Technical Specifications

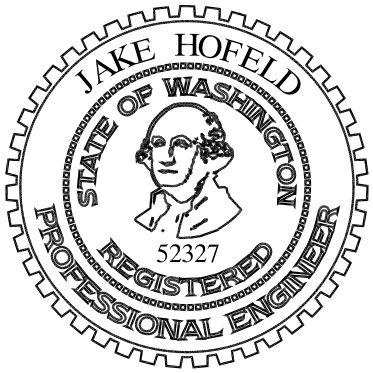
For

Satus Creek RM 20-25 Restoration Project
Phase 1

Prepared for
Yakama Nation Fisheries

100% Draft Design Submittal
Revision 1

January 12, 2026



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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, CURRENT EDITION

Satus Creek RM 20-25 Restoration Project
Phase 1
Technical Specifications
100% Draft Submittal – Revision 1

Table of Contents
Page 1

INDEX
SECTION 015000
MOBILIZATION

Paragraph **Page**

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS
(A.K.A. MOBILIZATION & DEMOBILIZATION)

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of the construction facilities and temporary controls, including mobilization and demobilization, as specified, as shown on the Drawings, or as otherwise directed by the Engineer. Work includes traffic control, temporary construction access roads, and erosion control items not specifically addressed under other pay items.

B. Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the site; for the establishment of all offices, and other facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site.

C. Demobilization shall consist of work and operations necessary to disband all mobilized items and cleanup the site. The removal of all temporary crossings, ramps, access ways, roads, signs, and fencing; dewatering facilities; and temporary facilities or works, and the restoration of surfaces to an equal or better than existing condition shall also be included as part of demobilization.

1.2 RELATED SECTIONS

A. Section 015626, Temporary Fence – Type ESA

B. Section 015713, Temporary Erosion Control and BMPs

C. Section 312319, Dewatering

2. PRODUCTS

A. Submit product data for all Temporary Creek Crossing materials including the following:

1. Streambed material
2. Aggregate base
3. Drain pipe
4. Geotextile separation fabric

3. EXECUTION

3.1 CONTRACTOR'S PLANT AND EQUIPMENT

A. Security. Contractor shall, at all times, be responsible for security of their plant and equipment. Owner shall not be responsible for missing or damaged equipment, tools, or personal belongings.

B. Construction Power and Communication Facilities. Contractor shall be responsible for providing sufficient electrical power and communication facilities to construct the work.

C. Storage Facilities.

1. Provide storage facilities for the protection of materials and supplies from weather, and shall keep the facilities clean and in proper order at all times.
2. Provide a storage area for lubricants, oils, and hazardous materials with sufficient means to contain spills. Facilities, handling, and any required cleanup will comply with all current local, state, and federal standards. Petroleum products stored on the site shall be secured from vandalism.

D. Sanitary Facilities. Maintain adequate toilet facilities at or near the work site.

E. Solid Waste Handling. Provide sufficient solid waste handling facilities to maintain site in a clean, orderly condition.

F. Water. Contractor shall provide all water necessary for construction and maintenance as specified.

3.2 MOBILIZATION AND DEMOBILIZATION

A. General. Perform mobilization and demobilization activities in accordance with the Drawings, and as specified.

3.3 TEMPORARY ACCESS ROADS

A. Temporary access roads shall be installed where shown on the Drawings or as directed by the Owner's Representative.

1. Install protective barriers in accordance with section 3.5 of this technical specification section.

B. Temporary creek crossings.

1. All temporary creek crossings shall be installed in accordance with the Drawings and technical specification section 312319, Dewatering and maintained for the duration of use. Coordinate with the Owner's Representative for isolation of the work area and aquatic organism salvage prior to installation of fill.
2. The Contractor shall be responsible for installing enough pipes to adequately pass streamflow while providing a minimum of 1 foot of freeboard as measured from the upstream and downstream water surfaces to the top of the geotextile bag dams on either side of the road.
3. All bags, pipes, aggregate base, geotextile, and plastic products shall be removed from the temporary crossing immediately following acceptance of the work associated with the crossing. Streambed materials may be left in the streambed, but shall be spread in a manner that prevents the free movement of water through the work area.

3.4 EXCAVATION

A. The Contractor, and any subcontractor, is required to notify U.S.A. forty-eight hours in advance of performing excavation work, by calling the toll free number (800) 424-5555.

3.5 PROTECTIVE BARRIERS

A. Protective barriers shall be erected around sensitive areas as designated on the Drawings or as directed by the Engineer. Barriers shall be constructed using bright orange plastic safety fencing (type ESA), per Section 015626, Temporary Fence – Type ESA.

B. Temporary fencing shall be maintained during construction. Except as directed by the Engineer, barriers shall be removed after completion of work.

3.6 STAGING AREAS

A. General. Staging areas at the project site are provided for the Contractor's use. By making this area available to the Contractor, the Engineer, and any other person or agency connected with the properties shall in no way be responsible or liable for any activity of the Contractor, subcontractors, or any individual or organization connected with the project.

B. Alternative Staging Areas. Alternative sites must be acceptable to Owner, and the Contractor must make all arrangements for their use at the Contractor's expense, and in accordance with all local, State and Federal regulations.

C. Additional Storage Areas. Should the Contractor require space in addition to that available on-site, the Contractor shall make arrangements for storage of materials and equipment in locations off the construction site, and shall provide the Engineer a copy of the letter of authorization for storage from the Owner.

3.7 HAZARDOUS MATERIALS CONTROL AND SPILL PREVENTION PLAN

A. General. Before starting work on the project, the Contractor shall submit for acceptance by the Engineer a Hazardous Materials Controls and Spill Prevention Plan. The Plan shall include provisions for preventing hazardous materials from contaminating soil or entering water courses and shall establish a Spill Prevention and Countermeasure Plan.

B. Facilities. Provide staging and storage areas for equipment, as required to contain contaminants away from water courses. Provide a contained, locked storage facility for fuels, lubricants, construction chemicals and other hazardous materials and supplies stored at site. If concrete work is proposed, provide a lined pit for concrete washdown, located where spills or overflow cannot enter nearby watercourses or storm drains. The pit shall be located a minimum of 75 feet from any flowing watercourse.

C. Equipment Maintenance. Clean and maintain equipment to prevent any leakage of fuel and lubricants. Establish a designated equipment refueling area. All fueling and maintenance of vehicles and other equipment and staging area shall occur at least 150 feet from any riparian habitat or water body.

D. Spills Countermeasures. Isolate work areas during in-water construction activities by using oil containment booms. Maintain a supply of oil booms, sorbent pads and other supplies to contain and clean spills. Contain and cleanup any hazardous material spills immediately and notify Engineer.

3.8 CONSTRUCTION SITE HOUSEKEEPING

A. Remove rubbish, trash, and debris from site on a regular basis. Transport and dispose of all rubbish and debris in accordance with all local regulations. Maintain staging area in an orderly manner. Cleanup and dispose of all concrete debris and washings when concrete work is complete.

3.9 PROTECTION OF EXISTING IMPROVEMENTS

A. Existing facilities, utilities, and property shall be protected from damage resulting from the Contractor's operations. Roadways and other improved surfaces shall be protected from damage by vehicles with tracks or lugs. Any damage resulting from the Contractor's operations shall be repaired by the Contractor to the condition which existed prior to the damage, and to the satisfaction of the Engineer, at no additional cost to the Owner.

3.10 RESTORATION OF SURFACES

A. Roads. Roadways used by the Contractor for hauling materials, equipment, supplies, etc., shall be cleaned and repaired if the condition of the roadway is damaged, or otherwise affected, due to the Contractor's operations.

3.11 STORAGE OF MATERIALS AND EQUIPMENT

A. Materials and equipment shall be stored to ensure the preservation of their quality and fitness for the work. Stores of equipment and materials shall be located to facilitate inspection. The Contractor shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment, supplied by the Contractor, until completion and final acceptance of the Work by the Owner.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Mobilization and Demobilization will be measured for payment on a lump sum basis.

B. Temporary Creek Crossings will be measured for payment on a unit basis for each temporary creek crossing installed.

4.2 PAYMENT

A. The contract lump sum price for Mobilization and Demobilization will include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for mobilization; demobilization; and temporary facilities and controls.

B. Temporary Creek Crossings will be paid for at the contract unit price for each Temporary Creek Crossings installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in delivering the Temporary Creek Crossings materials and installing the crossing, complete in place as shown on the Drawings, as specified herein, or as directed by the Engineer, and the removal of the Temporary Creek Crossings at the conclusion of construction.

C. Payment will be made under:

Pay Item	Pay Unit
Mobilization and Demobilization	Lump Sum (LS)
Temporary Creek Crossing	Each (EA)

END OF SECTION

INDEX
SECTION 015626
TEMPORARY FENCE – TYPE ESA

Paragraph **Page**

SECTION 015626
TEMPORARY FENCE – TYPE ESA

1. GENERAL

1.1 DESCRIPTION

A. Work under this section includes furnishing all labor, materials, equipment, and incidentals to install, maintain, and remove Temporary Fence – Type ESA (a.k.a. Boundary Fence), as shown on the Drawings, as specified, or as otherwise directed by the Engineer.

1.2 RELATED SECTIONS

A. Section 015000, Mobilization

B. Section 015713, Temporary Erosion Control and BMP's

C. Section 311100, Clearing and Grubbing

D. Section 312316, Excavation

1.3 SUBMITTALS

A. Submit to the Engineer, for review, the following:

1. Manufacturer's data for proposed fencing fabric.
2. Manufacturer's data or descriptive literature for proposed fence posts.

2. PRODUCTS

2.1 MATERIALS

A. High Visibility Fabric. High visibility fabric shall be machine produced, orange colored mesh manufactured from polypropylene or polyethylene. High visibility fabric may be made of recycled materials. Materials shall not contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. High visibility fabric shall be fully stabilized ultraviolet resistant and a minimum of four feet in width with a maximum mesh opening of 2" x 2". High visibility fabric shall be furnished in one continuous width and shall not be spliced to conform to the specified width dimension.

B. Posts. Posts for temporary fence (Type ESA) shall be of one of the following:

1. Wood posts shall be fir or pine, shall have a minimum cross section of 2" x 2", and a minimum length of 5.25 feet. The end of the post to be embedded in the soil shall be pointed. Wood posts shall not be treated with wood preservative.
2. Steel posts shall have a "U," "T," "L," or other cross sectional shape that resists failure from lateral loads. Steel posts shall have a minimum weight of 0.75 pounds per linear foot and a minimum length of 5.25 feet. One end of the steel post shall be pointed and the other end shall have a high visibility colored top.

C. Fasteners. Fasteners for attaching high visibility fabric to the posts shall be as follows:

1. The high visibility fabric shall be attached to wooden posts with commercial quality nails or staples, or as recommended by the manufacturer or supplier.
2. Tie wire or locking plastic fasteners shall be used for attaching the high visibility fabric to steel posts. Maximum spacing of tie wire or fasteners shall be 24 inches along the length of the steel post.

D. Used materials may be installed provided the used materials conform to these Specifications.

3. EXECUTION

3.1 INSTALLATION

A. All fence construction activities shall be conducted from the work side of the ESA as shown on the Drawings or as flagged in the field by the Engineer.

B. Posts shall be embedded in the soil a minimum of 16 inches. Post spacing shall be eight feet maximum from center to center and shall at all times support the fence in a vertical position.

C. Temporary fence (Type ESA) shall be constructed prior to clearing and grubbing work, shall enclose the foliage canopy (drip line) of protected plants, and shall not encroach upon visible roots of the plants.

D. Temporary fence (Type ESA) shall be located so that it is clearly visible, as determined by the Engineer.

3.2 MAINTENANCE

A. Temporary fence (Type ESA) that is damaged during the progress of the work shall be repaired or replaced by the Contractor the same day the damage occurs.

3.3 REMOVAL

A. When Type ESA fence is no longer required, as determined by the Engineer, it shall be removed and disposed of, except when reused as provided in this section.

B. Holes caused by the removal of temporary fence (Type ESA) shall be backfilled.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Temporary Fence – Type ESA will be measured by the linear foot of Temporary Fence – Type ESA installed at the locations indicated on the Drawings, as specified, or as directed by the Engineer.

4.2 PAYMENT

A. Temporary Fence – Type ESA will be paid for at the contract price per linear foot, which price will be payment in full for furnishing all labor, materials, tools, equipment, and incidentals necessary to install, maintain throughout the construction, and to remove Temporary Fence – Type ESA after site stabilization.

B. Payment shall be made under:

Pay Item	Pay Unit
Temporary Fence – Type ESA	Linear Foot

END OF SECTION

INDEX
SECTION 015713
TEMPORARY EROSION CONTROL AND BMPS

Paragraph **Page**

SECTION 015713
TEMPORARY EROSION CONTROL AND BMPS

1. GENERAL

1.1 DESCRIPTION

A. This work shall consist of temporary erosion control and air quality control measures, devices, and BMPs that may be shown on the Drawings, and as specified in the Contract Documents, Project Permit(s), Standard Specifications, these Technical Specifications, or as directed by the Engineer during the life of the contract. Temporary erosion control measures and other BMPs will also be required at staging/storage areas utilized during project construction. Said work is intended to provide prevention, control, and abatement of water and air pollution within the limits of the project and to minimize damage to the work, adjacent properties, streams or other bodies of water.

B. Installation and maintenance of temporary erosion control measures, devices and BMPs shall conform to the requirements as shown on the Drawings stated within this section, and Yakama Nation requirements.

1.2 RELATED SECTIONS

A. Section 015000, Mobilization

B. Section 312319, Dewatering

1.3 SUBMITTALS

A. Dirt Bag. Submit a material specification for the 'Dirtbag' device, for acceptance of the Engineer, prior to placement in the work.

2. PRODUCTS

A. Dirt Bag. The 'Dirtbag' shall be a commercially manufactured nonwoven geotextile fabric bag (polypropylene or equivalent) intended for such use, with a minimum grab tensile strength of 200 psi in any principal direction (ASTM D4632), and permittivity of 0.05 sec (ASTM D4491). For project area soils (source of sediment in waters) with more than 15% by weight passing a No. 200 sieve the fabric shall have an apparent opening size between 50 and 140, and for project area soils (source of sediment in waters) with less than 15% by weight passing a No. 200 sieve the fabric shall have an apparent opening size between 20 and 50. If no determination can be readily made in regards to the target area soil characteristics, the more restrictive condition shall prevail. The geotextile fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide an expected usable life comparable to the anticipated construction period; ultraviolet stability shall exceed 70% after 500 hours of exposure (ASTM D4355). The 'Dirtbag' device shall have a fill spout large enough to accommodate a pump four (4) inch discharge hose and attachment straps to secure the hose in place. The 'Dirtbag' device shall be sized to accommodate the applicable flow rates and prohibit release of the target effluent. Location of any 'Dirtbag' device requires acceptance of the Engineer, equipment access for removal and off-site disposal, and the area shall be stable to prevent erosion. Placement of drain rock, fabric, or other suitable substance to create a stable discharge site is the responsibility of the Contractor. Any 'Dirtbag' device shall be fitted with straps strong enough for lifting and the device removed from the Project site and properly disposed of.

3.

3. EXECUTION

3.1 GENERAL

A. Install temporary soil stabilization materials for water pollution control in all disturbed work areas that are considered inactive (i.e. excess of 14 days) or before forecast storm events. Should any temporary erosion control of this nature be required elsewhere as directed by the Engineer and/or regulatory agencies, install them within 48 hours of notification. Where applicable and upon acceptance of the Engineer, furnish and apply/install temporary mulch, temporary hydraulic mulch, temporary erosion control blankets, or temporary covers in conformance with the Standard Specifications and these Technical Specifications. Materials and construction methods shall comply with the Standard Specifications and these Technical Specifications.

3.2 MAINTENANCE

A. Maintain all temporary erosion control measures, devices, and BMPs placed in the work for the duration of the project. Maintenance includes all Manufacturer recommendations, and includes but is not limited to the following:

1. Immediately repair upon discovery damage to any temporary erosion control devices and/or BMPs during the course of the project at the Contractor's expense.
2. Inspect temporary erosion control devices and BMPs routinely, immediately after each rainfall event, and at least daily during prolonged rainfall events. Make required repairs immediately.
3. Inspect construction limit and tree protection fencing daily and repair, secure, and replace as necessary to maintain and preserve its intended purpose.
4. Routinely inspect all signage as required for the project and repair or replace upon discovery of damage, vandalism, and/or missing parts.
5. Should the filter fence fabric decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, replace fabric promptly.
6. Should a sediment log decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, replace sediment log promptly.
7. Replace single or group of gravel bag(s) when the bag material is ruptured or when the yarn has failed, allowing the bag contents to spill out.
8. Routinely inspect stakes and/or rope used to secure a sediment log in place and repair as necessary if found to be loose or ineffective.
9. Repair or replace damaged temporary gravel bag berm (or other measures which require gravel bags per the Project Drawings, Project Permits, these Technical Specifications and the Standard Specifications) on the same day when the damage occurs or is discovered.
10. Remove sediment deposits and other debris when they reach approximately one-half the height of the sediment barrier (or as recommended by the Manufacturer) and dispose of in a manner acceptable to the Engineer, and in conformance with the Standard Specifications.
11. Maintain temporary gravel bag berm (or other measures which require gravel bags per the Project Drawings, Project Permits, these Technical Specifications and the Standard Specifications to provide a sediment holding capacity of approximately one-third the height of the gravel bag berm above the ground. When sediment exceeds this height or when directed by the Engineer, remove and dispose of sediment in a manner acceptable to the Engineer, and in conformance with the Standard Specifications.
12. Remove and dispose of sediment deposits remaining in place after the temporary erosion control measure and/or BMPs is no longer required in a manner acceptable to the Engineer, and in conformance with the Standard Specifications.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Temporary Erosion Control and BMPs will be measured on lump sum basis.

4.2 PAYMENT

A. The lump sum contract price for Temporary Erosion Control and BMPs will include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for temporary erosion control measures, devices, and BMPs, provisions and requirements as stated in the Erosion Control Plan, stockpile management, sweeping, and maintenance of all such water pollution control measures that may be shown on the Project Drawings, and as specified in the Contract Documents, Project Permit(s), Standard Specifications, these Technical Specifications, and as directed by the Engineer, and no additional compensation shall be allowed therefore.

B. Payment will be made under:

Pay Item	Pay Unit
Temporary Erosion Control and BMPs	Lump Sum (LS)

END OF SECTION

INDEX
SECTION 311100
CLEARING AND GRUBBING

Paragraph **Page**

SECTION 311100
CLEARING AND GRUBBING

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all labor, equipment, and materials necessary to perform the clearing and grubbing, the removal or disposal of all cleared and grubbed materials, and the filling of all grubbing holes, as specified, as shown on the Drawings, or as directed by the Engineer.

1.2 RELATED SECTIONS

A. Section 015000, Mobilization

B. Section 015626, Temporary Fence – Type ESA

C. Section 015713, Temporary Erosion Control and BMPs

D. Section 312316, Excavation

E. Section 354200, Log Structures

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 CLEARING

General. All work shall comply with Section 015713, Temporary Erosion Control and BMPs.

A. In areas where grubbing is not required, the clearing operations shall consist of the complete removal of all obstructions above the ground surface.

B. Contractor shall flag all vegetation to be removed for approval by Owner's Representative prior to its removal. Once the flagging is completed, Owner's Representative will walk the vegetation removal areas and approve them prior to Contractor initiating clearing and grubbing activities.

C. Contractor shall use hand-operated equipment for clearing and grubbing within the creek channel, (except where mechanized equipment access is provided, as shown on the Drawings) and at any protected natural resource area.

D. Downed plant materials shall be removed from tree protection zones and protected natural resource areas by hand or with equipment located outside fencing. Contractor shall extract debris by lifting the material out, not skidding it across the soil surface.

E. Trees. Where trees are approved by the Owner's representative for removal, trees shall be felled in such a manner as to avoid damage to trees left standing, to the existing structures and installations, as well as with due regard for the safety of employees and others. Trees located beyond the limits for clearing and grubbing that are not marked for removal, shall be protected from damage, as indicated on the Drawings and as specified.

3.2 GRUBBING

A. No grubbing shall be performed on this project.

3.3 DISPOSAL OF DEBRIS

A. Cleared and Grubbed Materials. Except as hereinafter specified or otherwise indicated on the Drawings, all logs and slash which are the products of the clearing and grubbing operations shall be incorporated into the Log Structures.

B. Clean woody plant material products of the clearing and grubbing operations not designated for salvage may be chipped and disposed of on site at the location shown on the Drawings, or as specified by the Engineer, subject to approval of the Owner.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Clearing and Grubbing will be measured as a lump sum pay item.

4.2 PAYMENT

A. Clearing and Grubbing will be paid for at the lump sum contract price, which price will be payment in full for furnishing all labor, materials, tools, equipment and incidentals, and doing all work necessary to complete the clearing and grubbing operation as specified, including disposal or salvage of materials, and restoration of ground surfaces.

B. Removal and disposal of buried debris, not encountered during grubbing operations, will be paid for in accordance with Section 312316, Excavation.

C. Payment will be made under:

Pay Item	Pay Unit
Clearing and Grubbing	Lump Sum

END OF SECTION

INDEX
SECTION 312316
EXCAVATION

Paragraph **Page**

SECTION 312316
EXCAVATION

1. GENERAL

1.1 DESCRIPTION

A. The work covered by this section consists of furnishing all labor, equipment, materials, and performing all operations necessary to complete Excavation, as specified, as shown on the Drawings, or as directed by the Engineer. Work includes, but is not limited to the following:

1. Excavation for Log Structures
2. Other miscellaneous excavation incidental to the construction of the improvements.

1.2 RELATED SECTIONS

A. Section 015626, Temporary Fence – Type ESA

B. Section 354200, Log Structures

1.3 QUALITY ASSURANCE

A. Comply with all applicable permits and regulations.

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 GENERAL

A. The Contractor shall protect existing utilities in performing any excavation work.

B. The Contractor shall comply with all permit conditions in performing any excavation work.

3.2 EXCAVATION

A. General. Excavations shall extend into firm, undisturbed native soils. Excavation shall consist of removal of material for embankment foundation preparation, mass excavation and finish grading of the channel and slope improvements, and other miscellaneous excavations to the lines and grades shown on the Drawings, or as directed by the Engineer. If organic materials, yielding sub-grade (pumping) or other deleterious materials are encountered during foundation excavations, they shall be removed as directed by the Engineer.

B. Control of Water. Water control shall be performed in accordance with project permit conditions, and Dewatering, Section 312319 of these Specifications. When water is encountered, either ground water or surface runoff, the Contractor shall furnish, install, maintain, and operate all necessary machinery and equipment required to keep the excavation reasonably free from water, as approved by the Engineer, until the placement of backfill material has been completed, inspected, and approved, and all danger of flotation and other damage is removed. Water pumped from the excavation shall be disposed of in such manner as will not cause injury to public or private property, or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the Engineer. Water shall be controlled until work is complete.

C. Excess Excavation. Care shall be exercised by the Contractor not to excavate below the grades shown on the Drawings, except as specified herein, and as directed by the Engineer. All excavations extending below the grades shown on the Drawings, which are not directed by the Engineer, shall be backfilled with compacted embankment at the Contractor's expense.

D. Temporary Excavations. With exposure and drying, on-site soils may experience progressive sloughing if excavated near vertical and left un-shored during construction. Engineer suggests that the soils on-site should be considered Type C when applying OSHA regulations.

E. Tolerances. The excavation tolerance shall typically be +0.1 feet to -0.2 feet from the grades shown on the Drawings, except within the low flow channel, where excavation tolerance shall be +0.1 feet to -0.1 feet from the elevations shown on the Drawings.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Excavation. Excavation will not be separately measured for payment.

4.2 PAYMENT

A. No separate payment will be made for Excavation. All costs in connection with this work will be considered incidental to the cost of construction of associated improvement.

END OF SECTION

INDEX
SECTION 312319
DEWATERING

Paragraph **Page**

SECTION 312319
DEWATERING

1. GENERAL

1.1 DESCRIPTION

A. Furnish all labor, materials, equipment, and incidentals necessary to support relocation of aquatic organisms by others and to design, construct, operate, maintain, and remove all cofferdams, diversions, turbidity curtains, filtration systems and/or other measures, including pumping, to dewater the construction site and to divert streamflow and other surface waters and groundwater through or around the project area 24 hours a day during the entire field construction period, as shown on the Drawings, as specified, or as directed by the Engineer.

B. Dewatering details on the Drawings (if provided) are schematic. The design and implementation of the Dewatering Plan is solely the responsibility of the Contractor. Contractor shall make their own independent evaluation of water sources (surface and groundwater) in preparing their Dewatering Plan.

C. Dewatering shall comply with all project permit conditions, applicable laws and local ordinances.

1.2 RELATED SECTIONS

A. Section 015713, Temporary Erosion Control and BMPs

1.3 REFERENCES

A. Conserving the Gems of Our Waters Best Management Practices for Protecting Native Western Freshwater Mussels During Aquatic and Riparian Restoration, Construction, and Land Management Projects and Activities, Xerces Society for Invertebrate Conservation, 2018.

B. Habitat Improvement Program 4 Biological Opinion (HIP 4). NMFS No# WCRO-2020-00102.

1.4 SUBMITTALS

A. The Contractor shall submit the following for review and approval of the Engineer:

1. An Dewatering Plan listing materials, method of work, equipment to be used, methods for disposal of pumped water, provisions to prevent scour and erosion, and the proposed schedule shall be submitted to the Engineer. Approval of the Engineer shall be required before the Contractor proceeds with water control measures.
2. Product data for:

a. Pumps
b. Geotextile fabrics
c. Streambed rock
d. Impervious liners
e. Cofferdam material
f. Other materials used in dewatering
g. Block nets for excluding fish

1.5 QUALITY ASSURANCE

A. Comply with approved Hazardous Materials Control and Spill Prevention Plan, in accordance with Section 015000.

B. Notify Engineer 48 hours in advance of installation of temporary cofferdam(s) or diversion.

C. Notify Engineer 48 hours in advance of removal of temporary cofferdam(s) or diversion.

2. PRODUCTS

2.1 MATERIALS

A. Streambed Materail. Use only clean washed 4 inch minus streambed material. Sand will not be allowed. Streambed material shall have the following gradation:

Table 1: Streambed Material Gradation

Sieve Size (in.)	Percent Passing (%)
4	65-100
3	30-65
2	20-35
1	0-25

B. Geotextile for Bags shall be comprised of woven or nonwoven materials with sufficient strength to hold streambed rock without tearing.

C. Dewatering Facilities. Provide and operate dewatering facilities of suitable size and capacity. The use of equipment shall be consistent with the manufacturer's recommendations.

3. EXECUTION

3.1 GENERAL

A. Contractor is solely responsible for the design, construction, and maintenance and monitoring of the diversion and dewatering facilities. Comply with the Drawings, Specifications, and applicable permit conditions.

3.2 FISH REMOVAL

A. Aquatic Organism Removal will be performed by others. Contractor shall coordinate dewatering activities with the personnel doing the aquatic organism removal work.

3.3 SEDIMENT CONTROL

A. General. Comply with the provisions of the Project Permits and the WAC Chapters 173-200 and 173-201A.

B. Materials. Earthen materials shall not be used within the flowing channel, with the exception of clean, washed rock.

C. Cofferdam Construction. During construction of the cofferdam, install silt barrier(s) along the water side of the installation, as necessary to minimize mobilization and entrainment of disturbed soils within the active flowing channel, to a level in accordance with the permit conditions.

D. Discharge of diverted flow. Unless otherwise specified, a diversion must discharge into the same natural drainage way in which its headworks are located. Where feasible, discharge to existing pools or onto bedrock or otherwise erosion resistant surfaces. Construct energy dissipators at diversion outlets, where necessary to prevent scour at point of discharge.

E. Discharge of Seepage/Groundwater. Discharge water from the dewatered construction site either by gravity or pumping in a manner to prevent excessive turbidity from entering the receiving waters and to prevent scour and erosion outside of the construction site. Pumped water should be pre-filtered with a gravel pack around sumps for subsurface flows and a “Dirt Bag” or hay bales around pumps for surface flow.

F. Discharge pumped water into adjacent gravel bars, isolated local depressions, or temporary sediment basins, as shown on the Drawings . Where discharging water into the river will create excessive turbidity, route water through a sediment interceptor or other facilities to remove sediment from water.

G. Isolation of Construction Area. Place straw wattles, hay bale barriers, or cofferdams between construction area and flowing river channel, at all locations, as shown on the Drawings.

3.4 HAZARDOUS MATERIAL CONTROL

A. General. Comply with the approved Spill Prevention, Control and Countermeasures Plan (SPCC Plan) in accordance with Temporary Water Pollution Prevention, Section 01-07.15.

B. Equipment and Lubricants. Steam-clean all equipment prior to its use. Inspect all equipment for cleanliness and fluid leaks prior to use and monitor during its use. Maintain equipment as required. Equipment refueling shall only take place in a designated, contained area.

C. Isolation of Construction Area. Prior to performing work within flowing water, outside of cofferdams, install oil containment booms downstream of the work area. Maintain booms until completion of the work within the channel is complete.

D. Spills. Maintain a supply of oil spill booms, sorbent pads, and other supplies to contain and clean spills. Comply with approved SPCC Plan should spills occur.

3.5 COFFERDAMS

A. General. The Contractor is solely responsible for the design, construction, maintenance, and monitoring of cofferdams, dikes and other isolation facilities. Cofferdams with an exposed height greater than 10 feet shall be designed by a Professional Engineer registered in the State of Washington, based on available soil data.

B. Configuration. Cofferdam alignments, as shown on the Drawings, reflect the maximum allowable encroachment into the channel. Construct cofferdam alignments as shown or the Drawings, unless otherwise approved by Engineer. Provide cofferdams high enough to account for water surface fluctuations.

C. Secondary Dikes/Seepage Control. Secondary dikes within the isolated construction area can be used to control seepage and groundwater around excavations, provided all dike materials are removed from the exposed channel upon completion, prior to re-watering the work area.

3.6 FLOW BYPASS

A. Capacity. Bypass water around construction site using a cofferdam and bypass pipe as shown on the Drawings or equivalent facility, as approved by the Engineer. The bypass system shall be capable of passing the flows present at the time construction begins, with a minimum of 12 inches of freeboard (measured vertically from water surface to lowest point on dam). Bypass pipes shall have a minimum diameter of 10 inches to minimize the likelihood of clogging by debris.

B. Storm Events. During the designated period for instream work, the Contractor shall be solely responsible for the integrity of the dewatering system. If rain is predicted, the Contractor shall perform flood fighting activities as directed by the Engineer and regulatory agencies.

C. The diversion system may require adjustment to accommodate the sequence of work. No additional compensation shall be provided for any adjustments, revisions, or reinstallations of diversion elements.

D. The diversion shall result in conditions that allow the required compaction to be achieved and shall prevent sediment-laden water that exceeds the effluent discharge limits from entering the drainage ways.

E. Unless otherwise specified, a diversion must discharge into the same natural drainage way in which its headworks are located.

3.7 DEWATERING

A. General. Remove water from construction area using pumping, well points, drains, or other approved methods. Discharge of water shall comply with 3.3.D. Construction water shall be segregated from seepage water and routed through sediment interceptors or other facilities to remove contaminants and sediment. Excavated slopes in the saturated soils may need to be retained, tied back, or otherwise stabilized.

B. Well Points. Well points shall be designed to preclude the loss of fine soil by gravel packing or other suitable means.

C. Pumping Facilities. All pump intakes shall be screened to prevent the entrainment of fish, in accordance with project permit conditions. Pumps and discharge piping shall be suitable for the type of service provided and shall be a sufficient size and capacity to satisfactorily dewater work areas. Engines shall be muffled to avoid excess noise and pump intakes shall be fitted with screens as required.

D. Power Supply. Consider the availability and reliability of power sources for dewatering operation in dewatering system design and make provisions for temporary or backup power supply as deemed necessary. Where the primary diversion is operated by pumping, provide a backup system with automatic controls capable of starting the backup upon failure of the primary system.

E. Groundwater. Dewatering shall maintain water surfaces below the base of temporary excavations or trenches, to allow for visual inspection of the work, if requested by the Engineer. Lower groundwater tables within excavations for structures to a minimum of two (2) feet below foundations or as otherwise required to establish a firm, stable foundation. Control groundwater within excavation until completion of backfill operations.

3.8 WATER LEVELS DURING THE CONSTRUCTION PERIOD

A. The Contractor shall be responsible for making an independent evaluation of site conditions. The Contractor's dewatering plan shall address all potential sources of surface and groundwater, including but not limited to streamflow (natural or managed), backwatering of the channel from downstream blockages, domestic water lines, storm drain outfalls, irrigation tailwater, industrial discharges, seepage, and direct rainfall.

3.9 CLEANUP

A. Thoroughly clean up area to remove debris and contaminated materials. Remove fine sediments and restore disturbed area prior to removal of the dewatering facilities. Clean and round river run gravels or cobbles, if used in cofferdam construction, may be spread in the creek channel in lieu of removal, provided grading will not interfere with facility operation.

3.10 REMOVAL OF DEWATERING FACILITIES

A. Prior to removal of the dewatering facilities, complete the following activities:

1. Complete required tests and inspections.
2. Thoroughly cleanup work site.
3. Perform final walkthrough with Engineer.

B. Prior to removal of cofferdams and diversion, equalize the water surface levels on both sides of the dams.

3.11 REMOVAL OF BLOCK NETS

A. Block Nets shall be removed by the fisheries biologist after the dewatering facilities are removed and the in-channel work area is re-watered.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Dewatering will be measured for payment on a lump sum basis.

B. Water Diversion will not be separately measured for payment.

4.2 PAYMENT

A. Dewatering will be paid for at the contract lump sum price, which price will include furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the Dewatering as specified, as shown on the Drawings, or as directed by the Engineer.

B. No separate payment will be made for Water Diversion. Full compensation for all costs associated with this work, as shown on the Drawings, or as specified, shall be included for related work .

Pay Item	Pay Unit
Dewatering	Lump Sum (LS)

END OF SECTION

INDEX
SECTION 329200
SEEDING

Paragraph **Page**

SECTION 329200
SEEDING

1. GENERAL

1.1 DESCRIPTION

A. Work covered under this section consists of furnishing all labor, tools, materials, equipment and incidentals required to perform Seeding and Mulching, as specified, as shown on the Drawings, or as directed by the Engineer.

1. Seed mixes will be supplied by the Owner's Representative for installation by the Contractor.

1.2 RELATED SECTIONS

A. Section 015000, Mobilization

B. Section 329000, Planting

1.3 QUALITY ASSURANCE

A. All seed shall be labeled in accordance with the Washington Administrative Code (WAC) and shall be delivered to the site in sealed individual, unmixed bags with the vendor's certificate attached. Seed shall be sampled and tested in accordance with the WAC Chapter 16-302. Seed treated with mercury compounds shall not be used.

B. Seed which has become wet, moldy, or otherwise damaged in transit or in storage, will not be acceptable.

2. PRODUCTS

2.1 MATERIALS

A. Quantities shown on the Drawings represent pure live seed (pls).

B. Seed shall be mixed on-site in the presence of the Engineer. At no time shall the seed mix contain noxious weed seed. Seed shall be maintained in optimal health and be protected at all times from animal damage; vandalism; inclement weather conditions, including drought, wind, and frost; toxic water; sunlight; moisture; or contact with vehicles, equipment, and tools and any other conditions that would damage or reduce the viability of the seed.

C. Seed Mix. The seed mix and application rates are as shown on the Drawings. No substitutions are allowed without written consent of the Engineer.

D. Straw Mulch. Straw mulch shall be derived from wheat or barley. The Contractor shall furnish evidence that clearance has been obtained from the County Agricultural Commissioner, as required by law, before straw obtained from outside the county in which it is to be used is delivered to the site of the work. Straw that has been used for stable bedding shall not be used. Straw shall be free of mold. Straw shall be cured and dry with no water added after baling. Source must meet or exceed state certification standards for "weed free".

3. EXECUTION

3.1 PREPARATION

A. General. Seed the areas disturbed by construction activities, as specified herein or as directed by the Engineer.

B. Debris Removal. Prior to ground surface preparation operations remove and dispose of all wire, rubbish, stones, and other material which might hinder proper grading, and subsequent maintenance.

C. Surface Preparation. Surfaces which are too hard or smooth to accept the seeding, as determined by the Engineer, shall be broken up to a minimum depth of 3 inches, by disking or other methods approved by the Engineer, until the condition of the soil is acceptable. When conditions are such, by reason of excessive moisture or other factors, that satisfactory results are not likely to be obtained, the work shall be stopped and shall be resumed only when directed. Slopes in excess of 25% shall be prepared by track-walking or equivalent method approved by the Engineer.

3.2 APPLICATION OF SEED

A. Existing Features. During seeding operations, care shall be taken to avoid damaging existing facilities, vegetation to remain, or any other items on or around the planting areas.

B. Seeding Areas: Apply seed to areas indicated on the Drawings, or as directed by the Engineer.

C. Time of Seeding: Perform all seeding between October 1st and November 15 of the year construction begins. The seeding operation shall be halted when, in the opinion of the Engineer, conditions of high winds, excessive moisture or other factors are not conducive to satisfactory results. Upon written request of the Contractor, and upon written approval of the Engineer, seeding may be done during off seasons provided that:

1. The resulting stand of grass shall be at least equal to the stand that might be expected from planting during the normal season; and
2. The establishment period shall be lengthened, as required, to produce the above specified stand at no additional cost to the Owner.
3. Perform seeding prior to placement of erosion control fabric, where erosion control fabric is specified.

D. Broadcast Seeding. Seed shall be dry-applied by the following method:

1. Broadcast seed at the rates specified on the Drawings, uniformly by hand, mechanical hand seeder, combination seed spreader and cultipacker, or other approved equipment. Where seed is broadcast by hand or mechanical hand seeder, half the seed shall be sown with the sower moving in one direction, and the remainder sown with the sower moving at right angles to the first sowing. Broadcast seeding shall not be done during windy weather.
2. Rake seed into the soil to achieve a sowing depth of approximately 1/8 inch to 1/4 inch.
3. Following the application of seed, straw mulch shall be pneumatically applied or hand broadcast at the rate of 3,000 pounds per acre (typically 1.5 to 2 tons/acre.

3.3 REPAIR

A. General. When any portion of the ground surface becomes gullied or otherwise damaged following seeding within the period of Contractor's responsibility, repair the affected portion to

re-establish the condition and grade of the soil prior to planting and then reseed as specified for initial planting, all at no cost to the Owner.

B. Reseeding. When it becomes evident that the seeding has been unsuccessful, the Engineer will require that these areas be reseeded with the same seed and quantity as specified for the initial seeding. Complete reseeding within fifteen (15) days following notification and these areas shall be maintained by watering, as specified above, until the successful grass is established. Prepare the area to be reseeded as directed by the Engineer, to receive the reseeding.

3.4 FIELD QUALITY CONTROL

A. During the course of work or upon completion of the project, a check of the quantities of materials will be made against the areas treated, and if the minimum rates of application have not been met, the Engineer will require the distribution of additional quantities of those materials to make up the minimum applications specified.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Seeding and Mulching will be measured for payment on a lump sum basis.

4.2 PAYMENT

A. Seeding and Mulching will be paid for at the contract lump sum price, which price will include furnishing all labor, materials, tools, equipment, and incidentals necessary to complete the Seeding and Mulching as specified, as shown on the Drawings, or as directed by the Engineer.

B. Payment will be made under:

Pay Item	Pay Unit
Seeding and Mulching	Lump Sum (LS)

END OF SECTION

INDEX
SECTION 329300
PLANTING

Paragraph **Page**

SECTION 329300
PLANTING

1. GENERAL

1.1 DESCRIPTION

A. The work required under this Section shall include, but is not limited to, all labor, tools, materials, equipment and incidentals required to install all of the plants and appurtenances, as shown on the Drawings, described in these Specifications or as directed by the Owner's Representative.

1. All plant materials will be supplied by the Owner's Representative for installation by the Contractor.

1.2 RELATED SECTIONS

A. Section 329200, Seeding

1.3 SUBMITTALS

A. Complete as-built Drawings showing all deviations from the planting plans and specifications and submit to the Engineer upon completion of construction.

1.4 QUALITY ASSURANCE

A. Proper Installation. The Contractor shall be responsible for proper installation of the native plants to ensure healthy and vigorous growth and development according to the Plans, these Specifications and the Owner's Representative's direction.

B. Substitutions. No materials substitutions will be allowed without approval from the Owner's Representative.

C. Responsibility. If plants are damaged before or during installation, the Contractor shall be responsible for purchasing, securing, and paying all associated costs for replacement plants of the same watershed, species and size, unless otherwise approved by the Engineer.

D. Willows. ASTM International. (2003). D6765-02 Standard Practice for Live Staking.

2. PRODUCTS

2.1 GENERAL

A. Handling. The Contractor shall ensure that the plants and planting supplies are not damaged at any time. After acceptance by the Owner's Representative, handling and storage of the plants and bulk materials delivered to the site shall become the responsibility of the Contractor.

B. Plants Storage. Plants shall be maintained in optimal health and be protected at all times from animal damage; vandalism; inclement weather conditions, including drought, wind, and frost; toxic water; sunlight; moisture; or contact with vehicles, equipment, and tools and any other conditions that would damage or reduce the viability of the plants. Plants may be stored on the site in the Contractor's staging area provided a temporary fence is erected for plant protection. Shade, frost, and wind protection may be used if necessary to protect the health of the plants.

Plants shall be maintained moist at all times before planting and shall be completely watered 1-hour or less before installation and shall be moist when installed.

2.2 MATERIALS

A. Plants. Plant container sizes and species shall be as indicated on the Drawings. All plants will be supplied by the Owner's representative for installation by the Contractor.

B. Backfill Soil. Backfill soil material for planting pits shall be native soil found in the immediate vicinity of each planting pit or salvaged topsoil from the excavation of the Project area.

C. Wood Chip Mulch. Wood chip mulch shall be 1½ inch to 3 inch diameter chipped natural wood product free of all debris, rock, trash, diseased material, weed seed, invasive plant parts, pesticide residue, dye or synthetic substances of any kind. The Contractor will submit a 16 oz. sample to the Engineer for inspection and approval prior to delivering the product to the job site.

3. EXECUTION

3.1 GENERAL

A. Drawings. The Drawings are partially diagrammatic for graphic clarity and, therefore, do not show the exact individual planting locations for each species to be installed. The Contractor shall be responsible for the installation of all of the plants at the typical spacing and layouts shown on the Drawings and described in these Specifications, and as directed by the Owner's Representative.

B. Schedule. The Contractor's strict conformance to the Project schedule is essential for the success of this Project. Unless otherwise directed by the Owner's Representative, planting shall be conducted from October 1 through December 30. Planting shall not occur in saturated soils or while heavy rain is falling.

C. Disturbed areas. Do not disturb areas outside of the designated limits of disturbance, unless authorized in writing by the Owner's Representative. All associated restoration and revegetation of disturbed areas outside the designated limits of disturbance, as shown on the drawings, shall be borne solely by the contractor.

3.2 PREPARATION

A. Laws, Codes, Ordinances and Regulations. All local, municipal and State laws, codes, ordinances and regulations governing or relating to any part of this work are considered a part of these Specifications and shall be conformed to by the Contractor. These Specifications and the Drawings shall take precedence whenever they call for a higher quality or larger size than is required by the aforementioned codes, ordinances, and regulations. The Contractor shall be responsible for conformance to all applicable codes governing the materials and work at this Project site. Manufacturer's specifications shall govern should their directions and detailed drawings address information not included in these Specifications and the Drawings.

3.3 SITE CONDITIONS

A. Site Conditions. The contractor shall verify site conditions and be familiar with existing grade conditions, locations of existing features to be preserved, and all existing vegetation to remain. Field adjustments may be necessary to avoid disturbances to existing vegetation to remain. Before ordering materials or proceeding with work, the Contractor shall verify all dimensions

and quantities between the Drawings, these Specifications and field conditions; any and all discrepancies shall be reported immediately to the Owner's Representative.

B. Field Adjustments. Field Adjustments necessary to accommodate or to minimize disturbances to existing site conditions shall be done at the Contractor's expense. Work shall be postponed in any area of discrepancy with the Drawings or these Specifications until the Owner's Representative has provided a written resolution to the conflict. The Contractor shall assume full responsibility for proceeding with work without written approval.

C. Coordination. The Contractor shall coordinate the planting installation to avoid conflicts with roads, utilities, other construction, and any existing features.

D. Vandalism. Throughout the Contract period, the Contractor shall be responsible for the replacement or repair of any part of the plant installation that is damaged as a result of vandalism; the Contractor shall be responsible for securing the Project site to minimize negative effects from vandalism.

3.4 PLANT INSTALLATION

A. The Contractor shall be responsible for installing each of the plant species and related quantities, as indicated on the Drawings.

B. Installation Procedure. The requirements prescribed in this Section apply to container plants. The plant installation shall conform to the Drawings and these Specifications. If planting adjustments are necessary, the Contractor shall proceed only after receiving approval from the Owner's Representative for such adjustments. Plants shall be set out daily, ensuring that the number of plants distributed to the planting areas can actually be installed and watered. To assure quality installation, onsite workers shall be trained and supervised until satisfactory planting techniques are achieved according to the satisfaction of the Engineer.

C. Plant Layout. Individual planting locations shall be field marked (e.g. staked or flagged) per plant species by the Contractor. Field marked plant locations must be approved by the Owner's Representative before the start of any plant installation operations. Plant species shall be distributed throughout the Project site according to the locations and quantities indicated and as detailed on the Drawings. At no time shall plants be located within the access road locations indicated on the Drawings. At all times, plants will be located 5 feet clear of any access roads, ramps, or other structures.

D. Planting on Slopes. There shall be no planting basin required for plant installations on slopes that are covered with slope protection fabric.

E. Planting Pits. Planting pits shall be excavated as detailed on the Drawings and according to these Specifications. For Container plantings, excavate a planting hole approximately 3 times the width and 1.5 times the depth of container.. For all container sizes, plantings shall conform to the details included on the Drawings. The planting pit sides shall be scarified before plant placement. Before plant installation, the planting pit shall be backfilled to approximately half the depth of the pit. The backfill shall then be tamped and watered to remove air pockets and reduce settling.

F. Plants. At all times, plants shall be installed into soil that does not exceed field soil moisture capacity. The plant shall be placed in the planting pit and the backfill shall be completed, tamped, and watered. To place a container plant, remove the plant from the container with the rootball completely intact. Do not hold the plant by its stem or branch or in any way that may damage the plant. Scarify or roughen the sides and loosen the bottom of the root ball if roots are partially root bound. Insert the rootball in the planting hole without bending or damaging

the roots. Set the plant plumb (i.e., upright) and brace in position until the backfill has been tamped solidly around the rootball. Add water to planting hole to allow for settling of the soil. Position the plant so that the root crown is set 1/2 inch above finish grade at the time of planting. Place the plant in the hole and back fill with excavated soil. Remove all plant containers offsite and recycle according to State and local regulations.

G. Finish Grade. The planting hole shall be filled with moist, pulverized backfill. Backfill material shall make good contact with the rootball, leaving no air pockets. Planting pit filling shall be completed so that the root crown is covered with a maximum of 1/4 inch layer of backfill above finish grade. The Contractor shall be responsible for filling the planting pit to avoid settlement before plant placement. The Contractor shall add backfill, firmly packed in place to avoid air pockets, and adjust plants due to settlement as required.

H. Watering Basins. For each Tree Pot and Deepot container planting on non-sloped areas only, a 30 inch diameter watering basin with 3 inch high berm shall be constructed using native soil. The planting basins shall be top-dressed with a 3 inch deep, continuous layer of wood chip mulch. The wood chip mulch shall cover a 4 foot diameter area surrounding each plant and shall be retained within the watering basin's soil berm, where applicable. At no time will bark mulch be placed within 2 inches of the plant stem. Bark mulch shall be placed to evenly cover the entire surface of the planting basin.

I. Watering Installed Plants: The Contractor shall be responsible for ensuring that the plants are watered before, during, and after the installation. Plants shall be thoroughly watered immediately after installation at individual plant locations.

3.5 WILLOW STAKE INSTALLATION

A. Timing. Collect willow stakes while dormant, between December 1 and February 1. They shall be planted no later than February 15. During all stages, the plant materials shall be protected from exposure to wind and direct sunlight.

B. Delivery. The Contractor shall notify the Engineer of the delivery schedule in advance so the plant materials may be inspected upon arrival at the job site. The Engineer will inspect the cuttings for damage immediately upon receipt. Unacceptable cuttings will be removed from the job site immediately and disposed of at an authorized site.

C. Handling. Install willow stakes and live fascinces within 6 hours of collection. If planting does not occur within 6 hours, plant material must be properly stored according to the guidelines given in the following section.

D. Storage. All woody plant cuttings collected more than 6 hours prior to installation, must be carefully bound, secured, and stored submerged in clean fresh water for a period of up to one week. If stored outdoors temperatures must be less than 50 degrees F. Temperature indoors and in storage containers must be between 34 and 50 degrees F. If the willow stakes cannot be installed during the dormant season, cut during the dormant season and hold in cold storage at temperatures between 33 and 39 degrees F for up to 2 months.

E. Location. Prior to placement or installation of willow stakes and live fascines, the Contractor shall flag all plant material locations for approval by the Engineer. The Engineer may require adjustments to willow stake locations to meet field conditions.

F. Willow Stake Installation. Planting of willow stake shall be performed during above periods only when weather and soil conditions are suitable. Deviation from the above planting dates will be permitted only when approved in writing by the Engineer. Plant materials shall be placed at

intervals as indicated on the Drawings, with butt end down. Installed eighty percent of the stake below ground, leaving only twenty percent of the willow stake extending above ground.

3.6 CLEAN UP

A. Daily Cleanup. Site cleanup shall occur on a daily basis. All garbage, construction debris, excess plants and dirt, other discarded materials, and extraneous equipment caused by or due to the Contractor shall be removed offsite at the Contractor's expense and in accordance with State and local regulations.

B. Salvage. All materials designated to be salvaged shall be handled and removed with care. The Contractor shall be responsible for salvaging, removing offsite, and recycling all plant containers and racks; at no time will the Agency or the Engineer be responsible for recycling plant containers and racks.

3.7 OBSERVATION AND TESTING

A. Observations. The Contractor shall provide the Owner's Representative with 48-hours advance notification for the following required planting stage acceptance observations.

1. Field marking of individual planting site locations,
2. Observation and acceptance of plant materials before installation,
3. Preparation for individual planting sites,
4. Planting operations. The Contractor shall be responsible for the complete installation of plants according to the Drawings and as specified herein. Any unacceptable plants or planting operations shall be corrected according to the Owner's Representative's direction and at the Contractor's expense before the Final Acceptance observation.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Planting. Plantings will be measured for payment on a lump sum basis.

B. Plant Protection Cages. Plant Protection Cages will not be separately measured for payment.

C. Wood Chip Mulch. Wood Chip Mulch will not be separately measured for payment.

4.2 PAYMENT

A. Planting . Payment for Planting , measured as specified, will be paid at the contract lump sum price for all planting, which price will include all costs in connection therewith.

B. Payment will be made for the following pay items and pay units:

Pay Item	Pay Unit
Planting	Lump Sum (LS)

END OF SECTION

INDEX
SECTION 354200
LOG STRUCTURES

Paragraph **Page**

SECTION 354200
LOG STRUCTURES

1. GENERAL

1.1 DESCRIPTION

A. Work within this section includes furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the Log Structures, complete in place, including excavation, and backfilling, connection hardware, ballast boulder supply, preparation, and placement, and backfill of voids, as specified, as shown on the Drawings, or as otherwise directed by the Engineer.

1. All logs for the log structures shall be supplied to the staging area by Yakama Nation for installation by the Contractor.

1.2 RELATED SECTIONS

A. Section 015000, Mobilization

B. Section 015713, Temporary Erosion Control and BMP's

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. A29 – Standard Specification for General Requirements For Steel bars, Carbon and Alloy, Hot-Wrought
2. A36 - Standard Specification For Carbon Structural Steel
3. A153 – Standard Specification for Zinc Coating (Hot-Dip) On Iron and Steel Hardware
4. A193 – Standard Specification for Alloy Steel and Stainless Steel Bolting for High Temperature or Pressure Service and Other Special Purpose Applications
5. A194 – Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both
6. A413 – Standard Specification for Carbon Steel Chain
7. A475 – Standard Specification for Zinc-Coated Steel Wire Strand
8. A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
9. B695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
10. C881 – Standard Specification for Expoxy-Resin-Base Bonding Systems for Concrete

1.4 SUBMITTALS

A. Submit to the Engineer, for review and approval, the following, prior to delivering materials to the work site:

1. Product data sheet for connection hardware.
2. Quarry source for the ballast boulders.

2. PRODUCTS

2.1 MATERIALS

A. Ballast Boulders

1. Ballast Boulders. Boulders shall be sound, durable, hard, resistant to abrasion and free from laminations, weak cleavage planes, and the undesirable effects of weathering. It shall be of such character that it will not readily disintegrate from the action of air, water, or the typical conditions experienced during handling and placing. Ballast Boulders shall be sub-rounded to sub-angular.
2. Minimum weight of Ballast Boulders shall be 1.5 tons.
3. Salvaged Rock Material. Native rock found on site may be salvaged for reuse, subject to compliance with the material requirements for the intended use, and subject to the approval by the Engineer. The Engineer may require the Contractor to provide testing (e.g. gradation curve, hardness, etc.) to ensure that materials are suitable for reuse. The Engineer may, at his sole discretion, waive certain testing requirements to facilitate the Contractor's use of locally salvaged materials.

B. Threaded Rod and Nuts. Threaded Rod and shall be composed of one of the following at the Contractor's option:

1. Grade 75 all-thread rebar conforming to ASTM A615, bar designation #8. Nuts shall be H1F heavy hex nuts conforming to ASTM 194 Grade 2H.
2. B12 Coil Rod conforming to ASTM A29, diameter 1 inch. Nuts shall be B25 heavy coil nuts.

C. Steel Plates. Steel plates shall conform to ASTM A36 and meet the dimensions shown on the Drawings.

D. Slash. Slash shall consist of logs, rootwads, and branches of native trees salvaged from in and around the construction site during construction as directed by the Engineer. No invasive species or materials containing seeds of invasive species shall be used. Slash material volume shall be comprised of a minimum of 50 percent logs and rootwads with diameters larger than 6 inches in diameter, 40 percent branches between 1 and 6 inches and 10 percent small woody vegetation.

3. EXECUTION

3.1 GENERAL

A. Prior to the start of work, the Engineer shall designate representatives authorized to observe the Contractor's placement of Log Structures. Contractor shall notify the authorized representative 72 hours prior to placement of Log Structures. Construct all Log Structures in the presence of the authorized representative.

B. Log structure designs are shown conceptually due to the inherent variability of material properties. The design requires that the Engineer will observe construction of the log structures to ensure the intent of the design is met. Observations must include log and boulder selection, placement, connections for ballasting, and placement of backfill. Any log structures constructed without the Engineer present may result in rejection of the work by the Engineer.

C. The construction of Log Structures requires equipment which can place rock and logs in precise locations. An excavator of a suitable size and containing a thumb is suggested.

D. Placement of the foundation logs and rocks is critical to the success of the Log Structures. To ensure proper placement, the Contractor shall provide a portable pump or other method to de-water excessive ground water from the excavation, as necessary.

E. Log to Log connections. Each rebar connection shall be secured with two bolts, tightened to the manufacturer's recommended torque. Cut off excess rebar flush with surface of the log.

F. Log Placement. Log placement locations shown on the Drawings are approximate. Exact locations shall be as approved by the Engineer, or his authorized representative.

G. Place rootwads at an elevation where the majority of the root mass is below ordinary low water, as approved by the Engineer.

3.2 FIELD QUALITY CONTROL

A. Tolerances. Log and boulder placements shall be as approved by the Engineer.

B. Logs. All logs shall be inspected for approval by the Engineer, prior to installation.

3.3 PILE LOG INSTALLATION

A. Pile Logs shall be stripped of bark before installation.

B. Pile Logs shall be driven to the depths indicated in the plans with vibratory or pile driving equipment with narrower end of log facing downward.

C. Contractor shall furnish equipment to conduct pull-out tests on all piles as directed by the Engineer or Authorized Owner's Representative.

1. Pull-out tests shall be conducted to a maximum tensile load of 1,000 lbs. of force. Notify Engineer immediately of any piles that fail to withstand this tensile load as additional ballasting may be required to meet the minimum requirements for each log structure.

D. The exposed cut end of the pile log shall be masticated or cut in a manner that creates a more natural appearance without compromising the integrity of the log.

4. MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

A. Supply Boulders will be measured by the number of boulders supplied to the project that meet the weight and dimensions as specified, as directed by the Engineer.

B. Install Habitat Logs will be measured by the number of habitat logs installed, as shown on the Drawings, as specified, and as directed by the Engineer.

C. Install Apex Log Structure will be measured by the number of Apex Log Structures and associated connection hardware (and ballast boulders if directed by Engineer) installed, as shown on the Drawings, as specified, and as directed by the Engineer.

D. Install Lateral Log Structure will be measured by the number of Lateral Log Structures and associated connection hardware (and ballast boulders if directed by Engineer installed, as shown on the Drawings, as specified, and as directed by the Engineer.

E. Install Large Lateral Log Structure will be measured by the number of Large Lateral Log Structures and associated connection hardware (and ballast boulders if directed by Engineer installed, as shown on the Drawings, as specified, and as directed by the Engineer.

F. Fell Alders Into Channel will be measured by the number of felled alders placed in the channel, as shown on the Drawings, as specified, and as directed by the Engineer.

G. Slash materials for inclusion in logs structures as noted on the Drawings, will not be separately measured for payment.

4.2 PAYMENT

A. Supply Boulders will be paid for at the contract unit price for each boulder supplied to the project site (as directed by the Engineer) including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in delivering the boulders, complete in place, to the staging areas, as shown on the Drawings, as specified herein, or as directed by the Engineer.

B. Install Habitat Logs will be paid for at the contract unit price for each Habitat Log installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Habitat Log, complete in place, including log connections, as shown on the Drawings, as specified herein, or as directed by the Engineer.

C. Install Apex Log Structure will be paid for at the contract unit price for each Apex Log Structure installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Apex Log Structure, complete in place, including excavation and backfill, rock placement, and connections, as shown on the Drawings, as specified herein, or as directed by the Engineer.

D. Install Lateral Log Structure will be paid for at the contract unit price for each Lateral Log Structure installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Lateral Log Structure, complete in place, including excavation and backfill, rock placement, and connections, as shown on the Drawings, as specified herein, or as directed by the Engineer.

E. Install Large Lateral Log Structure will be paid for at the contract unit price for each Large Lateral Log Structure installed including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing each Lateral Log Structure, complete in place, including excavation and backfill, rock placement, and connections, as shown on the Drawings, as specified herein, or as directed by the Engineer.

F. Fell Alder Into Channel will be paid for at the contract unit price for each felled alder positioned in the channel at the direction of the Engineer, including all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in cutting and movement of the tree, complete in place, as shown on the Drawings, as specified herein, or as directed by the Engineer.

G. Payment will be made under:

Pay Item	Pay Unit
Supply Boulders	Each (EA)
Install Habitat Logs	Each (EA)
Install Apex Log Structure	Each (EA)
Install Lateral Log Structure	Each (EA)
Install Large Lateral Log Structure	Each (EA)
Fell Alders Into Channel	Each (EA)

END OF SECTION