

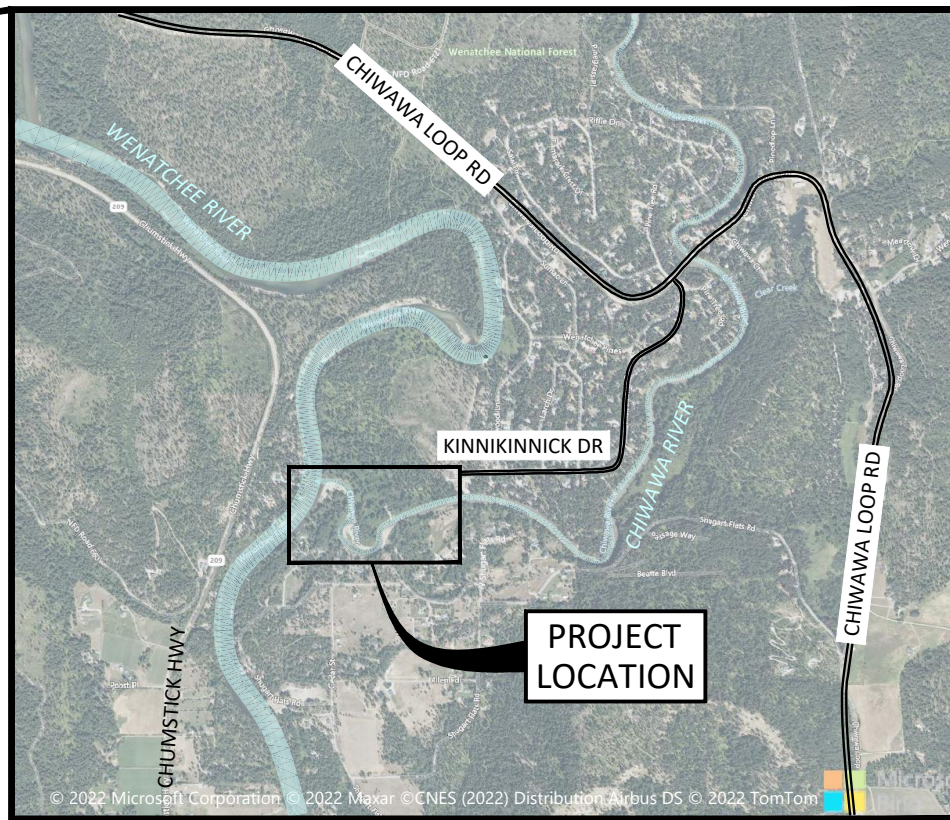
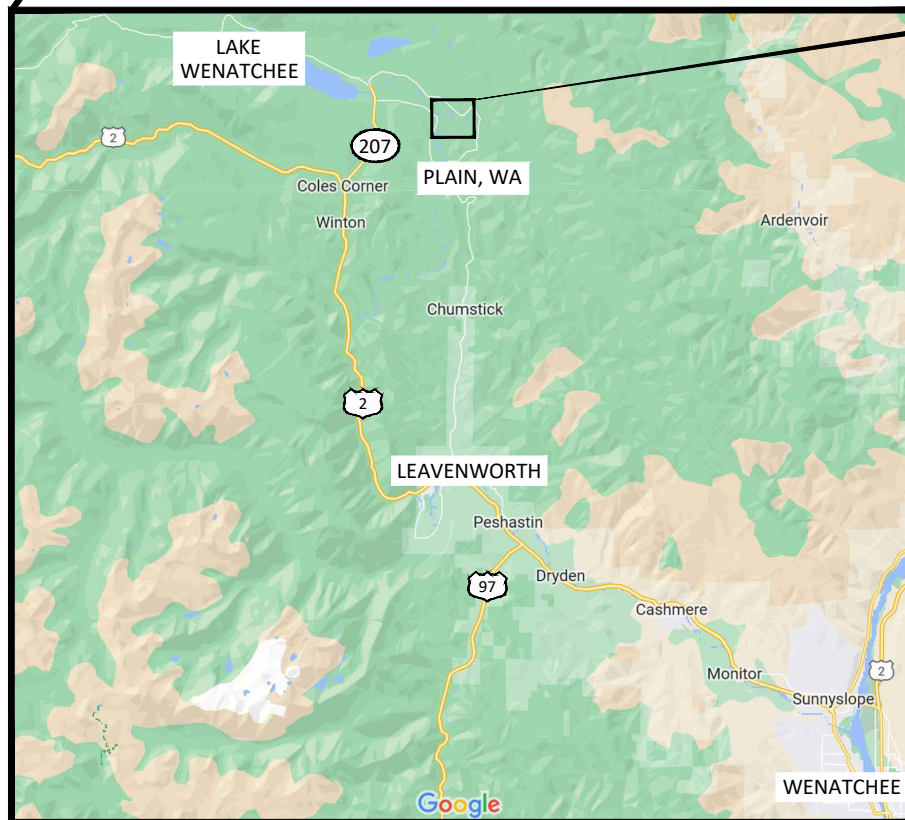
# CHIWAWA OUTLET - FISH HABITAT ENHANCEMENT

CHIWAWA RIVER  
CHELAN COUNTY, WA

*FINAL DESIGN*  
*for construction July 1-31, 2024*



YAKAMA NATION FISHERIES  
2 JOHNSON LANE  
WINTHROP WA, 98862



### SHEET INDEX

- 1 - COVER SHEET & SITE MAPS
- 2 - NOTES
- 3 - HIP1
- 4 - HIP2
- 5 - HIP3
- 6 - BMPS
- 7 - SITE OVERVIEW, ACCESS, STAGING
- 8 - PROPOSED CONDITIONS - CHIWAWA SITES C1 C2 C3
- 9 - PROPOSED CONDITIONS - CHIWAWA SITES C4 C5 C6
- 10 - PROPOSED CONDITIONS - CHIWAWA SITE C7
- 11 - TIMBER PILE DETAILS
- 12 - SPECIFICATIONS
- 13 - SPECIFICATIONS



VICINITY MAP  
NOT TO SCALE



COORDINATES:  
LATITUDE 47°48'20.22"N  
LONGITUDE 120°40'28.37"W

SITE MAP



T27N R17E  
SECTION 36, TOWNSHIP 27N, RANGE 17E  
NEAR PLAIN, WA. CHELAN COUNTY

WATERBODY: CHIWAWA RIVER  
TRIBUTARY OF: WENATCHEE RIVER > COLUMBIA RIVER



NO.	BY	DATE	REVISION DESCRIPTION

MM	MM	MB
DRAWN	DESIGNED	CHECKED
MB	JAN 30, 2024	PROJECT
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES  
CHIWAWA OUTLET - FISH HABITAT ENHANCEMENT  
FINAL DESIGN



501 Portway Avenue, Suite 101  
Hood River, OR 97031  
541.386.9003  
www.interfluve.com

COVER SHEET & SITE MAPS

SHEET

1 OF 13

IT IS STRONGLY SUGGESTED THAT THE CONTRACTOR ATTEND A PRE-BID SITE MEETING.

THE CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING WITH THE OWNER AND OWNER'S REPRESENTATIVE PRIOR TO BEGINNING CONSTRUCTION.

ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF STANDARD PLANS AND SPECIFICATIONS OF THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT), AND LOCAL STANDARDS UNLESS INDICATED OTHERWISE BY THE CONTRACT DOCUMENTS. IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT WILL PREVAIL.

IN CASE OF DISCREPANCY, BETWEEN NOTES, LOCAL REGULATIONS, OR OTHER CONTRACT DOCUMENTATION, CONTRACTOR SHALL OBTAIN CLARIFICATION/DIRECTION FROM OWNER.

**EXISTING DATA**

TOPOGRAPHIC SURVEY COLLECTED BY INTER-FLUVE, INC. BY RTK GPS AND TOTAL STATION IN 2018, 2019, 2020, 2022. REFERENCED TO NAD83 WASHINGTON STATE PLANE, NORTH ZONE US FEET NAVD 88, AND COMBINED WITH 2018 LIDAR..

PROPERTY BOUNDARIES PROVIDED BY CHELAN COUNTY, 2020.

WETLAND BOUNDARIES DISPLAYED IN THIS SET ARE THE RESULT OF A WETLAND DELINEATION COMPLETED BY OTHERS.

THE ORDINARY HIGH WATER (OHW) AND APPROXIMATE LOW WATER LINES DISPLAYED IN THE DESIGN PACKAGE WERE DELINEATED BY INTER-FLUVE STAFF IN 2022, AND ARE BASED UPON ANALYSIS, MODELING AND BEST PROFESSIONAL JUDGEMENT.

HYDRAULIC MODELING BY INTER-FLUVE USING USACE HEC-RAS (5.0). MODEL CALIBRATED USING SURVEYED WATER SURFACE ELEVATIONS AND EXISTING HIGH WATER MARKS.

**SOILS**

CHIWAWA RIVER ALLUVIAL FAN AND RIVER MATERIALS. LARGE BOULDERS MAY BE ENCOUNTERED.

**UTILITIES**

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR HAVING UTILITIES LOCATED PRIOR TO CONSTRUCTION ACTIVITIES.

THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE AFFECTED UTILITY SERVICE TO REPORT ANY DAMAGED OR DESTROYED UTILITIES. THE CONTRACTOR SHALL PROVIDE EQUIPMENT OR LABOR TO AID THE AFFECTED UTILITY SERVICE IN REPAIRING DAMAGED OR DESTROYED UTILITIES AT NO COST TO THE OWNER.

**CULTURAL RESOURCES**

IF ANY ARCHAEOLOGICAL RESOURCES AND/OR ARTIFACTS ARE ENCOUNTERED DURING CONSTRUCTION ALL CONSTRUCTION ACTIVITY SHALL IMMEDIATELY CEASE AND THE OWNER SHALL BE CONTACTED.

**TREE SALVAGE**

ALL TREES TO BE REMOVED FOR ACCESS WILL BE APPROVED AND CLEARLY MARKED BY THE OWNER PRIOR TO CONSTRUCTION ACCESS.

ALL TREES REMOVED WITHIN CLEARING LIMITS SHALL BE REMOVED WHOLE WITH ROOTS INTACT AND UTILIZED IN THE CHANNEL CONSTRUCTION AS DIRECTED BY OWNER'S REPRESENTATIVE. IF EXCESS MATERIAL NEEDS DISPOSAL OUTSIDE OF CHANNEL WORK, IT SHALL BE DISTRIBUTED ON THE FLOODPLAIN AS DIRECTED BY THE OWNER'S REPRESENTATIVE.

**LIVE TREES**

ALL TREES NOT MARKED FOR REMOVAL SHALL BE PRESERVED AND UNDISTURBED. CONSTRUCTION ACTIVITY SHALL NOT DEBARK OR DAMAGE LIVE TREES. KEEP OUT OF DRIP LINE OF ALL PRESERVED EXISTING TREES.

**CONSTRUCTION ACCESS**

THE CONTRACTOR IS ADVISED THAT ACCESS TO THE SITE WILL BE BY RURAL ROADS, ALONG WINDING SINGLE-LANE GRAVEL ROAD, AND THROUGH RIPARIAN AREAS.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ANY REQUIRED TRAFFIC CONTROL OR ACCESS PERMITS, AND PROVIDING REQUIRED TRAFFIC CONTROL MEASURES.

ALL EQUIPMENT, MATERIALS AND PERSONNEL SHALL REMAIN WITHIN THE LIMITS OF DISTURBANCE.

ALL TEMPORARY ACCESS ROUTES SHALL BE DECOMMISSIONED BY DECOMPACTION. WHERE VEGETATION REMOVAL IS REQUIRED FOR ACCESS OR STOCKPILE AREAS, VEGETATION SHALL BE CUT TO GROUND LEVEL (NOT GRUBBED).

**CONSTRUCTION STAKING**

THE OWNER WILL INSTALL STAKES AND OR FLAGGING TO DELINEATE EQUIPMENT ENTRY AND EXIT POINTS, STAGING AND STOCKPILE AREAS, AND PROJECT LIMITS. THE OWNER WILL INSTALL GRADE STAKES, AND ELEVATION CONTROL POINTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING DAMAGED OR MISSING STAKES.

SOME FIELD ADJUSTMENTS TO THE LINES AND GRADES ARE TO BE EXPECTED. LOCATION, ALIGNMENT, AND ELEVATION OF LARGE WOOD ARE SUBJECT TO ADJUSTMENT BASED ON FIELD CONDITIONS, AND MATERIAL SIZE.

**CONSTRUCTION QUANTITIES**

CLEARING & GRUBBING	0.98 AC
POOL EXCAVATION & HAUL OFFSITE	260 CY
PLACE FILL ONSITE	100 CY
EXCAVATION/BACKFILL	1600 CY
LOGS WITH ROOTS	83
TIMBER PILES	52
COFFERDAM	400 FT

**ABBREVIATIONS**

APPROX	APPROXIMATE	INV	INVERT
CY	CUBIC YARDS	LWM	LARGE WOODY MATERIAL
°	DEGREES	MAX	MAXIMUM
DIA or Ø	DIAMETER	MIN	MINIMUM
DBH	DIAMETER AT BREAST HEIGHT	OHW	ORDINARY HIGH WATER
EA	EACH	%	PERCENT
EL or ELEV	ELEVATION	RMx	RIVER MILE x
ESC	EROSION AND SEDIMENT CONTROL	STA	STATION
EXIST	EXISTING	TBD	TO BE DETERMINED
FT or '	FEET	TYP	TYPICAL
FTR	FULLY THREADED ROD	VERT	VERTICAL
HORIZ	HORIZONTAL	WSE	WATER SURFACE ELEVATION
IN or "	INCH	YR	YEAR

	MM	MM	MB
	DRAWN	DESIGNED	CHECKED
	MB	JAN 30, 2024	
	APPROVED	DATE	PROJECT
NO.	BY	DATE	REVISION DESCRIPTION

**YAKAMA NATION FISHERIES  
CHIWAWA OUTLET - FISH HABITAT ENHANCEMENT  
FINAL DESIGN**



501 Portway Avenue, Suite 101  
Hood River, OR 97031  
541.386.9003  
www.interfluve.com

**NOTES**

**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 AN 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.

Designed \_\_\_\_\_  
 Drawn \_\_\_\_\_  
 Checked \_\_\_\_\_  
 Approved \_\_\_\_\_  
 Title \_\_\_\_\_

**HIP GENERAL CONSERVATION MEASURES**  
 BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

**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 RELOCATED 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, MUSSELS, AND NATIVE FISH.

- 1. CONDUCT SITE SURVEY TO ESTIMATE SALVAGE NUMBERS.
- 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, LOCATING BY SNORKELING OR WADING.
- 6. SALVAGE LAMPREY BY ELECTROFISHING (SEE ELECTROFISHING FOR LARVAL LAMPREY SETTINGS AND LARVAL LAMPREY DRY SHOCKING SETTINGS).
- 7. SALVAGE BONY FISH AFTER LAMPREY WITH NETS OR ELECTROFISHING (SEE ELECTROFISHING FOR APPROPRIATE SETTINGS).
- 8. REGULARLY INSPECT DEWATERED SITE SINCE LAMPREY LIKELY TO EMERGE AFTER DEWATERING AND MUSSELS MAY BECOME VISIBLE.
- 9. MUSSELS MAY BE TRANSFERRED IN COOLERS.
- 10. MUSSELS WILL BE PLACED INDIVIDUALLY TO ENSURE ABILITY TO BURROW INTO NEW HABITAT.

**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 SHOULD 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).

Designed \_\_\_\_\_  
 Drawn \_\_\_\_\_  
 Checked \_\_\_\_\_  
 Approved \_\_\_\_\_  
 Title \_\_\_\_\_

**HIP GENERAL CONSERVATION MEASURES**

BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION

File Name  
 2021 HIP GCA

Drawing No.

**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 OF 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 LOOSENEED 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, WATE 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 PROJECT COMPLETION FORM (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, WATER QUALITY PROVISIONS PROVIDED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, WASHINGTON DEPARTMENT OF ECOLOGY, IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY WILL BE FOLLOWED.

**STAGED REWATERING PLAN.**

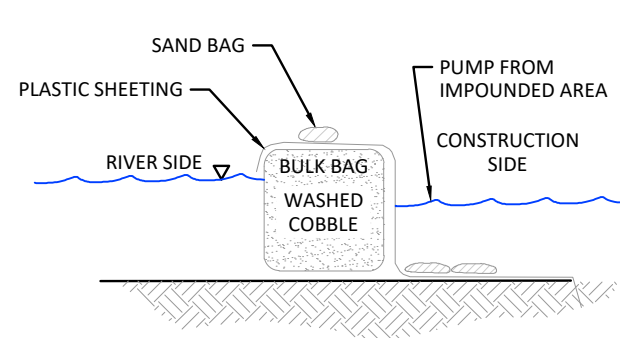
- A. WHEN REINTRODUCING WATER TO DEWATERED AREAS AND NEWLY CONSTRUCTED CHANNELS, A STAGED REWATERING PLAN WILL BE APPLIED.
- B. THE FOLLOWING WILL BE APPLIED TO ALL REWATERING EFFORTS. COMPLEX REWATERING EFFORTS MAY REQUIRE ADDITIONAL NOTES OR A DEDICATED SHEET IN THE CONSTRUCTION DETAILS.
  - 1. TURBIDITY 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.**

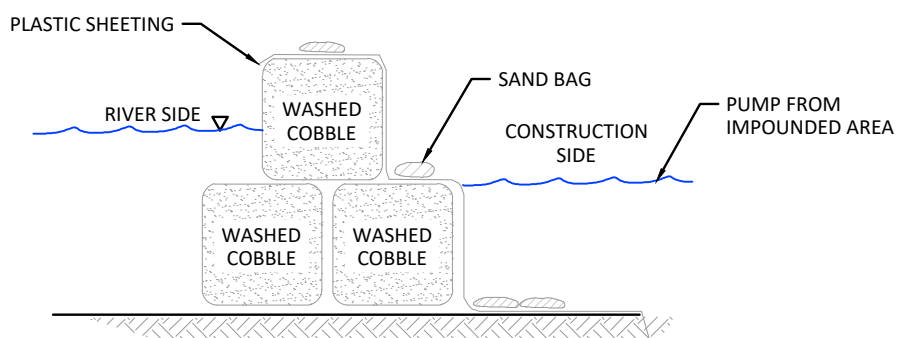
- A. RECORD THE READING, LOCATION, AND TIME FOR THE BACKGROUND READING APPROXIMATELY 100 FEET UPSTREAM OF THE PROJECT AREA USING A RECENTLY CALIBRATED TURBIDIMETER OR VIA VISUAL OBSERVATION (SEE THE HIP HANDBOOK TURBIDITY MONITORING SECTION FOR A VISUAL OBSERVATION KEY).
- B. RECORD THE TURBIDITY READING, 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 PROJECT COMPLETION FORM (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 PROJECT COMPLETION FORM (PCF).
- G. FINAL TURBIDITY READINGS, EXCEEDANCES, AND CONTROL FAILURES WILL BE SUBMITTED TO THE BPA EC LEAD USING THE PROJECT COMPLETION FORM (PCF).

Designed \_\_\_\_\_  
 Drawn \_\_\_\_\_  
 Checked \_\_\_\_\_  
 Approved \_\_\_\_\_  
 Title \_\_\_\_\_

**HIP GENERAL CONSERVATION MEASURES**  
 BONNEVILLE POWER ADMINISTRATION: ENVIRONMENT, FISH AND WILDLIFE DIVISION



SECTION - WATER DEPTHS LESS THAN 2.5'



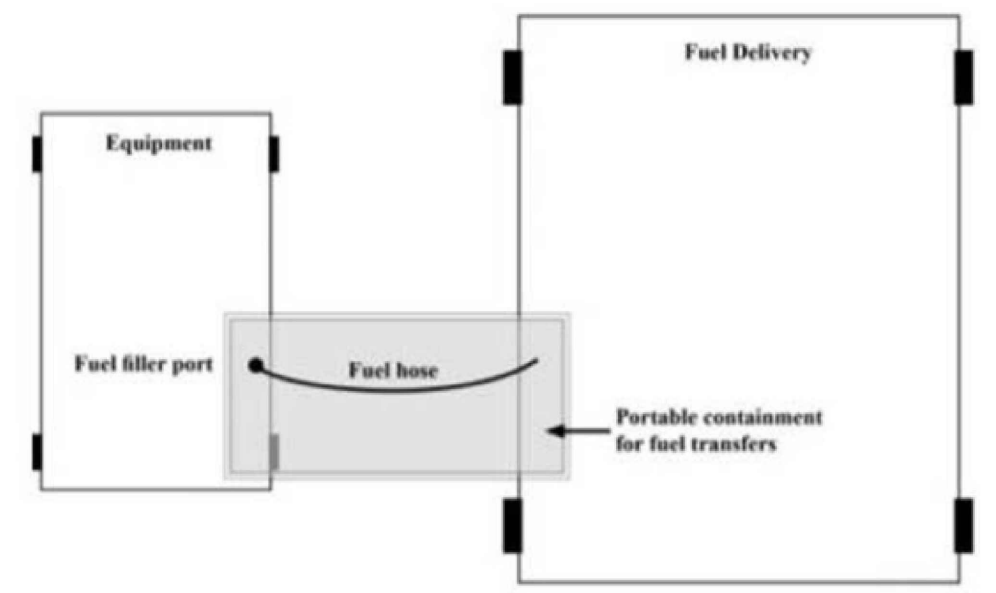
SECTION - WATER DEPTHS GREATER THAN 2.5'

**1**  
**6** **BULK BAG COFFERDAM**  
NOT TO SCALE

**BULK BAG NOTES:**

1. BULK BAG COFFERDAM SHALL BE CONSTRUCTED OF SEVERAL UNITS OF BULK BAGS FILLED WITH WASHED COBBLE, AND ABUTTED SIDE BY SIDE TO CREATE A ROW THAT ISOLATES THE CONSTRUCTION SITE.
2. IF WATER DEPTH EXCEEDS 85% OF THE BULK BAG HEIGHT, AN ADDITIONAL TOP ROW OF BULK BAGS SHALL BE INSTALLED, SUPPORTED BY TWO BOTTOM ROWS OF BULK BAGS. BULK BAG COFFERDAM SHALL BE SEALED BY COVERING THE COFFERDAM WITH PLASTIC SHEETING HELD IN PLACE BY STANDARD SANDBAGS PLACED IN ROWS ON TOP OF COFFERDAM, AND AT TOE OF COFFERDAM.
3. THE PLASTIC SHEETING SHALL BE DRAPED ALONG THE CHANNEL BOTTOM ON BOTH SIDES OF THE COFFERDAM WITH OUTWARD EDGE OF SHEETING MINIMUM 4- FEET FROM TOE OF COFFERDAM. THE DRAPED PORTION OF PLASTIC SHEETING SHALL BE PINNED TO THE CHANNEL BED BY MINIMUM TWO ROWS OF STANDARD SANDBAGS. ALL SANDBAGS SHALL BE FILLED WITH WASHED PEA GRAVEL.
4. THE CONSTRUCTION SIDE EDGE OF PLASTIC SHEETING SHALL BE TOED INTO THE CHANNEL BED MINIMUM 1-FT. TOEING IN THE OUTWARD EDGE OF PLASTIC SHEETING SHALL OCCUR AFTER THE COFFERDAM IS CLOSED TO PREVENT TURBIDITY RELEASE TO THE WATERWAY.
5. IF POSSIBLE, THE COFFERDAM SHALL BE EXTENDED ONTO A GRAVEL BAR AND OUT OF THE WATER. IF THE COFFERDAM MUST BE TERMINATED AT THE RIVER BANK, THE TERMINAL END OF THE COFFERDAM, WHERE IT CONNECTS TO CHANNEL BANK OR HIGH GROUND, SHALL BE SEALED TO THE GROUND WITH PLASTIC SHEETING AND STANDARD SANDBAGS. MULTIPLE LAYERS OF PLASTIC SHEETING AND SANDBAGS MAY BE REQUIRED TO FORM A WATERTIGHT SEAL.
6. BULK BAGS SHALL BE CUBE-SHAPED POLYPROPYLENE WOVEN FABRIC BAGS WITH FULLY OPEN TOP, FLAT BOTTOM, FOUR LOOPS, MINIMUM 2-TON WEIGHT CAPACITY, MINIMUM 5:1 SAFETY FACTOR.
7. PLASTIC SHEETING SHALL BE MINIMUM 6-MIL THICKNESS. ROLL LENGTH SHALL BE LONG ENOUGH TO ENSURE THAT ENTIRE LENGTH OF COFFERDAM WILL BE COVERED WITHOUT A SEAM. MINIMUM 12-FT WIDE ROLL SHALL BE USED FOR SINGLE LAYER BULK BAG COFFERDAM. MINIMUM 16-FT WIDE ROLL SHALL BE USED FOR 2-LAYER STACKED BULK BAG COFFERDAM.
8. CONTRACTOR SHALL PROVIDE PUMPING SUFFICIENT FOR A NET INFLOW OF WATER TO THE AREA ENCLOSED BY THE COFFERDAM, AND DISCHARGE TURBID WATER TO UPLAND FLOODPLAIN.
9. BULK BAG COFFERDAM SHALL BE COMPLETELY REMOVED AFTER CONSTRUCTION IS COMPLETED AND TURBIDITY HAS BEEN REMOVED. BULK BAG FILL (WASHED COBBLE) AND SANDBAG FILL (WASHED PEA GRAVEL) SHALL BE DISPOSED OF ON SITE. BAGS SHALL BE REMOVED FROM THE SITE ONCE CONSTRUCTION IS COMPLETED.
10. ALTERNATE COFFERDAM MATERIALS AND CONFIGURATIONS MAY BE ALLOWED BUT SHALL NOT BE IMPLEMENTED WITHOUT REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND/OR VENDOR CUT SHEETS FOR SUBSTITUTIONS.

SHEET PILE IS A PREFERRED ALTERNATIVE TO BULK BAGS FOR SITE ISOLATION



**2**  
**6** **FUELING AREA PROTECTION**  
NOT TO SCALE

**FUELING NOTES:**

CONTRACTOR SHALL PROVIDE ADDITIONAL PROTECTION MEASURES AGAINST FUEL SPILLS SINCE REFUELING AREA IS LESS THAN 150 FT FROM A WETLAND. ADDITIONAL PROTECTION MEASURES SHALL CONSIST OF:

1. CONTAINMENT EQUIPMENT SIZED TO CONTAIN THE MOST LIKELY VOLUME OF FUEL SPILLED DURING A FUEL TRANSFER.
2. PORTABLE CONTAINMENT EQUIPMENT SHALL BE POSITIONED TO CATCH ANY FUEL SPILLS DUE TO OVERFILLING THE EQUIPMENT AND ANY OTHER SPILLS THAT MAY OCCUR AT OR NEAR THE FUEL FILLER PORT TO THAT EQUIPMENT DURING EACH REFUELING ACTIVITY.
3. PERSONNEL MUST ATTEND TO THE FUELING PROCESS TO ENSURE THAT ANY SPILLS WILL BE OF LIMITED VOLUME.

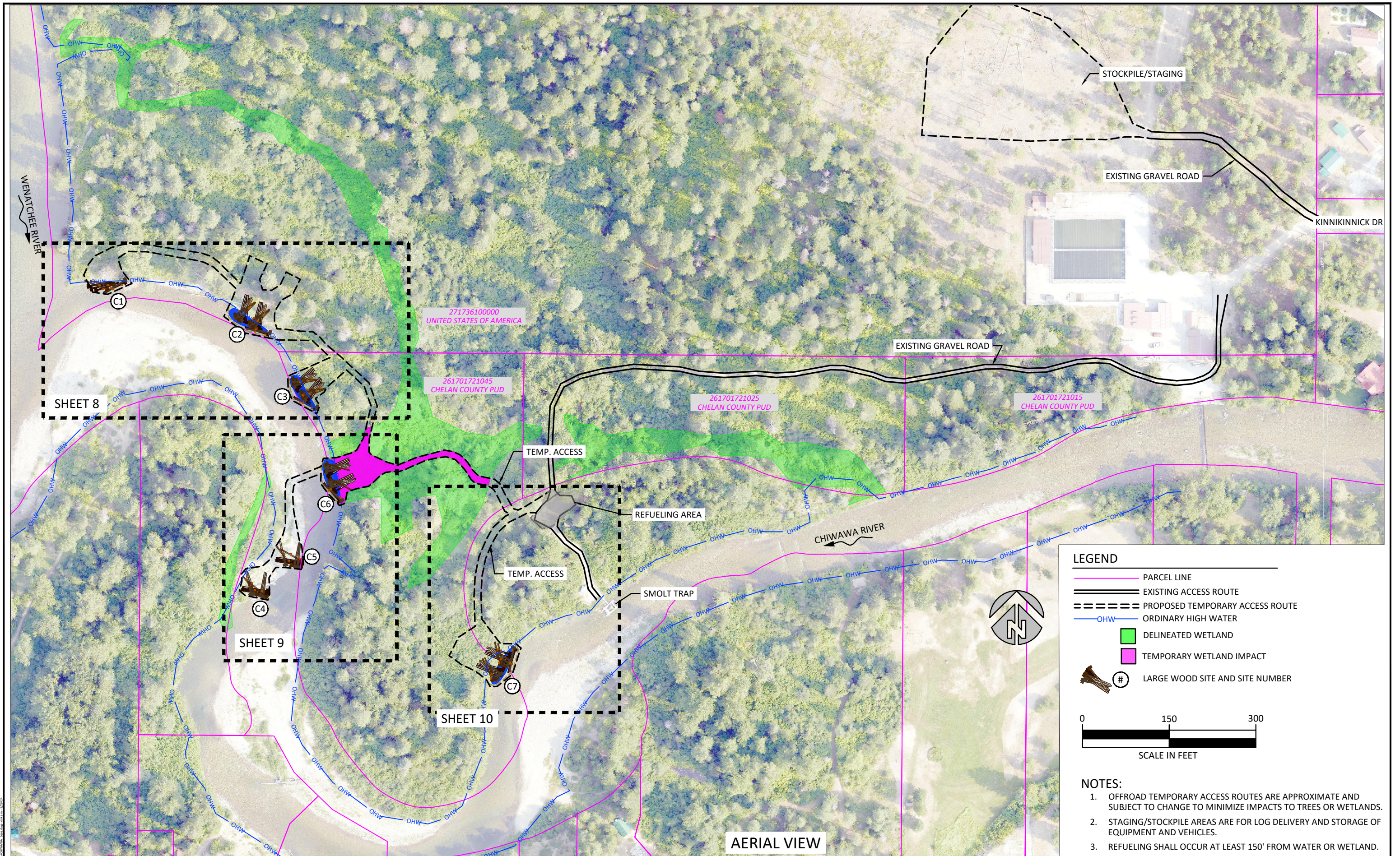
NO.	BY	DATE	REVISION DESCRIPTION

**YAKAMA NATION FISHERIES**  
**CHIWAHA OUTLET - FISH HABITAT ENHANCEMENT**  
**FINAL DESIGN**



501 Portway Avenue, Suite 101  
Hood River, OR 97031  
541.386.9003  
www.interfluve.com

**BMPS**



**LEGEND**

- PARCEL LINE
- EXISTING ACCESS ROUTE
- PROPOSED TEMPORARY ACCESS ROUTE
- ORDINARY HIGH WATER
- DELINEATED WETLAND
- TEMPORARY WETLAND IMPACT
- # LARGE WOOD SITE AND SITE NUMBER

0 150 300  
SCALE IN FEET

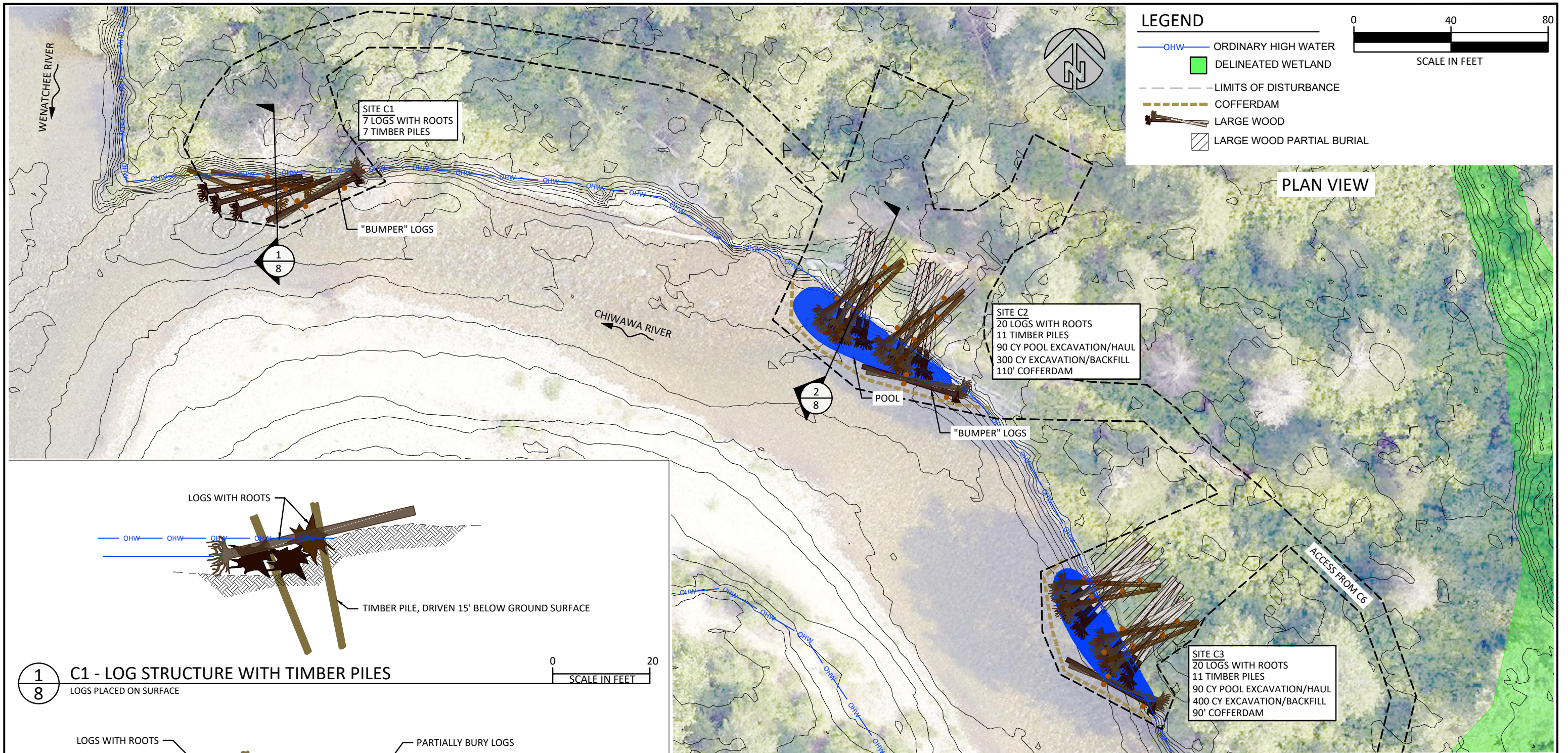
- NOTES:**
1. OFFROAD TEMPORARY ACCESS ROUTES ARE APPROXIMATE AND SUBJECT TO CHANGE TO MINIMIZE IMPACTS TO TREES OR WETLANDS.
  2. STAGING/STOCKPILE AREAS ARE FOR LOG DELIVERY AND STORAGE OF EQUIPMENT AND VEHICLES.
  3. REFUELING SHALL OCCUR AT LEAST 150' FROM WATER OR WETLAND.

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MB CHECKED
MB APPROVED	JAN 30, 2024 DATE	

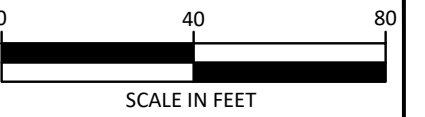
CITY OF BELLINGHAM  
**PADDEN CREEK RESTORATION: 24TH TO 30TH STREETS - PHASE 2**  
 60% DESIGN

501 Portway Avenue, Suite 101  
 Hood River, OR 97031  
 541.386.9003  
 www.interfluve.com



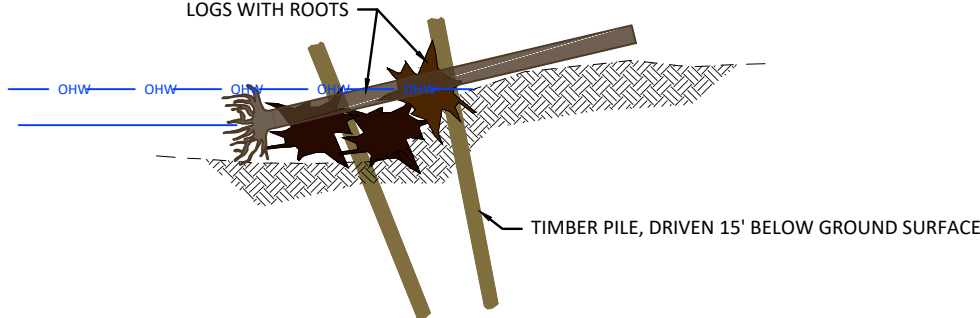
**LEGEND**

- OHW — ORDINARY HIGH WATER
- DELINEATED WETLAND
- - - LIMITS OF DISTURBANCE
- - - COFFERDAM
- LARGE WOOD
- LARGE WOOD PARTIAL BURIAL

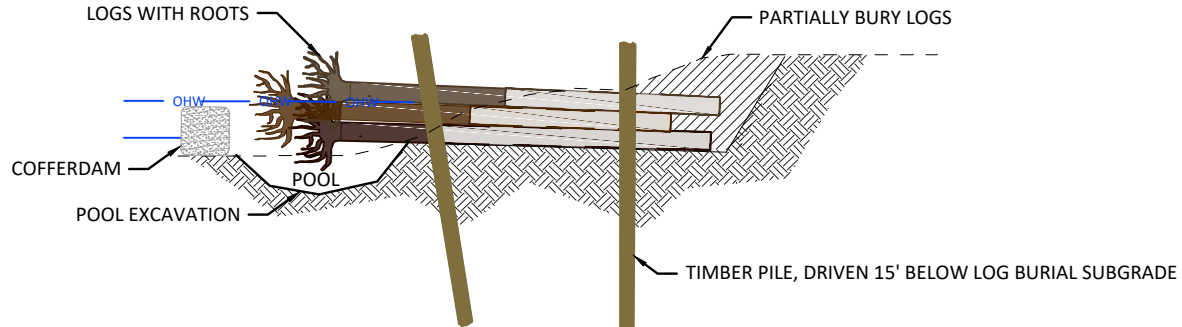


**PLAN VIEW**

**1** **C1 - LOG STRUCTURE WITH TIMBER PILES** 0 20  
SCALE IN FEET



**2** **C2 & C3 - PARTIALLY BURIED LOG STRUCTURE WITH TIMBER PILES** 0 20  
SCALE IN FEET



- NOTES:**
1. AT SITES WITH POOL EXCAVATION, ISOLATE WORK AREA WITH COFFERDAM. PUMP CONSTRUCTION WATER TO INFILTRATION AREAS AND MONITOR FOR FILTRATION PERFORMANCE. NO TURBIDITY SHALL ENTER THE CHIWAWA OR WENATCHEE RIVERS.
  2. WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
  3. ACCESS ROUTE MAY BE ADJUSTED TO PRESERVE EXISTING RIPARIAN TREES AND SHRUBS.
  4. ALL SLASH GENERATED DURING CLEARING SHALL BE SALVAGED FOR REUSE BY INCORPORATION INTO THE LARGE WOOD STRUCTURE. SLASH NOT UTILIZED IN THE STRUCTURE SHALL BE SCATTERED ON THE TEMPORARY ACCESS ROUTE.
  5. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES FOR A NATURAL APPEARANCE. SEE DETAILS, SHEET 11.
  6. EACH TOP LAYER LOG SHALL BE CONNECTED TO A MINIMUM OF 2 TIMBER PILES. SEE DETAILS, SHEET 11.

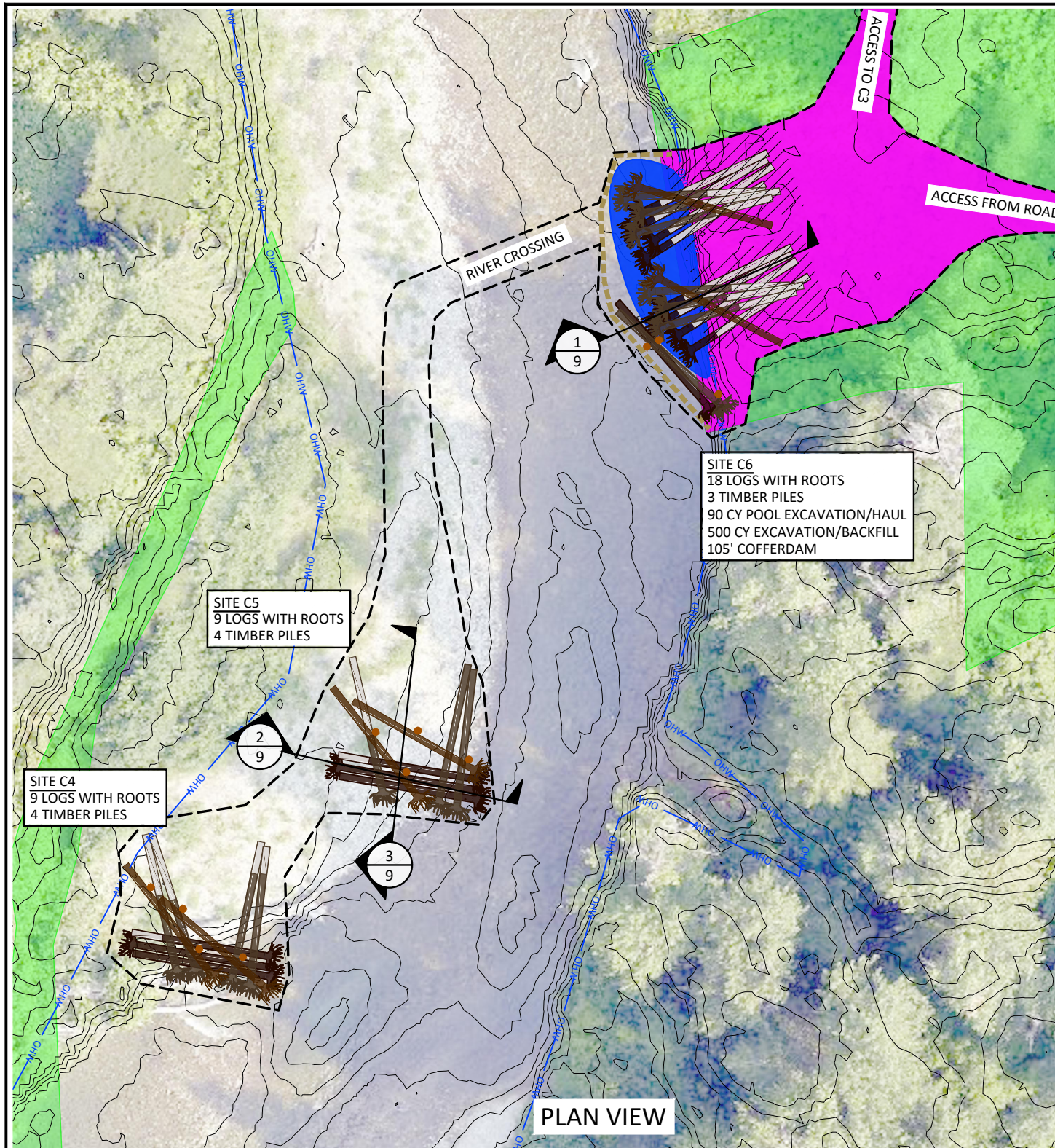
NO.	BY	DATE	REVISION DESCRIPTION

**YAKAMA NATION FISHERIES  
CHIWAWA OUTLET - FISH HABITAT ENHANCEMENT  
FINAL DESIGN**

501 Portway Avenue, Suite 101  
Hood River, OR 97031  
541.386.9003  
www.interfluve.com

**PROPOSED CONDITIONS -  
CHIWAWA SITES C1 C2 C3**





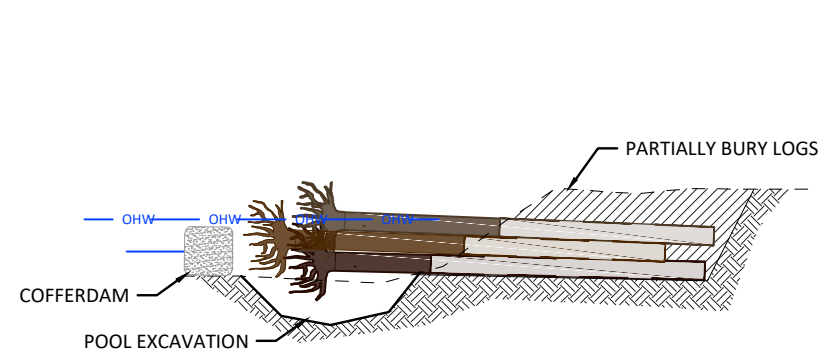
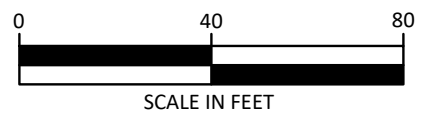
**SITE C6**  
 18 LOGS WITH ROOTS  
 3 TIMBER PILES  
 90 CY POOL EXCAVATION/HAUL  
 500 CY EXCAVATION/BACKFILL  
 105' COFFERDAM

**SITE C5**  
 9 LOGS WITH ROOTS  
 4 TIMBER PILES

**SITE C4**  
 9 LOGS WITH ROOTS  
 4 TIMBER PILES

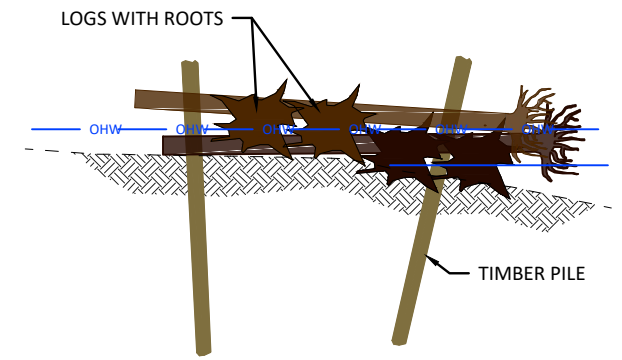
**PLAN VIEW**

- LEGEND**
- ORDINARY HIGH WATER
  - DELINEATED WETLAND
  - TEMPORARY WETLAND IMPACT
  - LIMITS OF DISTURBANCE
  - COFFERDAM
  - LARGE WOOD
  - LARGE WOOD PARTIAL BURIAL



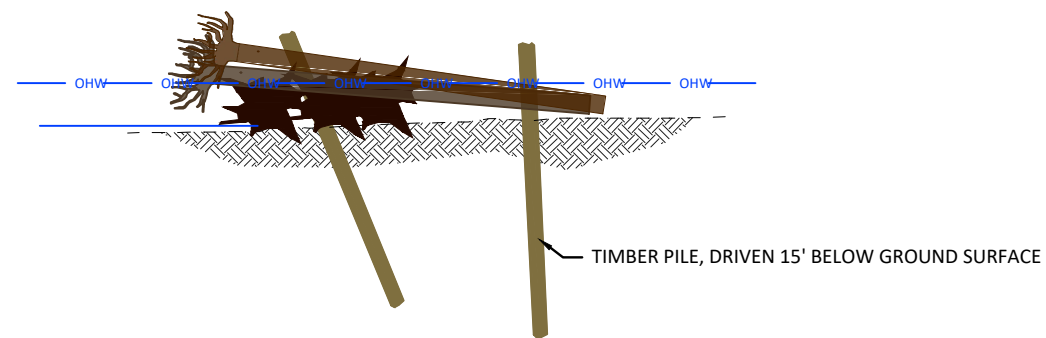
**1**  
**9** C6 - PARTIALLY BURIED LOG STRUCTURE  
 3 LAYERS  
 0 20  
 SCALE IN FEET

- NOTES:**
- ISOLATE WORK AREA WITH COFFERDAM. PUMP CONSTRUCTION WATER TO INFILTRATION AREAS AND MONITOR FOR FILTRATION PERFORMANCE. NO TURBIDITY SHALL ENTER THE CHIWAWA OR WENATCHEE RIVERS.
  - WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
  - ACCESS ROUTE MAY BE ADJUSTED TO PRESERVE EXISTING RIPARIAN TREES AND SHRUBS.
  - ALL SLASH GENERATED DURING CLEARING SHALL BE SALVAGED FOR REUSE BY INCORPORATION INTO THE LARGE WOOD STRUCTURE. SLASH NOT UTILIZED IN THE STRUCTURE SHALL BE SCATTERED ON THE TEMPORARY ACCESS ROUTE.



- NOTES:**
- WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
  - VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES FOR A NATURAL APPEARANCE. SEE DETAILS, SHEET 11.
  - EACH TOP LAYER LOG SHALL BE CONNECTED TO A MINIMUM OF 2 TIMBER PILES. SEE DETAILS, SHEET 11.

**2**  
**9** C4 & C5 - SECTION VIEW - BAR APEX LOG STRUCTURE  
 3 LAYERS  
 0 20  
 SCALE IN FEET



**3**  
**9** C4 & C5 - PROFILE VIEW - BAR APEX LOG STRUCTURE  
 3 LAYERS  
 0 20  
 SCALE IN FEET

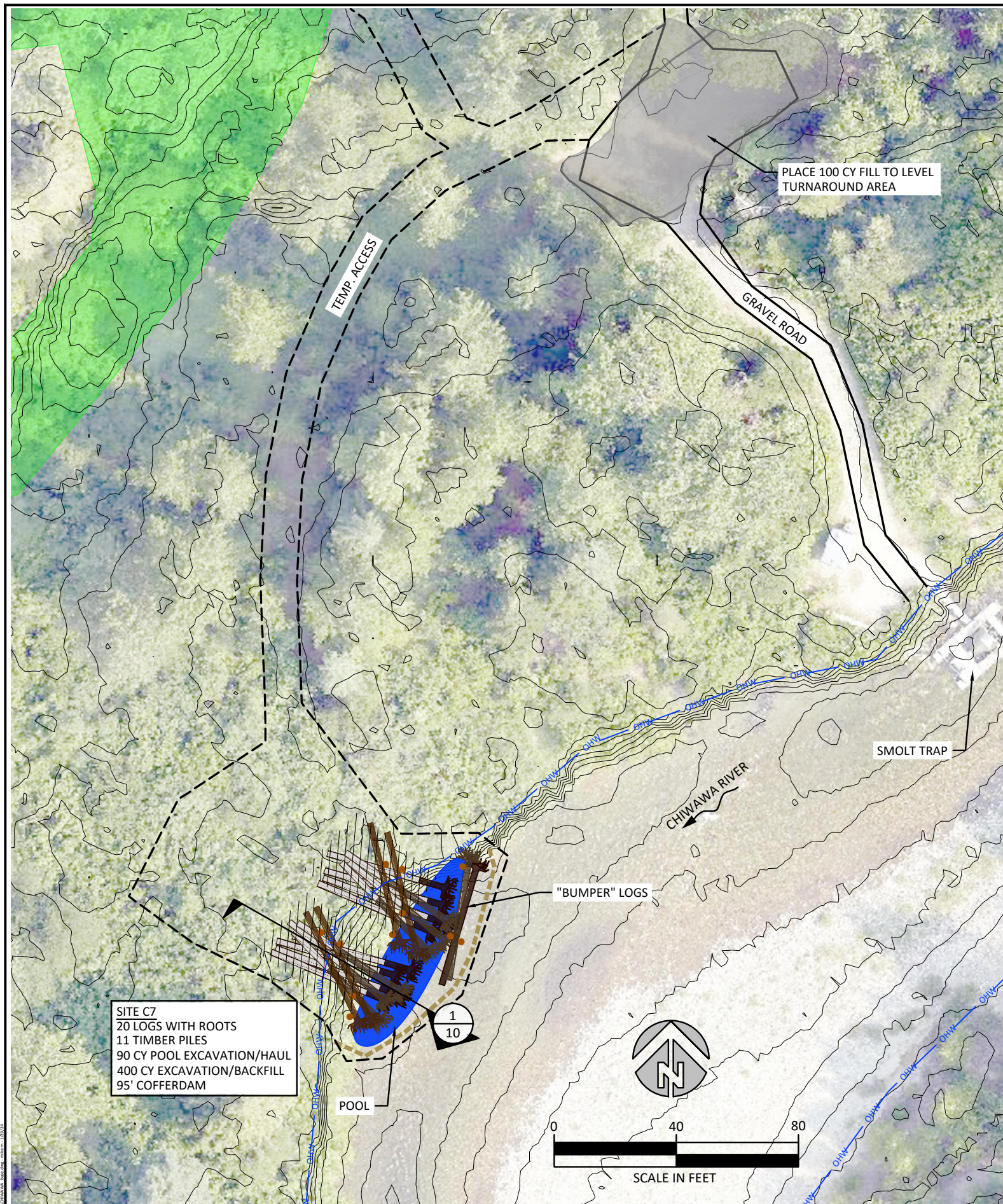
NO.	BY	DATE	REVISION DESCRIPTION

MM	MM	MB
DRAWN	DESIGNED	CHECKED
MB	JAN 30, 2024	
APPROVED	DATE	PROJECT

**YAKAMA NATION FISHERIES**  
**CHIWAWA OUTLET - FISH HABITAT ENHANCEMENT**  
**FINAL DESIGN**

501 Portway Avenue, Suite 101  
 Hood River, OR 97031  
 541.386.9003  
 www.interfluve.com

**PROPOSED CONDITIONS -**  
**CHIWAWA SITES C4 C5 C6**



PLACE 100 CY FILL TO LEVEL TURNAROUND AREA

TEMP. ACCESS

GRAVEL ROAD

SMOLT TRAP

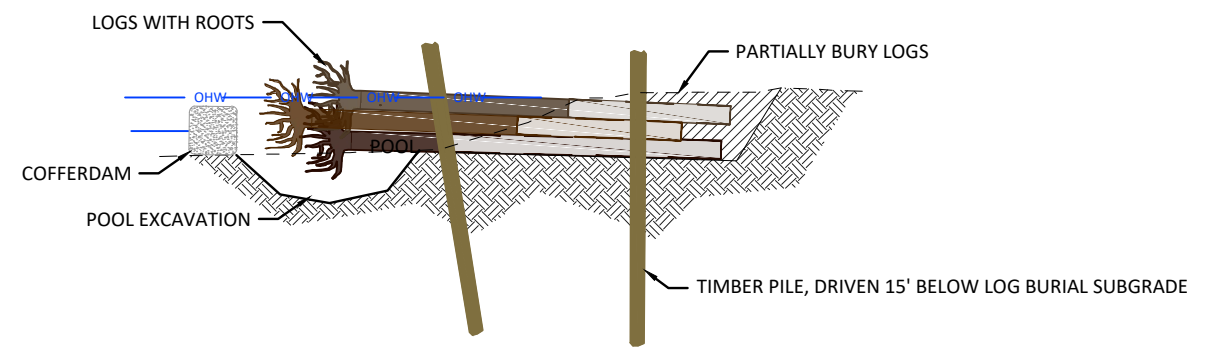
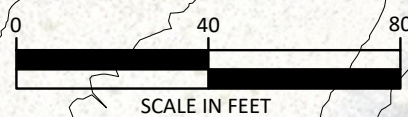
CHIWAHA RIVER

"BUMPER" LOGS

POOL

**SITE C7**  
 20 LOGS WITH ROOTS  
 11 TIMBER PILES  
 90 CY POOL EXCAVATION/HAUL  
 400 CY EXCAVATION/BACKFILL  
 95' COFFERDAM

1  
10



1 C7 - PARTIALLY BURIED LOG STRUCTURE WITH TIMBER PILES  
 10 3 LAYERS



**NOTES:**

- ISOLATE WORK AREA WITH COFFERDAM. PUMP CONSTRUCTION WATER TO INFILTRATION AREAS AND MONITOR FOR FILTRATION PERFORMANCE. NO TURBIDITY SHALL ENTER THE CHIWAHA OR WENATCHEE RIVERS.
- WOOD PLACEMENTS SHOWN ON PLANS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE IN THE FIELD.
- ALL SLASH GENERATED DURING CLEARING SHALL BE SALVAGED FOR REUSE BY INCORPORATION INTO THE LARGE WOOD STRUCTURE. SLASH NOT UTILIZED IN THE STRUCTURE SHALL BE SCATTERED ON THE TEMPORARY ACCESS ROUTE.
- VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT HEIGHTS ABOVE GROUND. CUT OR GRIND TOPS OF PILES FOR A NATURAL APPEARANCE. SEE DETAILS, SHEET 11.
- EACH TOP LAYER LOG SHALL BE CONNECTED TO A MINIMUM OF 2 TIMBER PILES. SEE DETAILS, SHEET 11.

**LEGEND**

- OHW — ORDINARY HIGH WATER
- DELINEATED WETLAND
- - - LIMITS OF DISTURBANCE
- ▨ COFFERDAM
- LARGE WOOD
- ▨ LARGE WOOD PARTIAL BURIAL

NO.	BY	DATE	REVISION DESCRIPTION

MM DRAWN	MM DESIGNED	MB CHECKED
MB APPROVED	JAN 30, 2024 DATE	PROJECT

YAKAMA NATION FISHERIES  
 CHIWAHA OUTLET - FISH HABITAT ENHANCEMENT  
 PLAN VIEW FINAL DESIGN

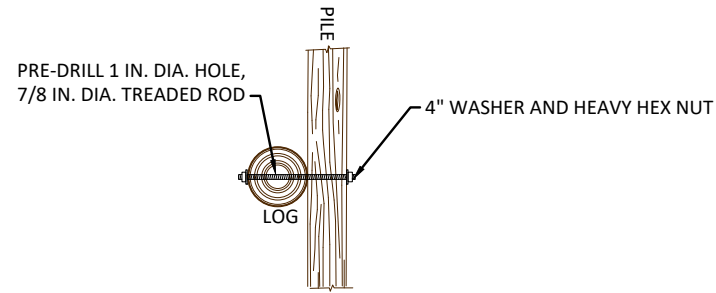


501 Portway Avenue, Suite 101  
 Hood River, OR 97031  
 541.386.9003  
 www.interfluve.com

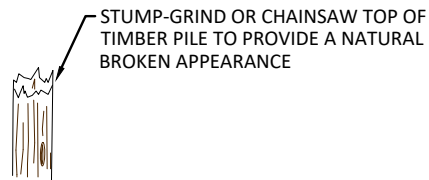
PROPOSED CONDITIONS -  
 CHIWAHA SITE C7

**BOLTED CONNECTION NOTES**

1. DRILL 1" DIA HOLE THROUGH LOGS.
2. INSERT 7/8" DIA THREADED ROD.
3. INSTALL STEEL PLATES AND HEAVY HEX NUTS. SECURE NUTS BY CHISELING THREADS OR MUSHROOMING EXPOSED ENDS OF ROD.
4. FILE OR GRIND OFF SHARP EDGES



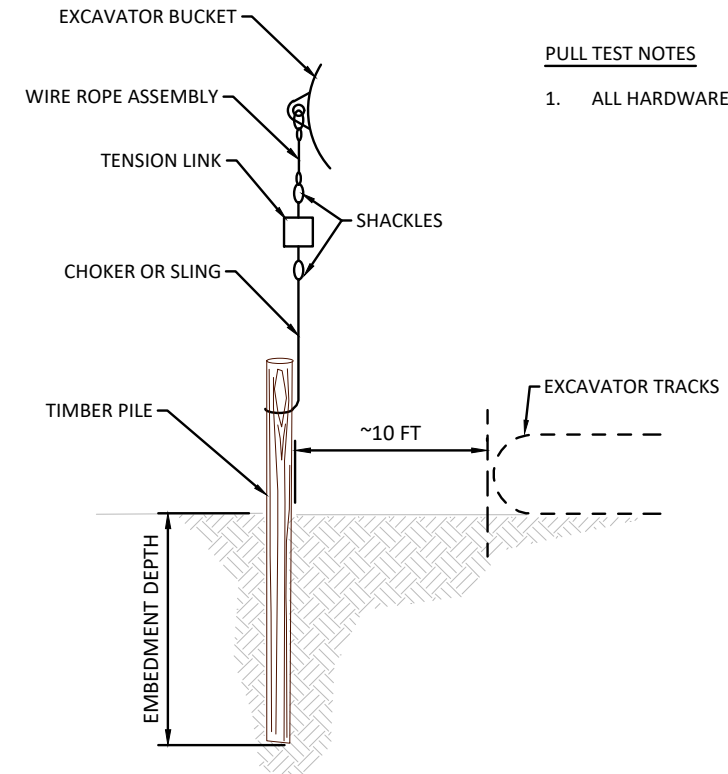
1  
11 TYPICAL DETAIL  
LOG-PILE CONNECTIONS  
NOT TO SCALE



2  
11 TYPICAL DETAIL  
ROUGHENED TOP  
NOT TO SCALE

**PULL TEST NOTES**

1. ALL HARDWARE SHALL BE RATED FOR MIN 12 TON WORKING LOAD



3  
11 TYPICAL DETAIL  
PILE PULL OUT TEST  
NOT TO SCALE

**TIMBER PILE NOTES:**

**GENERAL**

1. THE RESULTS OF ON-SITE PULLOUT TESTS WILL INFORM THE ENGINEER OF THE ACTUAL PERFORMANCE OF SUBSURFACE SOILS, WHICH WILL INFORM THE REQUIRED EMBEDMENT DEPTH. THE CONTRACTOR IS SOLEY RESPONSIBLE FOR SITE SAFETY .

**RIGGING**

1. RIGGING FOR PILE TESTING SHALL CONFORM TO THE TENSION SCALE MANUFACTURER'S RECOMMENDATIONS.
2. CHOKERS, CABLES AND AND SHACKLES SHALL HAVE MINIMUM WORKING LOAD RATING OF 12 TONS. FITTINGS SHALL BE SIZED ACCORDINGLY.

**TESTING**

1. TESTING OF PILES SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER. UP TO FOUR LOAD TESTS SHALL BE APPLIED TO EACH TESTED PILE. EACH OF THE FOUR LOAD TESTS SHALL BE APPLIED TO THE PILE WITH A DIFFERENT INSTALLED DEPTH. PROOF TESTS SHALL BE MADE AT UP TO FOUR EMBEDMENT DEPTHS. DEPTHS SHALL BE DETERMINED IN THE FIELD. AS A GUIDELINE, TEST EMBEDMENT DEPTHS MIGHT INCLUDE 8 FT, 10 FT, 11 FT, AND 12 FT.
2. EACH PILE TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS ALIGNED TO THE LONG AXIS OF THE PILE. RECORD THE PILE DIAMETER, EMBEDMENT DEPTH AND MAXIMUM FORCE REQUIRED TO MOVE THE PILE VERTICALLY APPROXIMATELY 1 INCH. THEN DRIVE THE PILE TO A NEW DEPTH. APPLY NEW LOAD AND RECORD MAX FORCE THAT CAUSES THE PILE TO MOVE VERTICALLY 1 INCH. REPEAT FOR THIRD AND FOURTH TEST.
3. EXCAVATOR SHALL BE NO CLOSER TO PILE THAN NEEDED TO GENERATE DESIRED LOADING. LIMIT COMPRESSIVE LOADING OF THE TRACKS ON THE GROUND BY DRIVING THE EXCAVATOR ONTO LOGS LAID ON THE GROUND TO DISTRIBUTE THE WEIGHT OVER A LARGER AREA.
4. ONE PILE PER LOG STRUCTURE SITE SHALL BE TESTED.
5. PILE EMBEDMENT DEPTH SPECIFIED IN THESE DRAWINGS MIGHT BE INCREASED AT NO ADDITIONAL COST TO THE OWNER PENDING PULL OUT TEST RESULTS . ASSUMED RESISTANCE IS 20,000 POUNDS. IF TESTING REVEALS FIELD PULLOUT RESISTANCE VALUES THAT ARE LESS THAN THE ASSUMED VALUES, PILES MAY BE REQUIRED TO BE DRIVEN UP TO 5 FT DEEPER THAN INDICATED IN PLANS.

NO.	BY	DATE	REVISION DESCRIPTION

MM	MM	MB
DRAWN	DESIGNED	CHECKED
MB	JAN 30, 2024	PROJECT
APPROVED	DATE	PROJECT

**YAKAMA NATION FISHERIES  
CHIWAHA OUTLET - FISH HABITAT ENHANCEMENT  
FINAL DESIGN**



501 Portway Avenue, Suite 101  
Hood River, OR 97031  
541.386.9003  
www.interfluve.com

**TIMBER PILE DETAILS**

SHEET

11 OF 13

Provisions

**INTRODUCTION**

The contractor shall attend a pre-construction meeting with the owner and owner’s representative prior to beginning construction.

The Washington State Department of Transportation's Standard Specifications for Road, Bridge and Municipal Construction 2024 (WSDOT Standard Specifications) shall apply unless otherwise noted in the following Provisions. In case of a conflict between the regulatory standards or specifications, the more stringent will govern. The “Contracting Agency” or “Owner” shall be the Confederated Tribes and Bands of the Yakama Nation. Additional specifications in the following contract sections are included for items not covered by the WSDOT Standard Specifications.

Sections 1-02, 1-03, and 1-08 (except 1-08.6, 1-08.7, 1-08.8) of the Standard Specifications do not apply.

The in-water work window is July 1 - July 31, 2024. High water in the river is commonly until mid-July. Work may occur outside of water before or after the in-water work window. Work shall be only within 7am to 7pm, and maximum of 6 days per week (Mon-Sat).

This project was designed in accordance with the BPA Habitat Improvement Program (HIP). HIP General Conservation Measures (CMs) are included on sheets 3-5. Site specific direction is added to the following Provisions. In a case of a conflict between the regulatory standards or specifications, local regulations, or other contract documentation, the more stringent will govern, unless specified in writing by the Owner.

All excavation activity will be monitored by a cultural resource specialist. If your work brings you into contact with any of the following cultural resources:

- native american cultural artifacts (example: flakes, arrowheads, stone tools, bone tools, pottery, etc.)
- historic era artifacts (example: building foundations, homesteads, shipwrecks, mining camps, etc.)
- human skeletal remains or bone fragments

you must **immediately discontinue** all ground-disturbing activity. Do not touch or move the objects and maintain the confidentiality of the site. Follow the procedures listed in the BPA inadvertent discovery procedure and await further direction from BPA’s cultural resources staff.

LiDAR contours in NAD83 Washington State Plane, North Zone US Feet, NAVD88.

**ITEM 001- TESC, SPCC PLAN AND IMPLEMENTATION**

Description

This work shall provide for preparation, implementation, and removal of a Temporary Erosion Sediment Control (TESC) plan and for the preparation and implementation of a Spill Prevention Control and Countermeasure (SPCC) plan in accordance with Section 1-07.15 of the Standard Specifications, and as amended by these Special Provisions.

The Contractor shall submit a TESC for the project to the Owner for approval. The TESC must satisfy the requirements of the Washington Department of Ecology NPDES Stormwater General Permit for Construction Activity and all other applicable permits. The TESC included in the Drawings and described herein is intended to provide a baseline for sediment and erosion control and does not ensure that the standards established by any applicable permits will be met. The Contractor may use these measures or alternative measures of his own design to ensure satisfactory performance and that the erosion control requirements of all applicable permits are met. The contractor shall be named as the permit holder. The contractor shall be responsible for implementing, inspecting and filing reports, maintaining, replacing, and removing TESC and SPCC measures. The plan shall include the name, address and 24-hour contact number of the person responsible for erosion prevention and sediment control measures.

1. A Spill Containment Kit shall be on site and crews shall be trained in its use.
2. Biodegradable Hydraulic Fluid shall be installed into each piece of heavy machinery working within 50 feet of the river.

Measurement

“TESC, SPCC Plan and Implementation,” including the above amendments to the item will be measured by lump sum.

Payment

Payment shall be considered full compensation for all equipment, labor, tools, materials, and incidentals necessary to complete. “TESC, SPCC Plan and Implementation”, lump sum.

**ITEM 002 - MOBILIZATION**

This item shall consist of preparation work and operations performed by the Contractor in accordance with Chelan County road requirements, the provisions of Section 1-09.7 of the Washington Department of Transportation Standard Specifications (Standard Specifications), and amended as follows:

1. Prior to entering the site, all equipment shall be power washed, become fully dry, and inspected to make sure no plants, soil, or other organic material adheres to the surface. If equipment leaves the site and returns, it shall be rewashed and inspected prior to accessing the site.

Temporary traffic control requirements shall include measures per Section 1-10 and local regulations. It is the Contractor’s responsibility to obtain County permit.

2. Temporary site access shall be along alignments and staging are shown in the plans. These are approximate. Actual disturbance limits will be staked and flagged in the field by the Owner. Designated disturbance limits shall be strictly adhered to.

3. Designated river crossing is shown in the Plans. River crossings shall be limited to a total of two round trip crossings.

4. Prior to demobilization, equipment tracks shall be graded smooth. Access routes, and stockpile and staging areas shall be returned to original or better condition. Any removed or damaged fences shall be repaired or replaced.

Measurement and Payment

Payment for Mobilization shall be by the lump sum contract price for, 'Mobilization', partial payments will be made as in accordance with Section 1-09.9 of the Standard Specifications. Payment shall be considered full compensation for all equipment, labor, tools, materials, and incidentals necessary to complete this work as specified.

**ITEM 003 - CRUSHED SURFACING TOP COURSE**

This item shall consist of access route improvement work performed by the contractor following demobilization of excavators and haul trucks.

Where indicated in the Plans and as directed by the Owner, a 2” thick compacted course of 5/8” Crushed Surfacing Top Course shall be installed to restore or improve the 0.25 mile of access road and the turnaround area. Watering of the road surface during installation and compaction shall be included.

Measurement

Crushed Surfacing Top Course, mixed by road mix method, will be measured per cubic yard. Measurement will be made in the hauling conveyance at the point of delivery.

Payment

The Contract unit price per cubic yard for “Crushed Surfacing Top Course” shall be full compensation for all labor, materials, tools and equipment necessary to satisfactorily procure, deliver, stockpile, haul, and construct and place Crushed Surfacing Top Course.

**ITEM 004 - CLEARING AND GRUBBING**

This item consists of clearing and grubbing for construction as shown on the plans including those areas required for Temporary Access Routes and in accordance with Section 2-01 of the Standard Specifications, and as amended by these Special Provisions.

1. Areas for Clearing and Grubbing are shown in the Plans. Adjustments to alignments and extents may be adjusted by the Owner to reduce damage to the environment. The final areas will be flagged in the field by the Owner prior to Clearing and Grubbing work. Clearing and Grubbing shall not occur outside of the designated limits.

2. Included in this item are the removal and salvage of trees and shrubs. Salvaged trees and shrubs shall be installed as woody material during construction. To the maximum practicable extent, the Contractor shall remove salvaged trees by excavating to loosen soil around each rootwad and then push over the trees in order to salvage logs with intact and attached roots. Salvaged trees may be temporarily stockpiled outside of the clearing limits but within reach of the excavator during access reclamation.

3. Vegetation protection and restoration per Section 1-07.16(2) shall be incidental to Clearing and Grubbing. All trees not marked for removal shall be preserved and undisturbed. construction activity shall not debark or damage live trees. Keep out of drip line of all trees outside of clearing limits. With prior approval by the Owner, trees may be limbed to facilitate equipment movement and site safety.

Measurement

“Clearing and Grubbing,” including the above amendments, will be measured by lump sum.

Measurement and compensation for the installation of the salvaged trees is described under “Logs” and paid under that item. No additional compensation will be allowed.

Payment

Payment will be made in accordance with Section 1-09.9 for the following bid items: “Clearing and Grubbing” per lump sum.

**ITEMS 005-011 LOG STRUCTURE**

Description

“Log Structure” includes all work associated with onsite movement and installation of logs with roots, timber piles, bumpers, salvaged trees, slash. The work includes securing using threaded rod as shown in the Plans. This item includes movement from stockpiles to installation areas, excavation and backfill to partially bury “Log Structure”. Cofferdam and pumping are required at designated “Log Structures” shown in the Plans.

Materials

Logs with Roots and Timber Piles will be supplied by the Owner to the staging areas shown in the Plans. The Contractor shall load and haul the logs from the Owner's stockpile. Quantities to be moved to each site are shown in the Plans.

Owner supplied Logs will have the following characteristics:

1. Logs with Roots: 40' long and >18" dbh.
2. Timber Piles: 20' long and 16” diameter in middle of log.
3. Slash: Slash includes shrubs and small trees removed from access routes and excavation areas.
4. Threaded Rod: Install threaded rod, washers, and nuts as specified in the Plans.

Construction Requirements

Logs: Locations of Logs with Roots shall generally be as indicated on the Plans. However, final location will depend upon the size, shape and quantity of material delivered or salvaged. Installation of Logs with Roots shall be understood to require a “fit in the field” approach as directed by the Owner. Logs with Roots shall be stabilized by partial burial and/or attachment to Timber Piles using Threaded Rod. The Owner may request that some logs be cut or broken to customize fit and placement. The pieces of cut logs will be incorporated into Log Structures as Slash.

Timber Piles: Approximate installation locations of timber piles are shown in the Plans. Specific locations shall be determined in the field and directed by the Owner. The required embedment depth is indicated on the plans. Installed Timber Piles shall also have the following field-directed characteristics:

- a. Timber Piles shall be installed at various angles and with varying heights above ground to break up a uniform appearance.
- b. Each Timber Pile log shall have the finished appearance of a broken top by stump-grinding or making multiple plunge cuts with chain saw to provide a roughened or ragged end.

Timber Piles shall be installed by vibratory hammer. Vibratory hammer shall have the following characteristics:

- a. Minimum of 800 kN (80 tons) of centrifugal force.
- b. Side grip with minimum 16” space between ends of jaws so that 16” diameter log will fit into the jaws without needing to slide the grip over the end and down the log.

Testing: At each Log Structure site, a minimum of one pile shall be tested for pullout resistance. Each test will require up to four individual pulls, each at a deeper depth. See details in Plans. The Contractor shall provide the tension link, meter, and associated hardware (rated 12 tons).

Threaded Rod: Install threaded rod where shown in the Plans or as directed by Owner.

Slash: Trees and shrubs removed by clearing for access or site excavations shall be utilized as Slash. Slash shall be incorporated into log structures as directed by the Owner. Intermingle, stack, and rack slash material to the installed logs and piles to emulate natural accumulations of wood material.

Earthwork: Where partial burial of logs is required, excavate to subgrade. Stockpile the fill within the designated disturbance area. Sort materials by general sizes, separating piles as coarse and fine material, and topsoil. Install timber piles. Backfill the logs as each layer is installed. Use coarse fill in lower layer and along waterward edge, and finer materials above. Replace topsoil on finished surface. Approximately 360 cy of pool excavation shall be hauled. 100 cy shall be placed and graded to make a level pad at the turnaround area. The remaining 260 cy shall become the property of the Contractor and hauled off-site.

Cofferdam: Cofferdams are shown in plans where isolation of the work area shall be required to prevent turbidity from entering the waterway. See plans for bulk bag cofferdam. Two 4” or one 6” trash pump(s) shall be used to pump construction water to infiltration areas while excavating pools. Sheet pile is a preferred and pre-approved alternative to bulk bag cofferdam. Other alternative cofferdam methods shall be submitted in the Contractor's proposal for review.

Measurement

“Log Structure” will be measured by per each completed site (C1-C7).

Payment

Payment will be made in accordance with Section 1-09.9 for the following bid items: “Log Structure” as per each.

The contract price for “Log Structure” shall be full compensation for all costs incurred for equipment, materials and labor for loading and hauling logs from stockpile areas, installing logs, earthwork for burying logs, timber piles and threaded rod, and slash as outlined in the plans. Other work and materials incidental to "Log Structure" include: haul and disposal of fill, filling and grading of turnaround area, coordination with fish rescue, cofferdam and pumping, and control of turbidity from cofferdam and pump discharge.

				<p style="text-align: center;"><b>YAKAMA NATION FISHERIES</b> <b>CHIWAHA OUTLET - FISH HABITAT ENHANCEMENT</b> <b>FINAL DESIGN</b></p>			 <p>501 Portway Avenue, Suite 101 Hood River, OR 97031 541.386.9003 www.interfluve.com</p>		<p><b>SPECIFICATIONS</b></p>		<p style="text-align: center;">SHEET <b>12 OF 13</b></p>	
				MM DRAWN	MM DESIGNED	MB CHECKED						
				MB APPROVED	JAN 30, 2024 DATE	PROJECT						
NO.	BY	DATE	REVISION	DESCRIPTION								

**COFFERDAM {Incidental to other items}**

Description

This item consists of providing and installing, maintaining, and removing measures to bypass the surface waters of the stream around in-channel work areas, and to prevent turbidity from entering the river.

Cofferdam shown in the Plans is one acceptable method. The Contractor may use this method or propose a different method that provides equal or better isolation of the work area from the flow. If a different method is proposed, Contractor shall submit drawings showing details of proposed methods for providing temporary isolation of surface water during construction activities. Review and approval of the Cofferdam Plan shall not relieve the Contractor from full responsibility for the adequacy of cofferdam work if the proposed plan is not successful at properly isolating the work area. Sheet pile installed by vibratory driver is a pre-approved cofferdam method. Driving sheet pile by impact hammer is not acceptable.

Cofferdams shall be suitably offset from work area so as to not interfere with log placement or limit pool excavation.

The work includes coordinating with the Owner for fish salvage and relocation activities. Excavation or log placement shall not occur until the Owner completes fish salvage.

Materials

The Contractor shall provide all required materials for the project. If Bulk Bag Cofferdam is the method to be used, see details for Bulk Bag Cofferdams on the Plans. Bulk Bag Cofferdams shall be filled with washed cobbles from off-site.

Sandbags filled with pea gravel or stream gravel. Using sand will not be allowed.

Construction Requirements

The contractor shall isolate the work area from the river by installing cofferdam per the plans. No turbidity from construction activities shall enter the river. Cofferdams shown on the plans are a suggested method. If Contractor elects to use alternate method(s) for temporary cofferdams, Contractor shall provide to the Owner a cofferdam/diversion plan for review prior to implementation.

1. Cofferdam
  - a. Construction methods for Bulk Bag Cofferdams are described in the project plans.
2. Coordination with Fish Rescue
  - a. The Contractor shall provide minimum 2 days advance notice to the Owner before each cofferdam installation date. The Contractor shall understand that cofferdam installation requires coordination with the Owner and only after the Owner has completed fish rescue can the cofferdams be completed. The Contractor is advised that fish rescue may take up to 24 hours per cofferdam.

Measurement and Payment

Cofferdam shall be incidental to "Log Structure".

**PUMPING {Incidental to other items}**

This item includes dewatering and controlling turbidity within construction areas isolated from the river by Cofferdams.

Description

The work consists of furnishing, monitoring, operating, maintaining, and removing pumps, coordinating with the Owner for fish salvage relocation activities, and installation of control of water BMPs.

Materials

1. Two 4" trash pumps, each with pumping capacity greater than 500 gpm, assuming 12 feet of vertical lift and 300 feet of discharge hose. To prevent turbidity from entering the river, pumps may need to run 24 hrs or until water is clear. Pumps shall have soundproofing. Electric pumps with generators and quiet packs are a preferred and pre-approved method.
2. Each water intake shall have a fish screen installed, operated and maintained according to NMFS' fish screen criteria (NMFS 1997; NMFS 2008). No pumping can occur until fish screen has been approved by Owner prior to installation.
3. Pumps shall be placed within a rigid or flexible container to contain fuel or oil spills. Diapers shall be stored at each pump.
4. Environmental Protection Measures such as straw bales, perforated pipe for discharge flow distributors, geotextiles, filter bags, or other means of controlling water and turbidity. No turbidity shall be allowed to enter the river or wetlands.

Construction Requirements

1. Pumps
  - a. Groundwater will be encountered during excavations. During construction of side-channel, construction water shall be pumped away from work areas to be infiltrated into the ground and without entering the river.
  - b. To help prevent turbidity from leaking through cofferdams, the contractor shall provide and operate 6" trash pump(s) to lower the water surface within the isolated area and discharge to an infiltration area.

Environmental Protection Measures

- a. If observed or measured turbidity downstream of cofferdam or pump discharge is more than 10% above the upstream background visual observation or measurement, the activity must be modified to reduce turbidity. Continue to monitor every 2 hours as long as instream activity continues.
- b. If exceedances occur for more than two consecutive monitoring intervals (after 4 hours), the activity must stop until the turbidity level returns to background, and the EC lead must be notified within 48 hours.
- c. 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. Additional and alternative methods, such as pumping into stilling basins or filtration geotextile fabric shall be required at the Contractor's expense.

Measurement and Payment

Measurement will be based on the item from the bid list installed and the work for that portion completed. The unit contract prices for "Pumping" shall be full compensation for all costs incurred for equipment, materials and labor for furnishing, installing, securing, maintaining and removal of pumping equipment as outlined in the plans. If additional environmental protection measures are required to control turbidity, they shall be considered incidental to pumping and no additional compensation will be made.

Pumping shall be incidental to "Log Structure".

NO.	BY	DATE	REVISION DESCRIPTION

MM	MM	MB
DRAWN	DESIGNED	CHECKED
MB	JAN 30, 2024	
APPROVED	DATE	PROJECT

**YAKAMA NATION FISHERIES  
CHIWAHA OUTLET - FISH HABITAT ENHANCEMENT  
FINAL DESIGN**



501 Portway Avenue, Suite 101  
Hood River, OR 97031  
541.386.9003  
www.interfluve.com

**SPECIFICATIONS**