW	25%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	8	1,863
	SALIX EXIGUA	FACW	NARROW-LEAF WILLOW	25%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	8	1,863
	CORNUS SERICEA	FACW	RED OSIER DOGWOOD	25%	LIVE STAKES**	5-6' , 3/4" TO 1-1/2" DIA	8	1,863
HERBACEOUS	*ELEOCHARIS PALUSTRIS*	OBL	COMMON SPIKERUSH	25%	PLUG	10 IN^3 PLUG	4	5,590
	CAREX NEBRASCENSIS	OBL	NEBRASKA SEDGE	25%	PLUG	10 IN^3 PLUG	4	5,590
	CAREX UTRICULATA (C. ROSTRATA)	OBL	NORTHWEST TERRITORY SEDGE	25%	PLUG	10 IN^3 PLUG	4	5,590
	CAREX PELLITA	OBL	WOOLLY SEDGE	25%	PLUG	10 IN^3 PLUG	4	5,590

** USE LIVE STAKES IF AVAILABLE; IF NOT AVAILABLE, SUBSTITUTE WITH CONTAINER-GROWN PLANTS

RIPARIAN PLANTING ZONE								
18.5 ACRES								
GROWTH HABIT	SCIENTIFIC NAME	INDICATOR STATUS[1]	COMMON NAME	PERCENT COMPOSITION	PROPAGATION METHOD	SIZE	SPACING (FEET O.C.)[3]	QUANTITY
SHRUB	ALNUS RHOMBIFOLIA	FACW	WHITE ALDER	100%	CONTAINER	1 GALLON	24	1,398
	PHYSOCARPUS CAPITATUS	FACW	PACIFIC NINEBARK	100%	CONTAINER	1 GALLON	8	11,180
	SALIX LUCIDA SSP. LASIANDRA	FACW	PACIFIC WILLOW	20%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	4	7,547
	SALIX EXIGUA	FACW	NARROW-LEAF WILLOW	20%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	4	7,972*
	SALIX AMYGDALOIDES	FACW	PEACHLEAF WILLOW	20%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	4	7,547
	SALIX PROLIXA	OBL	MACKENZIE'S WILLOW	20%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	4	7,547
	CORNUS SERICEA	FACW	RED-OSIER DOGWOOD	20%	LIVE STAKES**	5-6' , 3/4" TO 1-1/2" DIA	4	7,547

* NARROW-LEAF WILLOW QUANTITY INCLUDES TOTAL OF 425 STAKES TO BE USED FOR WOOD STRUCTURES AS INDICATED ON SHEETS C-261, C-266, C-267.
** USE LIVE STAKES IF AVAILABLE; IF NOT AVAILABLE, SUBSTITUTE WITH CONTAINER-GROWN PLANTS

WETLAND SEED MIX				
10.9 ACRES				
SCIENTIFIC NAME	COMMON NAME	PERCENT COMPOSITION	POUNDS PER ACRE[2]	POUNDS NEEDED[2]
CAREX ATHROSTACHYA	SLENDER-BEAK SEDGE	15	7.5	82.5
CAREX NEBRASCENSIS	NEBRASKA SEDGE	15	7.5	82.5
CAREX PELLITA	WOOLLY SEDGE	10	5	55
CAREX STIPATA	STALK-GRAIN SEDGE	10	5	55
CAREX UTRICULATA	NORTHWEST TERRITORY SEDGE	10	5	55
DESCHAMPSIA ELONGATA	SLENDER HAIR GRASS	15	7.5	82.5
ELEOCHARIS PALUSTRIS	COMMON SPIKE-RUSH	10	5	55
LEERSIA ORYZOIDES	RICE CUT GRASS	15	7	82.5
	SEED MIX TOTALS	100	50	550

RIPARIAN SEED MIX				
66.7 ACRES				
SCIENTIFIC NAME	COMMON NAME	PERCENT COMPOSITION	POUNDS PER ACRE[2]	POUNDS NEEDED[2]
HORDEUM BRACHYANTHERUM	MEADOW BARLEY	20	10	667
CAREX ATHROSTACHYA	SLENDER-BEAK SEDGE	20	10	667
AGROSTIS EXARATA	SPIKE BENTGRASS	20	10	667
DESCHAMPSIA CAESPITOSA	TUFTED HAIR GRASS	20	10	667
DESCHAMPSIA ELONGATA	SLENDER HAIR GRASS	20	10	667
	SEED MIX TOTALS	100	50	3,335

NOTES:
1. INDICATOR STATUS BASED ON THE USACE 2020 NATIONAL WETLAND PLANT LIST (LICHVAR ET AL. 2020) AND INDICATOR STATUS FOR THE ARID WEST REGION.
2. SEED QUANTITY IS LISTED AS POUNDS OF PURE LIVE SEED.
3. LIVE PLANT LAYOUT
   a. FINAL PLACEMENT OF PLANTS SHALL BE CHOSEN BASED ON MICROSITE CONDITIONS, BECAUSE SOIL PROPERTIES AND WATER TABLE DEPTH CAN VARY OVER SHORT DISTANCES, SUCH THAT SPECIES ARE BEST MATCHED TO THEIR SITE CONDITIONS.
   b. MORE INUNDATION-TOLERANT SPECIES SHALL BE PLACED IN LOWER ELEVATION OR WETTER AREAS WITHIN THE ZONE.
   c. FINAL PLANT LAYOUT SHALL UTILIZE CLUSTER PLACEMENT, GROUPING SEVERAL PLANTS (3 TO 5) OF THE SAME SPECIES TOGETHER SPATIALLY TO RESEMBLE SMALL STANDS OF EACH SPECIES.

TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER
91392PE
OREGON
JULY 12, 2016
JEREMY S. ANDREWS
EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PLANTING PLAN

DWG. NO.: L-204
CREATED: 1/19/26
SHEET: 49 of 50

FLOODPLAIN PLANTING ZONE								
5.2 ACRES								
GROWTH HABIT	SCIENTIFIC NAME	INDICATOR STATUS[1]	COMMON NAME	PERCENT COMPOSITION	PROPAGATION METHOD	SIZE	SPACING (FEET O.C.)[3]	QUANTITY
TREE	*ACER NEGUNDO*	FACW	ASH-LEAF MAPLE	100%	CONTAINER	1 GALLON	24	392
	POPULUS BALSAMIFERA SSP. TRICHOCARPA	FAC	BLACK COTTONWOOD	100%	CONTAINER	1 GALLON	18	305
SHRUB	*SALIX SCOULERIANA*	FAC	SCOULER'S WILLOW	20%	LIVE STAKES	5-6' , 3/4" TO 1-1/2" DIA	6	1,114
	CRATAEGUS DOUGLASII	FAC	BLACK HAWTHORNE	15%	CONTAINER	1 GALLON	6	836
	CORNUS SERICEA	FACW	RED OSIER DOGWOOD	20%	LIVE STAKES**	5-6' , 3/4" TO 1-1/2" DIA	6	1,114
	AMELANCHIER ALNIFOLIA	FACU	SASKATOON SERVICE-BERRY	15%	CONTAINER	1 GALLON	6	836
	RIBES LACUSTRE	FACW	BRISTLY BLACK GOOSEBERRY	15%	CONTAINER	1 GALLON	6	836
	ROSA WOODSII	FACU	WOODS' ROSE	15%	CONTAINER	1 GALLON	6	836

** USE LIVE STAKES IF AVAILABLE; IF NOT AVAILABLE, SUBSTITUTE WITH CONTAINER-GROWN PLANTS

UPLAND PLANTING ZONE								
2.5 ACRES								
GROWTH HABIT	SCIENTIFIC NAME	INDICATOR STATUS[1]	COMMON NAME	PERCENT COMPOSITION	PROPAGATION METHOD	SIZE	SPACING (FEET O.C.)[3]	QUANTITY
TREE	*ACER GLABRUM*	FAC	ROCKY MOUNTAIN MAPLE	33%	CONTAINER	1 GALLON	24	62
	ABIES GRANDIS	FACU	GRAND FIR	33%	CONTAINER	1 GALLON	24	62
	PINUS PONDEROSA	FACU	PONDEROSA PINE	33%	CONTAINER	1 GALLON	24	62
SHRUB	*HOLODISCUS DISCOLOR*	FACU	CREAMBUSH	25%	CONTAINER	1 GALLON	8	374
	PRUNUS EMARGINATA	FACU	BITTER CHERRY	25%	CONTAINER	1 GALLON	8	374
	SAMBUCUS RACEMOSA	FACU	RED ELDERBERRY	25%	CONTAINER	1 GALLON	8	374
	SYMPHORICARPOS ALBUS	FACU	COMMON SNOWBERRY	25%	CONTAINER	1 GALLON	8	374

FLOODPLAIN SEED MIX				
18.0 ACRES				
SCIENTIFIC NAME	COMMON NAME	PERCENT COMPOSITION	POUNDS PER ACRE[2]	POUNDS NEEDED[2]
ELYMUS GLAUCUS	BLUE WILDRYE	30	15	270
BROMUS CARINATUS	CALIFORNIA BROME	30	15	270
HORDEUM BRACHYANTHERUM	MEADOW BARLEY	20	10	180
DESCHAMPSIA CAESPITOSA	TUFTED HAIRGRASS	20	10	180
	SEED MIX TOTALS	100	50	900

UPLAND SEED MIX				
19.5 ACRES				
SCIENTIFIC NAME	COMMON NAME	PERCENT COMPOSITION	POUNDS PER ACRE[2]	POUNDS NEEDED[2]
ACHILLEA MILLEFOLIUM	WESTERN YARROW	10	5	97.5
ARTEMISIA LUDOVICIANA	WHITE SAGEBRUSH	10	5	97.5
ELYMUS ELYMOIDES	WESTERN BOTTLE-BRUSH	10	5	97.5
FESTUCA IDAHOENSIS	IDAHO FESCUE	20	10	195
KOELERIA MACRANTHA	PRAIRIE JUNEGRASS	15	7.5	146.25
LUPINUS POLYPHYLLUS	LARGE-LEAVED LUPINE	15	7.5	146.25
PSEUDOROEGNERIA SPICATA	BLUEBUNCH WHEATGRASS	20	10	195
	SEED MIX TOTALS	100	50	975

NOTES:
1. INDICATOR STATUS BASED ON THE USACE 2020 NATIONAL WETLAND PLANT LIST (LICHIVAR ET AL. 2020) AND INDICATOR STATUS FOR THE ARID WEST REGION.
2. SEED QUANTITY IS LISTED AS POUNDS OF PURE LIVE SEED.
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TETRA TECH
www.tetratech.com
19803 North Creek Parkway
Bothell, Washington 98011
Phone: 425-482-7600 Fax: 425-482-7652

REGISTERED PROFESSIONAL ENGINEER 91392PE OREGON JEREMY S. ANDREWS JUL 9 2025 EXPIRES: 12/31/2027

ISSUED FOR CONSTRUCTION

REV.	DATE	REVISION DESCRIPTION	DRW	ENG	CHK	APP
		PLAN SHEET SIZE ANSI B (11" X 17")				
1	1/19/26	ISSUED FOR CONSTRUCTION	SH/NS	JA	AK	CJ

CTUIR
UMABIRCH ENHANCEMENT DESIGN
PROJECT AREA 2

PLANTING PLAN

DWG. NO.: L-205
CREATED: 1/19/26
SHEET: 50 of 50

APPENDIX 2
CONSTRUCTION SPECIFICATIONS

UmaBirch Instream Design and Construction Oversight Project

Project Area 2 Umatilla River and Birch Creek Confluence Instream Enhancement and Floodplain Restoration

Appendix 2

Construction Specifications

Issued for Construction

Prepared for:

Confederated Tribes of the Umatilla Indian Reservation
Fisheries Program-Umatilla River Basin
Department of Natural Resources
46411 Timíne Way
Pendleton, OR 97801

Prepared by:

19803 North Creek Parkway
Bothell, WA 98011
Tel 425-482-7600 Fax 425-482-7652

January 2026

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

UMABIRCH INSTREAM DESIGN AND CONSTRUCTION OVERSIGHT PROJECT

PROJECT AREA 2 UMATILLA RIVER AND BIRCH CREEK CONFLUENCE INSTREAM ENHANCEMENT AND FLOODPLAIN RESTORATION

CONSTRUCTION SPECIFICATIONS

ISSUED FOR CONSTRUCTION

Submittal To:

Confederated Tribes of the Umatilla Indian Reservation
Department of Natural Resources
46411 Timíne Way
Pendleton, Oregon 97801

Prepared By:

Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, WA 98011

January 2026

TABLE OF CONTENTS

SECTION 01 11 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 DESCRIPTION

A. This section provides a brief narrative summary of the contract work. The project is located on the Umatilla River, confluence of Birch Creek and Umatilla River, and Birch Creek. This contract work consists of constructing a new Umatilla River channel and filling portions of the existing Umatilla River channel, constructing an Birch Creek channel and filling portions of the existing Birch Creek channel, constructing a new distributary channel, constructing new wetland features and link channels between wetland features, floodplain benching, floodplain terrace construction, and access route maintenance. Large woody material (LWM) and boulder habitat structures will be installed in channels and throughout the floodplain. Excavated materials shall be placed onsite as fill. The installation of LWM and channel fill will potentially require isolation of work areas from water and fish.

The Contractor shall provide all labor, equipment, supervision, transportation, operating supplies and incidentals to perform all work necessary on the areas specified herein. All aspects of the work shall be performed in an organized and systematic manner to assure that services are performed in a timely matter and comply with the technical specifications.

This summary does not provide the technical detail of the work activities, but describes the work as a whole, providing overall perspective to the separate tasks. This section shall be used in conjunction with all the other sections and the Drawings to establish the total work requirements.

1. Concurrent with the scheduled performance of the Work under these Contract Documents, removal of a portion of the existing U.S. Army Corps of Engineer's (USACE) Pendleton 2a Levee and the construction a new levee setback is provided as a separate project and is detailed in separate drawings and specification documentation. The Contractor will coordinate with Owner's representative on construction sequencing, access, and control of water, as well on coordination of specific work that overlaps between the floodplain habitat and levee setback earthwork.

B. The project was designed in accordance with the Bonneville Power Administration (BPA) Habitat Improvement Program (HIP) Programmatic Biological Opinion. Refer to the HIP Conservation Notes in the Drawings and the HIP handbook.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. The Contractor is advised that the contract work will consist of the following:

Clearing and Grubbing within Project Area
Installation of Temporary Construction Access Routes
Installation of Temporary Construction Bridges
Installation and Maintenance of Construction Area BMPs
Construction and Maintenance of Material Storage Areas

Removal of Portions of Existing Berms
Floodplain Benching
Wetland and Link Channel Excavation
Realigned Umatilla River Channel Excavation
Birch Creek Channel Excavation
Distributary Channel Excavation
Installation of Floodplain and Instream Structures
Floodplain Terrace Construction and Fill Placement
Access Route Maintenance
Finish Grading of Floodplain and Decompaction of Compacted Access Routes and Staging Areas
Installation of Revegetation Materials by CTUIR
Complete Project Area Cleanup, Repairs, Incidentals, and Punchlist Items

Additionally, erosion control measures must be executed to industry standards – care must be taken to prevent excavated soil material from entering the stream system. To ensure integrity of the stream channel and to reduce impacts to water quality and aquatic organisms, floodplain activities will be completed separately from activities in the wetted channel. Activities in the floodplain will occur between May and November, whereas work in the wetted channel, or that requires crossing the wetted channel, will occur between July 1 and September 30, during the Oregon Department of Fish and Wildlife (ODFW) in-water work period. No instream work will be conducted between May and June 30 or between October 1 and the November 30. The Contractor shall notify the CTUIR in writing 10 days before beginning any work activities.

B. For all construction activities, including those within the above listed instream work window, the Contractor shall be responsible for potential turbidity and sediment transport within and downstream of the physical limits of the project.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SUMMARY OF WORK

SECTION 01 14 00
WORK RESTRICTIONS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section provides general Work Restrictions that shall be observed by the Contractor during performance of work for the duration of the Contract.

1.02 CONDUCT OF WORK

A. Restricted Work Periods

1. Completion of the instream components of the project shall be restricted to the period of July 1 to September 30 during the construction period.

B. Restricted Work Areas

1. Completion of work adjacent to or on private property will require coordination with the affected landowners.

2. The Contractor and CTUIR will coordinate the project work schedule in order to notify landowners and stakeholders of when the work activities adjacent to or on the private property will occur.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF WORK RESTRICTIONS

SECTION 01 14 13
ACCESS TO SITE

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the location of the project site and the access routes the Contractor will use during performance of work for the duration of the Contract.

1.02 CONDUCT OF WORK

A. Location of Project Work Site

1. Overall location of the project site is shown on the Drawings.

B. Directions to Project Work Site

1. From Interstate 84 (I-84), take exit 207 toward US-30/Airport/Pendleton City Center. Head southwest on County 1300 Rd/McKennon Rd and continue on County 1300 Rd for 1.5 miles. Turn left onto Birch Creek Rd and continue for 0.6 miles. Access to the site is to the west of Birch Creek Rd.

C. Restricted Access Areas

1. Permission to access is granted by the private landowner to the CTUIR. The Contractor shall make arrangements with the CTUIR to access the project site through private land.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF ACCESS TO SITE

SECTION 01 14 20
SITE-SPECIFIC REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. This section provides general Site-Specific Requirements that shall be observed by the Contractor during performance of work for the duration of the Contract.

1.02 CONDUCT OF WORK

A. Coordination

1. Coordination with agencies, other on-site Contractors, and Owner shall generally be made by Contractor through the Owner's Representative or Engineer as expressed in the Contract Documents to assist Contractor with performance of the work with a minimum of interference and inconvenience. Contractor will access the project site at locations identified on the Drawings and by direct coordination with Owner's Representative management staff.

2. The project site is located on private lands. All activities shall be coordinated with other ongoing activities at the property and shall not interfere with these activities except with written approval of the Owner's Representative or Engineer.

B. Work Hours

1. The Contractor shall propose work hours based on the Contractor's construction schedule to ensure completion of all instream work during the allowable in-water work window (July 1 to September 30). The Contractor shall propose extended workdays and/or weekend work if necessary, to meet the time constraints of the appropriate year in-water work period. The Contractor's proposed work schedule shall be subject to Owner's Representative or Engineer's approval. Proposed work schedule may not be approved if the Owner's Representative or Engineer is not available to be on site during the proposed work hours.

1.03 GENERAL ACCESS REQUIREMENTS

A. The project site area is closely monitored by Owner's personnel. Contractor's personnel working at the site may be asked for appropriate identification. A list of all employees for the Contractor, suppliers, and vendor Representatives will be provided to the Owner's Representative or Engineer.

B. Irregular or Non-Routine Access

1. Access on an irregular basis and during other than established working hours will require prior approval by Owner's Representative or Engineer.

C. Maintenance of Access

1. Contractor shall not obstruct or interfere with access by others to existing facilities adjacent to the project site during the work under this Contract.

D. Vehicle Parking

1. Contractor's vehicles shall only park in approved areas as described by Owner's staff.

1.04 COORDINATION AND COOPERATION WITH OTHER CONTRACTORS

A. Removal of a portion of the existing U.S. Army Corps of Engineer's (USACE) Pendleton 2a Levee and the construction a new levee setback will be concurrent with the scheduled performance of the Work under these Contract Documents and the Contractor will coordinate with the Owner's representative on construction sequencing, access, and control of water, as well on coordination of specific work that overlaps between the floodplain habitat, levee removal, and new levee setback.

1.05 CONSTRUCTION SCHEDULE REQUIREMENTS

A. Workflow

1. The Work shall be planned, scheduled, and performed to complete the Work within the requirements of these Contract Documents and the requirements of appropriate Federal, State, and local agencies. Contractor shall prepare and maintain a construction schedule.

B. Construction Sequence

1. Period Before Completion of Pendleton 2a Levee Setback Project

- Mobilize and complete construction initiation activities:
    - Attend kickoff meeting with the CTUIR, landowner, and Engineer.
    - Complete review of pre-construction staking, flagging of sensitive areas, and contractor submittals.
    - Complete and receive approval for all required contractor submittals and plans.
    - Install construction fencing where required.
    - Install construction area temporary erosion and sediment controls (TESC) BMPs.
    - Complete clearing and grubbing.
    - Construct temporary access routes and staging areas.
- Acquire, haul, separate, and stockpile all required earth, rock, wood, and other materials in the designated staging area(s) as directed by CTUIR's Representative or Engineer.
- Begin constructing floodplain and terrace fill features outside of wetted channel, starting at downstream end of PA 2 and moving upstream:
    - Construct the new Birch Creek channel, distributary channel, and portions of the new Umatilla River channel, keeping channels isolated from flow by leaving earthen plugs in place at the connections with existing channels.

- Construct floodplain benching, floodplain terrace fill, ponds, and wetlands and link channels in the area south of the new Umatilla River alignment.
- Remove existing metal, concrete, debris, or wood structures (e.g., fences), decompact soils, and decommission existing roads.
- Protect existing mature vegetation and relocate mature trees to the extent possible.
- Regrade existing access route.
- Construct floodplain LWM structures.
- Complete POD decommissioning and removal.

- Perform work in the wetted channel during the in-water work window (July 1 to September 30):
  - After the necessary channels are completed, divert Birch Creek flow into the new Birch Creek channel and distributary channel, and dewater old Birch Creek channel downstream of the new channel:
  - Install temporary bridges or fish-excluded crossings as directed by the CTUIR;
  - Install and monitor TESCs;
  - Pre-wash new Birch Creek channel and pump turbid water to a CTUIR-approved location and monitor to ensure no turbid water returns to the stream;
  - Install block nets and salvage fish in old Birch Creek downstream of new channel (work to be completed by CTUIR);
  - Remove earthen plug to divert Birch Creek into the new Birch Creek channel and distributary channel;
  - Install work area isolation at the old Birch Creek confluence with Umatilla River and immediately downstream of new channel to block flow in segment of old Birch Creek;
  - Dewater old Birch Creek downstream of the new channel. Pump turbid water to a CTUIR-approved location and monitor to ensure no turbid water returns to the stream.
- Fill the dewatered segment of the old Birch Creek channel.

2. Period After Completion of Pendleton 2a Levee Setback Project
   - At any time of year, perform remaining floodplain and upland construction:
     - Complete the new Umatilla River channel alignment in the dry, maintaining isolation from active flow;
     - Complete fill placement, wetland creation, and LWM installation in areas north of the new Umatilla River channel.
     - Complete any other unfinished work.

- Perform work in the wetted channel during the in-water work window (July 1 to September 30):
    - Divert the Umatilla River into its new channel:
        - Install temporary bridges or fish-excluded crossings as directed by the CTUIR;
        - Install and monitor TESCs;
        - Pre-wash new Birch Creek channel and pump turbid water to a CTUIR-approved location and monitor to ensure no turbid water returns to the stream.
        - Remove earthen plug to connect new Birch Creek channel to old channel.
        - Install block nets and salvage fish in old Birch Creek downstream of new channel (work to be completed by CTUIR).
        - Install work area isolation at the old Birch Creek confluence with Umatilla River and immediately downstream of new channel to block flow in segment of old Birch Creek.
        - Dewater old Birch Creek downstream of the new channel. Pump turbid water to a CTUIR-approved location and monitor to ensure no turbid water returns to the stream.
    - Fill the dewatered segment of old Umatilla River channel and restore backwater flow:
        - Place fill in the dewatered, isolated old channel, working downstream to upstream (or in alternate sequence determined beforehand).
        - Remove pumps, cofferdams, temporary crossings, and TESCs.
    - Complete construction of instream LWM structures, habitat boulders, and any work requiring construction in the wetted channel;
- Complete site restoration activities and demobilize after completion of all other upland, floodplain, and wetted channel work:
    - Decompact floodplains and all disturbed areas.
    - Conduct seeding and mulching to stabilize site.
    - Install herbaceous plantings and plant trees and shrubs in the fall (to be completed by CTUIR).
    - Remove remaining TESCs.
    - Complete site cleanup and demobilization.

1.06 PROTECTION OF PROPERTY

A. Contractor shall protect all property within or in the vicinity of the work site. Contractor shall ensure that property is not removed, damaged, destroyed, or prevented from its normal use unless so designated in the Contract Documents. All property adjacent to the work shall be protected including, but not be limited to, protection from

construction-generated dust, debris, water, and vibration. Property includes land, utilities, trees, shrubs, landscaping, markers and monuments, natural features, monitoring wells, buildings, structures, site and drainage improvements, and other improvements, whether shown on the Drawings or not. No work shall be conducted in any wetlands or vegetation protection areas shown on the Drawings and restricted areas unless coordinated with and approved by the Owner's Representative or Engineer.

B. Contractor shall confine operations to within the clearing limits or other areas designated in the contract documents, and prevent the depositing of rocks, excavated materials, stumps, or other debris outside of these limits. Contractor shall retrieve material which falls outside of these limits and dispose of, or incorporate in the work, as directed by the Owner. Contractor shall preserve the scenic and natural environment along this construction project.

C. Contractor shall not allow objectionable material to enter any stream, river, lake, or other body of water. Contractor shall retrieve material which falls in these areas and dispose of, or incorporate in the work, and repair damage to vegetation or structures outside the project limits.

D. Contractor shall not operate equipment or otherwise disturb the natural vegetation and soil beyond the construction limits.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SITE-SPECIFIC REQUIREMENTS

SECTION 01 22 20
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 DESCRIPTION

A. The Bid Items described in this Section correspond with those listed on the Bid Form. Additional bid items requiring no further description may also be included on the form. It is the responsibility of the Contractor to make a thorough investigation of the Contract Drawings and Specifications, and the Site, to determine the scope of work for each bid item.

B. Payment will be made based on the quantities of work as measured in accordance with specified methods of measurement and the prices stipulated in the Bid Form and only for those items listed on the Bid Form. All other items of work shown on the Contract Drawings or required by Specifications shall be considered incidental to the items listed. This method of payment will constitute complete compensation for all work shown on the Contract Drawings and provided in the Specifications or other Subcontract documents, and for all costs of accepting the general risks, liabilities and obligations expressed or implied.

1.02 SCHEDULE OF VALUES

A. Contractor shall prepare and submit a schedule of values at the kickoff meeting for each contracted phase corresponding to the project specification sections and any other major work items to be used as a basis for monthly pay requests. The construction quantities in the schedule of values shall be updated weekly and verified and signed off by both the Contractor and the Owner's Representative.

B. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Specification table of contents. Provide multiple line items for subcontract amounts, where appropriate.

C. The quantity to be paid is the quantity shown in the Schedule of Items. The contract quantity will be adjusted for authorized changes that affect the quantity or for errors made in computing this quantity. If there is evidence that a quantity specified as a contract quantity is incorrect, the Contractor shall submit calculations, drawings, or other evidence indicating why the quantity is in error and request, in writing, that the quantity be adjusted. The CTUIR reserves the right to review all Contractor submitted actual quantity measurements for review and payment.

D. Submit copies of the schedule of values to Owner's Representative at earliest possible date, but no later than 15 days before the date scheduled for submittal of initial pay request.

1.03 PAY REQUESTS

A. Each pay request shall be consistent with previous applications and payments as certified by Owner's Representative and paid for by Owner.

B. It will be the Contractor's responsibility to prepare a monthly estimate of the percentage of work accomplished on each line item of the approved schedule of values. This estimate shall be submitted to the Owner's Representative each month as part of the pay request for review not later than the date established at pre-construction conference. The weekly construction quantities updated in the schedule of values that are updated weekly and verified and signed off by the Contractor and the Owner's Representative shall be used as the basis of the estimate. Owner's Representative will verify all measurements and monthly estimate and provide for approval to the Owner within 30 days of receiving monthly estimate.

1.04 DESCRIPTION OF BID ITEMS

A. This is a lump sum bid with lump sum and unit price pay items; therefore, the total lump sum price and all lump sum and unit price pay items submitted on the bid form shall constitute full compensation for furnishing all labor, materials, and equipment, and performing any associated Contractor quality control, environmental protection, meeting safety requirements, test and reports, and shall include all Contractor costs, overhead, and profit needed to perform all work required for each of the lump sum and unit price items, which will be completed by phase, with each phase contracted separately.

B. Contract quantities will be adjusted only when the variation in the bid items and actual work is of 15 percent or more.

C. Contractor shall give a price per hour for unforeseen work that is encountered during the contract performance and not included in the other sub-items. Hourly work must be authorized in advance by the CTUIR. The CTUIR does not guarantee that any hourly work shall be ordered and reserves the right to reduce or eliminate entirely the work under these items with no adjustment in contract unit price.

D. Mobilization: Payment will be made for mobilization in a lump sum. When 10 percent of the original contract amount is earned from other bid items, 100 percent of the mobilization item may be paid.

E. Payment for lump sum bid items may be made in accordance with the verified monthly estimate of percentage of work accomplished (see 103.B above).

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF MEASUREMENT AND PAYMENT

SECTION 01 25 10
CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the process and procedures to be followed by the Contractor and Owner in the event a contract modification is required during project implementation.

B. A contract modification is defined as a change order or amendment to the original contract to add costs to the construction contract for expanding the scope of work or to subtract costs to the construction contract for reducing the scope of work.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall keep a copy of the construction contract and bid sheet at the construction site during the entire implementation period.

B. During each weekly progress meeting, the Contractor shall provide a summary of work completed to date, a summary of work to be completed in the next week, and a summary of work to be completed within the next month.

C. During the discussion of work to be completed in the next week and next month provided by the Contractor during the weekly progress meeting, any work activities not included in the current contract shall be identified by the Contractor.

D. After the activities not included in the current construction contract have been identified by the Contractor, the Contractor shall prepare a description of the additional work required and an itemized cost to complete the additional work.

E. The Contractor shall submit the description of work and itemized costs to the Owner's Representative for review.

1.03 OWNER'S REPRESENTATIVE REVIEW

A. Upon receipt of the description of additional work and itemized costs, the Owner's Representative will complete a review of the materials.

B. Review of the submitted materials will be completed by the Owner's Representative within 7 days from the date of submittal.

C. If, during the review of the submitted materials, the Owner's Representative has questions or requires additional information to complete his/her review, they will contact the Contractor within 7 days from the date of the submittal.

D. A response to the Contractor's submittal by the Owner's Representative will be required within 7 days from the date of the submittal.

1.04 OWNER'S REPRESENTATIVE APPROVAL

A. After the Owner's Representative has reviewed the Contractor's submittal and verifies that the work included in the submittal is not included in the current scope of work, the Owner's Representative shall approve the submittal.

B. After the submittal has been approved, the Owner's Representative shall complete a change order or contract amendment to cover the work items in the submittal.

C. Any change order or contract amendment shall be completed by the Owner and ready for signature within 21 days from the date of the submittal.

D. Adhering to the time schedule described above is necessary to keep the project implementation on schedule and prevent the Contractor from completing a critical component of the project.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF CONTRACT MODIFICATION PROCEDURES

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the process and procedures to be followed by the Contractor and Owner for the preparation, submittal, and payment of monthly invoices for completed construction work.

B. During the pre-construction meeting, the Owner's Representative will identify the monthly submittal date for invoices to be submitted by the Contractor. This date will account for submittal, review, approval, and payment processing time to expedite payments to the Contractor.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. The Contractor shall keep a copy of the construction implementation spreadsheet at the construction site during the entire implementation period. This spreadsheet will show daily progress on schedule of value line items.

B. During each weekly progress meeting, the Contractor shall provide a summary of work completed during the prior week and a total since the last invoice period.

C. At the weekly progress meeting immediately before the monthly submittal date, the Contractor will present a draft invoice to the Owner's Representative. This draft invoice will show the percentage complete of schedule of value items included in the payment request.

D. The total percent complete shown on the draft invoice will be supported by the construction implementation spreadsheet submitted with the draft invoice.

1.03 OWNER'S REPRESENTATIVE'S REVIEW

A. During the weekly progress meetings, the total percentage of work completed recorded by the Owner's Representative and Contractor will be reconciled and approved.

B. Upon verification of the total percent complete, Owner's Representative will sign an invoice approval form and forward the invoice to the CTUIR Accounts Payable Section.

C. The CTUIR Accounts Payable Section will have 2 working days to review and approve or reject the invoice.

1.04 OWNER'S REPRESENTATIVE APPROVAL

A. The Owner's Representative will be expected to attend and participate in the Weekly Progress Meetings and keep current on the project implementation activities.

B. Upon receipt of the approved invoice from the Owner's Representative, the CTUIR Accounts Payable Section shall review the submitted invoice and construction implementation spreadsheet.

C. The CTUIR Accounts Payable Section will have 2 working days to review and approve or reject the invoice after receipt from the Owner's Representative.

D. After approval, the Owner's Representative will prepare all necessary administrative forms to initiate payment processing within the CTUIR Accounts Payable Section.

E. The Owner's Representative will have 3 working days to prepare the necessary administrative forms and secure signatures to initiate the payment process.

1.05 PAYMENT PROCESSING

A. Upon submittal of the administrative forms and Contractor invoice, payment processing will follow the standard operating procedures of the CTUIR Accounts Payable Section.

B. If payment has not been received by the Contractor within 4 working days of the estimated payment date defined in Section 1.01 B., the Owner's Representative will contact the CTUIR Accounts Payable Section to determine the reason for the delay.

C. The Owner's Representative will make every effort possible to resolve any issues that are holding up payment to the Contractor as quickly as possible.

D. In the event that payment is not received by the Contractor within 30 days of the estimated payment date, the Contractor will be allowed to charge interest on the outstanding balance. This interest charge will not be part of the overall construction cost included in the construction contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF PAYMENT PROCEDURES

SECTION 01 31 19.13
PRE-CONSTRUCTION MEETING

PART 1 GENERAL

1.01 DESCRIPTION

A. Not more than 5 days after a Notice to Proceed has been issued to the Contractor, but earlier if practicable, a mandatory pre-construction meeting will be scheduled by the Owner's Representative or Engineer. This meeting will occur not less than 10 days prior to work commencing.

B. The Owner's Representative or Engineer will preside at the pre-construction meeting.

C. Present to represent the Contractor shall be at least the project Superintendent, a representative with full contract authority to speak for each of their principal subcontractors, and other representatives as he/she may deem appropriate.

D. The Owner's Representative and other invited parties shall be present as required.

E. Proceedings of the meeting will be recorded and distributed to interested parties.

1.02 AGENDA

A. Both Owner's Representative and Contractor shall be prepared to speak to the following:

1. Name and Field Address of Job Superintendent
2. Emergency Phone and/or operator
3. Date of Construction Start
4. Date of Notice to Proceed
5. Notification of Utilities, Concerned Fire, Police, Schools, etc.
6. Coordination with other Contractors
7. Permits: County, City, all Government Agencies as required
8. Inspector: name, authority
9. Field office (location)
10. Submittals
11. Responsibility for lines and grades
12. Periodic progress payments including date for submittal
13. Construction Progress Schedule (bar graph or C.P.M.)

14. Safety Requirements and Special Hazards

15. Insurance and Bonds

16. Traffic Control

17. Construction Signs

18. Drawings revised to conform to construction records

19. Beneficial Occupancy

20. Retention of Contract Records

21. Guarantees and Warranties

22. Testing

23. Progress Meetings

24. Complaint Procedure

25. Job Photos

26. Other Matters Concerning Construction

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF PRE-CONSTRUCTION MEETING

SECTION 01 31 19.23
PROGRESS MEETINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. Weekly Progress Meetings will be held at the job site during construction.

B. The Owner's Representative or Engineer will preside at Progress Meetings.

C. Proceedings of meeting will be recorded and distributed to interested parties.

1.02 MEETINGS

A. Meetings other than Weekly Progress Meetings (if required) will be scheduled each week at mutually agreed time.

B. Location of meetings: As designated during preconstruction conference.

C. Attendance:

1. Owner's Representative

2. Engineer

3. Contractor

4. Other Contractors (if any)

5. Subcontractors as pertinent to agenda

6. Safety Representative (Optional)

7. Representatives of Governmental or other Regulatory Agencies (Optional)

1.03 MINIMUM MEETING AGENDA

A. Review and approve minutes of previous meeting.

B. Review work progress since last meeting.

C. Note field observations, problems and decisions.

D. Identify problems which impede planned progress.

E. Identify potential ways to increase construction efficiencies.

F. Develop corrective measures and procedures to regain planned schedule.

G. Revise Construction Schedule as indicated.

H. Plan progress during next work period.

I. Coordinate projected progress with other Contractors.

J. Review submittal schedules, expedite as required to maintain schedule.

K. Maintaining of quality and work standards.

L. Review proposed changes for:

1. Effect on Construction Schedule

2. Effect on Completion Date

M. Complete other current business.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF PROGRESS MEETINGS

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section includes specifications for the general requirements and procedures for preparing and submitting construction information and data for information and review. Other requirements for submittals are specified under applicable Sections of the Specifications.

B. Submittals are as specified throughout the Contract Documents and may not be included in this specification.

1.02 SUBMITTAL REQUIREMENTS

A. Schedule of Submittals: Within 10 calendar days after the effective date of Notice to Proceed, Contractor shall submit a completed submittal schedule and list of products for all items requiring Owner's Representative's or Engineer's review, as follows:

1. Work Plan, Shop Drawing, or other Submittal identification including description of the item. Include name of manufacturer, trade name, and model number, if applicable.

2. Specification section references.

3. Intended submission/resubmission date(s).

4. Order release date.

5. Lead time to delivery/anticipated delivery date(s).

6. Highlight items that require expedited review to meet the project schedule and are on the critical path.

B. These schedules shall be presented in a form that is readily reproducible and shall be updated and sent to Owner's Representative or Engineer on a bi-weekly basis (twice per month). Identify all submittals that are required by the Contract Documents and determine the date on which each submittal will be submitted.

C. Professional Seal Required: Submittals involving engineering expertise, such as excavation support structures, and load calculations, shall be sealed and signed by a Professional Engineer, currently registered in the State of Oregon, for the discipline involved.

D. Review Stamp and Action Block Space: Include a 5-inch square blank space, in the lower right corner, just above the title block, in which Engineer may indicate the action taken.

E. Review Period:

1. Prepare submittals sufficiently in advance so that review may be given before commencement of related work.

2. Allow 10 calendar days after receipt by Owner's Representative or Engineer for review of each submittal.

3. Contractor shall be responsible for determining whether or not certain submittals require longer review periods. Where longer review periods are required, Contractor shall schedule the Work accordingly, so that the Work and construction schedules are not adversely impacted.

F. Submittal Delivery: Ship submittals prepaid or deliver by hand directly to Owner's Representative or Engineer.

G. Transmittal Form: Accompany submittals with the transmittal forms provided by Owner's Representative or Engineer.

H. Changes in Reviewed Submittals: Changes in reviewed submittals will not be permitted unless those approved submittals with changes have been resubmitted and reviewed, in the same manner as the original submittal.

I. Supplemental Submittals: Supplemental submittals initiated by Contractor for consideration of corrective procedures shall contain sufficient data for review. Make supplemental submittals in the same manner as initial submittals.

J. Incomplete submittal packages will be returned without review.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Contractor's Review:

1. Each submittal shall be reviewed, stamped, and signed as reviewed and approved by Contractor prior to submission.

2. If the submittal is designated to be sent to Owner's Representative or Engineer for information, approval by the designated approval authority shall take place before submission to Owner's Representative or Engineer.

3. Contractor shall coordinate each submittal with the requirements of the Work, placing particular emphasis upon ensuring that each submittal of one trade is compatible with other submittals of that trade and with the submittals of other trades. Ensure submittal is complete with all relevant data required for review.

4. Review of drawings and associated calculations by Engineer shall not relieve Contractor from the responsibility for errors or omissions in the drawings and associated calculations, or from deviations from the Contract Documents, unless submittals containing such deviations were submitted to Engineer and the deviations were specifically called to the attention of Engineer in the letter of transmittal, and approved by Engineer as a Contract change.

5. Contractor's liability in case of deviations in the submittals from the requirements of the Contract Documents is not relieved by Engineer's review of submittals

containing deviations, unless Engineer expressly approves the deviations by issuing a Change Order.

6. Contractor shall be responsible for the correctness of the drawings, for shop fits and field connections, and for the results obtained by the use of such drawings.

B. Submittal Quantities: Unless noted otherwise, Contractor shall submit three copies of all submittals. Where permits and licenses and other such documents are obtained in Owner's name, submit the original and five copies.

C. Distribution of Submittals after Review: Distribute prints or copies of reviewed submittals, bearing Engineer's or designated approval authority's stamp and signature, to affected and concerned subcontractors, suppliers, and fabricators; and to affected and concerned members of Contractor's workforce.

D. Maintain at the site of the work a complete, up-to-date, organized file of all past and current submittals including an index and locating system which identifies the status of each submittal:

1. Assign a sequential number to each submittal.

2. Assign a revision number, using an alphanumeric sequence (e.g., 15, 15A, 15B, etc.) to all resubmittals.

1.04 ENGINEER'S REVIEW

A. Submittals will be reviewed for conformance with requirements of the Contract Documents. Review of a separate item will not constitute review of an assembly in which the item functions. Review will not relieve Contractor from Contractor's responsibility for accuracy of submittals, for conformity of submittals to requirements of Contract Documents, for compatibility of described product with contiguous products and the rest of the system, or for prosecution and completion of the Contract in accordance with the Contract Documents.

B. Engineer will indicate its reviews of submittals and the action taken by means of its review stamp. The review stamp will be affixed by Engineer, the action block will be marked, and the stamp will be signed and dated.

C. The review-stamp action-block marks will have the following meanings:

1. The mark NO EXCEPTIONS TAKEN means that every illustration and description appears to conform to the respective requirements of the Contract Documents; that fabrication, assembly, manufacture, installation, application, and erection of the illustrated and described product may proceed; and that the submittal need not be resubmitted.

2. The mark EXCEPTIONS AS NOTED - RESUBMISSION NOT REQUIRED means that every illustration and description appears to conform to the respective requirements of the Contract Documents upon incorporation of the reviewer's corrections, and that fabrication, assembly, manufacture, installation, application, and erection of the illustrated and described product may proceed. Submittals so

marked need not be resubmitted unless Contractor challenges the reviewer's exception.

3. The mark EXCEPTIONS AS NOTED - RESUBMISSION REQUIRED means that every illustration and description appears to conform to the respective requirements of the Contract Documents, and that fabrication, assembly, manufacture, installation, application, and erection of the illustrated and described product may proceed after incorporation of the reviewer's corrections and verification by Engineer that the reviewer's corrections have been properly incorporated in the submittal. Resubmission is also required if Contractor challenges the reviewer's corrections.

4. The mark REJECTED means that the submittal is deficient to the degree that the reviewer cannot correct the submittal with a reasonable degree of effort, has not made a thorough review of the submittal, and that the submittal needs revision and is to be corrected and resubmitted.

D. Contractor shall attend meetings as requested by Owner's Representative or Engineer to address issues related to the review of submittals.

E. Owner's Representative or Engineer will return submittals to Contractor within 10 calendar days after submittals have been received.

F. Contractor shall include 10 calendar days in its schedule for Owner and other parties to review submittals and re-submittals.

G. No schedule extensions will be permitted for poorly prepared, incomplete, or inaccurate submittals.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL PROCEDURES

A. Contractor's submittal schedule shall include the following submittals.

1. Submittal schedule
2. Construction schedule
3. Contract schedule of values
4. Weed-free material source certification
5. Spill Prevention Countermeasures and Control (SPCC) Plan
6. Oregon Department of Environmental Quality (ODEQ) 1200-C Permit
7. Erosion and Sediment Control (ESC) Plan
8. Storm Contingency Plan
9. Material Storage/Staging Plan
10. Dewatering and Work Area Isolation Plan
11. Excavation Plan
12. LWM, Boulder, Streambed and Grade Stabilization Material (Per Section 35 49 50 1.02)
13. Geotextile Manufacturer Certificate of Compliance
14. Seed Certification

15. Surveyor credentials
16. Oregon Department of Forestry (ODF) Notification of Operation
17. Final Record Drawings

END OF SUBMITTAL PROCEDURES

SECTION 01 35 43
ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes Environmental Protection work required to minimize environmental pollution and damage resulting from Contractor's operations during construction.

1.02 GENERAL REQUIREMENTS

A. Contractor shall perform the work, minimizing environmental pollution and damage as the result of construction operations, in accordance with these Drawings and Specifications and applicable local, state, and federal laws. Environmental pollution and damage is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to all life; affect other species of importance to humankind; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of land, water, and air, and includes management of visual aesthetics, noise, solid waste, biosolids, sludge, as well as other pollutants. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this contract. Contractor shall ensure compliance with this section by Subcontractors.

B. Permits

1. The Owner will obtain permits for Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, Sections 401 and 404 of the Clean Water Act, and Oregon Department of State Lands Removal-Fill.

2. Contractor shall be responsible for complying with all permit requirements including HIP Terms and Conditions. Contractor shall be responsible for obtaining all other permits as may be required including Oregon Department of Environmental Quality (ODEQ) 1200-C Permit and the Oregon Department of Forestry (ODF) Permit to Use Fire or Power-Driven Machinery. Contractor shall obtain all needed certifications and licenses as required by state and local jurisdictions.

C. Notification

1. Owner’s Representative or Engineer will notify Contractor in writing of any observed noncompliance with the previously mentioned federal, state, or local laws or regulations, permits, and other elements of the environmental protection specifications. Contractor shall, after receipt of such notice, inform Owner’s Representative or Engineer of proposed corrective action and take such action when approved. If Contractor fails to comply promptly, Owner’s Representative or Engineer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to Contractor for any such suspensions. Failure of Owner’s Representative or Engineer to notify Contractor of noncompliance does not relieve

Contractor of full responsibility of maintaining compliance conditions and work methods.

1.03 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. ESC Plan

a. The Contractor will secure the project area at the end of every workday in an effort to stabilize the project area to minimize impacts in case a high-water storm event occurs. The Contractor will be required to prepare and implement the ESC Plan to keep sediment from entering the channel during rain events.

b. Contractor shall submit all ESC Plans within 10 calendar days of Notice to Proceed. All erosion control plans shall be approved before work can begin. Plan shall be consistent with the requirements and meet the satisfaction of Owner.

c. ESC Plans shall include all measures necessary to protect resources and improvements. This shall include:

(1) The construction activities and sequence of implementation relating to specific erosion control measures.

(2) The location and type of permanent controls to be implemented during construction.

(3) The location and type of temporary controls to be implemented during construction.

(4) Detailed dewatering plan.

(5) Description of monitoring plan.

2. SPCC Plan

a. Contractor shall submit an SPCC Plan within 10 calendar days of Notice to Proceed. The SPCC Plan shall meet all applicable U.S. Environmental Protection Agency (EPA) requirements, must be certified by a registered professional engineer, and will include safe mobile fueling of equipment procedures, including inventory, storage, and handling. The Plan shall describe secondary containment procedures to be used during mobile fueling to protect nearby wetlands and other surface water bodies. Plan shall be consistent with the requirements and meet the satisfaction of Owner.

b. The Contractor will be required to prepare an emergency spill containment kit, to be located on the construction site at all times, and prepare a SPCC Plan, addressing prevention and cleanup of accidental spills. If a spill of petroleum product should occur in water, Contractor shall immediately notify the Owner's Representative and appropriate state agencies.

3. ODF Notification of operation

    a. The Contractor shall file a Notification of Operation or Permit to Use Fire or Power-Driven Machinery with the ODF before starting the work.

1.04 LAND RESOURCES

A. Contractor shall confine all activities to areas defined by the Drawings and Specifications. Prior to the beginning of any construction, Contractor shall identify the land resources to be preserved within the work area. Except in areas indicated on the Drawings or specified to be cleared, Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, wetlands, and landforms without permission. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized by the Owner's Representative or Engineer. Where such emergency use is permitted, Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs. Stone, earth, or other material displaced into uncleared areas shall be carefully removed and properly disposed of by Contractor at no additional cost to the Owner.

B. Work Area Limits

    1. Prior to construction, Contractor shall mark the areas that are not to be disturbed under this contract, as identified on the Drawings and by Owner's Representative or Engineer during the pre-construction meeting. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers not scheduled for abandonment on the Drawings and Specifications shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

C. Landscape

    1. Trees, shrubs, vines, grasses, landforms, wetlands, and other landscape features indicated and defined on the Drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.

D. Unprotected Erodible Soils

    1. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by Owner's Representative or Engineer.

E. Disturbed Areas

    1. Contractor shall effectively prevent erosion and control sedimentation through approved methods, which shall be included in the ESC Plan, including, but not limited to, the following:

a. Retardation of runoff and prevention of runoff channelization. Runoff from the construction site or from storms shall be retarded by means of site perimeter silt fencing, straw wattles, fiber rolls, straw bales, and the preservation of a vegetated buffer area around the site, and by any measures required by area-wide Drawings under the Clean Water Act. Straw mulch, wood chips, plastic sheeting, rolled erosion control products (i.e., erosion control blankets or mats), mid-slope sediment fences, fiber rolls, or wattles shall also be employed for temporary soil stabilization if an area is to remain unworked for longer than 1 week.

b. Erosion and sedimentation control devices. Contractor shall install temporary erosion and sedimentation control features as indicated on the Drawings or directed by the Owner's Representative or Engineer. Erosion and sedimentation control devices shall be checked daily and maintained throughout the duration of the project to prevent sediments from entering the stream channel.

c. Cleanup of roadways. Contractor shall maintain roads and parking areas traveled by construction equipment free of debris, tracked mud, and spillage. Cleanup of roadways shall be performed daily at a minimum. Any damage to public roadways caused by Contractor's equipment shall be restored at Contractor's expense.

F. Contractor Facilities and Work Areas

1. Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the Drawings or as directed by the Owner's Representative. Temporary movement or relocation of Contractor's facilities shall be made only when approved by the Owner's Representative. Borrow areas, if required, shall be managed to minimize erosion and to prevent sediment from entering nearby waters. Spoil areas shall be managed and controlled to limit spoil intrusion into areas designated on the Drawings and to prevent erosion of soil or sediment from entering nearby waters. Spoil areas shall only be developed with written approval of Owner's Representative or Engineer. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

1.05 WATER RESOURCES

A. Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Monitoring of active streams, wetlands, and tributaries affected by construction shall be Contractor's responsibility.

B. If at any time as a result of project activities fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), operations shall cease, and the Owner's Representative and Engineer shall be notified immediately and the following agency shall be contacted:

Oregon Department of Fish and Wildlife; Contact: 503-947-6002 and 800-452-0311.

C. The discharge or release of oil or petroleum hydrocarbons into or on the surface of waters of the state is prohibited. If visible oil sheen is observed beyond the limits of

the construction activity then all appropriate actions to stop, contain, and cleanup the oil shall be taken.

D. Mobile Equipment Fueling

1. Contractor shall service all equipment only in the areas approved by the Owner's Representative. No mobile equipment fueling shall take place over or within 150 feet of the Birch Creek and Umatilla River channels. All equipment fueling shall be conducted using secondary containment to capture potential fuel spills. All mobile equipment fueling locations shall be pre-approved by the Owner's Representative.

2. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, and all other equipment, etc., shall be checked daily for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters.

3. All vehicles carrying fuel will have specific equipment and materials needed to contain or clean up any incidental spills at the project site.

4. All pumps and generators used in or near streams will have appropriate spill containment structures and/or absorbent pads in place at all times during use.

E. Equipment used for this project shall be well maintained and, to the maximum extent possible, prevented from leaking petroleum-based products that could result in environmental contamination.

1. All equipment used for instream work will be cleaned of external oil, grease, dirt and mud, prior to arriving at the project site. All equipment will be inspected by the Owner's Representative before unloading at the site. Any leaks or accumulations of grease will be corrected before entering streams or areas that drain directly into waterways.

2. All equipment will be fueled outside of stream-adjacent riparian areas and wetland areas. Specific fueling areas may be approved and designated by the CO. When not in use, vehicles and fueling equipment will be stored in a designated staging area. The staging area should be in an area that will not deliver fuel, oil, etc. to streams.

3. Oil-absorbing floating booms, and other equipment such as pads and absorbent "peanuts" appropriate for the size of the stream, will be available on-site during all phases of construction. For small streams with few pools or slack water, booms may not be effective. Use pads and straw bales to anchor booms if necessary. Booms will be placed in a location that facilitates an immediate response to potential petroleum leakage.

F. The Contractor is solely responsible for all spills or leaks that occur during the performance of this contract. The Contractor must clean up spills or leaks in a manner that complies with Federal, state, and local laws and regulations and to the satisfaction of the Owner's Representative. Any spills resulting in a detectable sheen on water shall be reported to the EPA National Response Center (1-800-424-8802). Any spills over 25 gallons will be reported to the ODEQ and cleanup will be initiated within 24

hours of the spill. When available provide copies of all spill-related clean up and closure documentation and correspondence from regulatory agencies.

G. Washing Water

1. Contractor shall ensure that wash water containing oils, grease, or other hazardous materials resulting from wash down of equipment or working areas shall be contained for proper disposal or treatment and shall not be directly discharged into state waters, storm drains, or any part of the project site.

H. Diversion Operations

1. Construction operations for dewatering and rewatering shall be controlled at all times. Contractor will be responsible for limiting the impacts of water turbidity and contaminants known to be present at the site on habitat for wildlife and on water quality for discharge and downstream use.

2. Contractor shall construct and maintain cofferdams as necessary and as shown on the Drawings to divert and de-water fish isolation areas for all work activities within the wetted channel. Water removed from within the isolated work area shall be routed to an area to an area approved by the Owner's Representative to allow removal of fine sediment and other contaminants. The existing flow downstream from the project area shall be maintained throughout construction. The diversion and dewatering shall remain in place until instream restoration work is complete and Owner's Representative or Engineer approves removal of the system.

3. Rewatering of the isolated work area shall occur slowly and under the direct supervision/approval of the Owner's Representative. This process shall occur over sufficient time as to prevent excessive turbidity downstream of the work area.

I. Fish and Wildlife

1. Contractor shall minimize interference with, disturbance to, and damage of fish and wildlife. Both resident and anadromous fish are present in the project reach on Umatilla River and Birch Creek.

2. Oregon Administrative Rules (OAR) Chapter 340, Division 41 for additional water quality standards and related regulations (OAR 340-041-0036) states that limited duration activities necessary to address an emergency or to accommodate essential dredging, construction, or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied. Based on this OAR, the Owner shall get clearance to exceed State's water quality standards through a permit or certification authorized under terms of section 401 or 404 (Permits and Licenses, Federal Water Pollution Control Act) or OAR 14l-085-0100 et seq. (Removal and Fill Permits, Division of State Lands), with limitations and conditions governing the activity set forth in the permit or certificate.

J. No excavated material shall be placed in the channel bottom that would divert the stream and cause erosion.

1.06 AIR RESOURCES

A. Equipment operation and activities or processes performed by Contractor in accomplishing the specified construction shall be in accordance with the State of Oregon air quality rules and all Federal emission and performance laws and standards. Ambient air quality standards set by the EPA shall be maintained. Monitoring of air quality shall be Contractor's responsibility. All air areas affected by the construction activities shall be monitored by Contractor.

B. Particulates

1. Dust particles; aerosols and gaseous by-products from construction activities; and processing and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from airborne particulates which would cause the air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type or other methods will be permitted to control particulates in the work area if approved by the Owner's Representative. Sprinkling, to be efficient, must be repeated to keep the disturbed area damp at all times. Contractor must have sufficient, competent equipment available to accomplish these tasks. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

C. Hydrocarbons and Carbon Monoxide

1. Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

D. Sound Intrusions

1. Contractor shall keep construction activities under surveillance and controlled to minimize environment damage by noise, in accordance with all applicable Federal, State, and local regulations.

1.07 WASTE DISPOSAL

A. Solid Wastes

1. Solid wastes shall be placed in containers that are emptied on a regular schedule. Handling and disposal shall be conducted to prevent contamination. Segregation measures shall be employed so that no hazardous or toxic waste shall become co-mingled with solid waste. Contractor shall transport solid waste, including clearing debris, off Owner-controlled property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal.

B. Hazardous Materials Used by Contractor

1. Contractor shall take sufficient measures to prevent spillage of any materials of construction containing hazardous and toxic materials during operations (i.e. hydraulic fluid, ethylene glycol, etc.) and shall collect any such spilled materials in

suitable containers, observing compatibility. Contractor shall inform Owner's Representative of any hazardous waste generated during construction and request direction from Owner regarding proper transport and disposal. Spills of hazardous or toxic materials shall be immediately reported to Owner and Engineer. Cleanup and cleanup costs due to spills shall be Contractor's responsibility.

C. Burning

1. Burning will not be permitted.

1.08 HISTORICAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

A. No archeological sites within Contractor's work area have been identified. If identified during the course of the work, Contractor shall take precautions to preserve all such resources as they existed at the time they were first pointed out. Contractor shall provide and install protection for these resources and be responsible for their preservation during the life of the contract. If during excavation or other construction activities any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. Resources covered by this paragraph include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rocks or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other human activities. Upon such discovery or find, Contractor shall immediately notify Engineer and Owner's Representative. While waiting for instructions Contractor shall record, report, and preserve the finds in accordance with the National Historic Preservation Act and 43 Code of Federal Regulations Subtitle A Part 7, Protection of Archeological Resources.

1.09 FIRE CONTROL

A. The Contractor shall immediately extinguish, without expense to the CTUIR, all fires on or in the vicinity of the project which are caused by Contractor's employees, whether set directly or indirectly as a result of Contractor operations. The Contractor may be held liable for all damages and costs of additional labor, subsistence, equipment, supplies, and transportation resulting from fires set or caused by the Contractor's employees or resulting from contract operations.

B. At all times during closed fire season period, as specified by State law, the Contractor shall comply with each of the following provisions to the extent applicable to their operation under the contract.

1. Fire Tools. The Contractor will provide for each employee in the contract area at least one approved hand tool of a type appropriate in the contract area, such as shovel, Pulaski, or axe. Tools required and furnished under (2) and (4) below, shall count toward fulfillment of the above requirement.

2. Fire Extinguishers and Tools on Mobile or Stationary Equipment. Each unit of powered equipment used in connection with this contract, including automobiles, trucks, tractors, etc., shall be equipped with serviceable tools and fire extinguishers as follows:

One - fire extinguisher, dry chemical type of not less than 2-1/2 pound capacity with a 4 BC or higher rating.

One - shovel, round point #0 lady or equal.

One - axe, 2 pounds or over, 26-inch minimum length, or one pulaski.

One - water container (at least 1-gallon capacity), not required with stationary equipment.

3. Spark Arresters. Each internal combustion engine shall be provided with a spark arrester or spark-arresting device.

4. Power saws. For each power saw used in connection with this contract, the following will be provided:

   One - shovel, round point #0 lady or equal. Shovel must be immediately available for use.

   One - Fire extinguisher, containing not less than 8 ounces of extinguisher fluid, or a dry chemical powder-type of not less than 1-pound capacity. The extinguisher must be immediately accessible to the saw operator at all times.

5. Smoking. Smoking shall not be permitted within the contract area except on surfaced or dirt roads, at staging areas, within closed vehicles, or at other posted places, and shall never be allowed while working or traveling on foot.

6. Welding. Welding or use of cutting torches will be permitted only in areas that have been cleared or are free of all material capable of carrying fire. Flammable debris and vegetation must be removed from within a minimum of 10 feet radius of all welding and cutting torch operations. A shovel and a 5-gallon standard backpack water container (filled) with handpump attached shall be immediately available for use in the event of a fire start.

1.10 POST-CONSTRUCTION CLEANUP

A. Contractor shall clean up all areas used for construction.

1.11 RESTORATION OF LANDSCAPE DAMAGE

A. Contractor shall restore landscape features damaged or destroyed during construction operations outside the limits of the approved work areas.

1.12 TRAINING OF CONTRACTOR PERSONNEL

A. Contractor shall advise their personnel regarding all pertinent phases of environmental protection required in the Contract Documents. The training shall include methods of detecting and avoiding pollution, proper fueling techniques at this site, familiarization with pollution standards, both statutory and contractual, and installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental pollution control.

PART 2 PRODUCTS

2.01 FILTER FABRIC FENCE

A. Geotextile

1. Manufacturer's fabric specifications must be submitted for approval and must be available on-site.

2. Geotextile shall be a woven monofilament or non-woven fabric. Slit-film fabric shall not be used.

3. Apparent opening size (AOS), American Society for Testing and Materials [ASTM] D-4751): 100

4. Water permittivity (ASTM D-4491): 0.02 sec^{-1} minimum

5. Grab tensile strength (ASTM D-4632): 100 pounds minimum

6. Grab tensile elongation (ASTM D-4632): 30 percent maximum

7. Ultraviolet resistance (ASTM D-4355): 70 percent minimum

B. Posts: 2- by 4-inch wood or steel fence posts

C. Wire Mesh Backing: 14 gauge with 2-inch by 2-inch square openings

2.02 SAND BAGS

A. Sand bags shall be burlap or polypropylene and filled to a minimum weight of 30 pounds.

2.03 EROSION CONTROL BALES, WATTLES, LOGS, AND ROLLS

A. Furnish straw bales tied with either commercial quality baling wire or string. Conform to the following:

1. Furnish certified weed free (native grass seed) straw that is free from mold or other objectionable material. Furnish straw in an air-dry condition suitable for placing with mulch blower equipment.

2. Approximate length 3.5 feet; Shape rectangular; approximate mass 70 pounds

B. Furnish fully biodegradable fiber wattles, logs, or rolls of curled excelsior fiber rolled into a cylindrical shape and encased in fully biodegradable netting made from or casing made from jute, burlap, coir, or similar. Conform to the following:

1. Diameter 12 inches minimum; Mass 3 pounds per foot min; Netting with loose weave, non-welded/movable joint netting (leno or gauze weave)

C. Furnish fully biodegradable straw wattles that are manufactured from weed free straw and wrapped in fully biodegradable netting or casing made from jute, burlap, coir, or similar. Conform to the following:

1. Diameter 9 inches minimum; Netting with loose weave, non-welded/movable joint netting (leno or gauze weave)

D. Furnish erosion control matting that is manufactured from weed free materials like jute, burlap, coir, or similar.

1. Minimum netting strand thickness 0.2 inches; Netting with loose weave, non-welded or movable joint netting (leno or gauze weave).

E. Mulch shall be air-dried, well-seasoned, and free of undesirable seeds, noxious weeds, and all other material detrimental to plant life.

PART 3 EXECUTION

3.01 PERIMETER FILTER FABRIC FENCES

A. Construction

1. Install prior to other land-disturbing activities.

2. Silt fence trench: minimum 8 inches wide by 6 inches deep; backfill trench with compacted native soil.

3. Fence posts: Maximum separation, 6 feet.

4. Posts: Drive minimum 18 inches into ground.

5. Fabric: Staple to posts per manufacturer's recommendations.

6. Fence: Wire mesh backing.

7. Alignment: As described on Drawings.

8. Fence ends: Extend upslope perpendicular to the contour for a distance of at least 6-feet to inhibit flow around the end of the fence.

9. Fence sections: Overlap at least 10 feet.

B. Maintenance

1. Inspection: Daily. Repair damage immediately.

2. Sediment removal: If sediment is evident, remove the trapped sediment. Remove accumulated sediment at least daily.

3. Photo-degraded or damaged fabric: Replace.

4. Final site stabilization: Remove fence.

3.02 EROSION CONTROL BALES, WATTLES, LOGS, AND ROLLS

A. Erosion Control Plan

B. Application

1. Prepare the slope before the installation procedure is started.

2. Shallow gullies should be smoothed as work progresses.

3. Dig small trenches across the slope on contour, to place rolls in. The trench should be deep enough to accommodate half the thickness of the roll. When the soil is loose and uncompacted, the trench should be deep enough to bury the roll 1/3 of its thickness because the ground will settle.

4. It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.

5. Start building trenches and installing rolls from the bottom of the slope and work up.

6. Construct trenches at contour intervals 25-30 feet (8-10 meters) apart depending on the steepness of the slope. The steeper the slope, the closer together the trenches should be.

7. Lay the roll along the trenches fitting it snugly against the soil. Make sure no gaps exist between the soil and the straw wattle.

8. Use a straight bar to drive holes through the roll and into the soil for the willow or wooden stakes.

9. Drive the stake through the prepared hole, and into the soil. Leave only 1 or 2 inches (25 or 51 millimeters) of the stake exposed above roll.

10. Install stakes at least every 4 feet (1.2 meters) apart along the length of the wattle. Additional stakes may be driven on the downslope side of the trenches on highly erosive or very steep slopes.

B. Maintenance

1. Inspect the rolls and the slopes after rain events and at the frequencies as established in the ESC Plan. Make sure the rolls are in contact with the soil.

2. Repair any rills or gullies promptly.

3. Reseed or replant vegetation if necessary, until the slope is stabilized.

3.03 STRAW MULCH

A. Application

1. Disturbed areas that will remain unworked for longer than one week

2. Rate: 3 tons per acre (3 bales per 1,000 square foot, or 3 inches thick)

3. Secure mulch to soil: “Crimp” straw into soil by operating tracked vehicle (or straw crimping equipment) parallel to slope (up and down slope)

B. Maintenance

1. Stockpiled straw: have available on-site sufficient straw to replace 10 percent of covered area.

2. Inspect straw mulch: after each rainfall event, repair by replacing straw and re-crimping.

3.04 NOXIOUS WEED CONTROL

A. In order to prevent the potential spread of noxious weeds into work areas, Contractor shall be required to use weed-free equipment. The following is considered proof of weed-free equipment:

1. The Contractor will be required to clean all equipment prior to entry onto CTUIR lands. This cleaning shall remove all dirt, animal and plant parts and material that could carry invasive species seeds or parts into the work area. Only clean equipment inspected by the CTUIR will be allowed to operate within the work area. The inspection shall be pre-arranged by the Contractor and will occur prior to entering the work area. All subsequent move-ins of equipment shall be treated in the same manner as initial move-in.

2. For the purpose of item (1) above, equipment includes: hand tools, power tools, vehicles, all-terrain vehicles (ATV)/utility task vehicles (UTV), dump trucks, excavators, and all other heavy equipment.

B. Straw/hay bales shall be certified as “weed free”. The source field shall be inspected and certified by the county extension agent from the county that the straw/hay is grown. Each shipment into the work area shall be accompanied by a certification tag stating that it is weed free. The Contractor shall furnish the CTUIR with a statement of certification prior to unloading the bales.

END OF ENVIRONMENTAL PROTECTION

SECTION 01 35 43.20
CARE AND DIVERSION OF WATER

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the dewatering, treatment, discharge, and/or diversion of any water that might be required for performance of contract work. The work includes care and any necessary diversion of water in the vicinity of excavated banks, seepage into excavations, and water potentially generated by Contractor's project construction methods.

1.02 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. Construction Dewatering Water Storage, Treatment, and Discharge System

a. Contractor shall submit a Dewatering Plan with shop drawings showing design details and layout for the Construction Dewatering, Treatment, and Discharge System, and procedures for operation. These shop drawings shall be submitted within 10 calendar days following Notice to Proceed.

2. Storm Contingency Plan

a. Contractor shall submit, within 10 calendar days of Notice to Proceed, a Storm Contingency Plan. The Storm Contingency Plan shall detail actions to be taken in the event of an unexpected storm that could cause stormwater to collect and leave the work area.

B. Fish Passage

1. Both resident and anadromous fish utilize the project reach of Birch Creek and the Umatilla River. Upstream and downstream fish passage shall be maintained throughout construction, or as agreed upon with the fisheries co-managers.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF CARE AND DIVERSION OF WATER

SECTION 01 52 00
TEMPORARY CONSTRUCTION FACILITIES

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Construction Equipment Parking

1. Contractor shall identify a location within the project work area as an equipment parking area for daily parking and receive approval by the Owner's Representative. This area shall also be used for equipment fueling and daily maintenance and shall meet all criteria listed in Section 01 35 43 ENVIRONMENTAL PROTECTION Subsection 1.06 D, Mobile Equipment Fueling. No daily fueling or maintenance shall be completed outside this designated area.

B. Employee Parking

1. Contractor employees shall park privately owned vehicles in an area designated by the Owner's Representative. This area shall be within reasonable walking distance of the construction site. Contractor employee parking shall not interfere with existing and established parking requirements.

1.02 SUBMITTALS

A. None.

1.03 AVAILABILITY AND USE OF UTILITY SERVICES

A. Temporary Water and Electricity

1. No municipal water or electricity will be available at the project site. Contractor shall arrange for drinking water, potable water, and power at the project site as needed and coordinate these needs with the Owner's Representative at the pre-construction meeting.

B. Sanitation

1. Contractor shall provide and maintain within the construction area field-type sanitary facilities. The number of sanitary facilities shall be matched to the maximum number of personnel working at the site as required by Federal, State, and local codes and regulations. Sanitary facilities shall be equipped with a hand-washing station.

1.04 PROTECTION AND MAINTENANCE OF TRAFFIC

A. Contractor shall maintain and protect traffic and parked vehicles on all affected roads and parking lots during the construction period, except as otherwise specifically directed by the Owner's Representative. Measures for notification, any required hauling permits, the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of lights around and in front of equipment and the work, and the erection and maintenance of adequate warning, danger, and direction signs, shall be as required by the State and local authorities

having jurisdiction. The traveling public and Owner personnel shall be protected from damage to person and property. Contractor's traffic on roads selected for hauling material to and from the Site shall interfere as little as possible with public traffic. Contractor shall investigate the adequacy of existing roads and parking lots and the allowable load limit on these roads and parking lots. Contractor shall be responsible for the repair of any damage to roads and parking lots caused by construction operations.

B. Barricades

1. Contractor shall erect and maintain temporary barricades to limit public access to hazardous areas. Such barricades shall be required whenever safe public access to areas such as roads or parking areas is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic. Barricades shall be securely placed, clearly visible, and with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

1.05 CONTRACTOR'S TEMPORARY FACILITIES

A. Administrative Field Offices

1. Contractor shall provide and maintain administrative field office facilities within the construction area as directed by the Owner's Representative.

2. The Contractor shall provide a clean, watertight field office with heat, electric lighting, equipped with drawing rack and drawing display table, all weather automobile access, and parking in a central location on the job site for the use of the Owner's Representative or Engineer if so directed. The field office will provide space for project meetings, with table and chairs to accommodate the appropriate number of persons. The Contractor shall provide access to the field office during normal working hours and other times to be specified by the Owner's Representative or Engineer. The Contractor shall pay all costs to set up the office, supply materials, supply electricity, provide weekly janitorial service, and maintenance for the duration of the project. The Contractor shall not use the field office for the storage of any material, equipment, tools, or supplies.

B. Appearance of Trailers

1. Trailers used by Contractor for administrative or material storage purposes shall present a clean and neat exterior appearance and shall be in a state of good repair.

C. Security Provisions

1. Adequate outside security lighting shall be provided at Contractor's temporary facilities as needed. Contractor shall be responsible for the security of its own equipment.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF TEMPORARY CONSTRUCTION FACILITIES

SECTION 01 55 13
TEMPORARY ACCESS ROADS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section consists of the installation and removal of temporary access roads into the project work areas. Location of temporary access roads shall be field-fit as directed to protect existing vegetation to the extent practical.

1.02 SUBMITTALS

A. Contractor shall submit a plan showing the proposed location and construction techniques to install the access road based on the Drawings. This plan shall be developed using the equipment weights and proposed usage to ensure the location and construction will support the equipment and anticipated loads over the proposed usage period of the road.

PART 2 PRODUCTS

2.01 FILTER FABRIC

A. Installation of a filter fabric between the native soil and rock road surface may be required in places to keep the materials separate and ease the removal of the rock. If used, filter fabric shall be Mirafi 140NL or approved equal.

2.02 ROCK FOR ACCESS ROADS

A. Rock used for the access roads shall be free of soil and other extraneous materials. Materials used for the road construction shall be either quarry spalls or larger crushed rock.

2.03 TEMPORARY BRIDGES

A. Temporary construction bridges are required at locations as shown on Drawings.

B. Contractor shall submit proposed bridge configuration to Owner’s Representative or Engineer for approval at least a week in advance of installation.

PART 3 EXECUTION

3.01 SITE PREPARATION

A. Site clearing shall be completed within Section 31 10 00 SITE CLEARING

3.02 PRELIMINARY GRADING

A. Once the temporary road alignments have been approved by the Owner’s Representative or Engineer, preliminary grading can be completed. All materials removed during the preliminary grading shall be placed to the side of the temporary roads for use during site restoration upon completion of the project.

3.03 ROAD INSTALLATION

A. Upon completion of the preliminary grading, filter fabric may need to be installed on the temporary roads to ease removal of access road rock. Quarry spalls or large crushed rock will then be placed on the filter fabric to complete the access pad.

B. Compaction of the temporary roads will be completed using a dozer to spread the rock material, dump trucks delivering additional material, or an excavator after the rock is installed.

C. The length of the temporary construction access roads will vary depending on the site conditions and Contractor's proposed schedule and sequence of work.

3.04 TEMPORARY BRIDGE INSTALLATION

A. Bridges to be installed at the locations shown on the Drawings.

B. Bridges to be installed over active flowing water in the stream channel.

C. Bridges to be installed on temporary concrete abutments or on a firm substrate.

3.04 ROAD MAINTENANCE

A. During the use of the temporary access roads, if additional materials are needed to maintain the roads, these materials shall be of the same type that were used to originally construct the roads and pads.

3.05 ROAD REMOVAL

A. Upon completion of the construction, the temporary access roads shall be removed.

B. The Contractor shall remove the quarry spalls or larger crushed rock and haul this material to an off-site location. In addition, all filter fabric used shall be removed and hauled to an off-site location. It is the Contractors responsibility to remove all of the filter fabric and rock from the temporary roads.

C. All compacted access roads shall be subsoiled/scarified during Closeout.

3.06 SITE DECOMPACTION AND REGRADING

A. After the geotextile and rock have been removed from the temporary road alignment, these sites shall be evaluated for the degree of compaction by the Owner's Representative to make sure the disturbed areas will be restored to original conditions to the greatest extent practical for re-establishment of native vegetation.

B. Subsoiling/decompaction to a minimum depth of 18 inches will be required to restore heavily compacted subgrade. Subsoiling shall be performed with a dozer ripper, subsoiling grapple rake (SGR) or subsoiling excavator bucket (SEB) and will leave no clumps larger than 8 inches in diameter when finished. Subsoiling during Closeout shall be approved by the Owner's Representative or Engineer.

C. After the geotextile and rock have been removed from the temporary road alignment, these sites shall be regraded using the materials set aside during the preliminary grading. Finished grade along the road shall be as close to the original grade as possible.

3.07 SITE REVEGETATION

A. Revegetation along the regraded road alignments shall be completed by the Owner and in Section 32 90 00 SEEDING.

END OF TEMPORARY ACCESS ROADS

SECTION 01 71 23
FIELD SURVEYING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work described herein for Field Surveying may be selected for contract separately from the remainder of the specifications. Owner to determine Contractor for described work.

B. Contractor shall provide all materials, items, operations, or methods specified, listed, or scheduled on the Drawings or in the Specifications, including all materials, labor, equipment, and incidentals necessary and required to conduct proper surveys required to stake and lay out the work, based on the Drawings and CAD files provided by the Owner's Representative or Engineer.

C. Contractor shall perform surveys for layout of the work and to document final construction for "Record" Drawings.

1.02 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1. Survey Data for Record Drawings

a. Within 14 calendar days of final acceptance, Contractor shall furnish Owner's Representative or Engineer field survey data documenting the completed construction.

1.03 QUALITY CONTROL

A. All survey, layout, and related work shall be performed to the satisfaction of Owner's Representative or Engineer.

1.04 PROJECT RECORD DOCUMENTS

A. Upon completion of the work, Contractor shall submit Field Record Documents to Owner's Representative or Engineer under the provisions of Section 01 78 39 RECORD DRAWINGS.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall exercise care during the execution of the work to minimize any disturbance to the landscape in the areas surrounding the work site.

B. Contractor shall have onsite survey and grade control capacity such as total station, GPS, and/or GPS enabled construction equipment.

3.02 INSPECTION

A. Contractor shall verify locations of existing site reference and survey control points prior to starting work. Contractor shall promptly notify Owner's Representative or Engineer of any discrepancies discovered. Contractor shall also verify layouts periodically during construction.

3.03 GPS SURVEY REFERENCE POINTS

A. Survey reference points have been established by prior contract at the site. Contractor shall locate and verify the accuracy of three of these reference points for coordinate location and elevations prior to using them for work performed at the site. If any discrepancies exist in the location of the existing benchmarks, Contractor shall notify Owner's Representative or Engineer prior to performing any site layout activities. Contractor may install additional reference points for his/her convenience at locations approved by Owner's Representative or Engineer. No payment will be made for any additional permanent site control installed by Contractor beyond that specified and permitted herein. Contractor shall protect survey control points prior to starting site work and preserve permanent reference points during construction. Contractor shall not relocate site reference points without prior written approval from Owner's Representative or Engineer.

B. Contractor shall promptly report to Owner's Representative or Engineer the loss, damage, or destruction of any reference point or relocation required because of changes in grades or other reasons. Contractor shall replace dislocated survey control points based on original survey control at no additional cost to Owner. Replacement of dislocated survey control points shall be done by a licensed land surveyor in the State of Oregon. Survey accuracy used to relocate disturbed control points shall be equal to or better than that used to set the original control.

C. Contractor shall be responsible for the accuracy of all surveys performed with their forces, including those of their subcontractors. Any work performed not conforming to the lines, grades, elevations, and locations indicated on the Contract Drawings due to survey error shall be the responsibility of Contractor, and Contractor shall repair or relocate such work to its proper location at no additional cost to Owner.

3.04 SURVEY REQUIREMENTS

A. Contractor shall reference survey and site reference points to the provided control monuments and record locations of survey control points, with horizontal and vertical data, on project Record Documents. Record Drawings shall include the bare earth of all grading activities and location of all installed structures to the tolerances described herein.

B. Contractor shall with its own forces obtain working or construction lines or grades as needed.

C. All control surveys for elevation shall be ±0.1 foot. For horizontal, control angles shall be to the nearest 20 seconds ±10 seconds, and measured distances shall be to ±0.1 foot. All measurement surveys for elevation shall be to the nearest 0.1 foot ±0.05 foot and for horizontal distances shall be to ±0.1 foot.

D. Contractor shall provide all materials as required to properly perform the surveys, including, but not limited to, instruments, tapes, rods, measures, mounts and tripods, stakes and hubs, nails, ribbons, other reference markers, and all else as required. All material shall be of good professional quality and in first-class condition.

E. All lasers, transits, and other instruments shall be calibrated and maintained in accurate calibration throughout the execution of the work. A copy of the recent calibration of all instruments will be required and available to the Engineer and Owner.

F. Contractor shall furnish all materials and accessories (i.e., grade markers, stakes, pins, spikes, etc.) required for the proper location of grade points and line.

G. All marks given shall be carefully preserved and, if destroyed or removed without Engineer's or Owner's Representative's approval, they shall be reset, if necessary, at Contractor's expense.

H. Upon completion of surveys for control points, channel locations, structure locations, fencing locations, and access roads, the Contractor's Surveyor will notify the Owner's Representative or Engineer for review of the survey. Upon review and approval of the survey by the Owner's Representative or Engineer, the Contractor will be notified to proceed with implementation.

3.05 SURVEY OF COMPLETED EXCAVATION

A. At the completion of excavation and fill in all areas, Contractor shall survey the extents, elevations, grade breaks, and daylight points of all excavation and fill areas using a grid at a minimum of 25-foot centers plus key grade breaks, to document the final configuration.

3.06 SURVEY OF COMPLETED CONSTRUCTION

A. At the completion of restoration in all areas, Contractor shall survey the floodplain, backfill, creek bed and banks, using a grid at a minimum of 25-foot centers plus key grade breaks, to document the final configuration, access road to remain in place, and all major structures (such as boulders and/or large woody debris) in the creek or floodplain.

3.07 PAYMENT AS AN INCIDENTAL

A. The cost to Contractor of all work and delays occasioned by giving lines and grades, or making other necessary measurements, will be considered as having been included in the lump sum price for the work.

END OF FIELD SURVEYING

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 DESCRIPTION

A. This section describes the process and procedures to be followed by the Contractor, Engineer, and Owner for the review and acceptance of work during implementation.

B. Review and acceptance of work will be completed when needed during and at the end of construction, including for as-directed and hourly work.

C. Review and acceptance of work will be completed for the completion of earthwork, LWM structures, and channel features as shown on the Drawings.

D. A Record of Review and Acceptance of work will be kept by both the Contractor and Owner's Representative or Engineer at the project site.

1.02 CONTRACTOR'S RESPONSIBILITIES

A. During the weekly construction meetings, the Contractor will provide a summary of work completed and work under way at each of the work sites, including as-directed and hourly work.

B. The Contractor will communicate with the Owner's Representative or Engineer on the status of work completion at each of the work sites.

C. As work approaches completion at each work site, the Contractor will request the Owner's Representative or Engineer to review the work and prepare a punch-list of tasks to be completed at each site.

D. Upon receipt of the punch-list, the Contractor will complete each of the tasks identified by the Owner's Representative or Engineer.

E. Work on the tasks will continue until the Owner's Representative or Engineer accepts the completed work.

1.03 ENGINEER'S REVIEW AND APPROVAL

A. Upon receiving a request from the Contractor, the Owner's Representative will prepare a punch-list of tasks to complete work at each of the work sites.

B. The Owner's Representative will update the completion punch-list regularly to assist the Contractor in completing the work in an efficient manner. This will occur at a minimum of twice per week, more frequently if the task dictates more immediate action.

C. Upon completion of the tasks included on the punch-list, the Owner's Representative or Engineer will approve the work and sign the Record of Review and Acceptance.

D. As work approaches completion of individual components, the Engineer will notify the Owner's Representative on project activities and request an on-site review of the work.

1.04 OWNER'S REPRESENTATIVE APPROVAL

A. The Owner's Representative will be expected to attend and participate in the Weekly Progress Meetings and keep current on the project implementation activities.

B. Upon receipt of the request from the Engineer for an on-site review of the completed work, the Owner's Representative will schedule a time to be on-site to complete the review.

C. After the completion of the review, the Owner's Representative will have the option to approve, approve with conditions, or reject the work completed.

D. When the Owner's Representative approves with conditions or rejects the completed work, the Owner's Representative will have two (2) working days to prepare a punch-list of items to be completed prior to approval. This punch-list will be submitted to the Contractor and the Engineer.

1.05 PROJECT APPROVALS

A. Project approvals will be completed at the end of construction.

B. Upon project approval by the Engineer and Owner's Representative, the construction work will be accepted by the Owner's Representative.

1.06 PROJECT CLEANUP AND REPAIRS

A. Cleanup and repair of work area will be completed when needed during and at the end of construction.

B. The Contractor is expected to keep the project work area clean and prevent the accumulation of trash and debris. Placement of a dumpster at the project trailer with regularly scheduled pickups shall be arranged by the Contractor.

C. Additional cleanup and repair activities shall include but are not limited to road and fence repairs, general maintenance, staging area cleanup and maintenance and construction trailer maintenance.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF CLOSEOUT PROCEDURES

SECTION 01 78 39
RECORD DRAWINGS

PART 1 GENERAL

1.01 DESCRIPTION

A. Field Record Drawings.

1. Field Record Drawings shall be completed and submitted to Owner's Representative or Engineer, within 14 calendar days of final acceptance. All Drawings from the original Contract Drawings set shall be included, including the drawings where no changes were made. Owner's Representative or Engineer will review all field record drawings for accuracy and clarity. The Field Record Drawings will be returned to Contractor if corrections are necessary. Contractor shall make all corrections and shall return the Field Record Drawings within 7 calendar days of receipt.

1.02 SUBMITTALS

A. Field Record Drawings shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 FIELD RECORD DRAWINGS

A. Contractor shall keep at the construction site two complete sets of full-size prints of the Contract Drawings, reproduced at Contractor expense, one for Contractor's use, one for Owner's Representative or Engineer. During construction, both sets of prints shall be marked to show all deviations in actual construction from the Contract Drawings. The color green shall be used to indicate all additions and red to indicate all deletions. The drawings shall show the following information but not be limited thereto:

1. The locations and description of any structures, pipelines, utility lines and other installations of any kind or description known to exist within the construction area and not previously shown on the Contract Drawings. The location includes dimensions and/or survey coordinates for permanent features.

2. The location, orientation, topography and grade of all stream restoration features installed or affected as part of the project construction.

3. All changes or modifications from the original design and from the last inspection.

B. Where Contract Drawings or Specifications allow options, only the option actually used in the construction shall be shown on the record drawings. The option not used shall be deleted.

C. These deviations shall be shown in the same general detail utilized in the Contract Drawings. Marking of the prints shall be pursued continuously during construction to keep them up to date. The resulting field-marked prints and data shall be referred to and marked as "Field Record Drawings," and shall be used for no other purpose. They

shall be made available for inspection by Owner's Representative or Engineer whenever requested during construction and shall be jointly inspected for accuracy and completeness by Owner's Representative or Engineer and a responsible Representative of Contractor prior to submission of each monthly pay estimate. Failure to keep the Field Record Drawings current shall be sufficient justification to withhold 10 percent of the final payment until satisfactory drawings are received.

3.02 PAYMENT

A. All costs incurred by Contractor in the preparation and furnishing of Field Record Drawings shall be included in the contract price and no separate measurement or payment will be made for this work. Approval and acceptance of the Field Record Drawings shall be accomplished before final payment is made to Contractor.

END OF RECORD DRAWINGS

SECTION 02 41 13
SELECTIVE SITE DEMOLITION

PART 1 GENERAL

1.01 DESCRIPTION

A. Work specified in this Section includes, but is not necessarily limited to, the following:

1. Removal of the existing POD structures - locations shown on the Drawings.

2. Removal of POD underground utility lines, conduit, piping, power poles, overhead utility lines, and appurtenances as shown on the Drawings.

3. All material not identified for salvage or reuse shall be hauled off-site at the Contractor's expense.

1.02 SUBMITTALS

A. The Contractor shall submit a plan showing the proposed locations, elevations, equipment and construction techniques to remove the POD structures, underground utility lines, conduit, piping, power poles, overhead utility lines, and appurtenances shown on the Drawings. This plan shall be developed to include the equipment and proposed usage to ensure the location and conditions will support proposed decommissioning activities.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Contractor to verify elevations of all existing POD structures, underground utility lines, conduit, piping, power poles, overhead utility lines, and appurtenances before decommission work to begin.

B. Contractor to verify POD structures, underground utility lines, conduit, piping, power poles, overhead utility lines, and appurtenances are no longer in use prior to any demolition activities. Contractor to coordinate with local utility owner for decommissioning of utility lines and poles.

C. Completely remove the existing POD structures and appurtenances.

D. Completely remove the existing underground conduits, utility poles, and utility lines.

E. If additional structures are selected for demolition in the field, temporary erosion and sedimentation control features shall be in place before demolition.

F. All existing POD structure, underground utility line, conduit, piping, power pole, overhead utility lines, and appurtenance decommission work below the active Umatilla River and Birch Creek channel shall be completed during the in-water work window (July 1 – September 30).

G. Private overhead power service feeders not owned the power utility that are shown on the drawings for decommissioning shall be de-energized and decommissioned by a licensed and approved electrician.

3.02 COORDINATION

A. All utility decommission work shall be coordinated with the local residents and utility provider/owners. Active utilities shall not be decommissioned until approval to do so is received from utility owner in writing. Local utility owner requirements and standard operation procedures for decommissioning shall be followed. Notify and schedule as necessary with local residents and property owners.

3.03 PROTECTION OF PERSONS AND PROPERTY

A. Provide safe working conditions as required by OSHA and applicable State and local laws for employees throughout demolition, capping, and removal operations. Observe safety requirements for work below grade.

END OF SELECTIVE SITE DEMOLITION

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work specified in this Section includes, but is not necessarily limited to, the following:

1. Clearing and grubbing.

2. Removing designated trees and protecting from harm any trees or other objects selected to remain by Owner's Representative.

3. Stripping and stockpiling topsoil.

1.02 HISTORICAL ITEMS

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value that may be encountered during site preparation shall remain the CTUIR's property. Upon such discovery or find, Contractor shall immediately notify Engineer and Owner's Representative. While waiting for instructions Contractor shall record, report, and preserve the finds in accordance with the National Historic Preservation Act and 43 Code of Federal Regulations Subtitle A Part 7, Protection of Archeological Resources.

B. Items designated for attention of CTUIR if discovered shall be handled as described in Section 01 35 43 ENVIRONMENTAL PROTECTION.

1.03 SUBMITTALS

A. Submit:

1. Procedures and operational sequence for review and acceptance by the Owner's Representative or Engineer include:

a. Permits for transport and disposal of debris as required.

2. As-built drawings and records in accordance with Section 01 78 39 RECORD DRAWINGS.

1.04 DIMENSIONS AND LAYOUT

A. The Contractor shall be responsible for installing construction fence around the construction area and resetting fencing to accommodate changes in the construction area.

B. All work, materials, methods, and personnel shall be subject to approval by the Owner's Representative or Engineer prior to commencing construction and on a continuous basis throughout construction.

C. The Contractor is responsible for preserving all benchmarks and stakes and replacing any that are displaced or missing as a result of the Contractor's operations.

D. The Contractor shall be responsible for locating all underground utilities prior to beginning any excavation or underground demolition.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. This section describes the requirements for site clearing and grubbing. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

3.02 EROSION/POLLUTION CONTROL

A. Required erosion/pollution control facilities in accordance with Sections 01 35 43.20 CARE AND DIVERSION OF WATER and Section 01 35 43 ENVIRONMENTAL PROTECTION shall be in place prior to beginning the work of this Section.

3.03 EXISTING CONDITIONS

A. Protection of Facilities

1. Protect and maintain benchmarks and survey control points from disturbance during construction.

2. Provide, erect, and maintain temporary construction fencing around the construction area as shown on the Drawings.

3. Control construction traffic entering and leaving construction access gates to protect property.

B. Protection of Existing Improvements:

1. Provide, erect and maintain barricades, coverings, or other types of protection necessary to prevent damage to existing trees, fences, structures or buildings. Restore any improvements damaged by this work to their original condition, as acceptable to the Owner's Representative or Engineer.

3.04 TREE AND SHRUB PROTECTION

A. General:

1. Include barricades and/or fencing and other protection for trees indicated on the Drawings or directed by the Owner's Representative or Engineer to be saved and protected.

2. Maintain existing grade within root protection zone of trees to the edge of the dripline unless otherwise indicated.

3. Grubbing will be performed by cutting the vegetation at ground level while keeping the roots to the extent possible.

3.05 SITE WORK

A. Sprinkle debris with water as necessary to limit dust to lowest practicable level. Do not use excessive water which may cause flooding, contaminated runoff, or icing.

B. Existing utility lines within the project area shall remain in operation throughout the duration of the construction period. Protect and support all lines and meters from damage and movement.

C. Existing utility lines, structures, and meters serving other properties shall remain in operation throughout the duration of the construction period. Protect and support all lines and meters from damage and movement.

D. In the event the Contractor encounters utility lines not shown on the Drawings or otherwise indicated to be saved, removed, or abandoned, the location of such lines shall be marked in the field and the Owner's Representative or Engineer notified.

3.06 CLEARING LIMITS

A. Construction fences and clearing limits for the construction activities are shown on the Drawings.

B. Construction fences and temporary erosion control shall be installed prior to the beginning of site clearing for each construction period.

C. All trees removed within the clearing limits shall be sorted and stockpiled into the following size categories:

1. Diameter 18 inches or greater.

2. Diameter 4 to 10 inches.

3. Diameter less than 4 inches.

D. All shrubs and other wood material shall be collected and stockpiled for use later in the project.

3.07 DEMOLITION

A. Temporary erosion and sedimentation control features shall be in place before demolition.

B. Demolished material shall be treated as salvaged item.

3.08 SALVAGED ITEMS

A. Carefully dismantle and remove salvaged items.

1. The Contractor shall deliver any salvaged items to an approved location designated by the Owner's Representative.

3.09 STOCKPILING OF MATERIALS

A. Topsoil stripping and stockpiling:

1. Remove grass and vegetation before stripping topsoil.

2. Strip topsoil to depth of organic material encountered (typically 8 to 12 inches) in a manner to prevent intermingling with underlying subsoil or other clearing/waste materials.

3. Remove subsoil and non-soil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

4. Stockpile topsoil materials in designated or approved staging areas away from edge of excavations and without intermingling with subsoil. Grade and shape stockpiles to drain surface water. Cover stockpiles as necessary to prevent windblown dust.

B. The Contractor should have sufficient area on-site to stockpile large wood material for later use in the project.

C. If additional stockpile areas are required to complete the project on schedule, the Contractor will arrange off-site stockpile areas. No additional payments will be made for stockpiling excavated materials off-site.

D. Reusable materials shall be carefully segregated into material sizes defined in Section 3.06.

3.10 DISPOSAL OF MATERIALS

A. Refuse and non-organic trash resulting from site clearing and grubbing shall be disposed of by the Contractor in a manner consistent with all government regulations.

1. No burning permitted.

2. Do not leave refuse material on the project site, shoved onto abutting private properties, or buried in embankments or trenches on the project site.

3. Do not deposit debris in streams, bodies of water, roads, or upon private property except by written consent of the private property Owner.

4. Maintain haul routes clean and free of debris resulting from work of this Section.

5. All small trees, limbs, branches, bark and needles shall be buried during backfilling activities.

3.11 CLEAN-UP

A. Upon completion of the work of this Section, remove all rubbish, trash, and debris resulting from operations.

B. Remove equipment and tools; leave the site in a neat and orderly condition acceptable to the Owner’s Representative or Engineer.

END OF SITE CLEARING

SECTION 31 23 00
EXCAVATION AND FILL

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Section covers earthwork for the new Umatilla River channel, new Birch Creek channel, distributary channel, wetlands and link channels, floodplain benching, floodplain terrace, and access route maintenance.

1.02 JOB CONDITIONS

A. Environmental requirements: Construction shall progress only when weather conditions will not detrimentally affect the quality of the finished earthwork. If the atmospheric temperature falls below 35 degrees Fahrenheit in the shade, protect from freezing earthwork or soils-in-cut which require compaction to a specified degree.

B. Protection of adjacent work and existing facilities is the responsibility of the Contractor and must be accomplished. Where open cuts are used in lieu of shoring, the excavation slopes should be made to the angle judged safe by the Contractor's designated competent person responsible for excavations and trenches. Regardless, temporary cuts shall be no steeper than 1 vertical to 1 horizontal and meet all applicable OSHA regulations. Permanent slopes shall be as shown on the Drawings and in no case be steeper than 1 vertical to 2 horizontal. Cover exposed slopes if erosion or riling threatens.

C. Allowable instream work period will be July 1 to September 30. All in-channel work activities must be completed within this period due to spawning and incubation periods of lamprey, steelhead, and Chinook Salmon in Birch Creek and Umatilla River. Extensions of the in-channel work period may be granted under certain conditions by the ODFW District Office, but the Contractor shall not expect an extension due to scheduling conflicts.

1.03 DEFINITIONS

A. Excavation: Area or material removed to provide a suitable base for improvement.

B. Channel Fill: Fill material shall be from channels, floodplain benching, and wetland excavation. Material shall be free of organic and other unsuitable material. Channel fill relates to the proposed existing channel fill locations indicated on the Drawings.

C. Unsuitable excavated material: excavated soil heavy laden with fines and organic material such as peat, decomposing vegetation, soft organic clay, and silts and are completely devoid of sands, gravel, and cobble.

1.04 REFERENCES

A. Oregon Department of Transportation (ODOT) Standard Specifications for Construction 2024 or most current.

1. Section 00330 – Earthwork

2. Section 00330.12 – Borrow Material

3. Section 00330.42 – Embankment, Fills, and Backfills

4. Section 00330.43(C) – Earthwork Compaction Requirements

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. This section describes the requirements for excavation and backfilling. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

B. Refer to Section 31 23 19 CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING for specifications on work area isolation, fish salvage, dewatering, and rewatering.

3.02 PROTECTION OF ADJACENT WORK

A. Protection of adjacent work, utilities and other improvements must be accomplished. Properly slope cuts to provide stability. Temporary cuts should be no steeper than one vertical to one horizontal. Permanent slopes should be no steeper than one vertical to two horizontal. Cover exposed slopes if erosion or raveling threatens.

3.03 EQUIPMENT

A. Construction of the LWM structures, channel and wetland excavation, loading and hauling material to stockpiles, and backfilling the old channel fill and terraces will require numerous types of heavy equipment. This equipment will include but is not limited to medium to large excavators with bucket thumb, front end loaders, off-road dump trucks, and dozers with six-way blade.

B. Construction of the LWM structures, channel and wetland excavation, loading and hauling material to stockpiles, and backfilling the old channel fill and terraces will require the Contractor to have onsite survey and grade control capacity such as total station, GPS, and/or GPS enabled construction equipment.

3.04 EXCAVATION BELOW EXISTING GRADE

A. Unless otherwise specified, any appropriate method of excavation within the work limits shown may be employed which, in the opinion of the Contractor, is considered best, and meets applicable safety standards. The Contractor shall take whatever precautions are necessary to maintain the undisturbed state of the natural soils at and below the bottom of the excavation.

B. Should the excavation be carried below the lines and grades indicated on the drawings or specified herein because of the Contractor's operations, the Contractor shall refill such excavated space to the proper elevation as directed by the Owner’s Representative or Engineer. Should foundation materials be disturbed or loosened because of the Contractor's operations, they shall be removed and the space refilled as directed at no additional cost to the Owner.

C. Rock Excavation is defined as the removal of all material which by actual demonstration, cannot, in the Engineer or Owner's Representative's judgment, be reasonably excavated with equipment used for common earthwork and equipped with rippers or similar approved equipment. If bedrock is encountered that cannot be removed using the common earthwork equipment or equipment with minimum 125 Horsepower, the grading plan shall be adjusted as approved by the Engineer or Owner's Representative at no additional cost. The term Rock Excavation shall be understood to indicate a method of removal and not a geological formation.

3.05 CONTROL OF WATER

A. The Contractor shall follow guidelines contained in Sections 01 35 43 ENVIRONMENTAL PROTECTION 01 35 43.20 CARE AND DIVERSION OF WATER during all excavation and backfill operations.

B. The Contractor is responsible for complying with all permits conditions related to water in the stream, stormwater, and dust control during the excavation and backfill operations.

3.06 DUST CONTROL

A. The Contractor shall be responsible for providing control of airborne dust and particulates from the work areas. Visible dust shall be limited by water, dust palliative or other approved methods.

B. If water is used for dust abatement, it must be brought in by the Contractor from an outside source. Water may not be used directly from Birch Creek or Umatilla River without prior, written consent of the Owner's Representative.

3.07 EXCAVATION OF NEW RIVER AND CREEK CHANNELS, DISTRIBUTARY CHANNEL, AND WETLAND LINK CHANNELS

A. The new river and creek channels, distributary channel, and wetland link channels shall be excavated to the extents and dimensions shown on the Drawings.

B. Excavation will begin at the downstream end of the channel to prevent working in accumulated seepage flow from upstream.

3.08 EXCAVATION OF FLOODPLAIN BENCHING

A. Floodplain benching shall be excavated to the extents and dimensions shown on the Drawings.

B. Excavation will begin at the downstream end of the benching to prevent working in accumulated seepage flow from upstream.

C. Native riparian plant species and sod clumps should be salvaged and replanted once fill is complete, to the extent practicable.

3.09 EXCAVATED MATERIAL STOCKPILES

A. Excavated material stockpile areas are identified in the Drawings as staging areas.

B. Additional locations of the excavated material stockpile sites are to be determined by Owner's Representative or Engineer.

C. Contractor will be responsible for managing the volume, shape, and weather protection for each of the stockpile sites.

D. The Contractor is responsible for keeping the stockpiled material protected to prevent any major erosion off the piles.

E. In the event that sufficient room to store the anticipated excavated volume of material is not available in the identified stockpile sites, the Contractor can propose additional stockpile sites within the project area. Any new stockpile site must be approved by the Owner's Representative or Engineer prior to use by the Contractor.

3.10 EXCAVATION OF WETLANDS

A. New wetlands will be excavated to the extents and dimensions shown on the Drawings.

B. Excavation will begin at the downstream end of the wetland cluster to prevent working in accumulated seepage flow from the upstream excavated wetlands.

C. Native riparian plant species and sod clumps should be salvaged and replanted once fill is complete, to the extent practicable.

3.11 FLOODPLAIN TERRACE

A. Placement of suitable material as channel fill shall begin at the most upstream end and move downstream to the locations and dimensions as shown on the Drawings.

B. Channel fill shall be compacted with mechanical effort to a firm and unyielding surface using excavator bucket or other means approved by the Owner's Representative or Engineer. Fill should be placed in maximum 8-inch lifts. Channel backfill density should meet or exceed the density of the in-situ floodplain material.

C. Fill construction for channel backfill will begin once temporary isolation measures are in place to prevent working in accumulated seepage flow in the channel.

D. The channel fill area shall be dewatered and stripped of topsoil, vegetation, organic material, and unsuitable material.

E. Riparian plant species and sod clumps should be salvaged and replanted once fill is complete, to the extent practical.

3.12 ACCESS ROUTE MAINTENANCE FILL

A. Placement of suitable material as access route maintenance fill to the locations, extents, and dimensions as shown on the Drawings.

B. Access route maintenance fill shall be placed and compacted following the ODOT standard specification 00330.43(C) Earthwork Compaction Requirements, and method C for Non-Moisture-Density Testable Materials.

C. Access route maintenance fill testing method shall follow ODOT TM 158 In-Place Density of Embankment and Base Using Deflection Requirements to the extent possible, or approved equivalent.

D. The access route maintenance fill area shall be stripped of topsoil, vegetation, organic material, and unsuitable material.

E. Riparian plant species and sod clumps should be salvaged and replanted once fill is complete, to the extent practicable.

3.14 TEMPORARY ACCESS ROAD DECOMISSIONING/FLOODPLAIN DECOMPACTION

A. Demolish and decompact the temporary access road sections identified in the Drawings by restoring to approximate original ground contours. Remove any piping or structures, if found, and all associated fill material, down to “natural ground”. Finish slopes to provide gradual transitions in slope adjustments without noticeable breaks.

B. Any hardened road segment or surface area identified on the Drawings, or as directed in the field, shall be decompacted to promote water infiltration and establish vegetation. This work shall consist of loosening all of the soil in the existing roadbed or staging area to a depth of 18 inches (minimum) and a clod size no larger than 8 inches or as shown on the plans. All roadway materials shall be removed from the downhill side of the road and placed on the uphill or cut side of the road. The roadway fill material shall be excavated down to the natural hillslope material. The sides of the road prism shall be blended to match the natural ground elevation to avoid trapping water. The excavation shall match the existing slope and contours of the local existing grade.

C. Place available slash and wood material on the recontoured area, arranged to facilitate later clump planting of vegetation during revegetation as directed by the Owner’s Representative.

D. Refer to HIP Conservation Notes for additional requirements.

3.15 FINAL GRADING AND CLEAN-UP

A. All irregularities shall be made smooth except for natural surface roughness, washouts shall be filled, slopes made uniform, slightly rounded at top and bottom, and the entire area of the fill compacted and completed to the required lines, grades and cross-sections within 1/10th-foot above or below the established grade.

B. When final surfaces have been established, the Contractor shall protect the surfaces from erosion, raveling or any type of degradation, especially on surfaces that will be lined.

C. Temporary access roads shall be subsoiled/scarified during closeout.

D. Place available slash and wood material on the recontoured area, arranged to facilitate later clump planting of vegetation during revegetation as directed by the Owner’s Representative.

E. Refer to HIP Conservation Notes for additional requirements.

F. When work is completed, the Contractor shall place all surplus material including stumps, trees, and brush, in the floodplain. The Contractor shall leave the premises in condition acceptable to the Owner's Representative or Engineer.

3.16 TESTING

A. Testing for compaction is required for ACCESS ROUTE MAINTENANCE FILL, See PART 3 EXECUTION, 3.12.

END OF EXCAVATION AND FILL

SECTION 31 23 19
CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work in this section consists of the installation and removal of a streamflow diversion systems to isolate the stream channel during the installation of temporary crossings and construction of channel LWM structures.

1.02 SUBMITTALS

A. The Contractor shall provide a list of materials and equipment proposed for use during this component of the work. In addition, the Contractor shall submit the Manufacturer's data on a bypass pipe, if deemed necessary, for use during the project.

B. The Contractor shall submit a dewatering and work area isolation plan for pre-approval to CTUIR at least 10 days prior to beginning work.

1.03 REFERENCES

A. Blevins, E.L., L. McMullen, S. Jepsen, M. Blackburn, A. Code, and S.H. Black. 2017. Conserving the Gems of Our Waters: Best Management Practices for Protecting Native Weter Freshwater Mussels During Aquatic and Riparian Restoration, Construction, and Land Management Process and Activities. The Xerces Society, Portland, OR.

B. Blevins, E., L. McMullen, S. Jepsen, M. Blackburn, A. Code, and S.H. Black. 2019. Mussel-friendly Restoration: A Guide to the Essential Steps for Protecting Freshwater Mussels in Aquatic and Riparian Restoration, Construction, and Land Management Process and Activities. The Xerces Society, Portland, OR.

PART 2 PRODUCTS

2.01 DIVERSION STRUCTURE

A. The Contractor shall use a sheetpile, sandbag/stone, or other approved streamflow diversion structures, or a side-channel to re-route or dewater the portion of stream for in-water construction, with fish isolated from the installation of the diversion structure, as shown in the Drawings and as expressed in the HIP Terms and Conditions.

B. The Contractor shall provide material for instream temporary diversion measures such as block nets, silt fencing, floating booms, sandbags, and/or other suitable means. Instream temporary diversion shall be implemented at locations and at a duration only if approved by Engineer or Owner's Representative. The structure should include plastic liner or fine mesh silt fence to reduce the amount of fines entering the free flowing portion of the river. Block net mesh sizes and other diversion materials shall be in accordance with the National Marine Fisheries Service standards and as expressed in the HIP Terms and Conditions.

PART 3 EXECUTION

3.01 GENERAL

A. All channel dewatering system shall be approved by the owner, installed, and operational before any work in the channel can begin.

B. All instream activities must be completed after the channel has been diverted and all fish can pass through the diverted stream channel.

C. Refer to the HIP Conservation Notes in the Drawings if any fish operation is required. Construction work in the immediate vicinity of fish salvage will be delayed, typically for 2 to 24 hours but longer in some cases.

D. If native mussels are encountered, pause work and contact the Owner. Coordinate with the Xerces Society Freshwater Mussel Lead (Emilie Blevins, emilie.blevins@xerces.org), U.S. Fish and Wildlife Society (USFWS), and BPA Environmental Compliance Lead is required prior to initiating mussel salvage. If needed, mussel salvage shall refer to methods in Blevins et al. (2017, 2019) or as otherwise recommended by Xerces Society, USFWS, and/or BPA.

E. Turbid water or sediment must not be released into the channel downstream.

F. If any bypass pumping is approved by Engineer or Owner's Representative, the Contractor shall also provide pumps with adequate pump capacity, hoses, and personnel as backup to the temporary stream flow bypass system in the event the system becomes non-operational, as may be required during construction when flow rates in the existing channel exceed the design capacity of the gravity bypass, or to maintain a dry work area when installing LWM structures. Pumps and hoses may also be used to pump seepage flow through the cofferdam into the bypass pipeline to keep water out of the work area. Turbid water shall be discharged to an approved area with sufficient capacity to allow for slow infiltration and remain disconnected from active flow channel. The Contractor shall monitor pumping operation at all times.

   Any pumping operation shall use a fish screen that is in accordance with the National Marine Fisheries Service standards. Pump intake screens shall be sized to prevent fish from being entrained into the pump intake or from being impinged on the intake screen. The screen face should be oriented parallel to flow for best screening performance. The screen shall be designed and used such that it can be submerged with at least one-screen-height-clearance above and below the screen.

G. Upon removal of the temporary stream diversion, the disturbed area shall be re-graded to match surrounding topography and reseeded, if needed, as specified in Section 32 90 00 SEEDING.

3.02 FISH TRANSFER

A. Refer to the HIP Conservation Notes in the Drawings if fish transfer is deemed necessary.

B. Fish salvage operations will be conducted by CTUIR staff and their partners, not the Contractor. Contractor shall provide at least three (3) days advance notice before dewatering or isolating any work area. Dewatering and rewatering shall be done in carefully controlled stages as expressed in the Drawings and the HIP Terms and Conditions for the purpose of inducing volitional movement out of the work area and of salvaging fish. Close coordination will be necessary with the Owner's

Representative during this operation. Dewatering will take place as early in the morning as possible. No work will occur within the surrounding area until the fish salvage effort is complete. Construction work in the immediate vicinity of fish salvage will be delayed, typically for 2 to 24 hours but longer in some cases.

3.03 CHANNEL REWATERING

A. Upon activating the new main channel, the new main channel will be slowly re-watered, including pre-washing and pumping the turbid water to an approved floodplain location with no turbid water returns to the creek, and incrementally increasing flow in the new main channel over a period of hours to prevent loss of surface flow downstream and to prevent a sudden increase in stream turbidity. During re-watering, the site will be monitored to prevent stranding of aquatic organisms below the construction site. Rewatering will be completed under the direct supervision of the Owner's Representative. Refer to the HIP Conservation Notes in the Drawings.

END OF CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING

SECTION 32 90 00
SEEDING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section consists of furnishing all labor, equipment, and materials to establish ground cover and grass as noted on the Drawings. Any substantive variance to this specification due to unforeseen conditions encountered on the site, weather conditions, seed availability, other construction activities, etc. must be approved by the Owner's Representative.

B. Areas outside the limit of disturbance shall be protected from damage by Contractor. Any disturbance of trees, shrubs, grass, ground cover, or wetland areas outside the limit of disturbance shown on the Drawings shall be restored by the Contractor.

1.02 SUBMITTALS

A. Prior to use on the site, Contractor shall submit to Owner's Representative or Engineer certification of the seed mix as outlined by the State of Oregon Department of Agriculture "Rules for Seed Certification."

B. Prior to use on the site, Contractor shall furnish to Owner's Representative or Engineer a statement signed by the Manufacturer certifying that each lot of seed has been tested by a recognized seed testing laboratory within six months of the date of delivery to the site.

PART 2 PRODUCTS

2.01 SEED

A. Seed mix shall conform to the standards for "Certified" grade seed or better as outlined by the State of Oregon Department of Agriculture "Rules for Seed Certification." Mulch and seed mix must be certified as weed-free. The county extension agent or soils scientist will be consulted for approval of seed mixes and sources of certified weed-free mulch. All seed vendors must have a business license issued by supplier's state or provincial Department of Licensing with a "seed dealer" endorsement.

B. Seed mix shall be obtained from local sources to ensure plants are adapted to local climate and soil chemistry.

C. The seed mix and rate of application shall be as indicated in the Drawings.

D. The rate of application shall be as specified in the Drawings.

E. Seed that has become wet, moldy, or otherwise damaged in transit or storage shall not be accepted.

F. Seeding shall occur in areas shown on the Drawings.

G. Seed of the type specified shall be certified and commercially prepared and supplied in sealed containers. The labels shall show:

1. Common and botanical names of seed.

2. Lot number.

3. Net weight.

4. Pounds of Pure live seed (PLS) in the mix.

5. Origin of seed.

2.02 TACKIFIER

A. Tackifier shall be used as a tie-down for the seed mixture.

B. Tackifier shall be derived from natural organic plant sources containing no growth or germination inhibiting materials. Tackifier shall hydrate in water and readily blend with other slurry materials. Tackifier shall be noxious weed free and nontoxic to aquatic and terrestrial animals, soil microorganisms, and vegetation.

C. Apply tackifier at the Manufacturer's recommended rate.

2.03 FERTILIZER

A. Fertilizer shall not be used on this project.

2.04 WATER

A. Water shall be the responsibility of Contractor, unless otherwise noted. Water shall not contain elements toxic to plant life.

2.05 HYDROSEEDING APPARATUS

A. Use of a hydroseeding device for spreading seed and tackifier shall be capable of uniformly distributing the material at the Manufacturer's specified rate for that product.

2.06 EROSION CONTROL MATTING

A. Use of any Rolled Erosion Control Product to control erosion or protect young plants shall conform to Section 01 35 43 ENVIRONMENTAL PROTECTION.

B. Grade areas to be seeded to achieve the finished grades and grading drainage patterns indicated on the Drawings. Grading shall be accomplished in accordance with the requirements of Section 35 01 60 STREAM RESTORATION and Section 01 52 00 TEMPORARY CONSTRUCTION FACILITIES. Blend new surfaces to existing areas.

C. The ground to be seeded shall be free of large clods or rocks, roots and other material that may interfere with the work and subsequent maintenance operations. Hand picking may be required.

D. The Rolled Erosion Control Product shall be installed in accordance with the requirements of Section 01 35 43 ENVIRONMENTAL PROTECTION.

E. Seeding shall not commence until Owner's Representative or Engineer has accepted the condition of the prepared areas.

2.07 STRAW MULCH

A. Straw mulch shall be in air-dried condition, free of noxious weeds, seeds, or the materials detrimental to plant life. Straw mulch may be from bentgrass, bluegrass, fescue or ryegrass singly or in combination. Cereal grain straw from barley, oat or wheat may be allowed upon approval of the Contracting Officer. Provide straw that is not moldy, caked, decayed or of otherwise low quality. Submit certification from the supplier that the straw is free of noxious weed seeds or plant parts.

3.02 APPLICATION

A. Weather Limitations:

1. Seeding operations shall not be permitted when wind velocities exceed 15 miles per hour;

2. Seed shall be sown only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is unduly wet, or otherwise not in a tillable condition; and

3. Seeding shall only be completed from August 15 until December 1, preferably between October and November or as directed by Owner's Representative. Seeding at other times of the year shall only be completed with written permission from Owner's Representative or Engineer.

B. Hydroseeding

1. Seed shall be added to water and thoroughly mixed at the rates specified.

2. The seed and water shall be thoroughly mixed to produce a homogeneous slurry.

3. While the soil is still loose and moist, the seed and water slurry shall be uniformly broadcast under pressure over the nominated area at a rate of 30 pounds per acre using a hydroseeding apparatus.

4. Carefully regulate the flow rate and go over the area twice, applying half the seed with each application. The first application shall be from east to west and the second from north to south to ensure uniformity.

C. Watering:

1. Newly seeded areas shall not be watered to force seed germination, but only to sustain growth.

2. Vegetated areas shall be watered so as to provide optimum growth conditions for the establishment of the seed mix species.

3. Start watering within 5 working days after completing the seeded area, or once the seeds have germinated.

4. Run-off and puddling shall be prevented.

D. Maintenance

1. Maintain the seeded areas in a satisfactory condition until final acceptance by Owner's Representative or Engineer.

2. Maintenance shall include:

a. Watering vegetated areas where the establishment of the seed mix does not appear to be developing satisfactorily; and

b. Filling and leveling where erosion has washed an area away.

3. If in the opinion of the Owner's Representative or Engineer, repeat hydroseeding or repair is necessary due to Contractor's negligence, carelessness or failure to provide maintenance, then the work shall be at Contractor's sole expense.

4. Repeat hydroseeding or repair required due to factors determined by Owner's Representative or Engineer to be beyond the control of Contractor shall be paid for under the appropriate contract pay items.

3.03 APPLICATION

A. Contractor retains all ownership and responsibility for seeding until written acceptance by Owner's Representative or Engineer.

B. Owner's Representative or Engineer will accept the seeding when:

1. The application or installation is complete;

2. Documentation is complete;

3. Verification of the adequacy of all repairs, including associated vegetation, is complete; and

4. The required written seed certification documents have been received by Owner's Representative or Engineer.

C. Seeded areas shall be seeded as shown on the Drawings with the seed applied evenly at the specified seed applied rate shown on the Drawings. Application of seeding may be done in one operation by one of the following methods. The contractor shall demonstrate the selected method applies the seed evenly and at the specified rates to the Contracting Officer using a test plot prior to application.

1. Blower - Blower equipment using air pressure and an adjustable spout that uniformly applies dry seed at constant measured rates.

2. Mechanical Spreaders - Hand or machine operated mechanical spreaders that uniformly apply dry seed in the prescribed quantities.

3. Hydroseeding - Uniformly apply at the rate specified. Add 500 pounds per acre of hydromulch fiber to the seed and fertilizer mixture to visibly aid uniform application at no additional cost to the Contracting Agency.

D. Seeding shall not be permitted during unsuitable soil or weather conditions as determined by the Contracting Officer. Unsuitable conditions may include the following:

1. Temperatures less than 32 degrees Fahrenheit

2. Temperatures greater than 90 degrees Fahrenheit.

3. Wind velocities greater than 20 mph.

4. Frozen soil.

5. Saturated soil or standing water.

6. Heavy rains.

E. When seeding by hand, the seed shall be incorporated into the top ¼ inch of soil by hand raking or other methods approved by the Contracting Officer.

F. All seeded areas shall be protected and maintained throughout the construction of the project and until the work is accepted. No construction traffic will be allowed over a seeded or planted area once the seed and erosion control measures have been completed. Foot traffic shall be minimized; workers shall travel along completed sections only in designated areas. Any damage to seeded areas caused by construction traffic or construction activities shall be repaired and re-seeded at no cost to the Owner.

G. The seed shall be broadcast under erosion control measures.

H. The contractor shall prepare seeding areas as follows:

1. Remove all excess material, debris, stumps, and rocks greater than 3 inches in diameter from areas to be seeded. Dispose of removed materials offsite.

2. Prepare seeding area to a weed free and bare condition.

3. Bring area to uniform grade and install soil amendments as specified. Any slopes 3(H) to 1(V) or steeper shall not be tilled unless otherwise specified.

4. Compact to a reasonably firm but friable seedbed; tractor walk to uniformly cover the surface with longitudinal depressions at least 2 inches deep formed perpendicular to the natural flow of water on the slope. Condition the soil with sufficient water so the longitudinal depressions remain in the soil surface until completion of the seeding.

5. Seed and mulch within two days of preparation.

I. Seeded areas shall be mulched with an even application of straw mulch applied at a rate of 1.5 tons/acre. Care should be taken not to leave thick clumps of straw.

J. Straw Mulch shall be applied within 24 hours of seeding.

K. Rate of straw application shall leave approximately 25% of the ground surface visible following application.

L. String from straw bales shall be removed and properly disposed of.

END OF SEEDING

SECTION 32 93 00
PLANTING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work described herein for Planting may be selected for contract separately from the remainder of the specifications or the Owner may elect to self-perform this task. The Owner to determine the Contractor for the described work.

B. Work in this section consists of furnishing all labor, equipment, and materials to establish trees, shrubs, and hardwood cuttings as noted on the Drawings and in the plant list. Any substantive variance to this specification due to unforeseen conditions encountered on the site, weather conditions, plant availability, other construction activities, etc. must be approved by the Owner's Representative.

C. Areas outside the limit of disturbance shall be protected from damage by the Contractor. Any disturbance of trees, shrubs, or wetland areas outside the limit of disturbance shown on the Drawings shall be restored by the Contractor.

1.02 SUBMITTALS

The following submittals are required if the Contractor is to perform planting.

A. Proposed Plant Sources

1. Within 10 days after award of the contract, submit a complete list of plant materials proposed to be provided demonstrating conformance with the requirements specified. Include the names and address of all nurseries.

B. Product Certificates

1. Plant Materials List – Submit documentation at least 10 days prior to start of work under this section that plant materials have been ordered. Arrange procedure for inspection of plant material at time of submission.

2. Have copies of vendor's invoices or packing slips for all plants on site during installation. Invoice or packing slip should list species by scientific name, quantity, and date delivered. Submit invoices or packing slips at time of planting.

C. Maintenance Record

1. Submit record of maintenance work performed, quantity of plant losses, and replacements, and diagnosis of unhealthy plant material.

D. Construction Schedule

1. Within 10 days after award of contract, submit a construction schedule describing start and end dates of all work to be completed under the contract. Contractor shall regularly update construction schedule when any changes to the schedule are required.

E. Progress Schedule

1. Progress Schedule to be submitted on a weekly basis throughout the duration of active construction. At the beginning of work the Contractor shall select a day of the week for submittal of the current Progress Schedule and shall submit an updated Progress Schedule on that day each week for the duration of construction activities. Show updated complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Show projected percentages of completion for each item of Work as of time of each Progress Schedule.

1.03 DELIVERY, INSPECTION, STORAGE, AND HANDLING

A. Notification

1. The Contractor must notify the Owner's Representative 48 hours or more in advance of deliveries to arrange for inspection.

B. Plant Materials

1. Transportation: Plant material shall be packed for shipment in accordance with prevailing practice for the type of plant being shipped, and shall be protected at all times against drying, sun, wind, heat, freezing, and similar detrimental conditions both during shipment and during related handling. Where necessary, plant material shall be temporarily heeled in. When transported in closed vehicles, plants shall receive adequate ventilation to prevent sweating. When transported in open vehicles, plants shall be protected by tarpaulins or other suitable cover material. Cuttings shall be transported and stored in bundles of 25 stakes with all ends pointing the same way and clearly labeled with species and size. Handling and shipping shall be done in a manner that is not detrimental to the plants. The nursery shall furnish a notice of shipment in triplicate at the time of shipment of each truck load or other lot of plant material. The original copy shall be delivered to the Owner, the duplicate to the consignee and the triplicate shall accompany the shipment to be furnished to the Inspector at the job site. The notice shall contain the following information: 1. Name of shipper. 2. Date of shipment. 3. Name of commodity (including all names as specified in the Contract). 4. Consignee and delivery point. 5. State Contract number. 6. Point from which shipped. 7. Quantity contained. 8. Size (height, runner length, caliper, etc., as required). 9. Signature of shipper by authorized representative.

2. Scheduling and Storage: Plants shall be delivered as close to planting as possible. If there is unavoidable delay, the Contractor will be provided compensation of the added expense of storing plants, either on or off-site, unless the Contractor is the cause of delay. Plants in storage must be protected against any condition that is detrimental to their continued health and vigor. Protect plant materials from freezing, sun, drying winds, and/or mechanical damage. Cuttings shall be continually shaded and protected from wind.

3. Handling: Plant materials shall not be handled by the trunk, limbs, or foliage but only by the container, ball, box or other protective structure.

4. Labels: Plants shall have durable, legible labels stating correct scientific name and size. Ten percent of container grown plants in individual pots shall be labeled. Plants supplied in flats, rack, boxes, bags, or bundles shall have one label per group.

C. Inspection

1. Plants shall be subject to inspection and approval for conformance to specifications at time of delivery on-site. Approval of plant materials at any time shall not impair the subsequent right to inspection and rejection during progress of the work.

2. Plants inspected on site and rejected for not meeting specification must be removed immediately from site or red-tagged and removed as soon as possible. Contractor shall furnish replacement plants meeting the specification at no additional cost to the Owner.

1.04 WARRANTY

A. Installed plant material shall have a warranty for plant growth to be in a vigorous growing condition for a minimum 12-month period after initial planting. A minimum 12-month calendar period for the warranty of plant growth shall be provided regardless of the contract time period. When plant material is determined to be unhealthy in accordance with Section 3.07 PLANT ESTABLISHMENT PERIOD, it shall be replaced once under this warranty.

PART 2 PRODUCTS

2.01 PLANT MATERIAL

A. Plant Material Classification

1. Plants shall be nursery grown in accordance with good horticultural practices under climatic conditions similar to or more severe than those of the project site within northeast Oregon.

2. Plants shall be true to species and variety or subspecies. No cultivars or named varieties shall be used.

3. At the time of delivery, all plant material furnished shall meet the grades established by the latest edition of the American Standard for Nursery Stock, (ASNS) ANSI Z60.1 and shall conform to the size and acceptable conditions as listed in the Contract, and shall be free of all foreign plant material.

4. All plant material shall be purchased from a nursery licensed to sell plants in their state or province.

5. All plant material shall comply with State and Federal laws with respect to inspection for plant diseases and insect infestation. Plants originating in Canada must be accompanied by a phytosanitary certificate stating the plants meet USDA health requirements.

6. Any plant substitutions proposed by the Contractor shall be approved in writing by the Contracting Officer prior to procurement.

B. Plant List:

1. The plant materials shall be as shown on the Drawings.

C. Growing Conditions

1. Plant material shall be native to the region and well suited to the growing conditions of the project site. Plant material shall be grown under climatic conditions similar to those at the project site within northeast Oregon. To acclimate plant materials to site conditions, all plant materials used on a project shall be grown continuously outdoors north of the 42nd Latitude (Oregon-California border).

a. Container-Grown Plant Material

1) Containers shall include plastic pots, trays, or tubes. Plant material shall be grown in a container over time sufficient for new fibrous roots to have developed throughout the container and for the root mass to retain its shape and hold together when removed from the container. Plants must be true to container size and shall be grown in the specified container size for a period of no less than one growing season prior to delivery. Plants shall not be excessively root-bound.

2) Plants which have been determined by the Engineer to have suffered damage for the following reasons will be rejected: 1. Girdling of the roots, stem, or a major branch. 2. Deformities of the stem or major branches. 3. Lack of symmetry. 4. Dead or defoliated tops or branches. 5. Defects, injury, and condition which renders the plant unsuitable for its intended use.

3) Live woody or herbaceous plant material, except stakes, rhizomes, and tubers, shall be vigorous, well formed, with well-developed fibrous root systems, free from dead branches, and from damage caused by an absence or an excess of heat or moisture, insects, disease, mechanical or other causes detrimental to good plant development. Evergreen plants shall be well foliated and of good color. Deciduous trees that have solitary leaders shall have only the lateral branches thinned by pruning. All conifer trees shall have only one leader (growing apex) and one terminal bud, and shall not be sheared or shaped. Trees having a damaged or missing leader, multiple leaders, or Y-crotches shall be rejected.

4) The trees shall not be “poled” or the leader removed

b. Cuttings

1) Cutting stock shall be gathered during the dormant period. Cuttings shall be planted within 8 hours of collection, or shall be soaked in water for 1- to 7-days prior to planting, or shall be stored in a cooler at 33-40° F. The cooler shall be dark, moist, and cool at all times. Cuttings may not be soaked in water for more than 14 days. Cuttings to be stored for later

installation shall be bundled, laid horizontally, and placed in cold storage at a temperature of 34°F and 90 percent humidity. The storage area shall be moist and cool at all times, and shall be protected from sun, wind, and freezing conditions at all times during the storage period. Cuttings may be stored for 3-4 months using this method.

2) Cuttings shall not be gathered if temperatures are below 32°F (0°C). Cuttings shall be protected from sun, wind, freezing, drying or injury before and during planting. Cuttings shall be stored upright in water immediately after harvesting up until they are installed. Stored material shall be examined frequently for signs of disease and planted before dormant bud development.

3) Cutting size shall be as specified in the design drawings. Cuttings shall have the bottom cut slanted and below a dormant bud, and the top cut straight, 1/2 to 1 inch above a dormant bud. Cuttings shall be cut from one to two-year-old wood and shall be cut and installed with the bark intact.

4) No more than 1/3rd of branches from donor plant should be harvested for stakes.

5) Cuttings shall be harvested and installed during the dormant season.

c. Mulch Rings

1) Bark or wood chip mulch shall be in air-dried condition, free of noxious weeds, seeds, or the materials detrimental to plant life.

2) Provide bark or wood chip mulch that is not moldy, caked, decayed or of otherwise low quality.

D. Plant Material Size

1. Plant material shall be furnished in sizes indicated by the Drawings.

2.02 WATER

A. Unless otherwise directed, water used for watering plants shall be the responsibility of Contractor. Water shall not contain elements toxic to plant life.

PART 3 EXECUTION

3.01 INSTALLING PLANT MATERIAL TIME AND CONDITIONS

A. Container-Grown Plant Material

1. Container-Grown Plant Material shall be installed during the dormant season. The dormant season can vary year to year, and generally is expected to be from October 15 to November 30. The contractor shall use those dates to represent the dormant season. However, if site conditions vary from those dates, the contractor may request a different planting window. The alternate planting window would need to be approved by the Owner before being used by the contractor.

B. Cutting Plant Material Time

1. Cutting plant material shall be gathered and installed from November 15 to November 30. The contractor shall use those dates to represent the dormant season. However, if site conditions vary from those dates, the contractor may request a different planting window. The alternate planting window would need to be approved by the Owner before being used by the contractor.

C. Plant Material Conditions

1. When drought, excessive moisture, frozen ground, expected freezing air temperatures or other unsatisfactory conditions prevail, planting installation shall be stopped when directed. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted for approval by Owner's Representative.

3.02 SITE PREPARATION

A. Planting shall not occur until after rolled erosion control fabric has been placed per Section 01 35 43 ENVIRONMENTAL PROTECTION.

1. Layout

a. Planting boundaries shall be staked on the project site by the Contractor at the locations shown on the Drawings before any excavation for planting is made. Planting boundaries shall be reviewed with the Owner's Representative following staking. Planting shall not commence until approval from the Owner's Representative is received indicating agreement with the staked planting boundaries.

B. Protecting Existing Vegetation

1. Existing trees, shrubs, and other plants that are to be preserved shall be fenced off or otherwise barricaded along the dripline to protect them during planting operations.

3.03 EXCAVATION

A. Obstructions Below Ground

1. When obstructions below ground affect the work, adjustments to plant material location, type of plant, and planting method shall be done by the Owner's Representative.

B. Plant Pits

1. Plant pits for container plant material shall be dug to a depth equal to the height of the root mass as measured from the base of the root mass to the base of the plant trunk. Plant pits for bare-root plant material shall be dug to a depth equal to the height of the root system. All plant pits shall be dug at least twice as wide as the root mass or root system to allow for root expansion. The sides of planting pits shall be roughened to encourage root spread.

3.04 INSTALLATION

A. Setting Plant Material

1. All plant material shall be set plumb and held in position until sufficient soil has been firmly placed around root system or ball. The base of the plant shall be level with the surrounding ground.

2. Containerized plants shall be removed from their containers and the root mass gently loosened to prevent root-bound conditions. The base of containerized plants shall be set at the same grade as the surrounding soil; no roots should be exposed after planting. The base of containerized plants shall not be buried deeper than final grade. Prior to setting the plant in the pit, a maximum one-fourth depth of the root mass, measured from the bottom, shall be spread apart to promote new root growth. Do not compact soil around plant. Water each plant thoroughly after installed, ensuring the roots become saturated. Contractor shall add soil as necessary to replace any fill that settles below final grading during watering.

3. Plants shall be placed with the crown at the finished grade. In their final position, plants shall have their top true root (not adventitious root) no more than 1 inch below the soil surface, no matter where that root was located in the original root ball or container. The backfill material, including container and root ball soil, shall be thoroughly watered on the same day that planting occurs regardless of season.

B. Cuttings

1. A stinger on an excavator, driving a metal rod or similar method approved by the Contracting Officer may be used to penetrate the gravel/cobble substrate at this site. When backfilling “Rod” or Mud” by filling the hole with water and then soil to make a mud slurry followed by rod tamping to remove air pockets. On slopes, stakes must be planted perpendicular to finish grade. Regardless of the planting method, firmly compact the substrate around the entire length of the embedded Cuttings to ensure contact with soil and that no air pockets remain.

C. Mulch Rings

1. The Contractor shall apply bark or woodchip mulch rings around each installed plant as shown in the plans.

D. Watering

1. All plantings shall be watered immediately after backfilling, until saturated.

3.05 MAINTENANCE DURING PLANTING OPERATION

A. Plant material installed in the initial phase of planting shall be maintained in a healthy growing condition during installation. Installed plants shall be maintained to foster establishment and growth. The maintenance includes watering and adjusting plant position to counteract settling.

3.06 RESTORATION AND CLEANUP

A. Restoration

1. Turf areas, access roads, and facilities that have been damaged from the planting operation shall be restored to original condition.

B. Cleanup

1. Excess and waste material generated from within the lateral limits of sediment removal shown on the drawings shall be managed as contaminated material in accordance with Section 31 10 00 SITE CLEARING. Excess waste material generated from outside these limits shall be managed and disposed of by Contractor as uncontaminated construction debris.

3.07 PLANT ESTABLISHMENT PERIOD

A. Commencement

1. Upon completion of the last day of the planting operation, the plant establishment period for maintaining installed plant material in a healthy growing condition shall commence and shall be in effect for a minimum of 12 months. Written calendar time period shall be furnished for the plant establishment period. When there is more than one plant establishment period due to plantings that occur at separate times, the boundaries of the planted area covered by each period shall be recorded and provided to the Owner's Representative. The plant establishment period shall be modified for inclement weather shut down periods, or for separate completion dates for different areas.

B. Maintenance During Establishment Period

1. The site shall be maintained for 12 months after planting is finished. Maintenance of plant material shall include straightening plant material, pruning dead or broken branch tips; watering; eradicating weeds, insects and disease; documenting and control of invasive species: control of planted grasses to prevent competition with planted trees; and removing and replacing installed plants that are unhealthy and/or have been physically damaged beyond full recovery. Maintenance shall also include removal of litter or other coarse material that inhibits growth and establishment of installed plants.

2. At least one site visit should occur within two weeks of planting to make any adjustments to plant material. Additional visits may be required for watering and plant replacement.

a. Watering Plant Material

1) The plant material shall be watered as necessary to prevent desiccation and to maintain an adequate supply of moisture within the root zone, until the end of November. An adequate supply of moisture is estimated to be the equivalent of 0.5 inch absorbed water per week, delivered in the form of rain or augmented by watering. Runoff, puddling and wilting from the watering operations shall be prevented. Watering of other adjacent areas or existing plant material shall be prevented.

b. Weeding

1) Noxious weeds and persistent non-native plants that inhibit growth and establishment of installed vegetation shall be removed by hand or other method approved by the Owner's Representative. Invasive species in the restored areas shall be controlled as directed by the Owner. Spring and fall inventories for invasive species shall be taken for the 12-month period following restoration. Planted grasses shall be controlled such that they do not compete with the planted trees.

c. Plant Pit Settling

1) When settling occurs to the backfill soil mixture, additional backfill soil shall be added to the plant pit or plant bed until the backfill level is equal to the surrounding grade. Serious settling that affects the setting of the plant in relation to the maximum depth at which it was grown requires replanting in accordance with Section 3.04 - INSTALLATION.

d. Maintenance Record

1) Contractor shall report site status and maintenance actions to the Owner's Representative after each site visit for the duration of the establishment period. A record shall be furnished describing the maintenance work performed, the quantity of plant losses, and the quantity of replacements made on each site visit.

C. Unhealthy Plant Material

1. A tree will be considered unhealthy or dead when the main leader has died back or 25 percent or more of the branches have died. A shrub will be considered unhealthy or dead when 25 percent or more of the plant has died. Herbaceous plants shall be considered unhealthy or dead when the crown has not produced leaves or shoots during the growing season, or when the crown appears dried or decayed. Contractor shall determine the cause for unhealthy plant material and shall provide recommendations for replacement. Unhealthy or dead plant material shall be replaced prior to the following growing season.

D. Replacement Plant Material

1. Unless otherwise directed, plant material shall be provided for replacement in accordance with Section 3.01 - PLANT MATERIAL. Replacement plant material shall be installed in accordance with Section 3.04 - INSTALLATION, and recommendations in Section 3.07 - PLANT ESTABLISHMENT PERIOD. Plant material shall be replaced in accordance with Section 3.04 - WARRANTY. An extended plant establishment period shall not be required for replacement plant material.

END OF PLANTING

SECTION 35 01 60
STREAM RESTORATION

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this section consists of the improvements included in the restoration of the Umatilla River and Birch Creek stream channel and descriptions of the stream structures and ancillary materials required to complete the restoration.

B. Stream restoration components include additions of LWM (Section 35 49 50 LOG AND CHANNEL STRUCTURES) in the floodplain and new and existing main stream channels, excavation of a new main channel, excavation of wetlands, and old channel fill (Section 31 22 00 EXCAVATION AND FILL).

PART 2 PRODUCTS

2.01 LARGE WOOD MATERIAL

A. The Contractor shall utilize the large wood material logs of the type shown on the Drawings and as specified herein. See Section 35 49 50 LOG AND CHANNEL STRUCTURES for specifications.

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. Refer to Section 31 22 00 EXCAVATION AND FILL for specifications on excavation and fill of channels and floodplain areas. Refer to Section 35 49 50 LOG AND CHANNEL STRUCTURES for specifications of large wood material structures. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

B. Refer to Section 31 23 19 CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING for specifications on work area isolation, fish salvage, dewatering, and rewatering.

END OF STREAM RESTORATION

SECTION 35 49 50
LWM AND CHANNEL STRUCTURES

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. Work under this section consists of the rock and log habitat structures included in the new channel and old channel fill. This section includes descriptions of the stream structures and ancillary materials required to complete the improvements on the plan sheet or as directed in the field by Owner's Representative or Engineer.

1.02 SUBMITTALS

A. For the following materials, documentation demonstrating compliance with specifications shall be submitted at least 14 calendar days prior to delivery to the site:

1. Whole tree with rootwad

2. Log without rootwad or branches

3. Streambed Sediment

4. Habitat and Ballast Boulders

1.03 REFERENCES

A. ODOT Standard Specifications for Construction 2024 or most current.

PART 2 PRODUCTS

2.01 LARGE WOOD MATERIAL

A. The CTUIR requires whole trees for use in this restoration project for promoting fish habitat. This includes limbs, treetops, and rootwads. Harvested trees are to be pushed over after loosening the soils around the tree roots to maximize root wad size and minimize handling damage to the tree roots and bole. Whole trees should be excavated to retain the entire rootwad, with rootwad diameters meeting the specifications shown in Table 2.01-1 (see below). Soil lodged around the roots shall be displaced to the extent practical without destroying the integrity of the roots. Trees must be handled with care to remain as intact as possible, and contractors shall avoid excess handling of the rootwads to minimize breakage. Tree branches shall be retained intact with minimal breakage during transport and placement. These are critical details to the contract, and contractors should include details of the methods used to achieve the desired results.

B. All treetops, limbs, and other woody material created from the harvest and loading of the trees are also to be delivered to the project. These materials may be used for slash/racking as may be called for in the large wood structure drawings or specifications. Racking and slash material must be fresh (green) and flexible, not dry and brittle.

C. Contractor must obtain their own sources for trees. Whole trees should be conifers and must be of high quality, green, sound, and free of checks and defects that would affect structural integrity or accelerate decay. Trees shall not be comprised of rotten or punk wood. The following species, in order of preference, are acceptable: Spruce, Grand or White fir, Douglas fir, Lodgepole pine, Ponderosa pine, and juniper. Juniper trees must be from a dense stand that promoted height instead of limb development. Juniper trees need to have a minimum stem diameter of six inches at the top and still meet minimum length requirements. Junipers must not have excessive thick limbs, but rather should only have smaller limbs from being grown in a shaded forest stand environment. Western larch (tamarack) may also be used for large wood structures that do not required trees with limbs (e.g., for buried footer logs or revetment trees). Bidders must identify the species on the bid form, and if mixed species are to be provided then the percentage of each species shall be identified.

D. In some cases, whole trees may be harvested near the project site, such as those that must be removed for site access. In those cases, trees must be obtained from outside of the immediate work area and must not be removed from areas within 100 feet of a stream channel.

E. All trees must be alive when harvested with the following exception. Signs of light scorching are acceptable on large trees if confined only to the outer bark. Dead, dried out, or brittle trees are not acceptable.

F. Acceptable trees may have defects such as crooks, multiple forks, bends, etc., if the tree is alive (green) when harvested and as long as minimum stem and top diameters and lengths are still met. These defects shall not affect the structural integrity of the tree, and trees that end up broken during transportation or handling as a result of these defects may be rejected by Owner's Representative or Engineer. The maximum percentage of trees with these types of irregularities shall be no more than 30 percent in any size class.

G. Whole tree and log specifications are as follows:

TABLE 2.01-1
TREE SIZE REQUIREMENTS

Tree Type	Minimum DBH[1/] (inches)	Minimum Length (feet)	Minimum Rootwad Diameter (feet)
Whole tree with rootwad	18+	40	4
Log without rootwad or branches	18+	40	n/a
Slash/Racking material	4-10	6-16	n/a

[1/] DBH = Diameter at Breast Height, measured at 4.5 feet above the ground and with bark intact. If the tree splits into multiple trunks below that point the trunk is measured at its narrowest point beneath the split.
Note: Stem diameters at the top end for whole trees is a minimum of 8 inches (6 inches for Juniper) for all size classes.

H. Any trees that naturally exceed the required minimum length may be shortened so long as they meet the minimum length for each size class. Leaving trees longer than the minimum length is also acceptable. Trees requiring shortening must be snapped or broken off rather than cut with a chainsaw for a more natural appearance. Breaking trees in this manner must not result in splintering or weakening of the treetop.

I. Trees shall be marked in a manner that specifies length. Markings shall be visible around the whole tree at any one point, and can be accomplished using tree marking paint, chalk, or similar.

J. Trees must be handled to avoid damage to rootwads, stems, and limbs at all stages of the harvest and delivery process. Limbs that are broken off the trees are required for delivery to the staging site but may be hauled separately. Limbs on juniper trees may require cutting to allow transportation but leaving limb stabs of at least 18 inches is preferable.

K. Contractor shall not cut limbs flush to the bole, except where needed to allow for legal and safe transport.

L. All harvested trees and logs are subject to inspection by Owner's Representative or Engineer.

M. Upon delivery, Owner's Representative reserves the right to reject any trees or logs failing to meet the specifications and requirements herein.

2.02 STREAMBED SEDIMENT AND COBBLE

A. The excavated channel bed material shall consist of native alluvium consisting of finer material to seal the bed. The excavated channel and floodplain areas consist of native alluvium. Following excavation to proposed grade the existing bed material will be inspected by the owner's representative or Engineer to ensure that materials meet minimum size requirements.

1. If finer material is encountered and not suitable for the channel bed material, in the areas designated by the owner's representative or Engineer, the Contractor shall source locally floodplain alluvium that is suitable for streambed material.

B. If the native floodplain alluvium cannot be sourced locally, the Contractor shall furnish and import streambed sediment and cobbles with the following gradations:

1. Streambed sediment shall be clean, naturally occurring, water-rounded gravel material. Streambed sediment shall have a well-graded distribution of aggregate sizes and conform to the grading in Table 2.02-1:

TABLE 2.02-1
STREAMBED SEDIMENT

Approximate Size	Percent Passing
2½"	99-100
2"	65-95
1"	50-85
No. 4	26-44

No. 40	16 max.
No. 200	5.0-9.0

2. Cobbles shall be clean, naturally occurring, water-rounded material. Cobbles shall have a well-graded distribution of aggregate sizes and conform to the grading in Table 2.02-2:

TABLE 2.02-2
STREAMBED COBBLE

Approximate Size	Percent Passing
8”	99-100
6”	70-90
3”	20-50
¾”	10 max

3. The grading of the material shall be determined by the Owner’s Representative or Engineer through visual inspection of the load before it is dumped into place, or, if so ordered by the Owner’s Representative, dumping individual loads on a flat surface and sorting and measuring the individual rocks contained in the load.

B. Place streambed sediment in one or more layers with a layer depth less than 1½ times the maximum dimension of the streambed sediment, but no greater than 1 foot. Placement shall be by methods that do not cause segregation or damage to the prepared surface. Place or rearrange individual cobbles to obtain a uniformly dense, compact, low permeability mass. Fill voids by machine or hand tamping before placing the next lift. Compact bed materials by mechanical means such as plate compactors, loaders, etc.

D. Fill all voids left during placement of streambed sediment as shown on the Drawings. Use water pressure, metal tamping rods, and similar hand-operated equipment to force material into all surfaces and subsurface voids between the structure and rocks, and between individual rocks.

E. All streambed sediment shall consist of screened material free from adherent coatings. The materials shall be washed thoroughly to remove clay, loam, alkali, organic matter, or other deleterious substances.

2.03 BOULDERS

A. Boulders include large rocks (i.e., riffle rocks, ballast rocks) placed in the LWM structures to create habitat features, and to provide ballast for LWM structures. See Drawings for number required and approximate location.

B. Boulders shall be hard, sound, and durable. They shall be free from segregation, seams, cracks, and other defects tending to destroy resistance to weather. All Boulders shall be sub-angular or round in shape and come from a rock quarry close to the project site or from an alluvial source. Imported boulders shall conform to the soundness requirements specified in Table 2.05-1 and size requirements in Table 2.05-2. Nominal diameters refer to the intermediate axis of the boulder. Use of on-site boulders to be determined by the Owner’s Representative or Engineer

C. Excavated and cleaned riprap from onsite may be used in place of any boulders where size, sub-angular, and weight requirements are satisfied.

TABLE 2.05-1 BOULDER SOUNDNESS REQUIREMENTS		
Test	**Standard**	**Value**
Specific Gravity	ASTM C-127	Min. 2.65
Soundness	AASHTO T104 (5.2.2)	Not greater than 5% loss
Accelerated Expansion	CRD-C-148	Not greater than 15% breakdown
Absorption	ASTM C-127	Not greater than 2%
L.A. Abrasion	ASTM C-131	Max. 20% loss @ 500 rev.

TABLE 2.05-2 BOULDER SIZE REQUIREMENTS		
Boulder Type	**Nominal Diameter (feet)**	**Average Weight (lbs)**
Habitat Boulders	3.5	3,704
LWM Ballast Boulders	2.5	1,350

PART 3 EXECUTION

3.01 CONSTRUCTION REQUIREMENTS

A. The materials used for construction shall be as specified in PART 2 PRODUCTS. Construction schedule constraints in performing various portions of the work are provided in Section 01 14 20 SITE-SPECIFIC REQUIREMENTS.

B. Refer to Section 31 23 19 CHANNEL DEWATERING, FISH TRANSFER, AND CHANNEL REWATERING for specifications on work area isolation, fish salvage, dewatering, and rewatering

3.02 FLOODPLAIN AND CHANNEL LWM STRUCTURES

A. Floodplain and instream LWM structures include 10-Log Habitat, 22-Log Jam, 22-Log Bank Habitat, Revetment, and 10-Log Habitat structures.

B. Installation of LWM structures will occur at locations shown on the Drawings.

C. Installation of surface-placed log shall be as directed in the field by Engineer or Owner's Representative.

D. Refer to the Drawings for sequence and specified dimensions of whole trees with rootwads and branches and logs without rootwads or branches to be installed.

E. Boulders and vertical pilings at dimensions shown in Drawings will be installed around each log or rootwad for stability.

F. Drive or excavate to install vertical piles to minimum depths and elevations shown on the Drawings. Care shall be taken when driving vertical piles not to crush or buckle the timber pile. Split or broken piles shall be salvaged as racking material and a new timber pile shall be installed. Tops of timber piles shall be beaver cut at elevations shown on the Drawings.

   1. Predrilling is recommended for timber piles.

   2. Refusal occurs above 60 to 100 blows per foot. Contractor may propose installation of additional piles and/or other measures to provide equivalent stability. Alterations to timber pile installation depths and/or other measures to provide equivalent stability must be approved by the Engineer.

G. Orientation and placement of the LWM will be adjusted depending on the type of structure being installed.

H. Excavated material from installation trenches will be used as backfill and compacted around the structure to provide required ballast volume. Compaction will be completed using the excavator bucket to a firm and unyielding surface. Finish grade will be blended into the surrounding floodplain.

3.03 STREAMBED SEDIMENT AND COBBLES

A. Streambed sediment and cobbles shall be placed at locations along the new main channel that do not meet the requirements of Table 2.02-1 and Table 2.02-2 during channel excavation.

B. Once all the streambed sediment materials have been placed and before the stream bed is open to stream flows, the Contractor shall wash in fines from selected on site materials approved by the Owner's Representative to seal the gravels to keep the introduced water on the surface and avoid having the creek go underground through the new stream bed. Fines shall be washed in until ponding occurs on the surface of each lift prior to placing next lift.

C. Water that flows off the stream bed during the wash-in process shall be properly disposed of in accordance with the approved Temporary Erosion and Sediment Control Plan.

D. Once fines have been washed in, the surface shall be flushed so flows coming off the new stream bed do not increase the turbidity over existing levels in the upstream creek, as approved by the Owner's Representative.

3.04 LWM STRUCTURE AND HABITAT BOULDERS

A. The overall plan form of all boulders will be constructed as shown on the Drawings and as directed by Owner's representative or Engineer.

B. Installation of the boulders will occur at locations shown on the Drawings.

C. Excavated material backfilled and compacted around the boulders if necessary. Compaction will be completed using the excavator bucket to a firm and unyielding surface.

D. Refer to the Drawings for LWM structure sequencing and placement of boulders.

END OF LWM AND CHANNEL STRUCTURES

APPENDIX 3
BPA HIP CONSERVATION MEASURES

UmaBirch Instream Design and Construction Oversight Project

Project Area 2 Umatilla River and Birch Creek Confluence Instream Enhancement and Floodplain Restoration

Appendix 3

BPA Habitat Improvement Program Conservation Measures

Issued for Construction

Prepared for:

Confederated Tribes of the Umatilla Indian Reservation
Fisheries Program-Umatilla River Basin
Department of Natural Resources
46411 Timíne Way
Pendleton, OR 97801

Prepared by:

19803 North Creek Parkway
Bothell, WA 98011
Tel 425-482-7600 Fax 425-482-7652

January 2026

Chapter 3: General Conservation Measures

3.1 General Conservation Measures Applicable to all Actions

These measures will be implemented on all projects covered under the HIP.

3.1.1 Project Design and Site Preparation

3.1.1.1 State and Federal Permits

A. All applicable regulatory permits and official authorizations will be obtained by the Sponsor before project implementation.

B. These permits and authorizations include, but are not limited to, National Environmental Policy Act (NEPA), National Historic Preservation Act, appropriate state agency removal and fill permits, USACE Clean Water Act (CWA) 404 permits, CWA Section 401 water quality certifications, FEMA no-rise analyses.

3.1.1.2 Timing of in-water work

A. Formal recommendations published by state agencies such as the Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), Idaho Department of Fish and Game (IDFG), and Montana Fish Wildlife and Parks (MFWP), or informal recommendations from the appropriate state Fishery Biologist in regard to the timing of in-water work, will be followed. A maximum of one week past the recommended in-water work window shall be considered and approved by the BPA EC Lead.

B. The regional state biologist shall approve changes exceeding one week to in-water work.

C. Bull trout – In Bull Trout spawning and rearing areas, eggs, alevin, and fry are present nearly year-round. In Bull Trout habitats designated as foraging, migration, and overwintering (FMO) habitats, juvenile and adult bull trout may be present seasonally. Some project locations may not have designated in-water work windows for bull trout, or if they do, they may differ from the in-water work windows for salmon and steelhead. If this is the case, the Project Sponsor will contact the appropriate USFWS field office to ensure that all reasonable implementation measures are considered, and an appropriate in-water work window is applied to minimize project effects.

D. Lamprey – To minimize disturbance to migrant adults, the Project Sponsor and/or their contractors will avoid working instream or river channels that contain Pacific lamprey from March 1 to July 1 in low- to mid-elevation reaches (<5,000 feet). In high-elevation reaches (>5,000 feet), the Project Sponsor will avoid working instream or river channels from March 1 to August 1. If either timeframe is incompatible with other objectives, the area will be surveyed for nests and lamprey presence and avoided if possible. If lampreys are known to exist, the

Project Sponsor will utilize best management practices (BMPs) for dewatering and salvage as outlined in LTW 2020[1], or most recent guidance. Salvage should include salvage of larval lamprey from sediments. See conservation measures for fish salvage and electrofishing.

E. The final project in-water work window shall be indicated in the project drawings.

3.1.1.3 Contaminants

A. The Project Sponsor will complete a site assessment to identify the type, quantity, and extent of any potential contamination for any action that involves excavation of more than 20 cubic yards of material.

B. The site assessment, stored with the project files, will summarize:

1. The site visit, condition of property, and identification of areas used for various industrial processes;
2. Available records, such as former site use, building plans, and records of any prior contamination events;
3. Interviews with knowledgeable people, such as site owners, operators, and occupants, neighbors, or local government officials; and
4. The type, quantity, and likelihood of potential contaminants and sources present at the site.

3.1.1.4 Site layout and flagging

A. The project area will be clearly flagged prior to construction.

B. Areas to be flagged include:

1. Sensitive resource areas, such as areas below ordinary high water (OHW), spawning areas, springs, and wetlands;
2. Equipment entry and exit points;
3. Road and stream crossing alignments;
4. Staging, storage, and stockpile areas; and
5. No-herbicide-application areas and buffers.

3.1.1.5 Temporary access roads and paths

A. Existing access roads and paths will be preferentially used whenever possible, and the number and length of temporary access roads and paths through riparian areas and floodplains will be minimized to lessen soil disturbance, soil compaction, and impacts to vegetation.

[1] 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.fws.gov/pacificlamprey/LTWGMainpage.cfm

B. Vehicle use and human activities, including walking in areas occupied by terrestrial ESA-listed species, will be minimized.

C. Temporary access roads and paths will not be built on slopes where grade, soil, or other features suggest a likelihood of excessive erosion or failure. If slopes are steeper than 30%, the road will be designed by a civil engineer with experience in steep road design.

D. The removal of riparian vegetation during construction of temporary access roads will be minimized. When temporary vegetation removal is required, vegetation will be cut at ground level (not grubbed).

E. At project completion, all temporary access roads and paths will be obliterated and the soil will be stabilized and revegetated. 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.

F. Helicopter flight patterns will be established in advance, and located to avoid terrestrial ESA- listed species, including their occupied habitat and appropriate buffers, during sensitive life stages (i.e. nesting and critical breeding periods). See species-specific conservation measures for each listed species that may occur within the project area for more information.

3.1.1.6 Temporary stream crossings

A. Existing stream crossings, fords, or bedrock will be used whenever possible, and the number of temporary stream crossing will be minimized.

B. If an existing stream crossing is not accessible, temporary crossings will be installed. Treated wood shall not be used on temporary bridge crossings or in locations in contact with or over water.

C. For projects that require equipment and vehicles to cross in the wet:

1. The location and number of all wet crossings must be approved by BPA and clearly indicated on design drawings;
2. Vehicles and machinery will cross streams at right angles to the main channel wherever possible;
3. No stream crossings will occur 300 feet upstream or 100 feet downstream of an existing redd or spawning fish; and
4. After project completion, temporary stream crossings will be obliterated, and the banks restored.

3.1.1.7 Staging, storage, and stockpile areas

A. Staging areas (used for construction equipment storage, vehicle storage, fueling, servicing, and hazardous material storage) will be 150 feet or more from any natural waterbody or wetland, or on an adjacent established road area in a location and manner that will preclude erosion into, or contamination of, the stream or floodplain. Staging

areas may be closer than 150 feet if the area is above (elevation) the 100-yr floodplain or spill prevention measures are approved by the BPA EC Lead.

B. Natural materials used for implementation of aquatic restoration, such as large wood, gravel, and boulders, may be staged within 150 feet if clearly indicated in plans. Recommend referring to area as "Natural Material Stockpile Area" with a note that states vehicle storage, equipment storage, hazardous materials, fueling, and servicing not permitted in this area.

C. Any large wood, topsoil, and native channel material displaced by construction will be stockpiled for use during site restoration at a specifically identified and flagged area.

D. Any material not used in restoration, and not native to the floodplain, will be removed to a location outside of the 100-year floodplain for disposal.

3.1.1.8 Equipment

A. Mechanized equipment and vehicles will be selected, operated, and maintained in a manner that minimizes adverse effects on the environment (e.g., minimally-sized, low pressure tires; minimal hard-turn paths for tracked vehicles; temporary mats or plates within wet areas or on sensitive soils).

B. Equipment will be stored, fueled, and maintained in a clearly identified staging area that meets staging area conservation measures.

C. Refueled in a vehicle staging area located 150 feet or more from a natural waterbody or wetland, or in an isolated hard zone, such as a paved parking lot or adjacent, established road (this measure applies only to gas or diesel-powered equipment with tanks larger than 5 gallons);

D. Biodegradable lubricants and fluids[2] shall be used on equipment operating in the stream channel and live water.

E. Inspected daily for fluid leaks before leaving the vehicle staging area for operation within 150 feet of any natural water body or wetland; and

F. Thoroughly cleaned before operation below ordinary high water (OHW), and as often as necessary during operation, to remain free of grease.

[2] For additional information and suppliers of biodegradable hydraulic fluids, motor oil, lubricant, or grease. See, Environmentally Acceptable Lubricants by the U.S. EPA (2011); e.g., mineral oil, polyglycol, vegetable oil, synthetic ester; Mobil® biodegradable hydraulic oils, Total® hydraulic fluid, Terresolve Technologies Ltd.® biobased biodegradable lubricants, Cougar Lubrication® 2XT Bio engine oil, Series 4300 Synthetic Bio-degradable Hydraulic Oil, 8060-2 Synthetic Bio-Degradable Grease No. 2, etc.

3.1.1.9 Erosion control

A. Erosion control best management practices (BMPs) will be prepared and carried out, commensurate with the scope of the action. Temporary erosion control measures include:

1. Temporary erosion control BMPs shall be in place before any significant alteration of the action site, and shall be appropriately installed downslope of project activity within the riparian buffer area until site rehabilitation is complete.
2. If there is a potential for eroded sediment to enter the stream, sediment barriers will be installed and maintained for the duration of project implementation.
3. Temporary erosion control measures may include sedge mats, fiber wattles, silt fences, jute matting, wood fiber mulch with soil binder, or geotextiles and geosynthetic fabric. Biodegradable netting may be used so that they can decompose on site.
4. 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.
5. Sediment will be removed from erosion control once it has reached 1/3 of the exposed height of the control.
6. Once the site is stabilized following construction, temporary erosion controls will be removed.

B. Emergency erosion controls. The following materials for emergency erosion control will be available at the work site:

a. A supply of sediment control materials; and

b. An oil-absorbing floating boom whenever surface water is present.

3.1.1.10 Dust abatement

A. The Project Sponsor will determine the appropriate dust control measures by considering soil type, equipment usage, prevailing wind direction, and the effects caused by other erosion and sediment control measures. In addition, the following criteria will be followed:

B. Work will be sequenced and scheduled to reduce exposed bare soil subject to wind erosion.

C. Dust-abatement additives and stabilization chemicals (typically magnesium chloride, calcium chloride salts, or lignin sulfonate) will not be applied within 25 feet of a natural waterbody or wetland and will be applied so as to minimize the likelihood that they will enter streams. Applications of lignin sulfonate will be limited to a maximum rate of 0.5 gallons per square yard of road surface, assuming a 50:50 (lignin sulfonate to water) solution.

D. Application of dust abatement chemicals will be avoided during or just before wet weather and at stream crossings or other areas that could result in unfiltered delivery of

the dust abatement chemicals to a waterbody (typically these would be areas within 25 feet of a natural waterbody or wetland; distances may be greater where vegetation is sparse or slopes are steep).

E. Spill containment equipment will be available during application of dust abatement chemicals.

F. Petroleum-based products will not be used for dust abatement.

3.1.1.11 Spill prevention, control, and counter measures

A. A description of hazardous materials (fuel, lubricants, hydraulic fluid[3], or other contaminants) that will be used, including inventory, storage, and handling procedures, will be available on-site.

B. Written procedures for notifying environmental response agencies will be posted at the work site.

C. Spill containment kits (including instructions for cleanup and disposal) adequate for the types and quantity of hazardous materials used at the site will be available at the work site.

D. Workers will be trained in spill containment procedures and will be informed of the location of spill containment kits.

E. Any waste liquids generated at the staging areas will be temporarily stored under an impervious cover, such as a tarpaulin, until they can be properly transported to, and disposed of, at a facility that is approved for receipt of hazardous materials.

F. Pumps used adjacent to water shall use spill containment systems.

3.1.1.12 Invasive species control

A. Prior to entering the site, all vehicles and equipment will be power-washed, allowed to dry fully, and inspected to make sure no plants, soil, or other organic material adheres to the surface.

B. Watercraft, waders, boots, and any other gear to be used in or near water will be inspected for aquatic invasive species.

C. Wading boots with felt soles are not to be used due to their propensity for aiding in the transfer of invasive species unless decontamination procedures have been approved by the EC Lead.

[3] For additional information and suppliers of biodegradable hydraulic fluids, motor oil, lubricant, or grease. See, Environmentally Acceptable Lubricants by the U.S. EPA (2011); e.g., mineral oil, polyglycol, vegetable oil, synthetic ester; Mobil® biodegradable hydraulic oils, Total® hydraulic fluid, Terresolve Technologies Ltd.® biobased biodegradable lubricants, Cougar Lubrication® 2XT Bio engine oil, Series 4300 Synthetic Bio-degradable Hydraulic Oil, 8060-2 Synthetic Bio-Degradable Grease No. 2, etc.

3.1.2 Work Area Isolation & Fish Salvage

3.1.2.1 Work Area Isolation

A. Any work area requiring excavation or mobilization of sediment within the wetted channel will be isolated from the active stream whenever ESA-listed fish are reasonably certain to be present, or if the work area is less than 300-feet upstream from known ESA-listed fish spawning habitats. If the work area isolation practices would cause greater impacts than it would prevent, is located in deep or swiftly flowing water, or if fish can be effectively excluded by nets or screens, then an approval from a NMFS habitat biologist may be pursued.

B. **Work area isolation & fish salvage activities are considered incidental to construction-related activities and shall occur during the state-recommended in-water work windows.**

C. When work area isolation is required, design plans will include all isolation elements, fish release areas, a pump to be used to dewater the isolation area, and, when fish are present, a fish screen that meets NMFS's fish screen criteria (NMFS 2011[4], or most current). Wider mesh screens may be used after all fish have been removed from the isolated area.

D. Work area isolation and fish capture activities take place during periods of the coolest air and water temperatures possible, normally early in the morning versus late in the day, and during conditions appropriate to minimize stress to fish species present.

3.1.2.2 Fish Salvage

A. Monitoring and recording will take place for the duration of salvage activities. The salvage report will be communicated to the Agencies via the project completion form (PCF).

B. Salvage activates should take place during conditions to minimize stress to fish species, typically periods of the coolest air and water temperatures which occur in the morning versus late in the day.

C. A fish biologist will determine an operational plan to remove ESA-listed fish, with least harm to the fish, before in-water work begins. This will involve either passive movement of fish out of the project reach through slow dewatering, or actively removing the fish from the project reach. Should active removal be warranted, a fish biologist will clear the area of fish before the site is dewatered using one or more of a variety of methods including seining, dipping, or electrofishing, depending on specific site conditions. Salvage operations will follow the ordering, methods, and conservation measures specified as follows:

[4] NMFS. 2011. Anadromous salmonid passage facility design. Northwest Region. Available online at: http://www.habitat.noaa.gov/pdf/salmon_passage_facility_design.pdf

1. Slowly reduce water from the work area to allow some fish to leave the work area volitionally. If dewatered area contains large fine/ sandy sediment deposits, larval lamprey could be present, and potentially in large numbers. If so, consider electrofishing using lamprey electrofishing settings (which do not affect bony fish) prior to or during drawdown. See electrofishing conservation measures.
2. Block nets will be installed at upstream and downstream locations and maintained in a secured position to exclude fish from entering the project area.
3. Block nets will be secured to the stream channel bed and banks until fish capture and transport activities are complete. Block nets may be left in place for the duration of the project to exclude fish as long as passage requirements are met.
4. Nets will be monitored hourly anytime there is instream disturbance.
5. If block nets remain in place more than one day, the nets will be monitored at least daily to ensure they are secured to the banks and free of organic accumulation. If the project is within bull trout spawning and rearing habitat, the block nets must be checked every 4 hours for fish impingement on the net.
6. Capture fish through seining, and relocate to streams.
7. While dewatering, any remaining fish will be collected by hand or dip nets.
8. Seines with a mesh size to ensure capture of the residing ESA-listed fish will be used.
9. Minnow traps may be left in place overnight and used in conjunction with seining.
10. Electrofish to capture and relocate fish not caught during seining. This step is to be used as a last resort; after all passive techniques have been exhausted. See electrofishing conservation measures.
11. Continue to slowly dewater the stream reach.
12. Collect any remaining fish in cold-water buckets and relocate to the stream;
13. Limit the time fish would be in a transport bucket, and release them as quickly as possible.
14. The number of fish within a bucket will be limited, and fish will be of relatively comparable size to minimize predation.
15. Aerators for buckets will be used, or the bucket's water will be frequently changed with cold, clear, water at 15 minute, or more-frequent, intervals.
16. Buckets will be kept in shaded areas; or if in exposed areas, covered by a canopy.
17. Dead fish will not be stored in transport buckets but will be left on the streambank to avoid mortality counting errors.

D. In areas occupied by bull trout, lamprey, mussels[5], or native fish, the following salvage guidelines shall be met. See USFWS 2010, "Conservation Measures for Salvage of Native Fish, Lamprey and Mussels" (LTW 2020[6]) and guidance developed by the Xerces Society (Blevins et al. 2018, 2019) or most recent guidance for additional information. Salvage guidelines are as follows:

1. Conduct native mussel and lamprey presence and absence surveys; approximate numbers for salvage to aid in planning for salvage.
2. Pre-select site(s) for release and/or mussel bed relocation.
3. Salvage of bull trout will not take place when water temperatures exceed 15 degrees Celsius.
4. If drawdown less than 48 hours, salvage of lamprey and mussels may not be necessary if temperatures support survival in sediments.
5. Salvage mussels by hand after locating by snorkeling or wading. If mussels are numerous (or staff is limited), it may be necessary to do this step in the days before drawdown, as relocation/placement can be time consuming.
6. Salvage lamprey by electrofishing. See electrofishing conservation measures for lamprey and larval lamprey dry shock settings.
7. Salvage bony fish after lamprey with nets or electrofishing (see electrofishing conservation measures for appropriate settings).
8. Regularly inspect dewatered site since lamprey likely to emerge and mussels may become visible after dewatering.
9. Mussels may be transferred in coolers.
10. Mussels will be placed individually to ensure ability to burrow into new habitat.

3.1.2.3 Electrofishing Based on NMFS's Electrofishing Guidelines (NMFS 2000[7])

A. Initial Site Surveys and Equipment Settings

1. In order to avoid contact with spawning adults or active redds, researchers must conduct a careful visual survey of the area to be sampled before beginning electrofishing.
2. Prior to the start of sampling at a new location, water temperature and conductivity measurements shall be taken to evaluate electrofisher settings and

[5] For mussels, Blevins et al. 2018. Conserving the Gems of Our Waters: Best Management Practices for Protecting Native Western Freshwater Mussels, and Blevins et al. 2019. Mussel-Friendly Restoration. Both available on line at https://xerces.org/western-freshwater-mussels/

[6] 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.fws.gov/pacificlamprey/LTWGMainpage.cfm

[7] https://www.fisheries.noaa.gov/resource/document/additional-agency-guidance

adjustments. No electrofishing should occur when water temperatures are above 18°C or are expected to rise above this temperature prior to concluding the electrofishing survey.

3. Whenever possible, a block net should be placed below the area being sampled to capture stunned fish that may drift downstream.
4. Each electrofishing session must start with all settings (voltage, pulse width, and pulse rate) set to the minimums needed to capture fish (Table 1).
5. Equipment must be in good working condition and operators should go through the manufacturer's preseason checks, adhere to all provisions, and record major maintenance work in a logbook. Records for conductivity, water temperature, air temperature, electrofish settings, electrofisher model, electrofisher calibration, fish conditions, fish mortalities, and total capture rates shall be included in the salvage log book.

Table 1 Guidelines for initial and maximum settings for backpack electrofishing for salmonids.

	Initial Settings	Maximum Settings	
Voltage		Conductivity	Max Voltage
	100V	<100	1100 V
		100-300	800 V
		>300	400 V
Pulse Width	500 µS	5 mS	
Pulse Rate	30 Hz	70 Hz	

B. Electrofishing Technique

1. Sampling should begin using straight DC. The power needs to remain on until the fish is netted when using straight DC. If fish capture is unsuccessful with initial low voltage, gradually increase voltage settings with straight DC while remaining below maximum levels.
2. Maximum voltage will be 1100 volts when conductivity is less than 100 milliseconds, 800 volts when between 100 and 300 milliseconds, and 400 volts when less than 300 milliseconds (Table 1).
3. If fish capture is not successful with the use of straight DC, then set the electrofisher to lower voltages with PDC. If fish capture is unsuccessful with low voltages, increase pulse width, voltage, and pulse frequency (duration, amplitude, and frequency) within maximum values (Table 1).
4. Maximum pulse width is 5 milliseconds. Maximum pulse rate is 70 hertz.
5. Electrofishing will not occur in one area for an extended period. Electrofishing should be performed in a manner that minimizes harm to the fish. Stream segments should be sampled systematically, moving the anode continuously in a herringbone pattern (where feasible) through the water. Care should be taken when fishing in areas with high fish concentrations, structure (e.g., wood, undercut banks) and in shallow waters where most backpack electrofishing for juvenile salmonids occurs. Voltage gradients may be high when electrodes are in shallow water where boundary layers (water surface and substrate) tend to intensify the electrical field. Netters should not allow the fish to remain in the electrical field any longer than necessary by removing stunned fish from the water immediately after netting.
6. The anode should not intentionally contact fish. The zone of potential injury for fish of 0.5 m from the anode shall be avoided.
7. Settings will be lowered in shallower water since voltage gradients are likely to increase.
8. Electrofishing will not occur in turbid water where visibility is poor (i.e. unable to see the bed of the stream).
9. Electrofishing crews should be generally observant of the condition of the fish and change or terminate sampling when experiencing problems with fish recovery time, banding, injury, mortality, or other indications of fish stress. If mortality or obvious injury (defined as dark bands on the body, spinal deformations, de-scaling of 25% or more of body, and torpidity or inability to maintain upright attitude after sufficient recovery time) occurs during electrofishing, operations will be immediately discontinued, machine settings, water temperature, and conductivity checked, and procedures adjusted or electrofishing postponed to reduce mortality.

C. Sample Processing

1. Fish shall be sorted by size to avoid predation during containment.
2. Samplers must be aware of the conditions in the containers holding fish; air pumps, water transfers, etc. to maintain safe conditions. All sampling procedures must have a protocol for protecting held fish.
3. Fish should be observed for general condition and injuries (e.g., increased recovery time, dark bands, and visually observable spinal injuries).
4. Fish should be processed as soon as possible after capture to minimize stress. This may require a larger crew size. Each fish should be completely revived before releasing at the location of capture. A plan for achieving efficient return to appropriate habitat should be developed before each sampling session. Every attempt should be made to process and release ESA-listed specimens first.

D. Bull Trout Electrofishing Conservation Measures
    1. For salvage operations in known bull trout spawning and rearing habitat[8], electrofishing shall only occur from May 1 to July 31. In FMO[9] habitats, electrofishing may occur any time of year.
    2. Bull trout are very temperature sensitive and generally should not be electrofished or otherwise handled when temperatures exceed 15°C in spawning and rearing habitats.

E. Electrofishing settings for larval Lamprey
    1. Electrofishing should be performed in a manner that minimizes harm to fishes. Handling techniques as described in NMFS Electrofishing Guidelines are protective of lamprey. If there is a conflict between conservation measures for ESA-listed salmonids and lamprey/mussels notify BPA EC Lead and prioritize protections towards the ESA-listed fish. Verify electrofisher model with EC Lead if not one of the following:
        a. AbP-2 "Wisconsin" electrofisher (ETS Electrofishing, Verona, WI)
        b. Smith-Root LR-24 model electrofisher with lamprey settings;
        c. Smith Root Apex Backpack electrofisher with lamprey settings.
    2. Electrofishers used for larval lamprey sampling should be set with two wave forms, a lower frequency "tickle" wave form to coax larval lampreys out of the substrate and a higher frequency "stun" wave form to immobilize larval lampreys for netting (Table 2).
    3. First stage: use 125V direct current with a 25 percent duty cycle applied at a slow rate of 3 pulses per second, to induce larval lampreys to emerge from the sediment. At low water temperature (<10C˚), voltage may need to be raised (150-200V) to maintain its effectiveness (gradually increase voltage to find the appropriate setting to avoid the risk of electronarcosis). Use a pattern of 3 slow pulses followed by a skipped pulse (bursted pulse) helps larval lampreys to emerge.
    4. Second stage: immediately after larval lampreys emerge, use a fast pulse setting of 30 pulses per second to immobilize and net them. It is not necessary to stun lamprey for netting for experienced netters. Avoid exposing larval lampreys to extended periods of electrofishing as it has also been linked to electronarcosis. Recovery from electronarcosis takes about 15 minutes.
    5. Use dip nets to capture larval lampreys where they are readily visible. Where not visible, seines may be effective. Using fine mesh nets to "sweep" the water ("blind-netting") may increase the number of small larvae collected.

[8] Bull Trout Spawning and Rearing habitat is not foraging, migrating, and overwintering (FMO) habitats.
[9] Bull Trout Spawning and Rearing habitat is not foraging, migrating, and overwintering (FMO) habitats.

6. Within each reach, electrofishing should be conducted in a downstream to upstream direction (for the purpose of reducing turbidity/maintaining visibility) with one person operating the electrofisher and at least one person netting larval lampreys. Each reach should be thoroughly and slowly sampled (60-90 sec/m), with more effort directed at suitable lamprey rearing habitat and less effort in areas with hard substrates or high water velocity.
7. Multiple electrofishing passes should be made to ensure a more complete removal of larval lampreys. A fifteen-minute break between passes should be taken to reduce the chance of electronarcosis. Some research indicated on average, only 30% lamprey emerge per pass, thus the need for multiple passes.
8. Post-Drawdown: Larval lamprey may continue to emerge from sediments after drawdown. The following "Dry- Shocking" Guidelines can be used to encourage larvae to emerge from the sediments so they can be salvaged.
    a. During and after dewatering, dewatered areas where lamprey may be burrowed should be shocked, aka "dry-shocking." Dry shock in depositional areas of fine and sandy sediment for larval lamprey. Juveniles (eyed migrants) and adults are sometimes found buried in rockier areas, and those areas should also be shocked if other these life stages may be present.
    b. Dry-shock a square meter at a time. Place the anodes about 1 meter apart and tickle-pulse for 60 to 90 seconds. Remove emerged lamprey once the shocking has stopped. Move to next square meter and continue. Adjust to local conditions – in some instances, 60 seconds of shocking will be sufficient; in other areas 90 seconds is needed. In cold temperatures, it can be beneficial to raise the voltage to increase efficiency. A general guideline is at temperatures less than 100C, the voltage can be increased to 150-175 V. If emergence is really slow (or on the last salvage pass prior to complete dewatering), the voltage can be increased to 200 V initially, and up to 400 V if lower voltage is not effective (dry shocking only).

Table 2: Electrofishing Guidelines for Larval Lampreys.

	"Tickle" Bursted Slow Pulse Primary Way Form	"Stun" Standard Fast Pulse Secondary Wave Form
Voltage	125 v	125 v
Pulse Frequency	3 Hz	30 Hz
Duty Cycle	25%	25%
Burst Pulse Train	3:1	X
Maximum duration/set	60-90 seconds	


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3.1.2.4 Dewatering

A. Dewatering, when necessary, will be conducted over a sufficient period of time to allow species to naturally migrate out of the work area and will be limited to the shortest linear extent practicable.

B. Diversion around the construction site may be accomplished with a cofferdam and a by-pass culvert or pipe, or a lined, non-erodible diversion ditch. Where gravity feed is not possible, a pump may be used, but must be operated in such a way as to avoid repetitive dewatering and rewatering of the site. Impoundment behind the cofferdam must occur slowly through the transition, while constant flow is delivered to the downstream reaches.

C. All pumps will have fish screens to avoid juvenile fish impingement or entrainment, and will be operated in accordance with NMFS's current fish screen criteria (NMFS 2011, or most recent version). If the pumping rate exceeds 3 cubic feet per second (cfs), a NMFS Engineering review will be necessary. If the screen is in an isolated area with no fish (salmonids or larval lamprey), a larger mesh screen may be used.

D. Dissipation of flow energy at the bypass outflow will be provided to prevent damage to riparian vegetation and/or stream channel.

E. Seepage water will be pumped to a temporary storage and treatment site or into upland areas to allow water to percolate through soil or to filter through vegetation prior to reentering the stream channel.

3.1.3 Construction and Post-Construction Conservation Measures

3.1.3.1 Fish passage

A. Fish passage will be provided for any adult or juvenile fish likely to be present in the project area during construction, unless passage did not exist before construction, or the stream is naturally impassable at the time of construction, or if it shall increase negative effects on ESA-listed species or their habitat.

B. Fish passage alternatives shall be approved by BPA EC lead under advisement by NMFS habitat biologist.

3.1.3.2 Construction and discharge water

A. Surface water may be diverted to meet construction needs, but only if developed sources are unavailable or inadequate.

B. Diversions will not exceed 10% of the available flow.

C. All construction discharge water will be collected and treated using the best available technology suitable for site conditions. Treatments to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present will be provided.

3.1.3.3 Time and extent of disturbance

A. Earthwork (including drilling, excavation, dredging, filling and compacting) in which mechanized equipment is used in stream channels, riparian areas, and wetlands will be completed as quickly as possible.

B. Mechanized equipment will be used in streams only when project specialists believe that such actions are the only reasonable alternative for implementation, or would result in less sediment in the stream channel or damage (short- or long-term) to the overall aquatic and riparian ecosystem relative to other alternatives. To the extent feasible, mechanized equipment will work from the top of the bank, unless work from another location would result in less habitat disturbance.

3.1.3.4 Cessation of work

A. Project operations will cease when high flow conditions may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

B. Project operations will cease when allowable water quality levels are exceeded as defined by the state CWA section 401 water quality certification or HIP Turbidity Monitoring Protocol. See CWA Section 401 Water Quality Certification for more information.

3.1.3.5 Site restoration

A. All streambanks, soils, and vegetation will be cleaned up and restored as necessary using stockpiled large wood, topsoil, and native channel material.

B. All project-related waste will be removed.

C. All temporary access roads, crossings, and staging areas will be decompacted and re-contoured. When necessary for revegetation and infiltration of water, compacted areas of soil will be loosened.

D. All disturbed areas will be rehabilitated in a manner that results in similar or improved conditions relative to pre-project conditions. This will be achieved through redistribution of stockpiled materials, seeding, and/or planting with local native seed mixes or plants.

3.1.3.6 Revegetation

A. Planting and seeding will occur prior to or at the beginning of the first growing season after construction.

B. Use a mix of species, appropriate to the site that will achieve establishment, shade, and erosion control objectives. These would, preferably be forb, grass, shrub, or tree species native to the project area or region.

C. Vegetation, such as willow, sedge and rush mats, will be salvaged from disturbed or abandoned floodplains, stream channels, or wetlands, and replanted at the site in appropriate locations.

D. Short-term stabilization measures may include the use of non-native sterile seed mix (when native seeds are not available), weed-free certified straw, jute matting, and other similar techniques.

E. Surface fertilizer will not be applied within 50 feet of any stream channel, waterbody, or wetland.

F. Fencing will be installed as necessary to prevent access to revegetated sites by livestock or unauthorized persons.

G. Invasive species will not be used. Invasive plants will be removed or controlled until native plant species are well-established (typically within 3 years post-construction to achieve 70% of pre-project conditions).

3.1.3.7 Site access and implementation monitoring

A. The Project Sponsor will retain the right of reasonable access to the site in order to monitor the success of the project over its life. Project Sponsor staff or their designated representative will provide implementation monitoring to ensure:

   a. General conservation measures are adequately followed.

   b. Effects to listed species are not greater than predicted and incidental take limitations are not exceeded.

   c. Turbidity monitoring is being conducted in accordance with the HIP turbidity monitoring protocol.

B. The Project Sponsor or designated representative will submit the Project Completion Form (PCF) to ensure compliance with the applicable BiOp.

3.1.3.8 CWA section 401 water quality certification

A. The Project Sponsor or designated representative will complete and record water quality observations to ensure that in-water work is not degrading water quality.

B. During construction, CWA section 401 water quality certification provisions provided by the Oregon Department of Environmental Quality, Washington Department of Ecology, or Idaho Department of Environmental Quality will be followed.

3.2 Staged Rewatering Plan and Conservation Measures

A. When appropriate, the Project Sponsor shall implement a staged rewatering plan for projects that involve introducing streamflow into recently excavated channels under activity category 2a) Improve Secondary Channel and Wetland Habitat or 2f) Channel Reconstruction. This plan may be altered according to site specific conditions with coordination and feedback from BPA and the Services.

B. The following will be applied to all rewatering efforts. Complex rewatering may require additional notes or a dedicated sheet in the construction details.

1. Turbidity monitoring protocol will be applied to rewatering efforts.
2. Pre-wash the newly-excavated channel before rewatering[10]. Turbid wash water will be detained and pumped to the floodplain or into a reach with sediment capture devices, rather than discharging into fish-bearing waters.
3. Install seine nets at upstream end to prevent fish from moving downstream until 2/3 of total flow is restored to the channel.
4. Starting in the early morning, introduce 1/3 of the flow into the new channel over a period of 1-2 hours.
5. Introduce the second 1/3 of the flow over the next 1-2 hours. Salvage fish from the old channel at this time, so that the old channel is fish-free before dropping below 1/3 of the flow. *Note: the fish will be temporarily blocked from moving downstream into either channel until 2/3 of the flow has been transitioned to the new channel. This blockage to downstream fish passage is expected to persist for roughly 12 to 14 hours, but fish will still be able to volitionally move out of the channel in the downstream direction.* Perform monitoring as in #3 above.
6. After the second 1/3 of flow is introduced over 2 hours, and turbidity is within 10% of the background level, remove seine nets from the new channel, and allow fish to move downstream back into the channel.
7. Introduce the final 1/3 of flow. Once 100% of the flow is in the new channel, install plug to block flow into the old channel and remove seine nets from the old channel. Additional efforts to salvage larval lamprey emerging from fine sediment deposits should be conducted after the flow is gone and possibly for a few hours after flow is gone, as the larvae will continue to emerge.
8. Install plug to block flow into old channel or bypass if not part of project. Remove any seine nets.
9. In lamprey systems, lamprey salvage and dry shocking may be necessary.

[10] The contractor may find it useful to have prewashed gravel bags available onsite to control the flow of water.

3.3 HIP Turbidity Monitoring Protocol and Conservation Measures

The Project Sponsor is responsible for monitoring turbidity during implementation. If the geomorphology of the project area (e.g., silty or claylike materials) or the nature of the action (e.g., large amounts of bare earth exposure) shall preclude the successful compliance with these triggers, notify the BPA EC Lead in advance of the likelihood of an exceedance and seek additional recommendations. Turbidity protocol is as follows:

A. Take a background turbidity measurement approximately 100 feet upstream from the project area using a recently-calibrated turbidimeter or estimated using visual observations (Figure 1). Note the turbidity level, location, and time of the background measurement.

B. Record the turbidity measured using a calibrated turbidimeter or estimated by visual observation **(**Figure 1) before work begins at the downstream point, known as the measurement compliance point. Note the turbidity level, location, and time. The compliance point shall be located downstream of the disturbance area, approximately:

    1. 50 feet downstream for streams that are less than 30 feet wide;
    2. 100 feet downstream for streams between 30 and 100 feet wide;
    3. 200 feet downstream for streams greater than 100 feet wide; and
    4. 300 feet from the discharge point or nonpoint source for locations subject to tidal or coastal scour.

C. Turbidity shall be measured by turbidimeter or estimated by visual observation (Figure 1) at the background and compliance points every **4 hours** while work is being implemented.

D. If there is a visible difference between a compliance point and the background then an exceedance (10% or more) has occurred and must be noted in the PCF. Adjustments or corrective measures must be taken in order to reduce turbidity.

E. If exceedances occur for more than **two consecutive monitoring intervals** (after 8 hours), the activity must stop until the turbidity level returns to background, and the BPA EC Lead must be notified after the project is concluded. The BPA EC Lead shall document the reasons for the exceedances and the corrective measures taken. This is very important as BPA is required to report to the Services upon all exceedances.

F. If at any time, monitoring, inspections, or observations/samples show that the turbidity controls are ineffective, immediately mobilize work crews to repair, replace, or reinforce controls as necessary. Document those occurrences in the Project Completion Form (PCF).

G. The Project Sponsor shall submit a summary of readings, exceedances, control failures, adaptive measures to BPA using the HIP Project Completion Form (PCF).

Figure 1 Suggested Visual Observational Differences in Turbidity

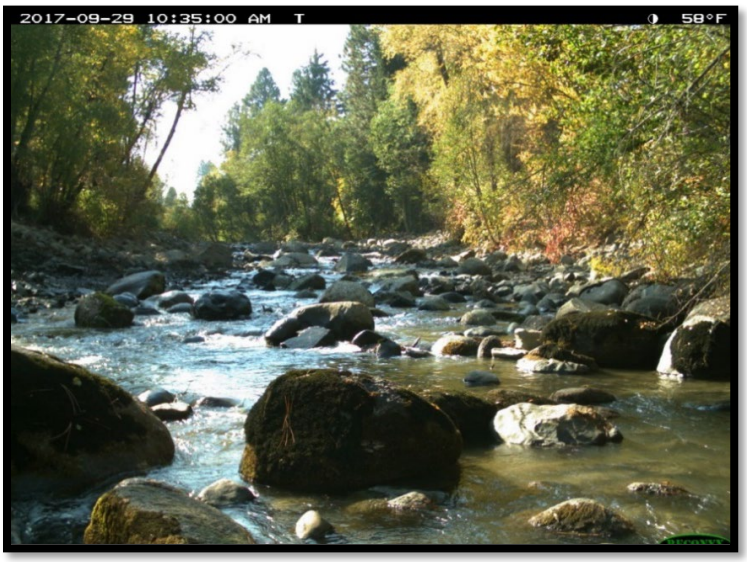
NOTE: A visual observation of a difference between compliance points shall be assumed to be about a 10% increase in natural stream turbidity.

4.1.3 Category 1c) Headcut and Grade Stabilization

Description

HIP provides ESA coverage for BPA funded restoration of fish passage and grade control (i.e., headcut and grade stabilization) with geomorphically-appropriate structures. Structures may include engineered riffles, rock weirs, log weirs, and large wood (LW). If geomorphic conditions are appropriate, consideration should be given towards use of a roughened channel or constructed riffle to minimize the potential for future development of a passage (jump height) barrier.

For wood-dominated systems, grade control engineered log jams (ELJs) should be considered as an alternative. Grade control ELJs are designed to arrest channel downcutting or incision, retain sediment, lower stream energy, and increase water elevations to reconnect floodplain habitat and diffuse downstream flood peaks. Unlike hard weirs or rock grade control structures, a grade control ELJ is a complex broad-crested structure that dissipates energy more gradually.



Guidelines for Risk

- ***Low Risk:*** N/A, see Section 2.4 Risk Determination for low risk consideration.
- ***Medium Risk:*** Grade control structures that address headcuts less than 18 inches in height as measured from the streambed (18 inches refers to the total height of the headcut(s), rather than height of individual structures).
- ***High Risk*****:** Grade control structures that address headcuts greater than or equal to 18 inches in height as measured from the streambed (18 inches refers to the total height of the headcut(s), rather than height of individual structures).

Guidelines for Review

- BPA Functional review required for all risk levels.
- BPA Technical review required for medium and high risk levels.
- NMFS Engineering review required for headcut or grade stabilization actions greater than or equal to 18 inches in height.
- Interagency review required for high risk projects.
- USFWS Field Office Supervisor review required if passage improvement increases connectivity between bull trout and non-native species.

Conservation Measures (General)

1) All structures will be designed to the design benchmarks set forth in NMFS 2011[16] (or most recent version).
2) For grade control structures that are greater than or equal to 18 inches in height, provide the profile of the stream thalweg for a minimum for of (10) upstream and (10) downstream channel widths beyond the extent of the proposed construction. The design documentation shall provide enough information to clearly demonstrate project impacts to the stream channel and the potential for channel degradation.

Conservation Measures (Boulder and log weirs)

1) For the use of wood, see additional conservation measures in activity category 2d) Install Habitat-Forming Instream Structures (Large Wood, Small Wood and Boulders).
2) Install weirs low in relation to channel dimensions so that they are completely overtopped during channel-forming flow events (approximately a 1.5-year flow event).
3) Weirs are to be placed perpendicularly across the channel or in upstream pointing "V" or "U" configurations (with the apex oriented upstream). The apex should be lower in elevation than the structure wings to support low flow consolidation.
4) Weirs are to be constructed to allow upstream and downstream passage of all native fish species and life stages that occur in the stream. This can be accomplished by providing plunges no greater than 6 inches in height, allowing for juvenile fish passage at all flows.
5) Key the weirs into the streambed (preferably at least 2.5 times their exposure height) to minimize structure undermining due to scour. The weir should also be keyed into both banks in a manner that prevents water from cutting around the structure.
6) Include fine material in the weir material mix to help seal the weir/channel bed, thereby preventing subsurface flow. Geotextile material can be used as an alternative approach to prevent subsurface flow.
7) Material used to construct weirs shall be durable and of suitable quality to ensure permanence in the climate in which it is to be used.

[16] NMFS. 2011. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon. Available at: http://www.westcoast.fisheries.noaa.gov/publications/hydropower/fish_passage_design_criteria.pdf

8) For boulder weirs, the use of gabions, cable, or other mechanical connections to prevent the movement of individual boulders in a weir are not allowed.

Conservation Measures (Headcut stabilization and roughened riffles)

1) Provide fish passage over stabilized head-cut or constructed riffle according to NMFS 2011[17] (or most recent version). Passage can be provided through a series of log or rock weir structures or a roughened channel.
2) Armor features intended for grade stabilization with sufficiently-sized and amounts of material to provide a structure capable of withstanding a 100-year flow event (or other approved design flow) without further progressing the headcut or substantially degrading the riffle.
3) Headcut stabilization structures and roughened riffles will be constructed utilizing an engineered stream simulation bed material, which will be pressure-washed into place until surface flow is apparent and minimal subsurface material to ensure fish passage immediately following construction (if natural flows are sufficient). Successful washing will be determined by minimizing voids within placed matrix such that ponding occurs with little to no percolation losses.
4) For grade stabilization efforts, design considerations should extend beyond the control structure to include the plunge pool downstream and the upstream approach. Also consider floodplain return flows and flanking that could create potential new headcut conditions, and potential changes in bank erosion conditions due to structure placement.
5) Minimize lateral migration of the channel around the head cut or riffle ("flanking") by designing the downstream face with a lower elevation in the center of the channel cross section to direct flows to the middle of channel.
6) Materials used for construction can be native to the area if gradation is shown to be appropriate.

[17] NMFS. 2011. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon. Available at: http://www.westcoast.fisheries.noaa.gov/publications/hydropower/fish_passage_design_criteria.pdf

4.2 Category 2: River, Stream, Floodplain, and Wetland Restoration

HIP provides ESA coverage for BPA funded river, stream, floodplain, and wetland restoration actions with the objective of providing appropriate habitat conditions required for foraging, rearing, and migrating ESA-listed fish.

Projects utilizing habitat restoration actions outlined within this activity category shall be related to limiting factors identified within the applicable sub-basin plan for the watershed, a recovery plan for ESA-listed species, or shall be prioritized by recommended restoration activities identified within a localized region by a technical oversight and steering committee (e.g., the Columbia River Estuary). Individual projects may utilize a combination of the activities listed in the River, Stream, Floodplain, and Wetland Restoration activity category.

The following activity categories address projects that improve fish habitat: (a) Improve Secondary Channel and Floodplain Connectivity; (b) Set-back or Removal of Existing Berms, Dikes, and Levees; (c) Protect Streambanks Using Bioengineering Methods; (d) Install Habitat-Forming Instream Structures (Large Wood, Small Wood and Boulders); (e) Riparian and Wetland Vegetation Planting; (f) Channel Reconstruction; and (g) Install Habitat Forming Natural Materials (Sediment and Gravel).

4.2.1 Category 2a) Improve Secondary Channel and Floodplain Connectivity

Description

HIP provides ESA coverage for BPA funded restoration projects that increase floodplain hydrologic connectivity. Project may include:

- Reconnect historical stream channels within floodplains;
- Restore or modify hydrologic and other essential habitat features of historical river floodplain swales, abandoned side channels, spring-flow channels, wetlands, and historical floodplain channels; and
- Create new self-sustaining floodplain and side channel habitats, which are maintained through natural processes.

Guidelines for Risk

- ***Low Risk:*** N/A, see Section 2.4 Risk Determination for low risk consideration.
- ***Medium Risk:*** Projects that require limited excavation to activate historic side channels and floodplains.
- ***High Risk:*** Projects that require substantial excavation. Projects that do not follow historic channel alignments.

Guidelines for Review

- BPA Functional review required for all risk levels.
- BPA Technical review required for medium and high risk.
- NMFS Engineering review is not required.
- Interagency review required for high risk projects.

Improve Secondary Channel and Floodplain Connectivity requires a Staged Rewatering Plan (Section 3.2).

Conservation Measures

1) Reconnection of historical fragmented habitats and increasing water surface elevations are preferred to excavation of newly constructed side channels in floodplains. Proposed new side channel construction must be within the historic floodplain (e.g. 5-year flow event), current channel meander migration zone, and require limited excavation for construction. Side channel excavation in floodplains connected less than the 5-year flow event shall meet conservation measures in activity category 2f) Channel Reconstruction.
2) Side channel creation with flows similar to the mainstem or depths greater than the mainstem shall meet conservation measures in activity category 2f) Channel Reconstruction.
3) Excavated natural materials should be placed instream if possible according to activity category 2f) Channel Reconstruction or 2g) Install Habitat Forming Natural Materials as appropriate. Any excess or unsuitable materials shall be hauled to an upland site or spread across the adjacent floodplain in a manner that does not restrict floodplain capacity. Hydric soils may be salvaged to provide appropriate substrate and/or seed source for hydrophytic plant community development. Hydric soils will only be obtained from wetland salvage sites. Sediment to be placed in-water shall be assessed for contaminants per HIP section 3.1.1.2.
4) Designs must demonstrate that the project will be self-sustaining over time or promote the recovery of natural habitat-forming processes. Self-sustaining means the restored or created habitat would not require major or periodic maintenance, but function naturally within the processes of the floodplain.
5) In the floodplain and intermittent side channels, adequate precautions will be taken to prevent the creation of fish passage issues or stranding that increase mortality of juvenile or adult fish. Stranding must be avoided by incorporating features that create shallow, slow-moving, water during flood stage that will not create large scour pools.
6) Side channels will be constructed to prevent fish stranding by providing a continual positive overall grade.
7) All side channel and pool habitat work will occur in isolation from waters occupied by ESA-listed salmonid species until project completion. During project completion, a reconnection may be made by either excavation to waters occupied by ESA-listed salmonids or re-watering of these channel units.

8) A protected riparian buffer strip of 35-feet associated with secondary channels and restored wetlands shall extend from the bankfull elevation towards the floodplain. An average riparian buffer can be applied to projects that are unable to achieve the 35-foot buffer in all areas or with a protection plan approved by the EC Lead.

4.2.2 Category 2b) Set-back or Removal of Existing Berms, Dikes, and Levees

Description

HIP provides ESA coverage for BPA funded restoration projects that remove fill (e.g., dredge spoils) from past channelization projects, roads, trails, railroad beds, dikes, berms, and levees in order to restore natural estuary and freshwater floodplain connectivity and function. Tide gates may be setback with berms, dikes, and levees. However, tide gates must not degrade baseline conditions (fish passage and habitat). Placement of new gates where none previously existed is not covered in this consultation.

Actions in freshwater, estuarine, and marine areas include: 1) full and partial removal of levees, dikes, berms, and jetties; 2) breaching of levees, dikes, and berms; 3) lowering of levees, dikes, and berms; 4) setback of levees, dikes, and berms; and 5) removal of spoils piles from the floodplain.

Guidelines for Risk

- ***Low Risk:*** N/A, see Section 2.4 Risk Determination for low risk consideration.
- ***Medium Risk:*** Projects that improve floodplain connectivity but do not significantly inundate new portions of the floodplain (less than 1 acre), when comparing flows at the protection level of the levee or 100-year event if the protection level is unknown.

- ***High Risk:*** Projects that inundate substantial new portions of the floodplain (greater than or equal to 1 acre) currently cut off from the river, when comparing flows at the protection level of the levee or 100-year event if the protection level is unknown.

Guidelines for Review

- BPA Functional review required for all risk levels.
- BPA Technical review required for medium and high risk.
- NMFS Engineering review required if tide gates are relocated.
- Interagency review required for high risk projects.

Conservation Measures

1) To the greatest degree possible, non-native fill material, originating from outside the floodplain of the action area, will be removed from the floodplain and disposed of at an upland site.
2) Overburden or fill material that is native to the project area may be used within the floodplain to create set-back dikes and fill anthropogenic holes provided that this does not impede floodplain function. Excavated natural materials should be placed instream if possible according to activity category 2f) Channel Reconstruction or 2g) Install Habitat Forming Natural Materials as appropriate. Sediment to be placed in-water shall be assessed for contaminants per HIP section 3.1.1.2.
3) When necessary, loosen compacted soils once overburden material is removed.
4) When substantial new portions of the floodplain are reconnected (greater than or equal to one acre) the project shall minimize fish stranding potential. Fish stranding potential and project consideration to minimize stranding shall be clearly demonstrated in the Basis of Design Report for review.
5) In addition to other breaches, the berm, dike, or levee shall always be breached at the downstream end of the project and/or at the lowest elevation of the floodplain to ensure that flows will naturally recede back into the main channel, minimizing fish entrapment.
6) When a setback is required, setback locations should prioritize the functional floodplain and be placed outside of either the meander belt width or the channel meander zone margins.
7) When a setback is required, it is not allowed to provide more flood protection than the existing levee, no net rise. Hydraulic modeling shall be required to determine flood protection of existing levee.

4.2.3 Category 2c) Protect Streambanks Using Bioengineering Methods

Description

The HIP will not cover stand-alone bank stabilization projects.

HIP provides ESA coverage for BPA funded projects that restore eroding streambanks through bank shaping; installation of soil reinforcements (e.g., coir logs, large wood, etc.) and other bioengineering techniques to support development of riparian vegetation; and/or planting of trees, shrubs, and herbaceous cover to restore ecological functions in riparian and floodplain habitats.

As actions that are covered by this programmatic consultation need to have the purpose of restoring floodplain and estuary functions or to enhance fish habitat, streambank stabilization shall only be proposed as a subsidiary action to additional habitat restoration actions (e.g. channel reconstruction).

The primary structural streambank protection action proposed is the installation of large wood and riparian vegetation configured to increase bank strength and resistance to erosion. This is considered to be an ecological approach to managing streambank erosion (i.e., bioengineering).

Guidelines for Risk

- ***Low Risk:*** N/A, see Section 2.4 Risk Determination for low risk consideration.
- ***Medium Risk:*** Streambank protection to start as medium risk.
- ***High Risk:*** See Section 2.4 Risk Determination for high risk consideration.

Guidelines for Review

- BPA Functional review required for all risk levels.
- BPA Technical review required for medium and high risk.
- NMFS Engineering review is not required.
- Interagency review required for high risk projects.

Conservation Measures

1) Without changing the location of the bank toe, damaged streambanks will be restored to a slope, pattern, and profile suitable for establishment of permanent woody vegetation. This may include sloping of unconsolidated bank material to a stable angle of repose or the use of benches in consolidated cohesive soils. The purpose of bank shaping is to provide a more stable platform for the establishment of riparian vegetation, while also reducing the depth to the water table, therefore promoting better plant survival.
2) Bioengineering bank stabilization methods shall provide long term stabilization through self-sustaining vegetation. Projects should ideally use plantings and soil bioengineering for bank stabilization. Large wood should be used for stabilization as a method of last resort. Large wood may be added to create complexity and interstitial habitats when feasible.

3) Structural placement of large wood should focus on providing channel boundary roughness for energy dissipation versus flow re-direction that may affect the stability of the opposite streambank.

4) Large wood will be intact, hard, and undecayed to partly decaying with untrimmed root wads to provide functional refugia habitat for fish. Use of decayed or fragmented wood found lying on the ground may be used for additional roughness and to add complexity to large wood placements but will not constitute the primary structural components.

5) Wood that is already within the stream or suspended over the stream may be repositioned to allow for greater interaction with the stream.

6) Large wood anchoring shall not utilize cable.

7) Treated wood, copper- or zinc-plated hardware shall not be used in construction of habitat features. ASTM A615 and/or black steel hardware (or approved similar steels) shall be used.

8) The utilization of structural connections (biodegradable rope or pins) should be used minimally. Structural connections for large wood shall only be used if hydraulic conditions warrant use. Rationale for structural anchorage shall be justified and demonstrated in the Basis of Design Report and will be evaluated as a component of the HIP Technical Review. Designs that use a structural connection shall be stamped by a licensed engineer.

9) Ballast (sediment, boulders, other logs) for structural stability of large wood shall only be used if hydraulic conditions warrant use. Rationale for structural ballast shall be justified and demonstrated in the Basis of Design Report and will be evaluated as a component of the HIP Technical Review. Designs that incorporate ballast shall be stamped by a licensed engineer.

10) Boulders shall not be used for streambank stabilization, except as ballast to stabilize large wood, unless it is necessary to prevent scouring or downcutting at an existing structure (e.g., a culvert, bridge support, headwall, utility lines, or building). In this case, rock may be used as the primary structural component for construction of vegetated riprap with large wood. Scour holes may be filled with rock to prevent damage to structural foundations but will not extend above the bed of the adjacent river. This does not include scour protection for bridge approach fills.

11) Streambank protection may not impair natural stream flows into or out of secondary channels or riparian wetlands.

12) Riparian buffer strips associated with streambank protection shall extend from the bankfull elevation towards the floodplain a minimum distance of 35 feet.

13) Fencing shall be installed as necessary to prevent access and grazing damage to revegetated sites and riparian buffer strips. If fencing is used, see activity category 9b) Construct Fencing for Grazing Control.

4.2.4 Category 2d) Install Habitat-Forming Instream Structures (Large Wood, Small Wood, and Boulders)[26]

Description

HIP provides ESA coverage for BPA funded restoration projects that include placement of in stream structures comprised of natural habitat-forming materials to provide instream complexity and to support spawning, rearing, and resting habitat for salmonids and other aquatic species. Anthropogenic activities have altered riparian habitats, reduced instream habitat complexity, and eliminated or reduced features like pools, cover, and bed complexity that Salmonids need for rearing, feeding, and migrating. To offset these impacts, in-stream structures consisting of large wood, small wood, and boulders will be placed in stream channels either individually or in combination. Structures may be placed to create rearing habitat and pool formation; promote spawning gravel deposition; reduce siltation in pools; reduce the width/depth ratio of the stream; decrease flow velocities; and to connect floodplain areas for natural vegetation recruitment, habitat diversity, and high-flow refugia.

Instream structures are prone to having unintended consequences; caution must be exercised when using this approach. Structures have the potential to affect hydraulics, sediment transportation, and wood transport. The degree to which these effects achieve the desired results or place nearby habitat, infrastructure, property, and public safety at risk depends on a number of important variables that affect the way in which a structure functions in the stream.

[26] descriptions of each technique refer to the WDFW Stream Habitat Restoration Guidelines: http://wdfw.wa.gov/publications/00046/,the USACE's EMRRP Technical Notes, Stream Restoration: http://el.erdc.usace.army.mil/publications.cfm?Topic=technote&Code=emrrp, or the NRCS National Engineering Handbook Part 654, Stream Restoration: http://policy.nrcs.usda.gov/viewerFS.aspx?id=3491

Large Wood Placements

Large wood placements are projects or structures that use trees greater than one foot in diameter at breast height, (DBH), are 15 feet or greater in length, and are used as the primary pieces within the placement or structure. These criteria do not preclude the use of materials with dimensions less than this size class for racking, woven, or slash that may be incorporated into the structure.

Placement of large woody debris (wood) and other structures in streams is one of the most widespread and common techniques to improve riverine fish habitat. Techniques for wood placement include falling, pushing, hauling trees from the riparian zone, and construction of highly engineered structures such as logjams (Roni et al. 2014).

Structure design criteria should be focused on balancing biological benefit and structural resiliency. Benefits should focus on enhancing watershed driven processes including floodplain connectivity. Increasing the system-wide placement and longitudinal extent of process forming friction elements may be more effective in many reaches than individual, large scale structures. The placement of large wood should be viewed as an interim solution - a short-term improvement providing habitat as natural rates of woody debris recruitment are restored through riparian forest regeneration.

Small Wood Placements

Small wood placements are defined herein as projects or structures that use trees that are less than one foot in diameter DBH and 15 feet or less in length.

This activity includes the installation of small wood in-channel structures that improve habitat by flattening local stream gradients, increasing interactions between the stream and floodplain, increasing floodplain groundwater storage, capturing of relatively fine sediment in the channel, pool formation, hyporheic exchange, and riparian recovery. Structures consist of porous channel-spanning or partial spanning structures comprised of small diameter woody debris (including whole trees) riparian cuttings and other inert materials that are structurally reinforced with small diameter driven posts. Structures include spaces between posts that allow water, sediment, fish, and other aquatic organisms to move through the structure.

Variation of this restoration treatment may include small, whole tree placement, beaver dam analogues (BDA), post assisted log structures (PALS), post lines only, post lines with wicker weaves, construction of starter dams, reinforcement of existing active beaver dams, and reinforcement of abandoned beaver dams as described by Pollock et al. (2012).

Boulder Placements

Boulders may be placed to restore habitat diversity in plane bed streams from which boulders have been removed, to alter plain bed channels that were historically dominated by wood, and to add habitat complexity in new or altered stream reaches. Boulder placements increase habitat diversity and complexity, improve flow heterogeneity, provide substrate for aquatic vertebrates, moderate flow disturbances, and provide refuge for fish during high flows.

Guidelines for Risk

- ***Low Risk:*** N/A, see Section 2.4 Risk Determination for low risk consideration.
- ***Medium Risk:*** Habitat structures to start as medium risk. See Section 2.4 for other risk level considerations.
- ***High Risk:*** See Section 2.4 Risk Determination for high risk consideration.

Guidelines for Review

- BPA Functional review required for all risk levels.
- BPA Technical review required for medium and high risk.
- NMFS Engineering review is not required.
- Interagency review required for high risk projects.

A Monitoring and Adaptive Management Plan is required for process-based projects that require multi-year treatments. Scale and risk may also be considered.

Conservation Measures (Large Wood)

1) Large wood placements for primary purposes other than habitat restoration or enhancement are excluded from this consultation. Large wood placements incorporated with bank protection and slope stability shall adhere to activity categories 1c) Headcut and Grade Stabilization and 2c) Protect Streambank Using Bioengineering Methods.
2) Large wood placements must be designed to mimic the process and function of natural accumulations of large wood in the channel, estuary, or marine environment and address defined limiting factors.
3) Large wood anchoring shall not utilize cable. Pinning to boulders shall not be practiced in streams with recreational use.
4) The utilization of structural connections (biodegradable rope or pins) should be used minimally. Structural connections for large wood shall only be used if hydraulic conditions warrant use. Rationale for structural anchorage shall be justified and demonstrated in the Basis of Design Report and will be evaluated as a component of the HIP Technical Review.
5) If pins are used, protruding ends of rebar shall be cut flush with log or bent in order to prevent impaling fish, people, or wildlife.
6) Treated wood, copper- or zinc-plated hardware shall not be used in construction of habitat features. ASTM A615 and/or black steel hardware (or approved similar steels) shall be used.

7) Ballast (sediment, boulders, other logs) for structural stability of large wood shall only be used if hydraulic conditions warrant use. Rationale for structural ballast shall be justified and demonstrated in the Basis of Design Report and will be evaluated as a component of the HIP Technical Review.

8) Installation of large wood that requires ballast, excavation, or structural connections shall be designed by a licensed engineer unless BPA Technical Lead review member confirms project is low risk according to Section 2.4. Rationale for structural anchorage shall be justified and demonstrated in the Basis of Design Report. In addition, the Basis of Design Report shall include structural stability calculations (An appendix is acceptable).

9) Large wood must be intact, hard, and undecayed to partly decaying and should preferably include untrimmed root wads when available to provide functional refugia habitat for fish. Large wood includes whole trees with rootwad and limbs attached, pieces of trees with or without rootwads and limbs, and cut logs. Use of decayed or fragmented wood found lying on the ground or partially sunken in the ground is not acceptable for key pieces but may be incorporated to add habitat complexity.

10) Riparian buffer strips associated with streambank protection shall extend from the bankfull elevation towards the floodplain a minimum distance of 35 feet.

11) If non-federal laws or ordinances require specific stability requirements, federal supremacy does not apply. Design shall include stability for primary LWD elements including base, key and anchorage members (logs larger than 15 feet long and greater than one foot in diameter). These pieces are assumed to comprise ~ 50% of the overall structure. Woven, racking, matrix, and recruited material are expected to be transient and dynamically interact with the fluvial system. If specific stability evaluation of a structure result in criteria more conservative than that presented above, then a risk – benefit analyses is expected to ascertain the appropriateness of the subject structure. This assessment will be used to determine the benefits to fish habitat and may result in forgoing or modification of the project element.

12) Rock may be used for ballast but should be limited to what is needed to anchor the large wood. Use of rock shall be justified in Basis of Design Report, and stability calculations are required.

13) Piling shall consist of wood piles; steel piles are not to be used under any circumstance. Drive each piling as follows to minimize the use of force and resulting sound pressure.
    a) Use a vibratory head to drive the piles; an impact hammer may only be used in the dry.
    b) Select areas with soft substrate rather than rocky hard substrate; avoid bedrock, and
    c) Isolate the work area if possible to minimize acoustic disturbance.

Conservation Measures (Small Wood)

1) Small wood placements shall be conducted by hand or small machinery not to exceed 15,000 lbs. operating weight. If heavy equipment is required, project shall adhere to Large Wood conservation measures.

2) Small wood placements shall be constructed for floodplain reconnection in stream systems less than 4% stream gradient.

3) Additional potential effects of structures may include channel aggradation and associated channel widening, bank erosion, increased channel meandering, and decreased channel depth. The Basis of Design Report must demonstrate how these potential impacts have been addressed.

4) Structures must be porous, must provide for a water surface differential of no more than one-foot at low flows, or otherwise provide a clear path for fish passage over, through or around the structure during low flows.

5) Structures shall have crest elevations that extend no more than 3 feet above the stream bed. Vertical posts (if utilized) shall be cut flush and not extend above the proposed crest elevation.

6) Vertical posts (if utilized) must be driven to a depth at least 1.5 times the expected scour depth of the waterway or a ratio of 1:2 for exposed – embedded length whichever is more conservative. A minimum 1.5-foot clear space is recommended between posts.

7) For incised channels, an adaptive management approach using lower elevation structures that trap sediment and aggrade the channel, with future and subsequent project phases is preferred over tall structures with excessive drop and increased risk of failure.

8) All primary materials used in small wood placements must consist of non- treated wood (e.g. fence posts) and must be constructed from a materials source collected outside the riparian area.

9) Placement of inorganic material is limited to the minimum quantity necessary to prevent under-scour of structure and manage pore flow sufficient to ensure adequate over-topping flow and side flow to facilitate fish passage where required.

10) No cabling, wire, mortar or other materials that serve to affix the structure to the bed, banks or upland is allowed.

11) Structures cannot unreasonably interfere with use of the waterway for navigation, fishing or recreation.

Conservation Measures (Boulder Placement)

1) Boulder placements for purposes other than habitat restoration or enhancement are not covered under this activity.

2) Boulder clusters should only be applied where a biologic or geomorphic need has been identified. Rationale for boulder placements shall be justified and demonstrated in the Basis of Design Report.

3) Boulder placements will be limited to reaches with a streambed that consists predominantly of coarse gravel or larger sediments and will address identified limiting factors.

4) The cross-sectional area of boulder placements may not exceed 25% of the cross-sectional area of the low-flow channel.
5) Boulder placements may not be installed with the purpose of shifting the stream flow to a single flow pattern in the middle or to the side of the stream.
6) Boulders will be machine-placed (no end dumping allowed) and will rely on the size of boulder, rather than anchoring, for stability.
7) Boulders will be installed in a low position in relation to channel dimensions so that they are completely overtopped during channel-forming flow events (approximately a 2-year flow event.

4.2.5 Category 2e) Riparian and Wetland Vegetation Planting

Description

HIP provides ESA coverage for BPA funded restoration projects that include vegetation planting to restore natural plant species composition and structure to recover associated watershed processes and functions. Under this activity category, the Project Sponsors would plant native trees, shrubs, herbaceous plants, and/or grasses to help stabilize soils and restore riparian plant communities. Native plant species and seeds will be obtained from local sources to ensure plants are adapted to local climate and soil chemistry.

Vegetation management strategies will be utilized that are consistent with local native succession and disturbance regimes and specify seed/plant source, seed/plant mixes, and soil preparation. Planting will address the abiotic factors contributing to the sites' succession (i.e., weather and disturbance patterns, nutrient cycling, and hydrologic condition). Only certified noxious weed-free seed (99.9%), straw, mulch or other vegetation material for site stability and revegetation projects will be utilized.

Guidelines for Risk

- ***Low Risk:*** Riparian vegetation planting is considered low-risk.
- ***Medium Risk:*** N/A.
- ***High Risk:*** N/A.

Guidelines for Review

- BPA Functional review required for all risk levels.
- BPA Technical review is not required.
- NMFS Engineering review is not required.
- Interagency review is not required.

Conservation Measures

1) An experienced silviculturist, botanist, ecologist, or associated technician shall be involved in designing vegetation treatments.
2) Species to be planted must be of the same species that would naturally occur in the project area and be appropriate for site specific hydrologic conditions.
3) Transplant material shall come from outside the bankfull width, and where such plants are abundant, and preferably be salvaged from areas where excavation is planned.
4) Sedge and rush mats should be sized and anchored to prevent their movement during high flow events.
5) Species distribution shall mimic natural distribution in the riparian and floodplain areas and be adapted for the hydrologic conditions.
6) Plantings shall utilize appropriate stock and be installed in a manner that maximizes access to groundwater sources to improve survival.

7) Plantings shall be installed during dormant periods with sufficient time for root development to improve survival (typically Fall/Winter).

8) Livestock shall be excluded from the planting area. If necessary, riparian exclusion fencing for grazing shall be installed in accordance with activity category 9b) Construct Fencing for Grazing Control.

4.2.6 Category 2f) Channel Reconstruction

Description

HIP provides ESA coverage for BPA funded channel reconstruction projects that improve aquatic and riparian habitat diversity and complexity, reconnect stream channels to floodplains, reduce bed and bank erosion, increase hyporheic exchange, provide long-term nutrient storage, provide substrate for macroinvertebrates, moderate flow disturbance, increase retention of organic material, and provide refuge for fish and other aquatic species. All this will be accomplished by reconstructing stream channels and floodplains that are compatible within the appropriate watershed context and geomorphic setting.

Channel reconstruction consists of re-meandering, movement, or geomorphic modification (e.g. width/depth ratio) of the primary active channel. The reconstructed stream system shall be composed of a naturally sustainable and dynamic planform, cross-section, and longitudinal profile which incorporates unimpeded passage and temporary storage of water, sediment, organic material, and species. Stream channel adjustment over time is to be expected in naturally dynamic systems and is a necessary component to restore a wide array of stream and riparian functions.

Channel reconstruction may include structural elements such as streambed simulation materials, streambank restoration, and hydraulic roughness elements. For bed stabilization and hydraulic control structures, constructed riffles shall be preferentially used in pool-riffle stream types, while roughened channels and boulder weirs shall be preferentially used in step-pool and cascade stream types. Material selection for stabilizing features shall mimic natural stream system materials (large wood, rock, gravel).

This proposed action is not intended to artificially stabilize streams into a single location or into a single channel for the purposes of protecting infrastructure or property.

Guidelines for Risk

- ***Low Risk:*** N/A, see Section 2.4 Risk Determination for low risk consideration.
- ***Medium Risk:*** Channel Reconstruction that restores historical alignments with minimal earthmoving.
- ***High Risk:*** Channel Reconstruction that creates or modifies channels through substantial earthmoving.

Guidelines for Review

- BPA Functional review required for all risk levels.
- BPA Technical review is required for all channel reconstruction.
- NMFS Engineering review is not required.
- Interagency review is required for high risk.

Channel Reconstruction requires a Staged Rewatering Plan (Section 3.2) and a Monitoring and Adaptive Management Plan (Adaptive Management discussed in Section 2.6).

Conservation Measures

1) Identify the conditions that lead to the degraded habitat and demonstrate that the channel reconstruction actions account for and correct those conditions to the extent possible.
2) Demonstrate that the proposed action will mimic natural conditions for gradient, width, sinuosity and other geomorphic and hydraulic parameters.
3) Demonstrate that proposed structural elements appropriately fit within the geomorphic context of the stream system.
4) Demonstrate that the project will be self-sustaining over time and that habitat benefits will be realized over a wide hydrologic range. Self-sustaining means the restored or created habitat would not require major or periodic maintenance but channel and floodplain processes will function naturally to maintain the habitat.
5) Demonstrate that the proposed action will not result in the creation of fish passage issues or post-construction stranding of juvenile or adult fish.
6) Designs that substantially fill the channel with unsorted alluvium using a valley bottom restoration approach such as "Stage Zero" must demonstrate that watershed process will contribute to self-sustainability of the project and that the appropriate level of technical analysis and risk mitigating measures have been met through project planning and design. Considering the experimental nature of this approach, it is highly recommended that the Project Sponsor coordinate early with the BPA EC Lead and BPA Technical Lead to maintain a shared understanding of the project through the development and design execution phases.
7) Sediment to be placed in-water shall be assessed for contaminants per HIP section 3.1.1.2.