METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1
FINAL DESIGN DRAWINGS

PREPARED FOR:
YAKAMA NATION FISHERIES
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PROJECT GOALS:

- IMPROVE POOL QUANTITY/QUALITY AND COVER FOR ADULT HOLDING AND SUMMER/WINTER REARING FOR SPRING AND SUMMER CHINOOK SALMON, BULL TROUT, COHO SALMON, STEELHEAD, AND LAMPREY.
- IMPROVE OR MAINTAIN ATTRACTIVE FLOW TO THE METHOW PUD HATCHERY VOLITIONAL CHANNEL.
- IMPROVE WIDTH TO DEPTH RATIO AT CONFLUENCE OF VOLITIONAL CHANNEL AND METHOW RIVER TO IMPROVE PASSAGE FOR RETURNING ADULT SALMON (NEAR BASEFLOW CONDITIONS).
- MINIMIZE RISK TO PUBLIC SAFETY IN THE MAINSTEM METHOW RIVER.
- AVOID INCREASE IN FLOOD HEIGHT AND EROSIVE FORCE (SHEAR STRESS) THAT MAY ADVERSELY AFFECT PRIVATE PROPERTY AND INFRASTRUCTURE.

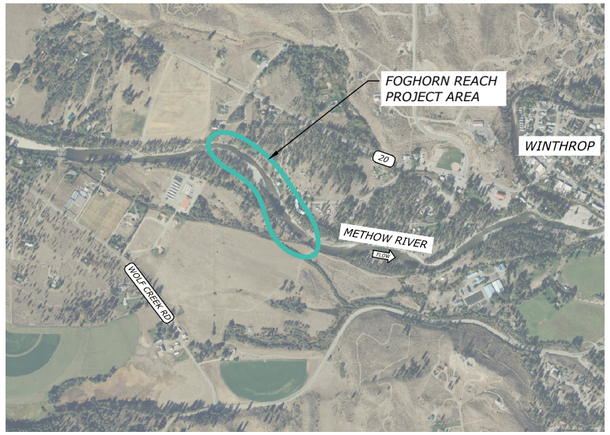
PROJECT OBJECTIVES:

- INSTALL ENGINEERED LARGE WOOD HABITAT STRUCTURES WITH EXCAVATED POOLS IN LOCATIONS WHERE HYDRAULICS WILL MAINTAIN PERSISTENT HABITAT.
- IMPROVE PASSAGE INTO HATCHERY CHANNEL OUTLET AT THE CONFLUENCE WITH THE METHOW RIVER.

SHEET INDEX

LOCATION MAP
NOT TO SCALE

VICINITY MAP
NOT TO SCALE



PROJECT MAP
NOT TO SCALE

Applied Science & Engineering

Yakama Nation Fisheries

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FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUN YOUNG — STATE OF WASHINGTON — 52975 — REGISTERED PROFESSIONAL ENGINEER — 4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

DRAWING NAME
GENERALS

COVER

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GENERAL NOTES AND REQUIREMENTS

GENERAL

1. PROJECT COORDINATE SYSTEM (HORIZONTAL DATUM) IS NAD83 WASHINGTON STATE PLANE, NORTH ZONE, US FOOT. THE VERTICAL DATUM IS NAVD88.
2. THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, AND MUNICIPAL CONSTRUCTION (WSDOT STANDARD SPECIFICATIONS, 2018 EDITION) SHALL APPLY UNLESS OTHERWISE NOTED IN THE DRAWINGS OR PROJECT SPECIAL PROVISIONS (SPECIFICATIONS).
3. TOPOGRAPHIC MAPPING WITHIN THE PROJECT AREA IS BASED ON 2022 GREEN TOPOBATHYMETRIC LIDAR DATA COLLECTED BY NV5. ALL DIMENSIONS ON THE DRAWINGS ARE IN UNITS OF FEET AND DECIMALS, UNLESS OTHERWISE SPECIFIED.

DESCRIPTION OF WORK

1. THIS PROJECT WILL IMPROVE BANK, CHANNEL, RIPARIAN, AND AQUATIC HABITAT CONDITIONS TO ADDRESS LIMITING FACTORS ASSOCIATED WITH ESA LISTED CHINOOK SALMON AND STEELHEAD WITHIN THE METHOW RIVER. IT WILL INCREASE IN-STREAM HYDRAULIC DIVERSITY, STREAM COVER, AND MICROHABITATS ALONG CHANNEL MARGINS, INCREASE FREQUENCY, DURATION, AND AREA OF FLOODPLAIN INUNDATION, AND IMPROIVE RIPARIAN COMMUNITIES.
2. THE WORK WILL INCLUDE THE FOLLOWING ACTIVITIES AS SHOWN ON THE DRAWINGS: INSTALLATION AND REMOVAL OF TEMPORARY CONSTRUCTION ACCESS ROUTES AND COFFERDAMS, DEWATERING, EARTHWORK WITHIN THE EXISTING CHANNEL AND FLOODPLAIN (EXCAVATION OF PILOT CHANNELS), INSTALLATION OF MULTIPLE WOOD HABITAT STRUCTURES TO ENHANCE AQUATIC HABITAT, AND REVEGETATION OF ALL DISTURBED AREAS (PLANTING AND/OR SEEDING). ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, DRAWINGS, AND SPECIFICATIONS.

PROJECT ROLES

1. THE ABOVE WORK IS TO BE PERFORMED FOR YAKAMA NATION FISHERIES, HEREAFTER REFERRED TO AS THE "SPONSOR". ONLY THE SPONSOR MAY APPROVE CHANGES TO THE CONTRACT AMOUNT AND THE CONTRACT REQUIREMENTS. THE SPONSOR WILL APPOINT A PROJECT STAFF MEMBER, HEREAFTER REFERRED TO AS "CONTRACTING OFFICER", WHO WILL ADMINISTER THE CONSTRUCTION CONTRACT AND PAYMENTS, BE THE PRIMARY POINT OF CONTACT WITH THE CONTRACTOR, ENGINEER, AND REGULATORY AGENCIES, DISTRIBUTE INFORMATION, REVIEW AND COORDINATE DESIGN CHANGES, SUBMITTALS, AND REQUESTS FOR INFORMATION (RFI'S), PERFORM FIELD OVERSIGHT AND INSPECTIONS, AND COORDINATE PRE-FINAL AND FINAL INSPECTIONS AND DEVELOP ASSOCIATED PUNCH LIST ITEMS. THE CONTRACTING OFFICER WILL ALSO COORDINATE ALL FISH SALVAGE ACTIVITIES (TO BE COMPLETED BY PROJECT PARTNERS) AND WILL BE RESPONSIBLE FOR COORDINATION WITH PROPERTY OWNERS.
2. RIO ASE, HEREAFTER REFERRED TO AS THE "ENGINEER," IS THE SPONSOR'S REPRESENTATIVE WHO HAS DESIGNED THE PROJECT. THE ENGINEER PROVIDES CLARIFICATION TO THE CONTRACTOR AND/OR CONTRACTING OFFICER REGARDING THE INTENT OF THE DRAWINGS AND SPECIFICATIONS AND WHETHER ALL THE PROPOSED OR COMPLETED WORK IS IN COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS. THE ENGINEER WILL ALSO REVIEW ANY PROPOSED DESIGN CHANGES, SUBMITTALS, AND RFI'S, AND HELP TO PREPARE PRE-FINAL AND FINAL PUNCH LIST ITEMS.
3. THE OWNERS OF THE PROPERTY WHERE CONSTRUCTION WILL OCCUR ARE DOUGLAS COUNTY PUD, METHOW CONSERVANCY, JULIE MUYLLAERT, JESSICA KLEIN, AND, HEREIN REFERRED TO AS THE "PROPERTY OWNERS."
4. CONSTRUCTION OBSERVATION MAY BE PROVIDED BY THE SPONSOR AND THE ENGINEER. CONSTRUCTION OBSERVERS WILL NOT DIRECT THE CONTRACTOR IN ANY WAY BUT WILL ADVISE THE CONTRACTING OFFICER REGARDING THE TECHNICAL REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, AND WHETHER THE ONGOING WORK IS IN COMPLIANCE OR IF THERE ARE DISCREPANCIES. THE CONSTRUCTION OBSERVERS ARE NOT RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, PROCEDURES AND/OR SAFETY OF THE CONTRACTOR.
5. CONTRACTOR SHALL COORDINATE ALL WORK AND ACCESS TO THE SITE WITH THE CONTRACTING OFFICER.

WORK SCHEDULE

1. THE CONTRACTOR SHALL COMPLETE ALL CONSTRUCTION INCLUDING CORRECTION AND ACCEPTANCE OF DEFECTIVE WORK AND DEMOBILIZATION PRIOR TO _____.
2. THE APPROVED IN-WATER WORK WINDOW FOR THIS PROJECT IS JULY 1 TO JULY 31. ALL WORK REQUIRING EQUIPMENT TO OPERATE PARTLY, OR WHOLLY, BELOW THE ORDINARY HIGH WATER LINE SHALL BE COMPLETED DURING THE IN-WATER WORK WINDOW.
3. THE CONTRACTOR MAY NOT LEAVE THE WORK SITE OR SUSPEND ACTIVITY FOR MORE THAN FIVE (5) CONSECUTIVE DAYS AFTER MOBILIZING TO THE SITE AND PRIOR TO REACHING SUBSTANTIAL COMPLETION UNLESS OTHERWISE APPROVED BY THE CONTRACTING OFFICER.
4. THE NORMAL WORK HOURS SHALL BE 7:00 AM TO 5:00 PM, MONDAY THROUGH FRIDAY. NO WORK SHALL BE PERFORMED AT THE SITE OUTSIDE THE NORMAL WORK HOURS, OR ON SATURDAYS, SUNDAYS, OR HOLIDAYS UNLESS AUTHORIZED BY THE CONTRACTING OFFICER. THE CONTRACTOR SHALL REQUEST WORK HOUR VARIATIONS IN WRITING VIA EMAIL FROM THE CONTRACTING OFFICER PRIOR TO WORKING OUTSIDE NORMAL WORK HOURS.

SITE LOCATION

1. ALL WORK IS ON THE METHOW RIVER, ASSOCIATED FLOODPLAIN, AND UPLAND AREAS. THE PROJECT IS LOCATED ON PRIVATE AND PUBLIC LAND: SECTION 3, TOWNSHIP 34 NORTH, RANGE 21 EAST, OKANOGAN COUNTY, WASHINGTON.
2. CONSTRUCTION ACCESS TO THE RIVER WILL BE IDENTIFIED BY THE CONTRACTING OFFICER. SITE IMPROVEMENTS MAY BE REQUIRED TO CREATE ACCESS POINTS SUITABLE FOR MOBILIZATION OF CONSTRUCTION EQUIPMENT AND DELIVERY OF PROJECT MATERIALS.

EXISTING CONDITIONS LEGEND

- PROPERTY LINE, APPROXIMATE
- EXISTING CONTOUR (1-FT INTERVAL)
- EXISTING ACCESS ROAD
- EXISTING OVERHEAD POWER LINE
- POWER POLE
- EXISTING CHANNEL
- OHW — ORDINARY HIGH WATER (OHW)
- EXISTING RIP RAP
- EXISTING CATEGORY 3 WETLAND

PROPOSED CONDITIONS LEGEND

- PROPOSED CONTOUR (1-FT INTERVAL)
- CHANNEL THALWEG
- GL — GRADING LIMIT
- PROPOSED INUNDATION (LOW FLOW - 131 CFS)
- POOL EXCAVATION
- WOOD HABITAT STRUCTURE
- CONSTRUCTED RIFFLE
- FILL (COARSE NATIVE ALLUVIUM)
- SHORT ROUGHENED EDGE
- TEMPORARY ACCESS ROUTE
- TEMPORARY COFFERDAM
- SPOILS AREA
- TEMPORARY MATERIAL STOCKPILE AREA
- TEMPORARY STAGING AND REFUELING AREA

ABBREVIATIONS

AC	ACRE
BMP	BEST MANAGEMENT PRACTICES
BO	BIOLOGICAL OPINION
BPA	BONNEVILLE POWER ADMINISTRATION
CFS	CUBIC FEET PER SECOND
CO/C.O.	CONTRACTING OFFICER
CP	CONTROL POINT
CSRO	COLUMBIA-SNAKE SALMON RECOVERY OFFICE
CWA	CLEAN WATER ACT
CY	CUBIC YARDS
DBH	DIAMETER AT BREAST HEIGHT
DEQ	DEPARTMENT OF ENVIRONMENTAL QUALITY
DSL	DEPARTMENT OF STATE LANDS
EA	EACH
E.	EAST
EG	EXISTING GROUND
EL	ELEVATION
EPA	ENVIRONMENTAL PROTECTION AGENCY
ESA	ENDANGERED SPECIES ACT
FCRPS	FEDERAL COLUMBIA RIVER POWER SYSTEM
FG	FINISH GRADE
HIP	HABITAT IMPROVEMENT PROGRAM
HWY	HIGHWAY
I	INTERSTATE
LWD	LARGE WOODY DEBRIS
LWM	LARGE WOODY MATERIAL
MC	MAIN CHANNEL
MW	MONITORING WELL
N.	NORTH
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NMFS	NATIONAL MARINE FISHERIES SERVICE
NPDES	NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
OC	ON CENTER
OG	ORIGINAL GRADE
OHW	ORDINARY HIGH WATER
OSHA	OCCUPATIONAL SAFTEY AND HEALTH ADMINISTRATION
PH	PHONE
PLS	PURE LIVE SEED
PLS/AC	PURE LIVE SEED PER ACRE
PP	PLAN AND PROFILE
R	RANGE
REM	RELATIVE ELEVATION MODEL
S.	SOUTH
SC	SIDE CHANNEL
SEC.	SECTION
SHPO	STATE HISTORIC PRESERVATION OFFICE
STA	STATION
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
SY	SQUARE YARDS
T	TOWNSHIP
TESC	TEMPORARY EROSION & SEDIMENT CONTROL
TOB	TOP OF BANK
TYP	TYPICAL
U.G.	UNITED STATES
USACE	UNITED STATES ARMY CORPS OF ENGINEERS
USBR	UNITED STATE BUREAU OF RECLAMATION
USFS	UNITED STATES FOREST SERVICE
USFWS	UNITED STATES FISH & WILDLIFE SERVICE
V	VOLTS
W.	WEST
WDFW	WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
WSE	WATER SURFACE ELEVATION
YR	YEAR

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HIP IV CONSERVATION MEASURES APPLICABLE TO ALL ACTIONS

THE ACTIVITIES COVERED HERE 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.

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 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 PROJECT SPONSOR 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; AND

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.

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 PROJECT SPONSOR.

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OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNYOUNG — STATE OF WASHINGTON — 52975 — REGISTERED PROFESSIONAL ENGINEER — 4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

DRAWING NAME
GENERALS

HIP CONSERVATION MEASURES 1

DRAWING NO.
G3
SHEET 3 OF 19

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

C. SAMPLE PROCESSING.

1. FISH SHOULD BE SORTED BY SIZE TO AVOID PREDATION DURING SAMPLING.
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 PROJECT SPONSOR 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).

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 REPETIVE 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.

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH
RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNYONG YOUNG
STATE OF WASHINGTON
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HIP CONSERVATION MEASURES 2

DRAWING NO.

G4

SHEET 4 OF 19

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 PROJECT SPONSOR UNDER ADVISEMENT BY THE NMFS HABITAT BIOLOGIST.

2. CONSTRUCTION AND DISCHARGE WATER.

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

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

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

3. TIME AND EXTENT OF DISTURBANCE.

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

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

4. CESSATION OF WORK.

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

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

5. SITE RESTORATION.

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

B. PROJECT-RELATED WASTE WILL BE REMOVED.

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

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

6. REVEGETATION.

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

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

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

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

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

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

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

7. SITE ACCESS AND IMPLEMENTATION MONITORING.

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

B. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL SUBMIT THE 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.

9. 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.

4. TURBIDITY MONITORING PROTOCOL WILL BE APPLIED TO REWATERING EFFORTS.
5. 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.
6. INSTALL SEINE NETS AT UPSTREAM END TO PREVENT FISH FROM MOVING DOWNSTREAM UNTIL 2/3 OF TOTAL FLOW IS RESTORED TO THE CHANNEL.
7. STARTING IN EARLY MORNING INTRODUCE 1/3 OF NEW CHANNEL FLOW OVER PERIOD OF 1-2 HOURS.
8. INTRODUCE SECOND THIRD OF FLOW OVER NEXT 1 TO 2 HOURS AND BEGIN FISH SALVAGE OF BYPASS CHANNEL IF FISH ARE PRESENT.
9. 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).
10. INTRODUCE FINAL THIRD OF FLOW ONCE FISH SALVAGE EFFORTS ARE COMPLETE AND DOWNSTREAM TURBIDITY VERIFIED TO BE WITHIN ACCEPTABLE RANGE.
11. INSTALL PLUG TO BLOCK FLOW INTO OLD CHANNEL OR BYPASS. REMOVE ANY REMAINING SEINE NETS.
12. IN LAMPREY SYSTEMS, PERFORM LAMPREY SALVAGE AND DRY SHOCKING MAY BE NECESSARY.

10. 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 PROJECT SPONSOR 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 PROJECT SPONSOR USING THE PROJECT COMPLETION FORM (PCF).

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

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HIP CONSERVATION MEASURES 3

DRAWING NO.

G5

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CONSTRUCTION QUANTITIES

Item Description	Overall QTY	North Work Area QTY	South Work Area QTY	Unit
General				
Mobilization and Demobilization	1			LS
Environmental Controls	1			LS
Temporary Construction Access	1			LS
Cofferdams and Dewatering	1			LS
Site Work				
Earthwork				
Channel Excavation (cut)	386	90	296	CY
Backfill for Wood Structures	386	90	296	CY
*Constructed Riffle	104		104	CY
Wood Material Acquisition and Delivery	1			LS
HS-1: Three Log Structure	2		2	EA
HS-2: Low Profile Bank Jam	2		2	EA
HS-3: Large Bank Jam	2	2		EA
HS-4: Single Log Structure	10		10	EA
Roughened Edge Bank Treatment	93		93	LF
**Medium Track Hoe (i.e. CAT 330 or similar)	10			HRS
Crushed Surfacing Top Course	210	210		CY

*CONSTRUCTED RIFFLE QUANTITY ASSUMES MATERIAL ONSITE IS UNSUITABLE FOR RIFFLE CONSTRUCTION. IT IS ANTICIPATED THAT MUCH OF THE EXCAVATED MATERIAL WILL BE SUITABLE FOR RIFFLES THOUGH D84-D100 MATERIAL MAY NEED TO BE ADDED/MIXED IN TO MEET THE SPECIFIED GRADATION.

**OPTIONAL BID ITEM, TO BE PERFORMED AS DIRECTED BY THE CONTRACTING OFFICER.

WOOD MATERIALS SCHEDULE

MATERIAL TYPE	SIZE (DBH) (IN)	MIN. LENGTH (FT)	ROOTWAD	MIN. ROOTWAD DIA. (FT)	BRANCHES	NORTH AREA QTY	SOUTH AREA QTY	TOTAL	UNIT
*TYPE 1	18" - 24"	35 - 40	YES	5	NO	22	24	46	EA
*TYPE 2	18" - 24"	30 - 35	YES	NA	NO	0	21	21	EA
*TYPE 3	18" - 24"	25 - 30	NO	NA	NO	8	18	26	EA
RACKING	6" - 14"	15 - 25	YES	2.5	YES	24	76	100	EA
SLASH	1" - 4"	5 - 15	NA	NA	YES	10	114	124	CY
*TYPE 1, 2, AND 3 LOGS ARE SUPPLIED BY THE PROJECT SPONSOR, CONTRACTOR IS RESPONSIBLE FOR TRANSPORTING FROM THE SOURCE TO THE PROJECT SITE.									

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CONSTRUCTION QUANTITIES

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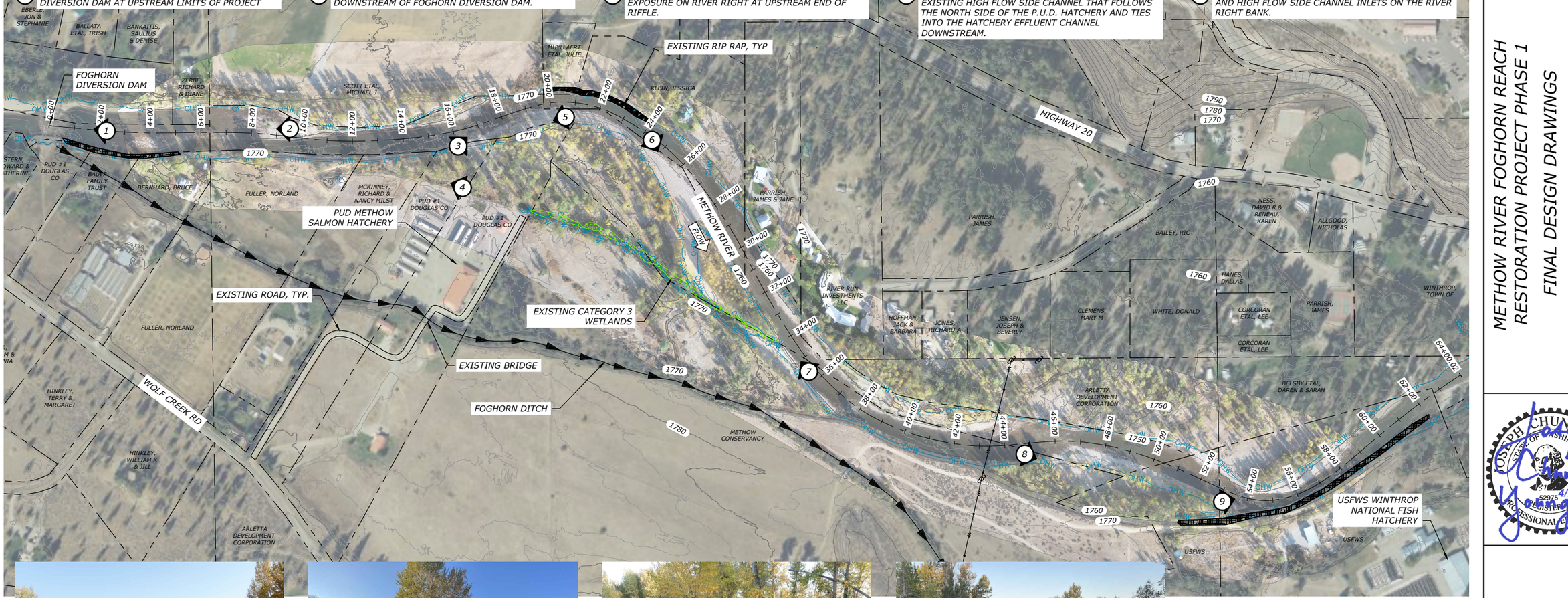
1 LOOKING UPSTREAM AT EXISTING FOGHORN DIVERSION DAM AT UPSTREAM LIMITS OF PROJECT

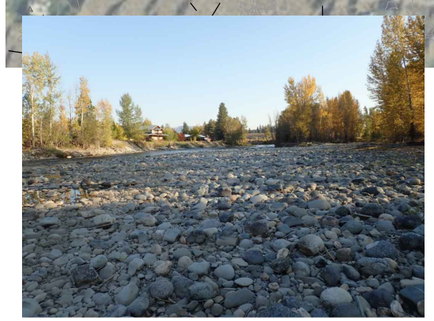
2 LOOKING UPSTREAM AT EXISTING HIGH-ANGLE RIFFLE DOWNSTREAM OF FOGHORN DIVERSION DAM.

3 LOOKING DOWNSTREAM, EXISTING BEDROCK EXPOSURE ON RIVER RIGHT AT UPSTREAM END OF RIFFLE.

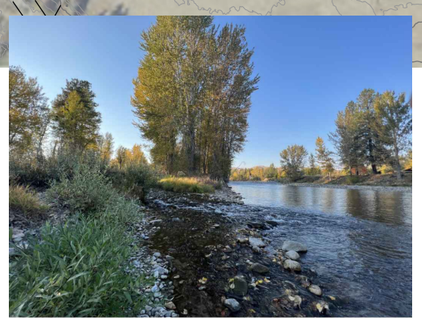
4 LOOKING UPSTREAM TOWARD THE INLET OF AN EXISTING HIGH FLOW SIDE CHANNEL THAT FOLLOWS THE NORTH SIDE OF THE P.U.D. HATCHERY AND TIES INTO THE HATCHERY EFFLUENT CHANNEL DOWNSTREAM.

5 LOOKING UPSTREAM AT THE EXISTING GRAVEL BAR AND HIGH FLOW SIDE CHANNEL INLETS ON THE RIVER RIGHT BANK.

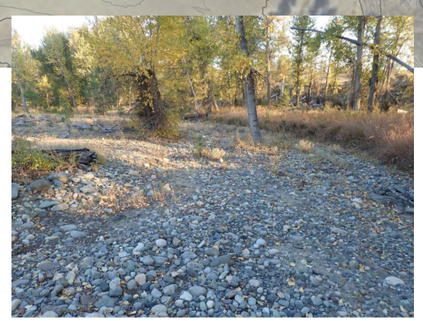




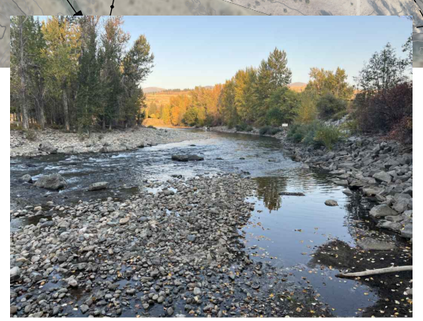
6 LOOKING DOWNSTREAM AT EXISTING GRAVEL BAR AND SEASONAL SIDE CHANNEL ON RIVER RIGHT.



7 LOOKING UPSTREAM AT CONFLUENCE OF P.U.D. EFFLUENT CHANNEL AND METHOW RIVER.



8 LOOKING DOWNSTREAM, EXISTING SEASONAL SIDE CHANNEL INLET AT UPSTREAM END OF GRAVEL BAR.



9 LOOKING DOWNSTREAM AT EXISTING RIFFLE WITH LARGE BOULDERS AND LOW FLOW ALCOVE NEAR DOWNSTREAM PROJECT EXTENTS.

200 0 200 400 600
SCALE OF FEET

NOTE: HIGH RESOLUTION AERIAL DRONE IMAGERY AND ON-THE GROUND PHOTOS CAPTURED BY RIO ASE OCTOBER 19, 2022.

EXISTING CONDITIONS - OVERVIEW

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNGYOUNG YANG
STATE OF WASHINGTON
52975
REGISTERED
PROFESSIONAL ENGINEER
4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

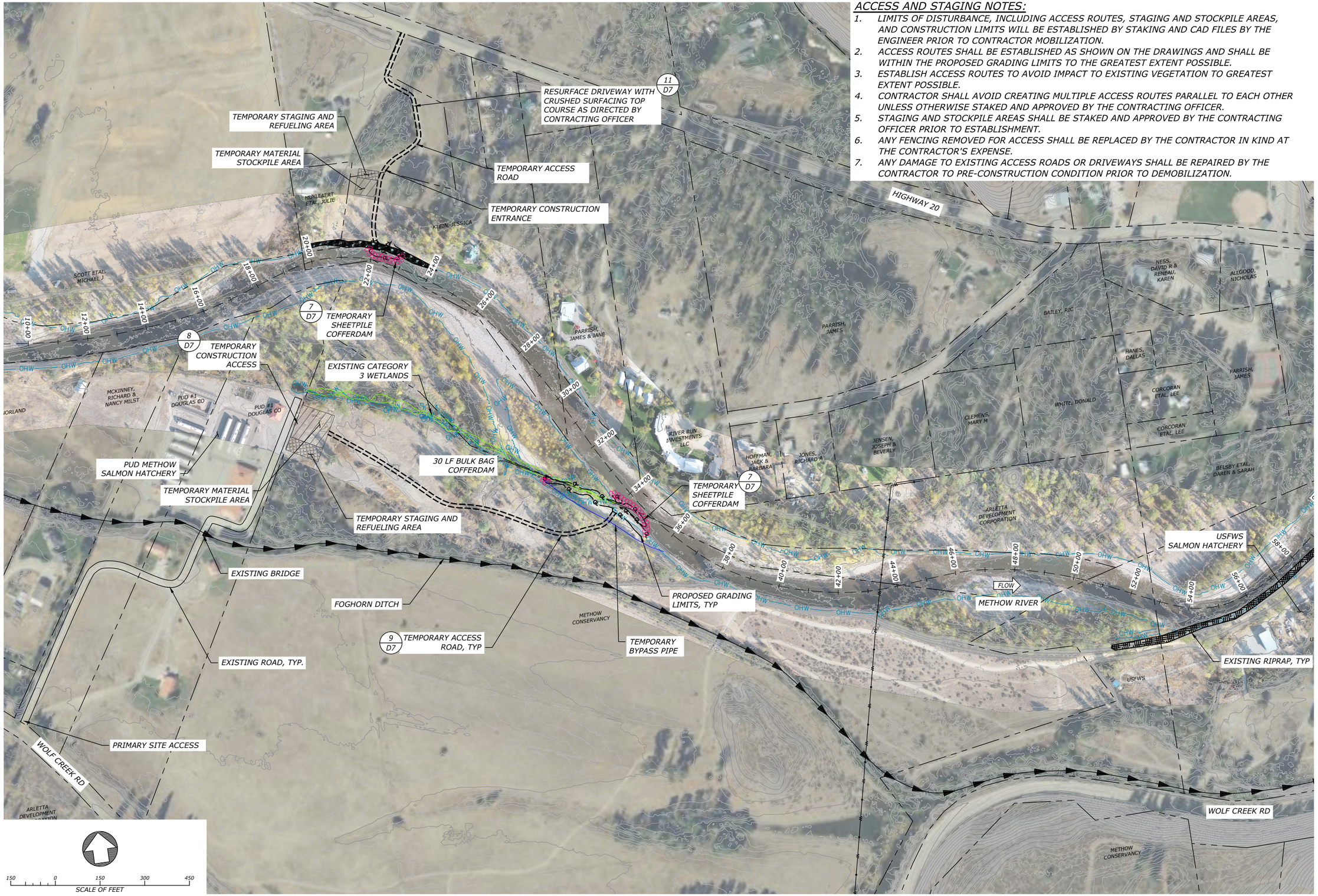
DRAWING NAME
EXISTING CONDITIONS
OVERVIEW

DRAWING NO.
C1
SHEET 7 OF 19

J:\R_PROJECTS\METHOW_HUCS\FOGHORN_REACH_RESTORATION_YAKAMA\PRODUCTION\FOGHORN_EXISTINGOVERVIEW.DWG SAVED BY: TIM SICKLES PLOT DATE: 4/29/2026 2:22 PM

ACCESS AND STAGING NOTES:

1. LIMITS OF DISTURBANCE, INCLUDING ACCESS ROUTES, STAGING AND STOCKPILE AREAS, AND CONSTRUCTION LIMITS WILL BE ESTABLISHED BY STAKING AND CAD FILES BY THE ENGINEER PRIOR TO CONTRACTOR MOBILIZATION.
2. ACCESS ROUTES SHALL BE ESTABLISHED AS SHOWN ON THE DRAWINGS AND SHALL BE WITHIN THE PROPOSED GRADING LIMITS TO THE GREATEST EXTENT POSSIBLE.
3. ESTABLISH ACCESS ROUTES TO AVOID IMPACT TO EXISTING VEGETATION TO GREATEST EXTENT POSSIBLE.
4. CONTRACTOR SHALL AVOID CREATING MULTIPLE ACCESS ROUTES PARALLEL TO EACH OTHER UNLESS OTHERWISE STAKED AND APPROVED BY THE CONTRACTING OFFICER.
5. STAGING AND STOCKPILE AREAS SHALL BE STAKED AND APPROVED BY THE CONTRACTING OFFICER PRIOR TO ESTABLISHMENT.
6. ANY FENCING REMOVED FOR ACCESS SHALL BE REPLACED BY THE CONTRACTOR IN KIND AT THE CONTRACTOR'S EXPENSE.
7. ANY DAMAGE TO EXISTING ACCESS ROADS OR DRIVEWAYS SHALL BE REPAIRED BY THE CONTRACTOR TO PRE-CONSTRUCTION CONDITION PRIOR TO DEMOBILIZATION.



PROPOSED CONDITIONS - ACCESS AND STAGING

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNYONG YOUNG
STATE OF WASHINGTON
52975
REGISTERED PROFESSIONAL ENGINEER
4/29/2026

DATE:	APRIL 27, 2026
DESIGNED:	TDS, SJB
APPROVED:	JCY

DRAWING NAME

PROPOSED CONDITIONS

ACCESS AND STAGING

DRAWING NO.

C2

SHEET 8 OF 19

FILE: R:\PROJECTS\METHOW_HUCS\FOGHORN_REACH_RESTORATION_NW\CAD\PRODUCTION\FOGHORN ACCESSSTAGING.DWG SAVED BY: TDS PLOTTED: 4/29/2026 2:23 PM

NORTH WORK AREA (DWG C5)

EXISTING RIPRAP - PROTECT AND PRESERVE EXISTING RIPRAP BETWEEN WOOD HABITAT STRUCTURES

7 / D7 COFFERDAM N1 - 155 LF SHEETPILE COFFERDAM

22+00

20+00

24+00

26+00

28+00

30+00

32+00

34+00

36+00

18+00

OHW

FLOW

METHOW RIVER

EXISTING CATEGORY 3 WETLAND

PROPERTY LINE, TYP

PUD METHOW SALMON HATCHERY

TEMPORARY MATERIAL STOCKPILE AREA, TYP

TEMPORARY STAGING AND REFUELING AREA, TYP

9 / D7 TEMPORARY ACCESS ROAD, TYP

COFFERDAM S1 - 30 LF BULK BAG OR SAND BAG TEMPORARY COFFERDAM

470 LF - 18" PVC, HDPP, OR HDPE TEMPORARY BYPASS PIPE

7 / D7 COFFERDAM S2 - 210 LF SHEETPILE COFFERDAM

SOUTH WORK AREA (DWG C6)

80 0 80 160 240
SCALE OF FEET

NORTH WORK AREA SEQUENCING NOTES

STEP 1: STABILIZE TEMPORARY ACCESS ROAD AND STAGING AREA.

STEP 2: INSTALL COFFERDAM N1 AND DEWATERING PUMPS AS NEEDED.

STEP 3: EXCAVATE SCOUR POOL

STEP 4: EXCAVATE EXISTING BANK FOR LARGE BANK JAM STRUCTURES, STOCKPILE RIP RAP SEPARATE FROM REMAINING EXCAVATED MATERIAL.

STEP 5: INSTALL LARGE BANK JAM STRUCTURES

STEP 6: BACKFILL LARGE BANK JAM STRUCTURES BEGINNING WITH GENERAL FILL MATERIAL, COMPACTING IN LIFTS PER DETAIL. FINISH BACKFILL BY PLACING RIP RAP MATERIAL.

STEP 7: REMOVE COFFERDAM SLOWLY, STARTING AND DOWNSTREAM END WORKING UPSTREAM.

STEP 8: RESTORE ACCESS ROAD AND STAGING AREA TO PRE-CONSTRUCTION CONDITION. RESURFACE DRIVEWAYS WITH 3" THICK CRUSHED SURFACING TOP COURSE AT CONTRACTING OFFICER'S DIRECTION.

SOUTH WORK AREA SEQUENCING NOTES

STEP 1: STABILIZE TEMPORARY ACCESS ROAD AND STAGING AREA.

STEP 2: INSTALL COFFERDAM S1 AND TEMPORARY BYPASS PIPE TO DIVERT WATER FROM THE EXISTING SIDE CHANNEL TO THE METHOW RIVER.

STEP 3: INSTALL COFFERDAM S2 AND DEWATERING PUMPING AS NEEDED.

STEP 4: EXCAVATE SIDE CHANNEL 1 AND METHOW RIVER SCOUR POOLS.

STEP 5: INSTALL CONSTRUCTED RIFFLES

STEP 6: INSTALL ALL WOOD STRUCTURES PER DETAILS.

STEP 7: BACKFILL WOOD STRUCTURES AND PLACE FILL.

STEP 8: HAUL EXCESS FILL MATERIAL TO DESIGNATED SPOILS AREA (TBD).

STEP 9: REMOVE COFFERDAM S2 STARTING AT THE DOWNSTREAM END, WORKING UPSTREAM

STEP 10: REMOVE COFFERDAM S1 AND BYPASS PIPE.

STEP 7: RESTORE ACCESS ROAD AND STAGING AREA TO PRE-CONSTRUCTION CONDITION.

PROPOSED CONDITIONS - CONSTRUCTION SEQUENCING

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNYOUNG — STATE OF WASHINGTON — 52975 — REGISTERED PROFESSIONAL ENGINEER — 4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

DRAWING NAME
PROPOSED CONDITIONS

CONSTRUCTION SEQUENCING

DRAWING NO.
C3
SHEET 9 OF 19

NORTH WORK AREA (DWG C5)

EXISTING RIPRAP - PROTECT AND PRESERVE EXISTING RIPRAP BETWEEN WOOD HABITAT STRUCTURES

LARGE BANK JAM, TYP (3 / D3)

SHEETPILE COFFERDAM, TYP (7 / D7)

EXISTING CATEGORY 3 WETLAND

PROPERTY LINE, TYP

PUD METHOW SALMON HATCHERY

TEMPORARY MATERIAL STOCKPILE AREA, TYP

TEMPORARY STAGING AND REFUELING AREA, TYP

9 / D7 TEMPORARY ACCESS ROAD, TYP

4 / D4 SINGLE LOG STRUCTURE, TYP

5 / D5 ROUGHENED EDGE, TYP

1 / D1 THREE LOG STRUCTURE, TYP

2 / D2 LOW PROFILE BANK JAM, TYP

SOUTH WORK AREA (DWG C6)

METHOW RIVER

FLOW

OHW

18+00 20+00 22+00 24+00 26+00 28+00 30+00 32+00 34+00 36+00

80 0 80 160 240
SCALE OF FEET

PROPOSED CONDITIONS - OVERVIEW AND KEY MAP

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNYOUNG YOUNG
STATE OF WASHINGTON
52975
REGISTERED PROFESSIONAL ENGINEER
4/29/2026

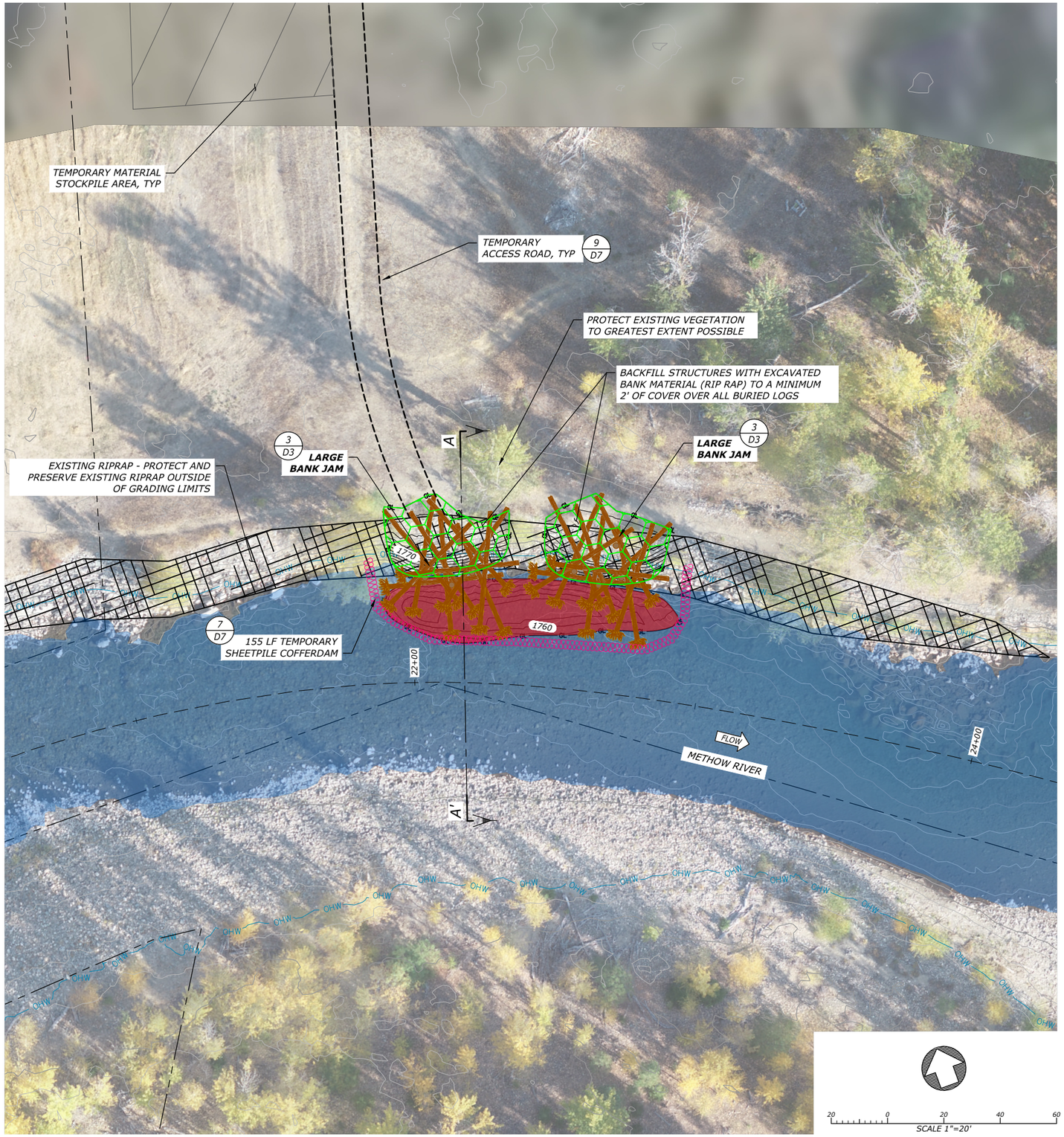
DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

DRAWING NAME
PROPOSED CONDITIONS

OVERVIEW AND KEY MAP

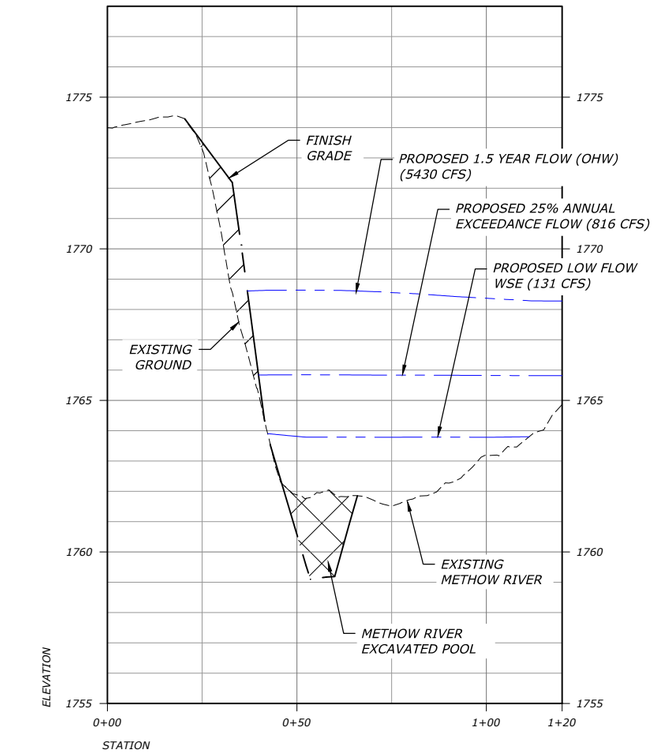
DRAWING NO.
C4
SHEET 10 OF 19

M:\R_R\PROJECTS\METHOW_HUCS\FOGHORN_REACH_RESTORATION_NW\CAD\PRODUCTION\FOGHORN_PROPOSED\CONDITIONS_DWG SAVED BY: TIM SICKLES PLOT DATE: 4/29/2026 2:26 PM



NORTH WORK AREA - PLAN

SCALE 1"=20'



SECTION A-A'

HORIZONTAL
20 0 20 40 60
SCALE 1"=20'

VERTICAL
5 0 5 10 15
SCALE 1"=5'

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUN YOUNG
STATE OF WASHINGTON
52975
REGISTERED PROFESSIONAL ENGINEER
4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

DRAWING NAME

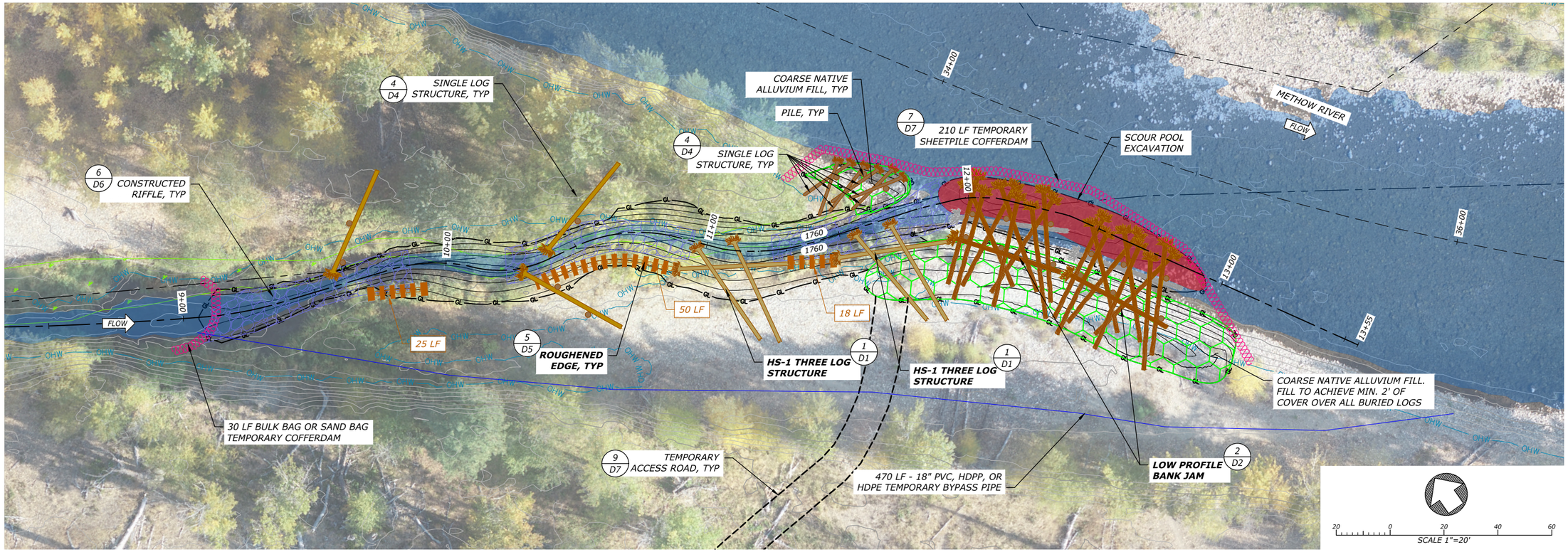
PROPOSED CONDITIONS

NORTH WORK AREA

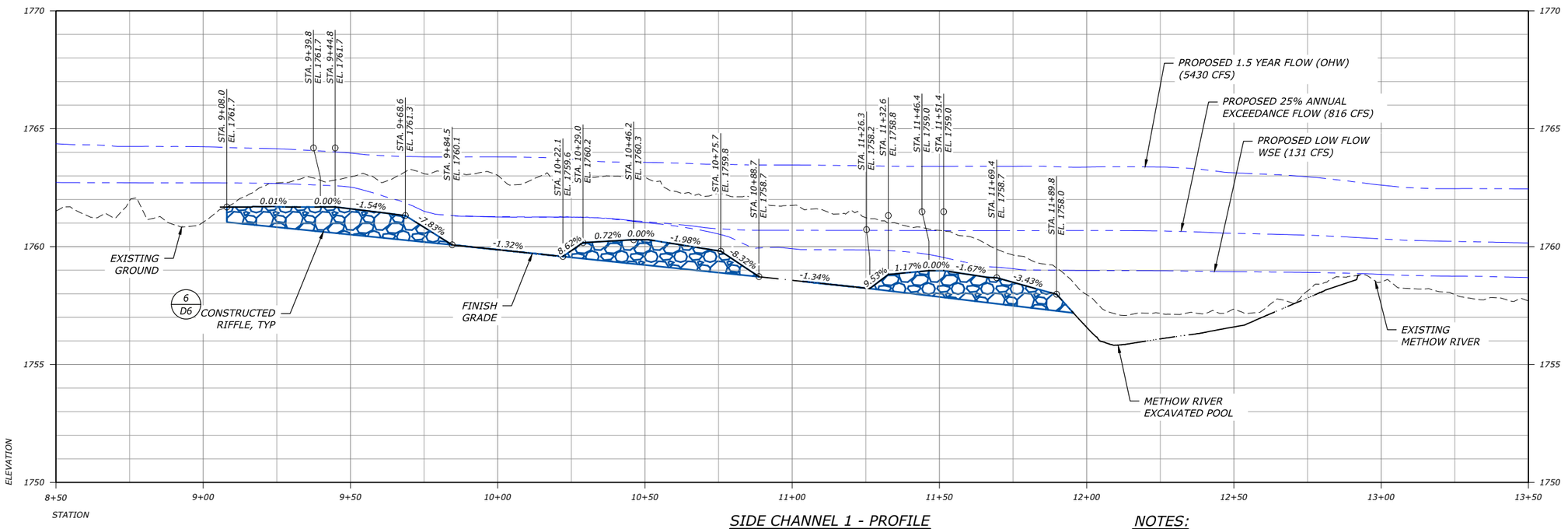
DRAWING NO.

C5

SHEET 11 OF 52



SIDE CHANNEL 1 - PLAN



SIDE CHANNEL 1 - PROFILE

NOTES:

1. PROPOSED WATER SURFACE ELEVATIONS SHOWN IN PROFILE VIEW REPRESENT 4 CFS HATCHERY EFFLUENT LOW FLOW IN ADDITION TO METHOW RIVER FLOWS.

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

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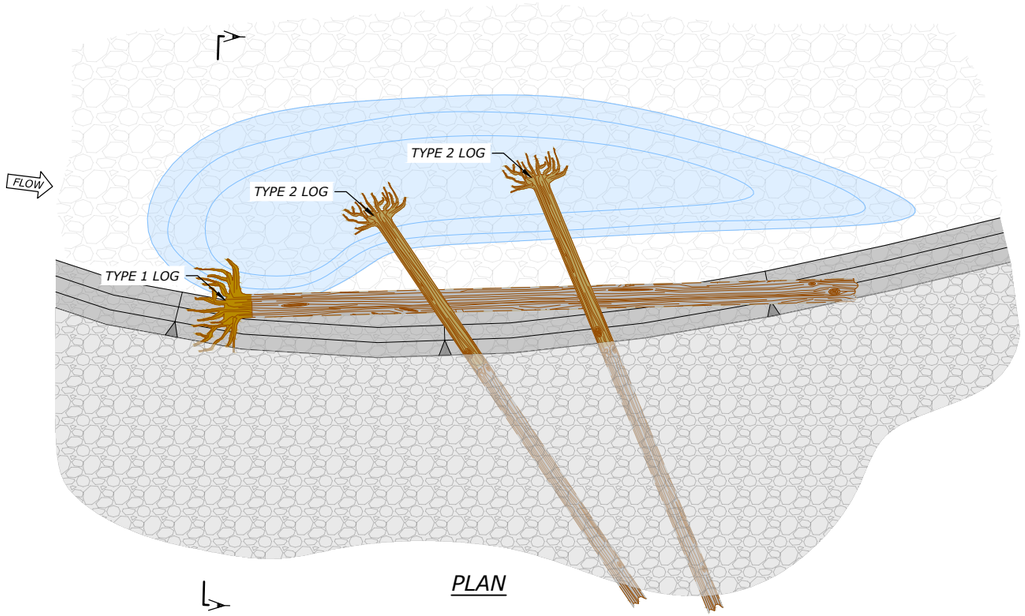
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNG YOUNG — STATE OF WASHINGTON — 52975 — REGISTERED PROFESSIONAL ENGINEER — 4/29/2026

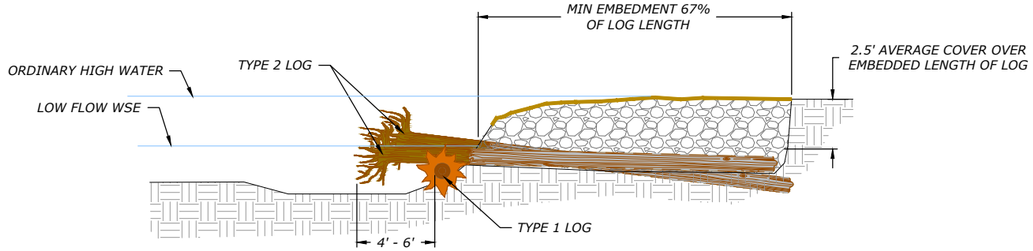
DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

DRAWING NAME
PROPOSED CONDITIONS
SOUTH WORK AREA

DRAWING NO.
C6
SHEET 12 OF 52



PLAN



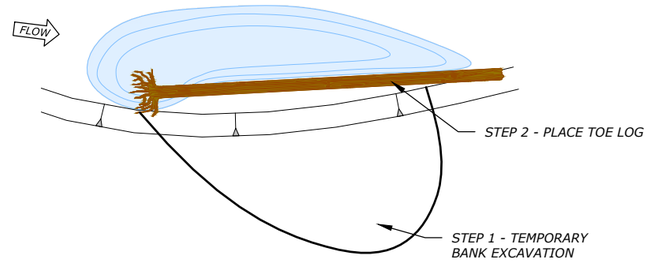
SECTION A-A'

NOTES:

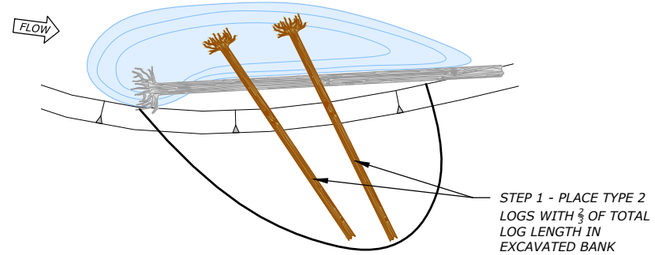
1. INSTALL STRUCTURES AT LOCATIONS IDENTIFIED IN THE PLANS. THE EXACT LOCATION OF EACH STRUCTURE SHALL BE APPROVED BY THE CONTRACTING OFFICER PRIOR TO INSTALLATION.
2. IF POOL EXCAVATION IS NOT SPECIFIED IN THE GRADING PLAN, THE CONTRACTING OFFICER WILL DETERMINE IF A SCOUR POOL IS DESIRED. THE SCOUR POOL SHALL BE EXCAVATED TO A DEPTH OF 2' ADJACENT TO THE STRUCTURE AND EXTEND BEYOND ROOTWADS EXTENDING INTO CHANNEL PER THE DIRECTION OF THE CONTRACTING OFFICER.
3. ROUGH GRADING OF CHANNEL SHALL BE COMPLETE PRIOR TO CONSTRUCTION OF STRUCTURE INCLUDING CONSTRUCTION OF RIFFLES OR STREAMBED MATERIALS.
4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE. UNSUITABLE IS DEFINED AS ANYTHING CLASSIFIED AS A CLAY, SILT, OR SAND. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING MAKING CERTAIN TO NOT DAMAGE OR CHANGE THE ELEVATION OF THE STRUCTURE MATERIAL DURING COMPACTION.
5. ALL CUT ENDS OF LOGS THAT WILL BE EXPOSED UPON COMPLETION OF STRUCTURE SHALL BE MARRED PRIOR TO INSTALLATION. THE CONTRACTOR SHALL USE AN EXCAVATOR, OR OTHER HEAVY EQUIPMENT TO TEAR APART WOOD FIBERS AT THE CUT END OF THE LOG TO CREATE THE APPEARANCE OF A LOG THAT HAS NATURALLY BROKEN APART.
6. LOG PLACEMENT MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER TO PROVIDE VARIABILITY FROM STRUCTURE TO STRUCTURE.

STRUCTURE SEQUENCING

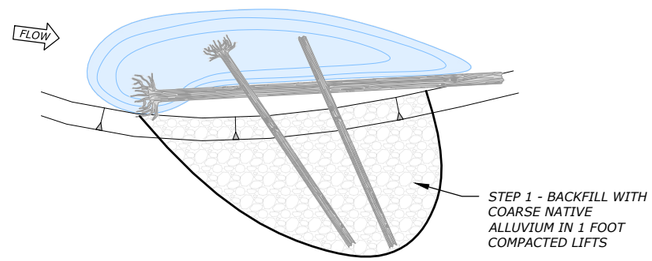
STAGE 1



STAGE 2



STAGE 3



HS-1: Three-Log Structure Material Schedule						
Log Type	Size DBH (in)	Length (ft)	Rootwad	Min. Rootwad Dia. (ft)	Branches	Quantity
Type 1	18 - 24	35 - 42	Yes	5	No	1 EA
Type 2	18 - 24	30 - 35	Yes	4.5	No	2 EA
Slash	1 - 4	5 - 15	NA	NA	Yes	2 CY

1 HABITAT STRUCTURE 1 - (HS-1) THREE LOG STRUCTURE
NTS

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH
RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

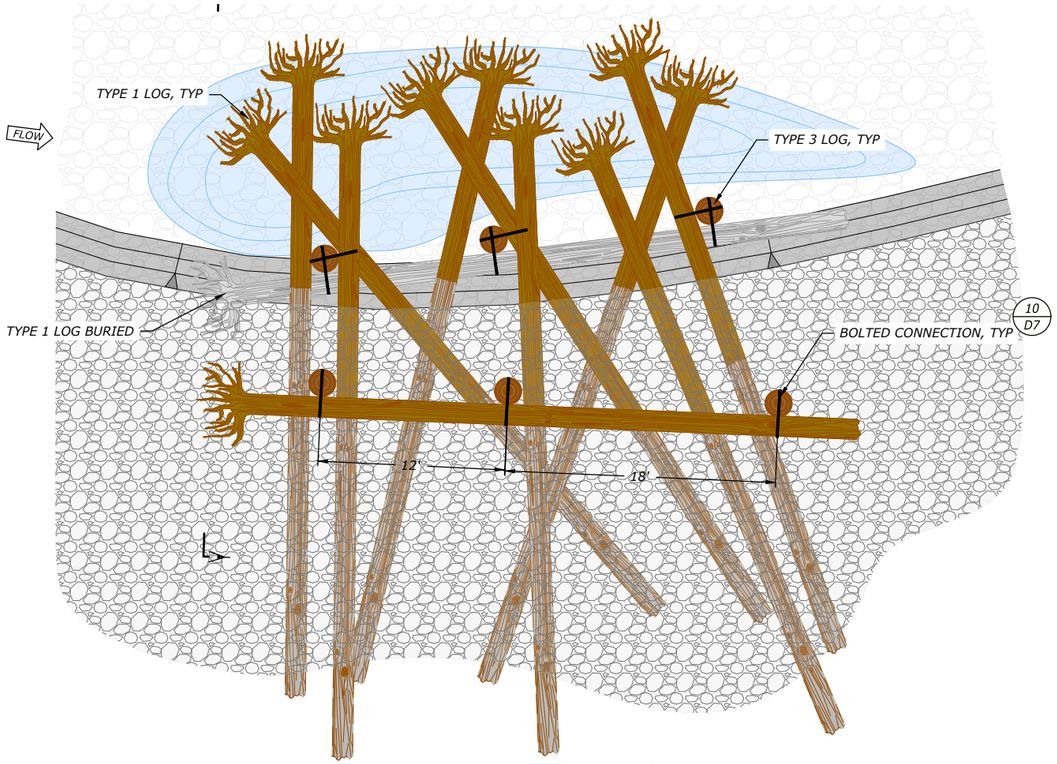
JOSEPH CHUNG YOUNG
STATE OF WASHINGTON
152975
REGISTERED
PROFESSIONAL ENGINEER
4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

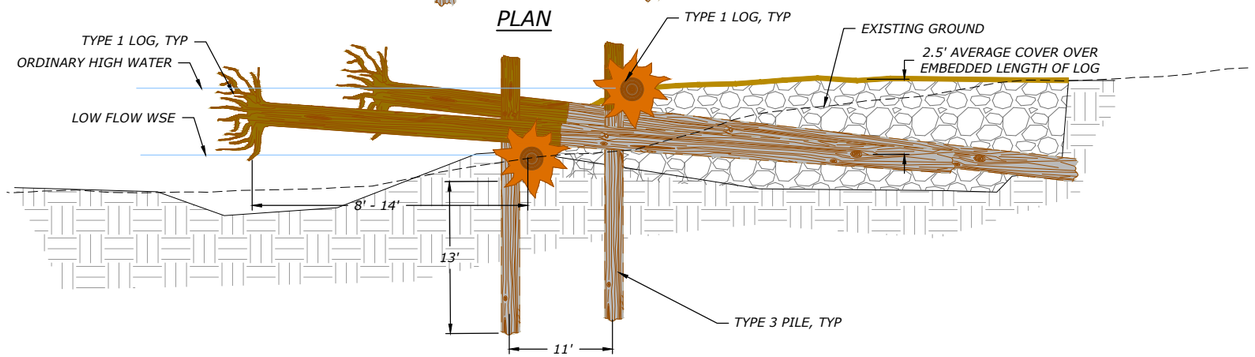
DRAWING NAME
DETAILS

HS-1 - THREE LOG STRUCTURE

DRAWING NO.
D1
SHEET 13 OF 39



PLAN



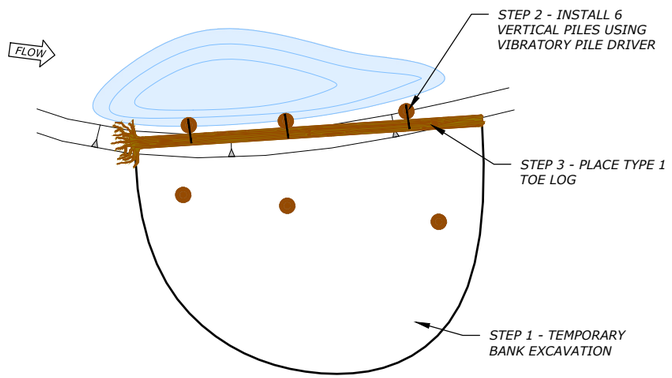
SECTION A-A'

NOTES:

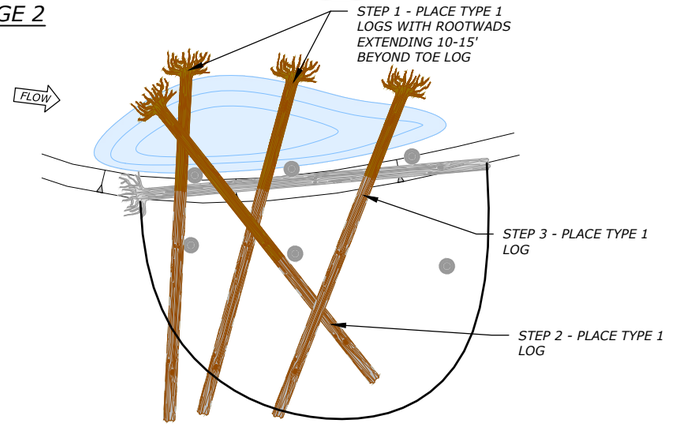
1. INSTALL STRUCTURES AT LOCATIONS IDENTIFIED IN THE PLANS. THE EXACT LOCATION OF EACH STRUCTURE SHALL BE APPROVED BY THE CONTRACTING OFFICER PRIOR TO INSTALLATION.
2. ROUGH GRADING OF CHANNEL AND SCOUR POOLS SHALL BE COMPLETE PRIOR TO CONSTRUCTION OF STRUCTURE INCLUDING CONSTRUCTION OF RIFFLES OR STREAMBED MATERIALS.
3. PILES SHALL BE VIBRATORY DRIVEN TO MINIMUM DEPTH OF 13'. EXPOSED ENDS OF PILES SHALL BE BROKEN OFF NO MORE THAN 3' ABOVE TOP OF HIGHEST TYPE 1 LOG.SEE PILE LOG TESTING DETAIL ON SHEET D7.
4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE. UNSUITABLE IS DEFINED AS ANYTHING CLASSIFIED AS A CLAY, SILT, OR SAND. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING MAKING CERTAIN TO NOT DAMAGE OR CHANGE THE ELEVATION OF THE STRUCTURE MATERIAL DURING COMPACTION.
5. ALL CUT ENDS OF LOGS THAT WILL BE EXPOSED UPON COMPLETION OF STRUCTURE SHALL BE MARRED PRIOR TO INSTALLATION. THE CONTRACTOR SHALL USE AN EXCAVATOR, OR OTHER HEAVY EQUIPMENT TO TEAR APART WOOD FIBERS AT THE CUT END OF THE LOG TO CREATE THE APPEARANCE OF A LOG THAT HAS NATURALLY BROKEN APART.
6. LOG PLACEMENT MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER TO PROVIDE VARIABILITY FROM STRUCTURE TO STRUCTURE.

STRUCTURE SEQUENCING

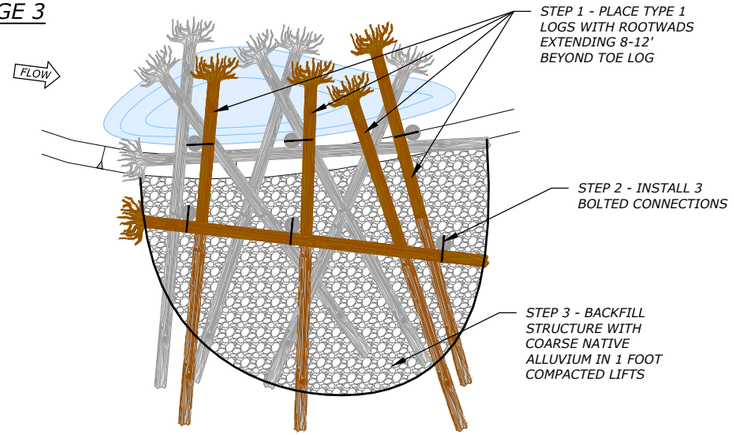
STAGE 1



STAGE 2



STAGE 3



HS-2: Low Profile Bank Jam Material Schedule

Log Type	Size DBH (in)	Length (ft)	Rootwad	Min. Rootwad Dia. (ft)	Branches	Quantity
Type 1	18 - 24	35 - 42	Yes	5	No	11 EA
Type 3	18 - 24	25 - 30	No	NA	No	4 EA
Racking	6 - 14	15 - 25	Yes	2.5	Yes	8 EA
Slash	1 - 4	5 - 15	NA	NA	Yes	5 CY

2 HABITAT STRUCTURE 2 - (HS-2) LOW PROFILE BANK JAM
NTS

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

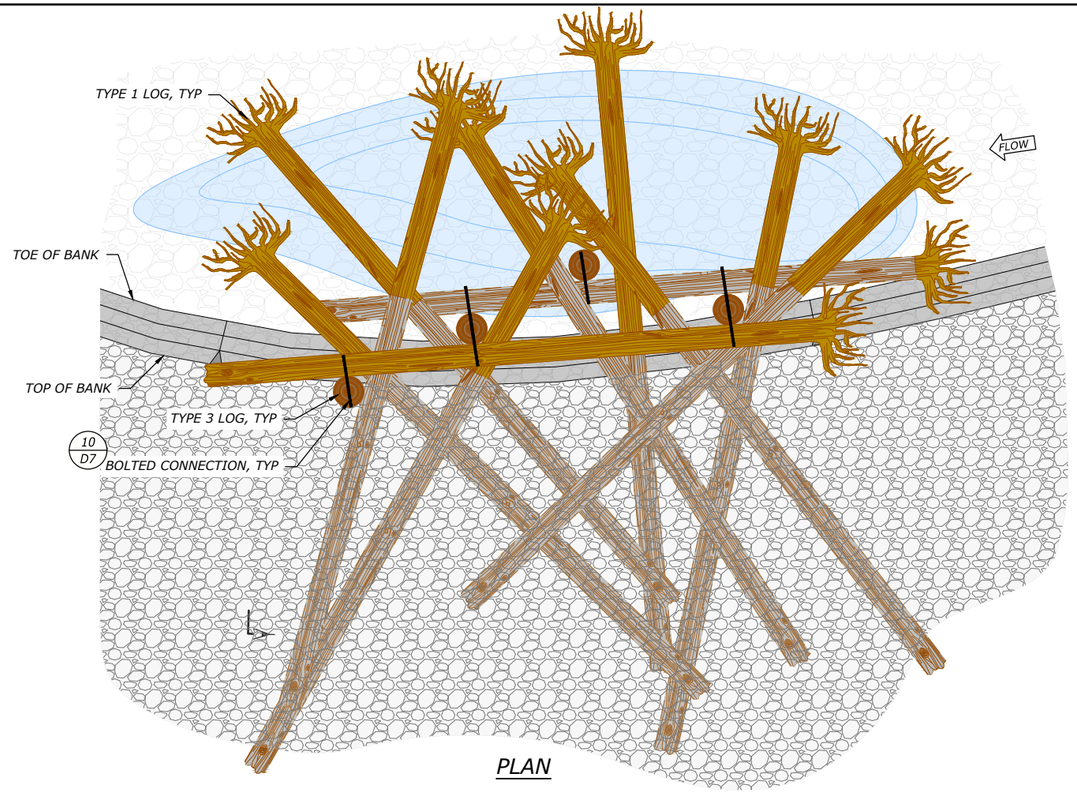
JOSEPH CHUNGYOUNG — STATE OF WASHINGTON — 52975 — REGISTERED PROFESSIONAL ENGINEER — 4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

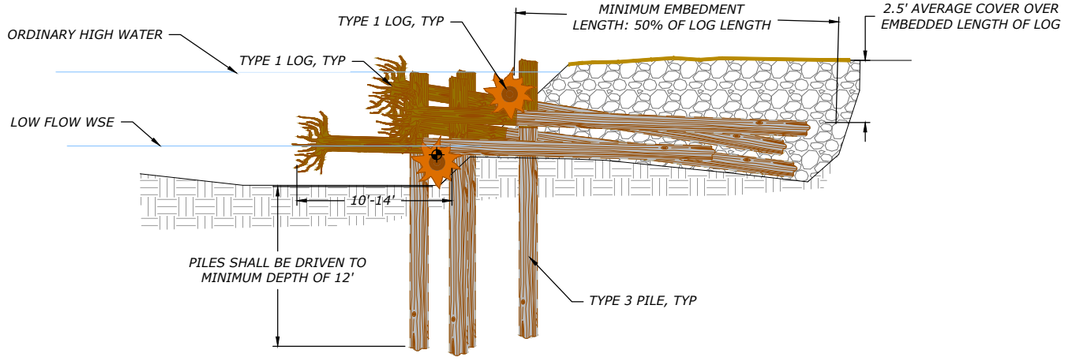
DRAWING NAME
DETAILS

HS-2 - LOW PROFILE BANK JAM

DRAWING NO.
D2
SHEET 14 OF 39



PLAN



SECTION A-A'

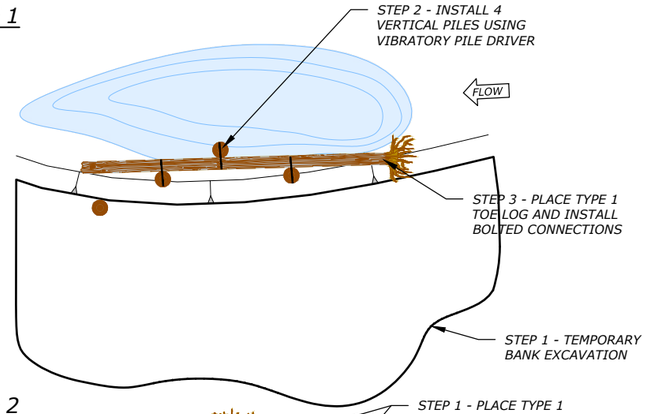
NOTES:

1. INSTALL STRUCTURES AT LOCATIONS IDENTIFIED IN THE PLANS. THE EXACT LOCATION OF EACH STRUCTURE SHALL BE APPROVED BY THE CONTRACTING OFFICER PRIOR TO INSTALLATION.
2. IF POOL EXCAVATION IS NOT SPECIFIED IN THE GRADING PLAN, THE CONTRACTING OFFICER WILL DETERMINE IF A SCOUR POOL IS DESIRED. THE SCOUR POOL SHALL BE EXCAVATED TO A DEPTH OF 2' ADJACENT TO THE STRUCTURE AND EXTEND BEYOND ROOTWADS EXTENDING INTO CHANNEL PER THE DIRECTION OF THE CONTRACTING OFFICER.
3. ROUGH GRADING OF CHANNEL SHALL BE COMPLETE PRIOR TO CONSTRUCTION OF STRUCTURE INCLUDING CONSTRUCTION OF RIFFLES OR STREAMBED MATERIALS.
4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE. UNSUITABLE IS DEFINED AS ANYTHING CLASSIFIED AS A CLAY, SILT, OR SAND. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING MAKING CERTAIN TO NOT DAMAGE OR CHANGE THE ELEVATION OF THE STRUCTURE MATERIAL DURING COMPACTION.
5. ALL CUT ENDS OF LOGS THAT WILL BE EXPOSED UPON COMPLETION OF STRUCTURE SHALL BE MARRED PRIOR TO INSTALLATION. THE CONTRACTOR SHALL USE AN EXCAVATOR, OR OTHER HEAVY EQUIPMENT TO TEAR APART WOOD FIBERS AT THE CUT END OF THE LOG TO CREATE THE APPEARANCE OF A LOG THAT HAS NATURALLY BROKEN APART.
6. LOG PLACEMENT MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER TO PROVIDE VARIABILITY FROM STRUCTURE TO STRUCTURE.
7. PILE LOGS SHALL BE INSTALLED USING VIBRATORY PILE DRIVER, SEE PILE LOG TESTING DETAIL ON SHEET D7.

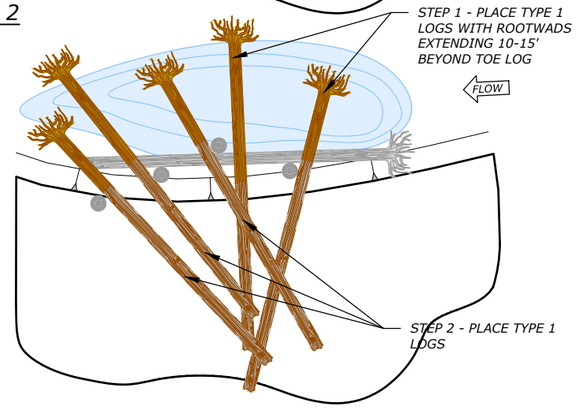
3 HABITAT STRUCTURE 3 - (HS-3) LARGE BANK JAM
NTS

STRUCTURE SEQUENCING

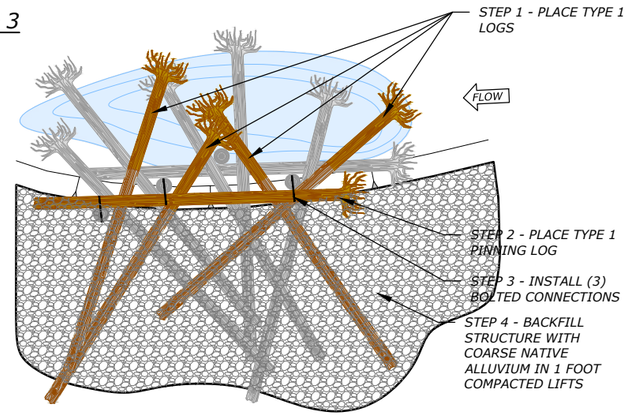
STAGE 1



STAGE 2



STAGE 3



HS-3: Large Bank Jam Material Schedule

Log Type	Size DBH (in)	Length (ft)	Rootwad	Min. Rootwad Dia. (ft)	Branches	Quantity
Type 1	18 - 24	35 - 42	Yes	5	No	11 EA
Type 3	18 - 24	25 - 30	No	NA	No	4 EA
Racking	6 - 14	15 - 25	Yes	2.5	Yes	12 EA
Slash	1 - 4	5 - 15	NA	NA	Yes	5 CY

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH
RESTORATION PROJECT PHASE 1

FINAL DESIGN DRAWINGS

FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

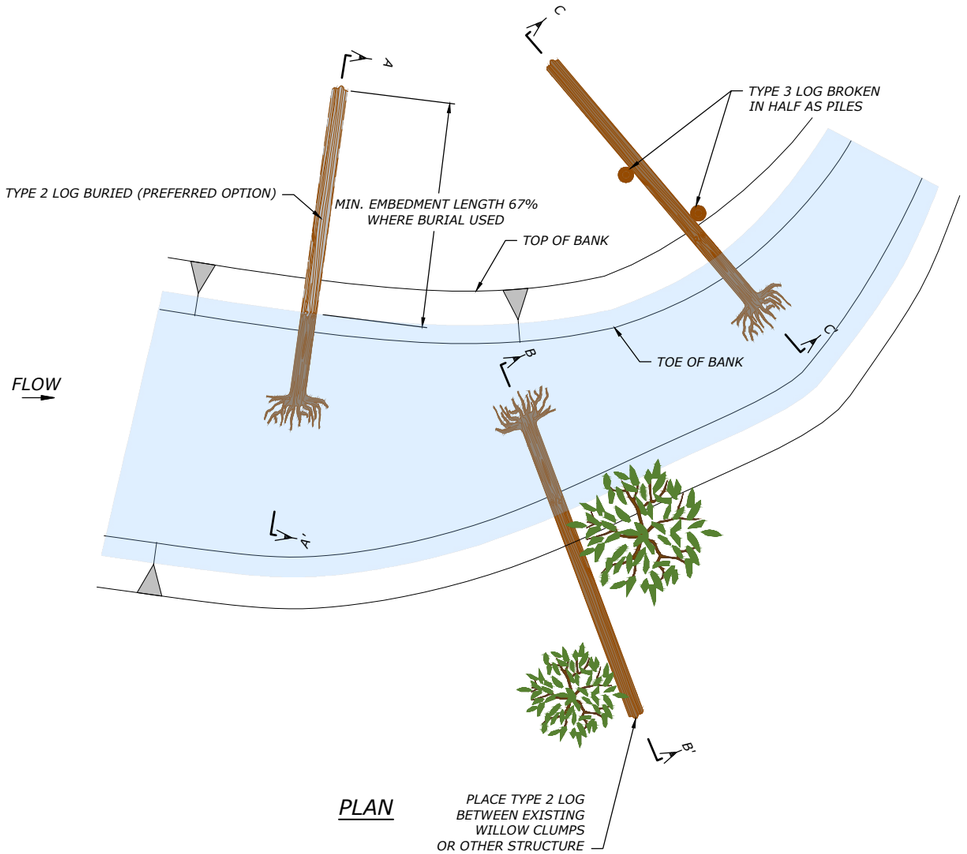
JOSEPH CHUNHUOUNG
STATE OF WASHINGTON
52975
REGISTERED
4/29/2026
PROFESSIONAL ENGINEER

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

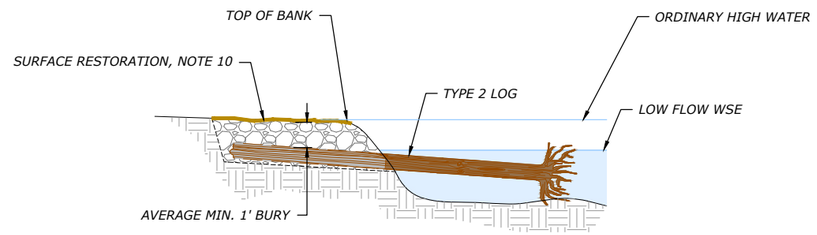
DRAWING NAME
DETAILS

HS-3 - LARGE BANK JAM

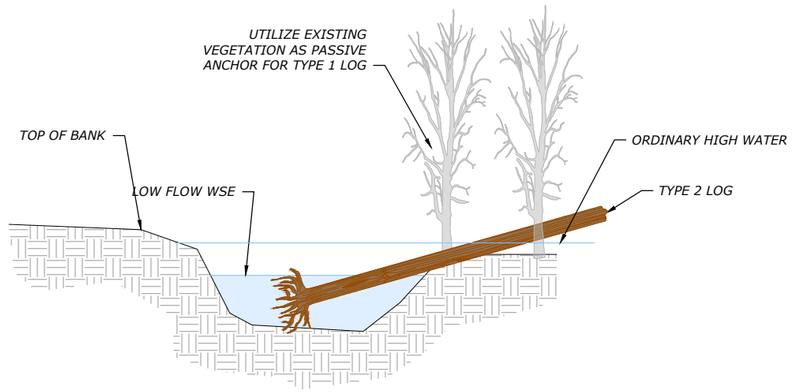
DRAWING NO.
D3
SHEET 15 OF 39



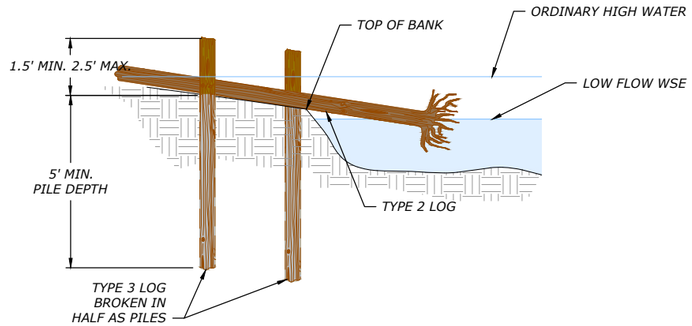
PLAN



SECTION VIEW A-A' (BURIED) - PREFERRED



SECTION VIEW B-B' (ON SURFACE)



SECTION VIEW C-C' (PILES)

NOTES:

1. INSTALL STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN AND PROFILE DRAWINGS.
2. THE EXACT LOCATION OF EACH STRUCTURE SHALL BE LOCATED PRIOR TO INSTALLATION FOR APPROVAL BY THE CONTRACTING OFFICER.
3. ROUGH GRADING OF CHANNEL SHALL BE COMPLETE PRIOR TO CONSTRUCTION OF STRUCTURE INCLUDING RIFFLE CONSTRUCTION AND PLACEMENT OF BAR MATERIAL.
4. SEE STRUCTURE SCHEDULE FOR NUMBER OF STRUCTURES, LOCATIONS, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
5. ALL CUT ENDS OF LOGS THAT WILL BE EXPOSED UPON COMPLETION OF STRUCTURE SHALL BE MARRED PRIOR TO INSTALLATION. THE CONTRACTOR SHALL USE AN EXCAVATOR, OR OTHER HEAVY EQUIPMENT TO TEAR APART WOOD FIBERS AT THE CUT END OF THE LOG TO CREATE THE APPEARANCE OF A LOG THAT HAS NATURALLY BROKEN APART.
4. RACKING, SLASH, AND LIVE STAKES SHALL BE INCORPORATED INTO THE STRUCTURE WHILE PLACING LAYERS SUCH THAT IT IS WOVEN INTO STRUCTURE IN BETWEEN PLACED LOGS, FILLING VOIDS, ETC. AT EACH STEP THROUGHOUT CONSTRUCTION AS DIRECTED BY THE CONTRACTING OFFICER.
5. WHEN EXCAVATED INTO GROUND, BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1-FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
6. WHEN UTILIZING EXISTING VEGETATION AS PASSIVE ANCHORS THERE SHALL BE AT A MINIMUM A WILLOW CLUMP ON THE DOWNSTREAM SIDE, BUT PREFERABLY ON THE UPSTREAM SIDE AS WELL. THE CONTRACTING OFFICER SHALL AGREE TO PLACEMENT AREAS OF STRUCTURES THAT ARE NOT BURIED.
7. LOG PLACEMENT MAY BE ADJUSTED IN THE FIELD BY THE CONTRACTING OFFICER TO PROVIDE VARIABILITY FROM STRUCTURE TO STRUCTURE.
8. EXISTING DOWNED WOOD ON SITE MAY BE UTILIZING IF IT IS IN GOOD CONDITION AND MEETS DESIGN SPECIFICATION AS APPROVED BY CONTRACTING OFFICER.
9. PILE LOGS SHALL BE INSTALLED USING VIBRATORY PILE DRIVER, SEE PILE LOG TESTING DETAIL ON SHEET D7.

HS-4: Single Log Structure Material Schedule						
Log Type	Size DBH (in)	Length (ft)	Rootwad	Min. Rootwad Dia. (ft)	Branches	Quantity
Type 2	18 - 24	30 - 35	Yes	4.5	No	1 EA
Type 3	18 - 24	25 - 30	No	NA	No	1 EA

4 HABITAT STRUCTURE 3 - (HS-3) SINGLE LOG STRUCTURE
NTS

Applied Science & Engineering

Yakama Nation Fisheries

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OKANOGAN COUNTY, WASHINGTON

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APPROVED: JCY

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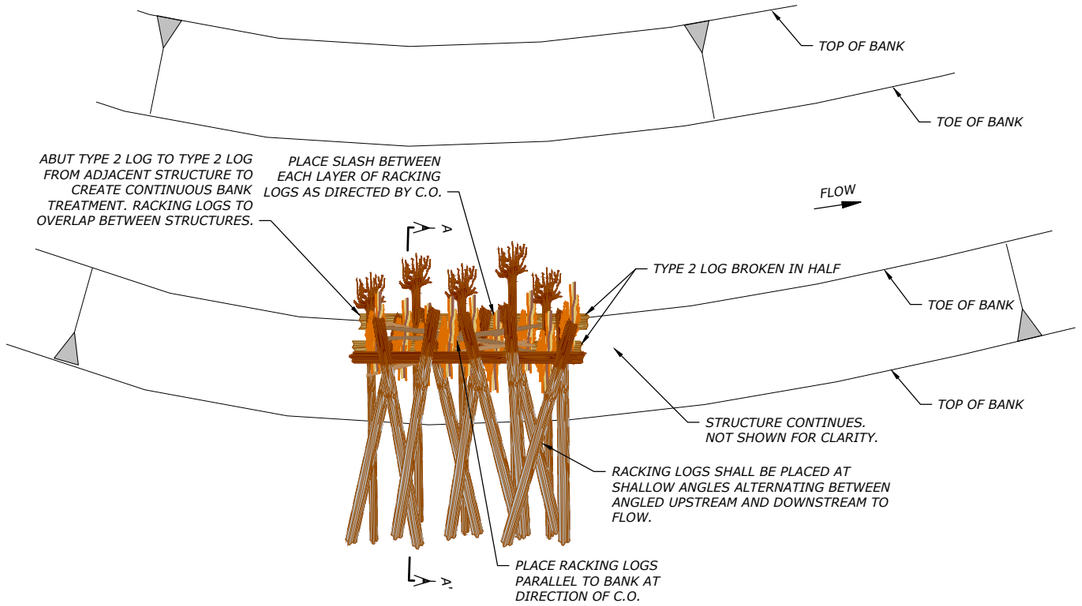
DETAILS

HS-4 - SINGLE LOG

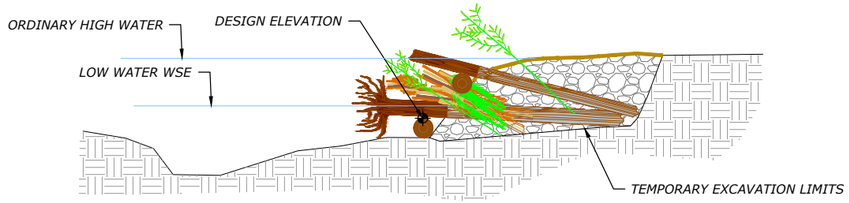
DRAWING NO.
D4
SHEET 16 OF 39



PLAN

NOTES:

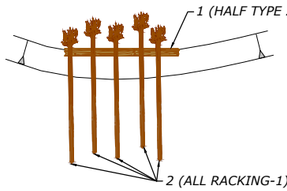
1. ROUGHENED EDGE BANK TREATMENT SHALL BE CONSTRUCTED AT LOCATIONS AS SHOWN ON THE PLANS. THE EXACT LOCATION OF EACH OCCURRENCE OF BANK ROUGHNESS SHALL BE LOCATED BY THE CONTRACTOR AND APPROVED BY THE C.O. PRIOR TO CONSTRUCTING A PARTICULAR OCCURRENCE.
2. ALL EXPOSED ENDS OF KEY LOGS AND RACKING LOGS SHALL BE BROKEN. ALL EXPOSED CLEAN CUT ENDS OF LOGS WILL REQUIRE THE CONTRACTOR TO REPLACE WITH A BROKEN END AT NO ADDITIONAL EXPENSE.



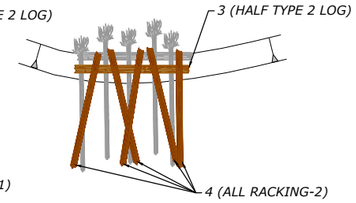
SECTION VIEW (A - A') SHORT ROUGHENED EDGE

ROUGHENED EDGE STRUCTURE SEQUENCING

STAGE 1



STAGE 2



STEPS:

1. TYPE 2 LOG (FOOTER) SHALL BE PLACED SO ITS UPSTREAM END RESTS ON THE STREAM BED (UP TO ½ DIAMETER BURIED TO ACCOMODATE VARIED BANK HEIGHTS) ALONG THE TOE OF THE BANK. BACKFILL AND COMPACT AROUND FOOTER LOG WITH COMPACTED FILL.
2. RACKING-2 LOGS (WITH ROOTWADS) SHALL BE INSTALLED ON TOP OF THE TYPE 2 LOG. ROOTWADS SHALL BE PLACED OVER TOP OF FOOTER LOG WITH ROOTWAD AS CLOSE TO BANK AS POSSIBLE AND AS DIRECTED BY C.O.
3. PLACE GENERAL FILL OVER PLACED MATERIALS AND COMPACT TO CREATE AN APPROXIMATE 45-DEGREE SURFACE FOR INSTALLATION OF BRUSH BANK TREATMENT AT THE ANTICIPATED LOW WATER ELEVATION. LOW WATER ELEVATION CAN BE ESTIMATED FROM PLAN AND PROFILE DRAWINGS. A PROPOSED LOW WATER ELEVATION SURFACE CAN BE PROVIDED TO THE CONTRACTOR UPON REQUEST FOR GPS USE.
4. PLACE RACKING LOGS PARALLEL TO BANK AND ALONG BANK AT TOP OF STRUCTURE, PIN WITH TWO RACKING LOGS WITH EXPOSED ENDS DOWNSTREAM TO FLOW. ENSURE THAT RACKING LOGS ARE NOT TOO STEEPLY VERTICALLY ANGLED FROM FRONT TO BACK BY PLACING FILL AT BACKSIDE AS NECESSARY.
5. BACKFILL TO TOP OF ANGLED LOGS WITH COMPACTED FILL.
6. PLACE SLASH ALONG TOP OF BACKFILL AT BANK EDGE AS DIRECTED BY C.O.
7. BACKFILL TO FINISH. BACKFILL SHALL BE PLACED IN MAXIMUM 1-FT LIFTS AND COMPACTED.

Roughened Edge Bank Treatment (Per 15-ft Length) Material Schedule						
Log Type	Size DBH (in)	Length (ft)	Rootwad	Min. Rootwad Dia. (ft)	Branches	Quantity
Type 2	18 - 24	30 - 35	Yes	4.5	No	1 EA
Racking	6 - 14	15 - 25	Yes	2.5	Yes	9 EA
Slash	1 - 4	5 - 15	NA	NA	Yes	15 CY

5 ROUGHENED EDGE BANK TREATMENT
NTS

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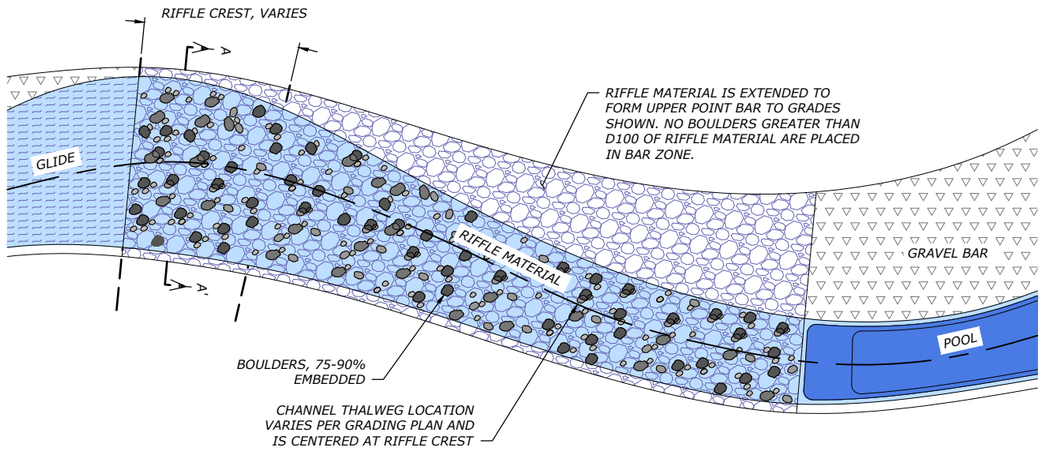
DRAWING NAME
DETAILS
ROUGHENED EDGE

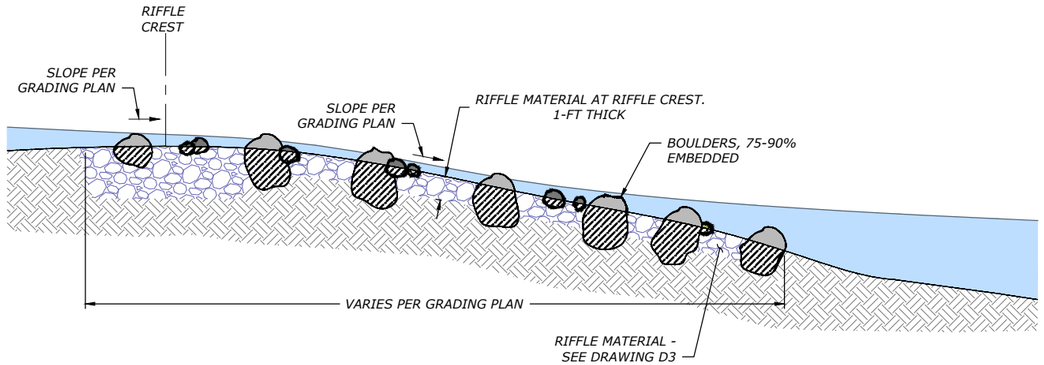
DRAWING NO.
D5
SHEET 17 OF 39

RIFFLE OVERVIEW NOTES:

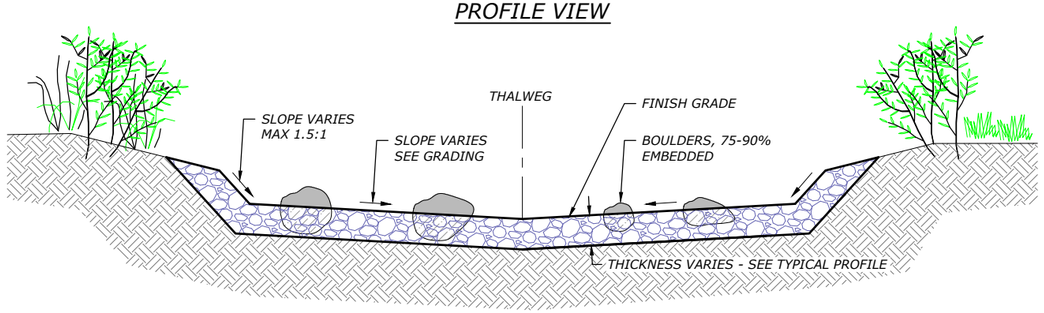
CONSTRUCTED RIFFLES ARE TO BE INSTALLED AT LOCATIONS SHOW IN THE GRADING PLANS. IF IN-SITU MATERIAL MEETS THE SPECIFICATION FOR RIFFLE MATERIAL PER THE GRADATION ON THIS SHEET THEN THE RIFFLE SHALL BE GRADED WITHOUT OVER-EXCAVATION AND PLACEMENT OF CONSTRUCTED RIFFLE MATERIAL. OTHERWISE, RIFFLE SHALL BE OVER-EXCAVATED AND CONSTRUCTED RIFFLE MATERIAL INSTALLED PER THE RIFFLE CONSTRUCTION STEPS OUTLINED ON THIS DRAWING.



PLAN



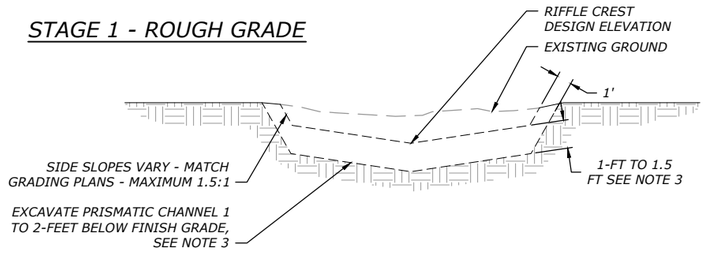
PROFILE VIEW



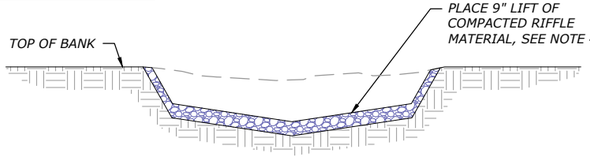
SECTION A-A'

CONSTRUCTION SEQUENCING

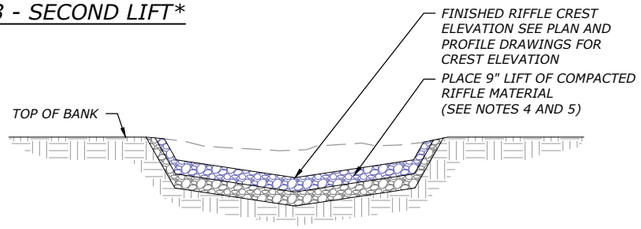
STAGE 1 - ROUGH GRADE



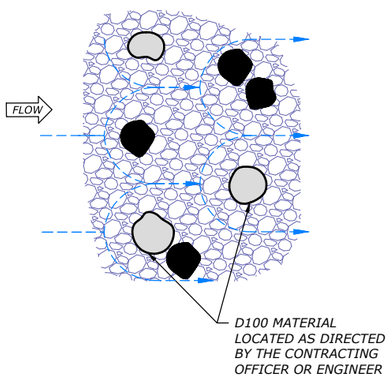
*STAGE 2 - FIRST LIFT**



*STAGE 3 - SECOND LIFT**



STAGE 4 - BOULDER PLACMENT, BANK TREATMENT, AND TOP DRESSING



BOULDER PLACEMENT

6 *CONSTRUCTED RIFFLE*
NTS

CONSTRUCTED RIFFLE NOTES:

1. *STOCKPILE CHANNEL MATERIALS PER DESIGN SPECIFICATIONS. MATERIALS ARE TO BE STOCKPILED IN THE IMMEDIATE PROJECT AREA OR TRANSPORTED FROM THE SORTING AREA AS NEEDED.*
2. *THREE PLACEMENTS ARE REQUIRED AS FOLLOWS:*
   - *2.1. CONSTRUCTED RIFFLE MATERIAL*
   - *2.2. LARGE AND SMALL BOULDERS (FOR EMBEDMENT)*
   - *2.3. ROUGHNESS ROCK (TOP DRESSING)*
3. *TREAT EXISTING CHANNEL BED BY REMOVING ORGANICS AND CREATING A PRISMATIC WORKING SURFACE FOLLOWING CHANNEL THALWEG AND DESIGN CONTOURS ON GRADING DRAWINGS. ROUGH GRADE FROM FINISH GRADE TO SPECIFIED RIFFLE MATERIAL DEPTH IN CHANNEL BED IN ACCORDANCE WITH PLAN AND PROFILE DRAWINGS. ROUGH GRADE BANKS BY 1-FT TO SLOPES SHOWN ON GRADING PLANS AND NOT EXCEEDING 1.5:1.*
4. *RIP EXISTING CHANNEL BED AT MINIMUM 4" DEEP TO CREATE A BETTER BONDING SURFACE BETWEEN THE TWO LAYERS.*
5. *IMPORT WELL-MIXED RIFFLE MATERIAL AND/OR CREATE MATERIAL FROM NATIVE ALLUVIUM FROM PROJECT EXCAVATIONS MEETING THE SPECIFICATIONS FOR CONSTRUCTED RIFFLE MATERIAL. COMPACT RIFFLE MATERIAL IN 9-INCH LIFTS USING TRACKED 300 SERIES EXCAVATOR, OR SIMILAR EQUIPMENT AS APPROVED BY C.O. TRACK ON MATRIX MATERIAL SUFFICIENTLY TO COMPACT MATERIAL.*
6. *REPEAT RIFFLE CONSTRUCTION BY PLACING ANOTHER 9-INCH LIFT WHERE REQUIRED TO MEET DESIGN FG AND CROSS SECTION SHAPE.*
7. *BOULDERS OF VARIOUS SIZES ARE TO BE ADDED TO THE RIFFLE TO CREATE DIVERSE FLOW PATHS AND HABITAT.*
8. *TOP DRESS WITH COARSE RIFFLE MATERIAL AS NEEDED AND DIRECTED BY C.O. TO ADD SOME INITIAL ROUGHNESS TO THE CHANNEL AND FORM A NATURAL APPEARANCE.*
9. *FOR THOSE AREAS WHERE HABITAT STRUCTURES OR BANK TREATMENTS ARE TO BE PLACED ADJACENT TO THE CONSTRUCTED RIFFLE, THE RIFFLE WILL BE CONSTRUCTED BEFORE PLACEMENT OF HABITAT STRUCTURES OR BANK TREATMENTS.*
10. *RIFFLES AND CHANNELS THAT ARE MARKED AS COMPLETE BY THE CONTRACTOR SHALL NOT BE DRIVEN ON BY MACHINERY TO PREVENT OVER COMPACTION OR MOVEMENT OF MATERIAL WITHOUT APPROVAL FROM C.O..*

RIFFLE MATERIAL	
PERCENT PASSING	*SIZE CLASS*
100%	*8.5 INCHES*
84%	*6.8 INCHES*
50%	*4.2 INCHES*
30%	*3.2 INCHES*
16%	*3.2 INCH*
10%	*0.2 INCH*

GRADATION NOTES:

1. *PERCENT PASSING SIZE CLASS IS BASED ON THE NOMINAL DIAMETER OF ROCK.*
2. *NOMINAL DIAMETER SHALL BE MEASURED AS THE INTERMEDIATE AXIS WHERE THE SMALL AND LARGE AXIS SHALL NOT BE MORE THAN 3 TIMES LESS THAN OR GREATER THAN THE NOMINAL DIAMETER.*
3. *SIZE CLASS IS UNIQUE TO THESE DRAWINGS AND IS NOT THE UNIFIED SOIL CLASSIFICATION.*
4. *ACCEPTABLE RIFFLE MATERIAL MAY BE CREATED FROM STOCKPILES OF VARIOUS SIZED SCREENED MATERIALS.*

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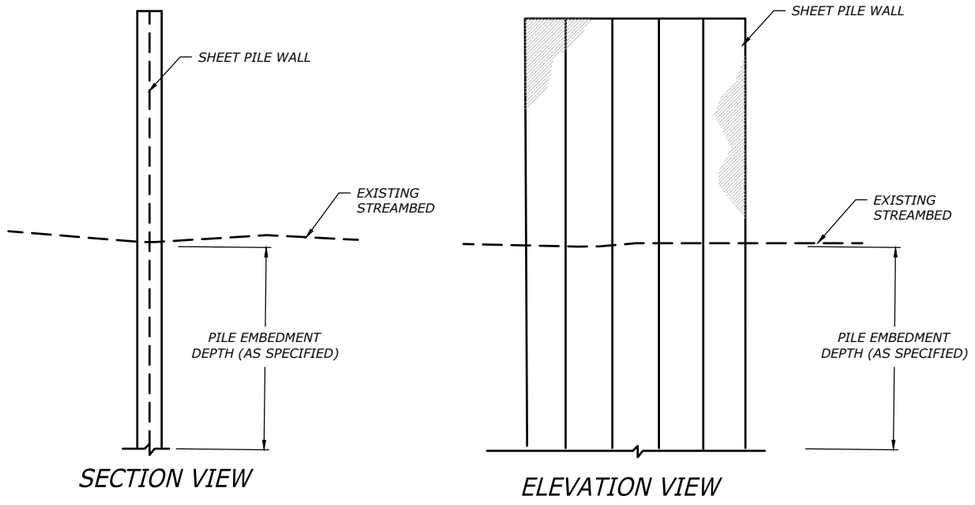
CONSTRUCTED RIFFLE

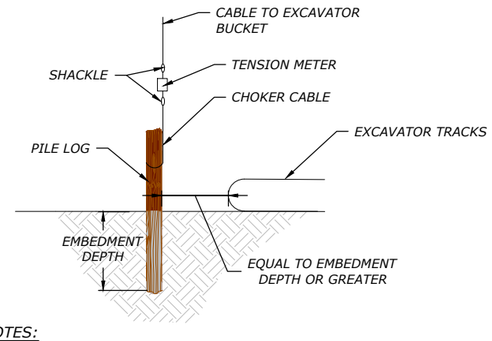
DRAWING NO.

D6

SHEET 18 OF 39



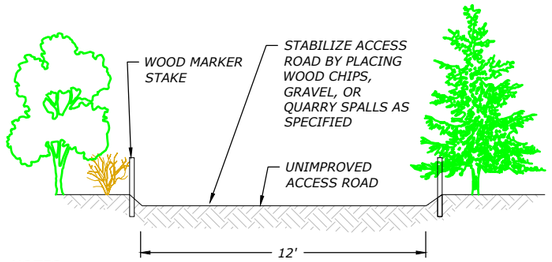
7 SHEET PILE COFFERDAM
NTS



PILE LOG TESTING NOTES:

1. ALL PILES FOR THIS PROJECT SHALL BE VIBRATED IN. SEE THE SPECIFICATIONS FOR PILE INSTALLATION REQUIREMENTS.
2. THE CONTRACTOR SHALL PERFORM PULLOUT TESTING OF A MINIMUM OF 1 AND MAXIMUM OF 3 PILES PER STRUCTURE. THE ENGINEER AND/OR CONTRACTING OFFICER WILL DETERMINE WHICH PILES TO TEST.
3. TESTING OF PILE LOGS SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER OR CONTRACTING OFFICER AS FOLLOWS:
   - 3.1. EACH VERTICAL LOG TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS CLOSELY ALIGNED TO AXIS OF VERTICAL LOG AS POSSIBLE.
   - 3.2. EACH PILE TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS CLOSELY ALIGNED TO THE AXIS OF THE PILE AS POSSIBLE. RECORD THE PILE DIAMETER, EMBEDMENT DEPTH, AND THE MAXIMUM FORCE REQUIRED TO MOVE THE PILE VERTICALLY APPROXIMATELY 1 INCH. THEN DRIVE THE PILE TO A NEW DEPTH TO BE DETERMINED BY THE ENGINEER. APPLY NEW LOAD AND RECORD MAX FORCE THAT CAUSES THE PILE TO MOVE VERTICALLY 1 INCH. REPEAT FOR THIRD AND FOURTH TEST.
   - 3.3. PROOF TESTS SHALL BE MADE AT UP TO FOUR EMBEDMENT DEPTHS TO BE DETERMINED IN THE FIELD. AS A GUIDELINE TEST EMBEDMENT DEPTHS MAY INCLUDE 6 FT, 8 FT, 10 FT, AND 12 FT.
   - 3.4. THE EXCAVATOR CONDUCTING PULL OUT LOADING SHALL BE POSITIONED NO CLOSER THAN EMBEDMENT DEPTH OF VERTICAL LOG, IF POSSIBLE. IF A CLOSER POSITIONING IS REQUIRED, THE EXCAVATOR SHALL BE NO CLOSER THAN THAT REQUIRED TO GENERATE DESIRED LOADING WITH DISTANCE FROM VERTICAL LOG NOTED IN THE TEST RECORD. EQUIPMENT GROUND PRESSURE MAY BE REDUCED BY POSITIONING THE EXCAVATOR ACROSS HORIZONTAL LOGS, WITH DISTANCE FROM VERTICAL LOG, LOG NUMBERS AND LENGTH NOTED IN THE TEST RECORD.
   - 3.5. PULL OUT RESISTANCE READING SHALL BE COMPARED AGAINST EXCAVATOR MAX LIFT OFFSET TABLE.
   - 3.6. SPECIFIED LOG EMBEDMENT DEPTHS IN THE DRAWINGS MAY BE REDUCED OR INCREASED, PENDING PULL OUT TEST RESULTS, AT NO ADDITIONAL COST.
4. IF 20 MINUTES OF FULL-FORCE VIBRATORY DRIVING EFFORT FAILS TO EMBED LOGS TO A SUFFICIENT DEPTH TO PROVIDE APPROXIMATELY 12,000 LB OF RESISTANCE TO PULLOUT, THE ENGINEER SHALL DETERMINE IF VERTICAL LOGS SHALL BE REPLACED OR SUPPLEMENTED WITH ADDITIONAL STABILITY MEASURES. THE ENGINEER SHALL PROVIDE DIRECTION BACK TO CONTRACTING OFFICER WITHIN 2 WORKING DAYS OF THE PILE TESTING.
5. RIGGING FOR VERTICAL LOG TESTING SHALL CONFORM TO THE TENSION SCALE MANUFACTURES' RECOMMENDATIONS.
6. CHOKERS, CABLES, AND SHACKLES SHALL HAVE MINIMUM WORKING LOAD RATING OF 12 TONS. FITTINGS SHALL BE SIZED ACCORDINGLY.

12 PILE LOG TESTING
NTS



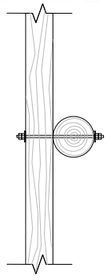
NOTES:

1. CLEARED ACCESS TO BE ROUTED TO MINIMIZE VEGETATION DISTURBANCE AND FOREST CLEARING.
2. CONTRACTOR SHALL MARK CLEARING LIMITS. CLEARING LIMITS TO BE APPROVED BY ENGINEER PRIOR TO ANY CLEARING ACTIVITIES.
3. ANY TREES GREATER THAN 18" Ø SHALL BE REMOVED W/ ROOTWADS INTACT AND STOCKPILED FOR USE IN LOGJAM CONSTRUCTION.
4. TREES AND SHRUBS WITH 6"-18" Ø SHALL BE STOCKPILED FOR USE AS RACKING MATERIAL IN LOGJAM CONSTRUCTION.
5. VEGETATION AND ORGANIC SOIL SHALL BE STRIPPED, TEMPORARILY STOCKPILED, AND REPLACED ON ROAD ALIGNMENT AFTER WORK IS COMPLETE AND ACCEPTED.
6. ACCESS SHALL BE MAINTAINED BY MINOR GRADING AND PLACEMENT OF WOOD CHIPS, GRAVEL AND/OR QUARRY SPALLS. ALL GRAVEL OR QUARRY SPALLS (IF PLACED) SHALL BE UNDERLAIN WITH A GEOTEXTILE AND REMOVED.
7. DECOMPACT ACCESS ROUTES AT LOCATIONS DETERMINED BY THE CONTRACTING OFFICER BY LOOSENING/RIPPING THE SURFACE.

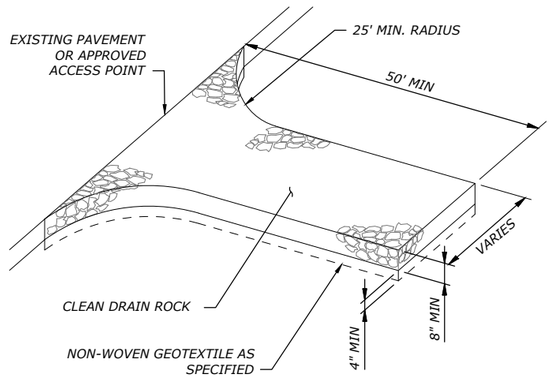
9 TEMPORARY ACCESS ROAD
NTS

BOLTED CONNECTION NOTES:

1. ALL BARK SHALL BE REMOVED FROM BOTH LOGS AT THE CONNECTION POINT PRIOR TO INSTALLATION.



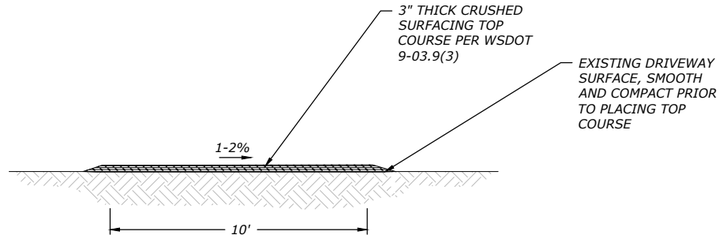
10 BOLTED CONNECTION
NTS



NOTES:

1. ADDITIONAL GRAVEL SHALL BE ADDED PERIODICALLY TO MAINTAIN PROPER FUNCTION OF THE PAD.
2. REMOVE GRAVEL ENTRANCE AND REPLACE WITH BASE COURSE PRIOR TO COMPLETION OF THE PROJECT.

8 CONSTRUCTION ENTRANCE
NTS



NOTES:

1. CONTRACTOR SHALL SMOOTH ANY WHEEL RUTS/DAMAGE TO EXISTING DRIVEWAY (SUBGRADE) AND COMPACT PRIOR TO PLACING CRUSHED SURFACING.
2. PLACE 3 INCH THICK LAYER OF CRUSHED SURFACING TOP COURSE AND MACHINE COMPACT AS DIRECTED BY CONTRACTING OFFICER.

11 DRIVEWAY SURFACING
NTS

GENERAL EROSION AND SEDIMENT CONTROL AND WORK AREA ISOLATION NOTES:

1. THE DETAILS SHOWN ON THIS SHEET ARE EXAMPLES OF ACCEPTABLE METHODS TO USE DURING CONSTRUCTION OF THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING AND SUBMITTING A COFFERDAM, PUMPING, AND DEWATERING PLAN FOR REVIEW AND APPROVAL BY THE CONTRACTING AGENCY OR ENGINEER. THE PLAN SHALL INCLUDE SUFFICIENT DETAIL OF MEANS AND METHODS SATISFYINGLY MEETING THE PROJECT SPECIFICATIONS AND PERMIT REQUIREMENTS. IF APPROVED, OTHER METHODS MAY BE USED SUCH AS UTILIZING INFLATABLE BLADDERS, PLATES, OR BARRIERS OF VARIOUS MATERIALS. COFFERDAMS SHALL INCLUDE PLASTIC LINER OR FINE MESH SILT FENCE TO REDUCE TURBIDITY AND FINES FROM ENTERING THE FREE FLOWING PORTION OF LIVE WATER.
2. COFFERDAMS SHALL BE CONSTRUCTED TO ACCOMMODATE ALL FLOW CONDITIONS AND WATER SURFACE ELEVATIONS EXPECTED DURING CONSTRUCTION PLUS A MINIMUM OF 1-FOOT OF FREEBOARD. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH WATER QUALITY STANDARDS, SAFETY AND CONSTRUCTION STANDARDS, DAMAGE OR LOSS TO EQUIPMENT, MATERIALS, AND DAMAGES TO PRIVATE PROPERTY.
3. THE CONTRACTING AGENCY IS RESPONSIBLE FOR MEASURING TURBIDITY HOWEVER THE CONTRACTOR SHALL ADHERE TO THE SPECIAL PROCEDURES REGARDING IN-STREAM WORK, TURBIDITY, AND DEWATERING (DRAWINGS G2). CONSERVATION MEASURES ARE SUMMARIZED ON DRAWINGS G3, G4, AND G5 AND SHALL BE STRICTLY ADHERED TO.
4. THE CONTRACTOR SHALL NOTIFY THE OWNER AND CONTRACTING OFFICER AT LEAST 5 DAYS BEFORE EACH COFFERDAM INSTALLATION DATE SO THAT FISH SALVAGE ACTIVITIES CAN BE SCHEDULED. ANTICIPATED COFFERDAM LOCATIONS ARE SHOWN IN THE PLANS.
5. FILL MATERIAL FOR BULK BAGS SHALL BE CLEAN, WASHED, AND ROUNDED MATERIAL MEETING STANDARD SPECIFICATIONS FOR DRAIN ROCK, STREAMBED AGGREGATES, STREAMBED SEDIMENTS, OR STREAMBED COBBLES. MATERIAL USED TO FILL BULK BAGS SHALL BE DISPOSED OF IN ACCORDANCE WITH THE PERMITS.
6. DEWATERING PUMP DISCHARGE FROM WITHIN COFFERDAM WORK AREAS SHALL BE RELEASED ONTO FLOODPLAIN AREAS AWAY FROM CONSTRUCTION ACTIVITIES. DISCHARGE SHALL BE COMPLETELY INFILTRATED PRIOR TO REACHING SURFACE WATERS UNLESS APPROVED BY THE CONTRACTING OFFICER. ALL RETURN FLOWS MUST MEET PERMIT REQUIREMENTS FOR TURBIDITY.
7. EXCAVATIONS ASSOCIATED WITH CHANNEL, FLOODPLAIN, AND WOOD HABITAT STRUCTURES SHALL BE DEWATERED IN ACCORDANCE WITH THE SPECIFICATIONS.
8. ALL PUMP INTAKES SHALL BE SCREENED FOR FISH PROTECTION AS REQUIRED BY NOAA.
9. ALL EARTHWORK ACTIVITIES AND WOOD HABITAT STRUCTURE CONSTRUCTION WITHIN THE ORDINARY HIGH WATER CHANNEL SHALL CONFORM TO THE WATER QUALITY STANDARDS ESTABLISHED BY REGULATORY AGENCY PERMITS FOR THIS PROJECT.

Applied Science & Engineering

Yakama Nation Fisheries

METHOW RIVER FOGHORN REACH
RESTORATION PROJECT PHASE 1
FINAL DESIGN DRAWINGS
FOR: YAKAMA NATION FISHERIES
METHOW RIVER - FOGHORN REACH
OKANOGAN COUNTY, WASHINGTON

JOSEPH CHUNG YOUNG
STATE OF WASHINGTON
152975
REGISTERED
PROFESSIONAL ENGINEER
4/29/2026

DATE: APRIL 27, 2026
DESIGNED: TDS, SJB
APPROVED: JCY

DRAWING NAME
DETAILS
ACCESS & ISOLATION DETAILS

DRAWING NO.
D7
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