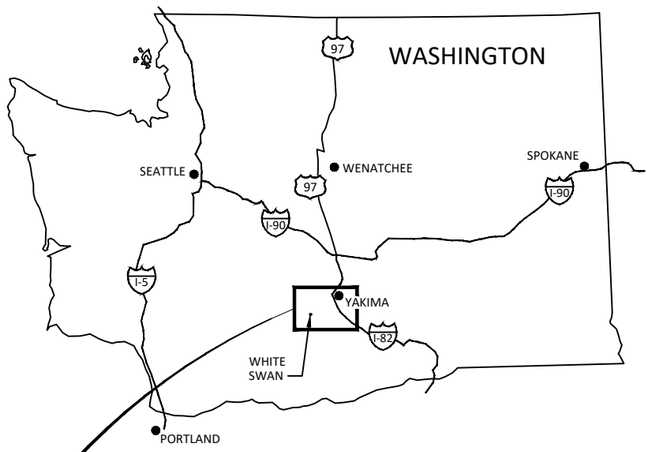
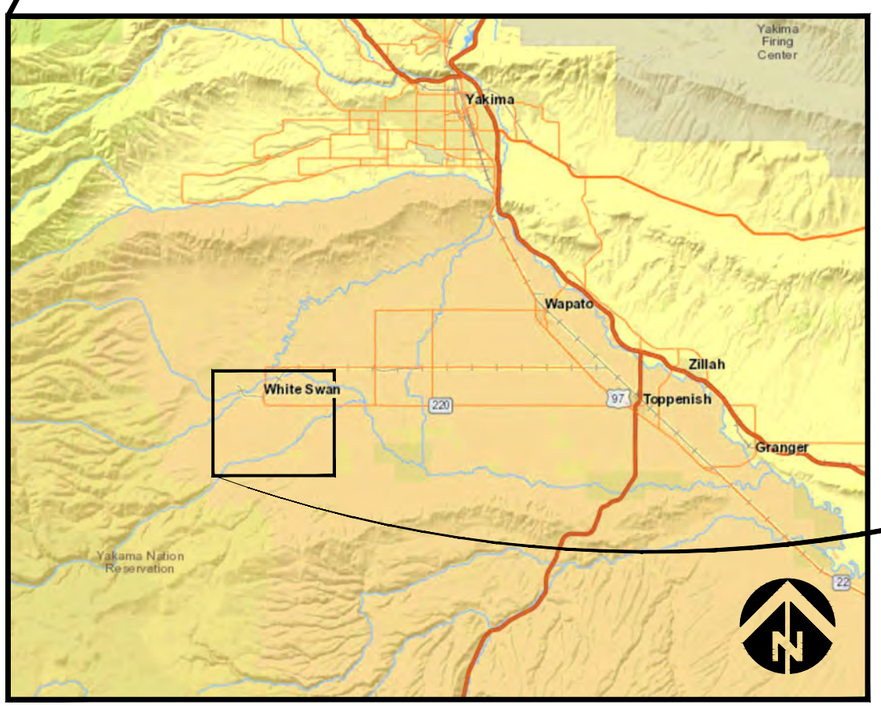
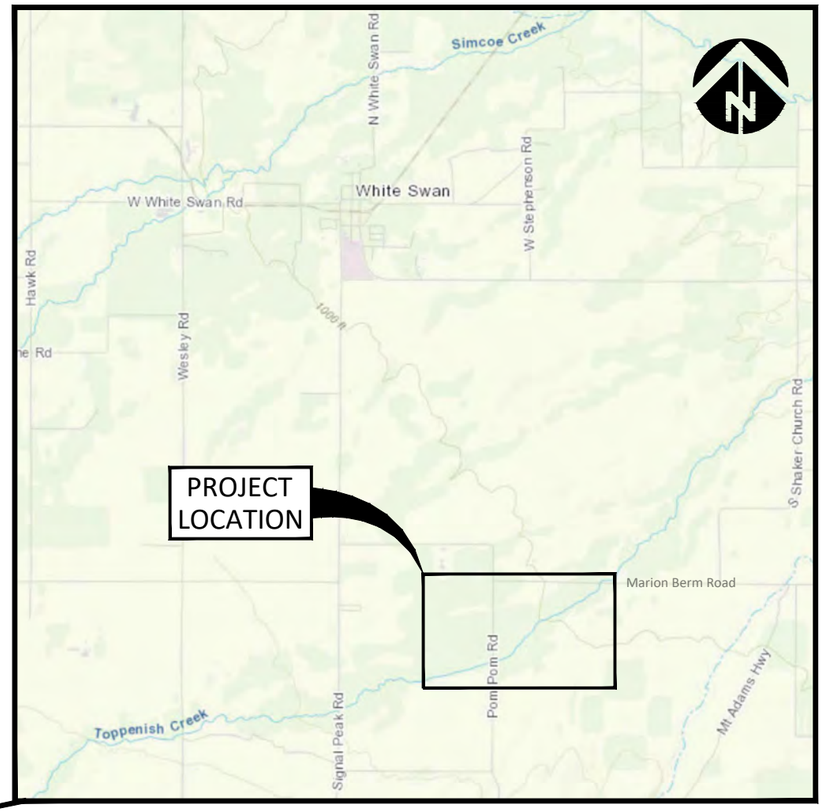
# POST-FIRE POM POM, TOPPENISH CREEK RESTORATION
# FINAL CHANNEL AND FLOODPLAIN DESIGNS

MARCH 2025




VICINITY MAP
SCALE: 1/8" = 1 mi.




UPSTREAM COORDINATES:
LATITUDE 46° 14' 33.25" N
LONGITUDE 120° 48' 41.78" W

DOWNSTREAM COORDINATES:
LATITUDE 46° 13' 51.82" N
LONGITUDE 120° 48' 09.66" W

SECTION 33, TOWNSHIP 9N, RANGE 16E

WATERBODY: TOPPENISH CREEK
TRIBUTARY OF: YAKIMA RIVER

SITE MAP
SCALE: 1" = 1 mi.

CONSTRUCTION WORK WINDOW IS JULY 1 TO OCTOBER 31

## SHEET LIST



MICHAEL R. McALLISTER — STATE OF WASHINGTON — 38180 — REGISTERED PROFESSIONAL ENGINEER — EXPIRES 09-25-2025

| NO. | BY | DATE | REVISION DESCRIPTION |
|---|---|---|---|
| | | | |

| DRAWN | DESIGNED | CHECKED |
|---|---|---|
| BB, NS, JR | MM, PL, EA, MB | PL, JG |
| APPROVED | DATE | PROJECT |
| MM | MAR 2025 | 200203 |

YAKAMA NATION FISHERIES
POST-FIRE POM POM, TOPPENISH CREEK RESTORATION
FINAL


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


COVER SHEET, LOCATION & SHEET LIST

SHEET 1 OF 32

THE CONTRACTOR SHALL ATTEND A PRE-BID SITE MEETING.

THE CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING WITH THE CONTRACTING AGENT (YRWP) AND CONTRACTING AGENT'S REPRESENTATIVE PRIOR TO BEGINNING CONSTRUCTION.

ALL WORK SHALL CONFORM TO THE CURRENT 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 SHALL PREVAIL.

IN CASE OF DISCREPANCY, BETWEEN NOTES, LOCAL REGULATIONS, OR OTHER CONTRACT DOCUMENTATION, CONTRACTOR SHALL OBTAIN CLARIFICATION/DIRECTION FROM CONTRACTING AGENT (YRWP).

## EXISTING DATA

TOPOGRAPHIC SURVEY COLLECTED BY INTER-FLUVE, INC. USING RTK, GPS, AND TOTAL STATION ON JUNE 24-25 AND NOV 10-12, 2020; AND OCT 20, 2022; AND OCT 18, 2024 AND MARCH 24, 2025. SURVEY DATA IS REFERENCED TO NAD83 WASHINGTON STATE PLANE, SOUTH ZONE, US FEET, NAVD 88.

LIDAR DATA SOLICITED BY WASHINGTON DEPARTMENT OF NATURAL RESOURCES AS PART OF THE YAKIMA BASIN DATA SET. DATA ACQUIRED BY QUANTUM SPATIAL IN NOVEMBER 2017 & MAY 2018.

HYDRAULIC MODELING BY INTER-FLUVE USING USACE HEC-RAS (6.1). MODEL VALIDATED USING SURVEYED WATER SURFACE ELEVATIONS AND FIELD OBSERVATIONS.

## WATERS OF THE U.S.

THE LOW FLOW WATER INUNDATION DEPICTED IN THE DESIGNS WERE EXTRACTED FROM THE 2-D HEC-RAS MODEL FOR EXISTING CONDITIONS AT 28 CFS.

## SOILS

SOILS ONSITE ARE EXPECTED TO BE COMPOSED OF ONYX SILT LOAM, UMAPINE SILT LOAM, AND WHATUM LOAM, AS MAPPED BY NRCS. NO SUBSURFACE INVESTIGATIONS HAVE BEEN COMPLETED.

## UTILITIES

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

CONTRACTOR TO COORDINATE WITH YAKAMA NATION FOR TEMPORARY RELOCATIONS OR REMOVAL OF ANY REMAINING UTILITY LINES, INCLUDING POWER LINES.

THE CONTRACTOR TO COORDINATE WITH YAKAMA NATION FOR TEMPORARY SHUT-OFF OF WATER MAIN UNDER POM POM ROAD.

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 CONTRACTING AGENT (YRWP).

## IN-WATER WORK PERIODS

WORK SHALL OCCUR DURING THE PERMITTED IN-WATER WORK PERIOD AS STATED IN THE APPLICABLE PERMITS.

## FISH RESCUE

ALL FISH RESCUE EFFORTS SHALL BE SUPERVISED BY A QUALIFIED YAKAMA NATION FISHERIES/AQUATIC BIOLOGIST EXPERIENCED WITH THE COLLECTION AND HANDLING OF SALMONID FISHES FROM CONSTRUCTION SITES.

ALL FISH TRAPPED IN RESIDUAL POOLS WITHIN THE PROJECT AREA SHALL BE CAREFULLY COLLECTED BY SEINE AND/OR DIP NETS AND PLACED IN CLEAN TRANSFER CONTAINERS WITH ADEQUATE VOLUME OF WATER AND HELD WITHIN NO LONGER THAN 10 MINUTES.

CAPTURED FISHES SHALL BE IMMEDIATELY RELEASED INTO THE RIVER.

CONTRACTOR WILL PROVIDE AGREED UPON ADVANCE NOTICE TO CONTRACTING AGENCY (YRWP) PRIOR TO FISH RESCUE. CONTRACTOR IS RESPONSIBLE FOR ISOLATING THE CONSTRUCTION LOCATION FROM THE STREAM ACCORDING TO REGULATORY AGENCY.

## CULTURAL RESOURCES

CULTURAL RESOURCE MONITORING TO BE PROVIDED BY THE CONTRACTING AGENT (YRWP) DURING GROUND DISTURBING ACTIVITIES. THE CONTRACTOR SHALL ACCOMMODATE THE MONITORING PERSONNEL AND COMPLY WITH THEIR DIRECTION RELATIVE TO INTERACTIONS WITH POTENTIAL CULTURAL RESOURCES.

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, HEARTH FEATURES, ETC)
- HISTORIC ERA ARTIFACTS (EXAMPLE: BUILDING FOUNDATIONS, HOMESTEADS, MINING CAMPS, ETC)
- HUMAN SKELETAL REMAINS AND 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 TRIBES INADVERTENT DISCOVERY PROCEDURE. THEN AWAIT FURTHER DIRECTION FROM THE TRIBES CULTURAL RESOURCES STAFF.

## TREE SALVAGE

ALL SAPLING AND TREES TO BE REMOVED SHALL BE APPROVED AND CLEARLY MARKED BY THE CONTRACTING AGENT'S REPRESENTATIVE.

ALL REMOVED NATIVE VEGETATION SHALL BE INCORPORATED INTO LOG STRUCTURES AS DIRECTED BY THE CONTRACTING AGENT'S REPRESENTATIVE. IF EXCESS VEGETATION MATERIAL NEEDS DISPOSAL OUTSIDE OF CHANNEL WORK, IT SHALL BE DISTRIBUTED IN DESIGNATED AREAS ON THE FLOODPLAIN OR ON THE FLOODPLAIN AS DIRECTED BY THE CONTRACTING AGENT'S REPRESENTATIVE.

ALL TREES REMOVED WITHIN CLEARING LIMITS SHALL BE REMOVED WHOLE WITH ROOTS INTACT AND UTILIZED IN CONSTRUCTION AS DIRECTED BY CONTRACTING AGENT'S REPRESENTATIVE.

REMOVE SOIL FROM ROOTS OF SALVAGED TREES BEFORE PLACEMENT IN THE WATERWAY.

## 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.

## PLANTINGS

PLANT INSTALLATION SHALL BE SCHEDULED FOR BEST SURVIVAL RATE. YRWP WILL COORDINATE PLANTING SCHEDULE WITH THE CONTRACTOR.

CONTRACTOR IS RESPONSIBLE FOR PROPER HANDLING, STORAGE, AND WATERING.

## CONTRACTOR'S PLANS

CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL BY THE CONTRACTING AGENT PRIOR TO COMMENCING WORK THE FOLLOWING PLANS:

- ACCESS, TRAFFIC CONTROL AND TEMPORARY STREAM CROSSING PLAN
- CONSTRUCTION SEQUENCING PLAN
- STREAM DIVERSION AND SITE DEWATERING PLAN
- EROSION, SEDIMENT AND DUST CONTROL PLAN
- EARTHWORKS EXCAVATION, PLACEMENT, SALVAGE & REUSE, AND DISPOSAL PLAN

## CONSTRUCTION ACCESS

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ANY REQUIRED TRAFFIC CONTROL OR ACCESS PERMITS, AND PROVIDING REQUIRED TRAFFIC CONTROL MEASURES INCLUDING, BUT NOT LIMITED TO, SIGNAGE AND FLAGGERS.

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

THE CONTRACTOR SHALL KEEP THE WORK AREAS IN A NEAT AND CLEAN CONDITION FREE OF DEBRIS AND LITTER FOR THE DURATION OF THE PROJECT.

TEMPORARY ACCESS ROUTES IN AREAS PRONE TO INUNDATION DURING THE IN-WATER WORK WINDOW SHALL BE DECOMMISSIONED BEFORE THE END OF THE IN-WATER WORK WINDOW.

## CONSTRUCTION STAKING

THE CONTRACTING AGENT (YRWP) OR DESIGNATED REPRESENTATIVE WILL INSTALL FLAGGING TO DELINEATE EQUIPMENT ENTRY AND EXIT POINTS, STAGING AND STOCKPILE AREAS, AND PROJECT LIMITS. THE CONTRACTING AGENT (YRWP) WILL INSTALL ELEVATION CONTROL POINTS. THE CONTRACTOR SHALL BE RESPONSIBLE, AT OWN EXPENSE, FOR STAKING AND REPLACING DAMAGED OR MISSING STAKES.

THE CONTRACTING AGENT (YRWP) AND CONTRACTING AGENT'S REPRESENTATIVE WILL MARK LIMITS OF DISTURBANCE PRIOR TO MOBILIZATION OF EQUIPMENT OR MATERIALS ONTO THE SITE.

LOCATION, ALIGNMENT, AND ELEVATION OF LOGS AND LOGS WITH ROOTWADS ARE SUBJECT TO ADJUSTMENT IN THE FIELD AS DIRECTED BY YRWP REPRESENTATIVE, BASED ON FIELD CONDITIONS, AND MATERIAL SIZE.

ANY PROPERTY MONUMENTS DISTURBED OR DESTROYED SHALL BE REPLACED BY A WASHINGTON STATE PROFESSIONAL LICENSED SURVEYOR AT CONTRACTOR'S EXPENSE.

## ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| APPROX | APPROXIMATE | HORIZ | HORIZONTAL | RMx | RIVER MILE x |
| AVE | AVERAGE | IN or " | INCH | STA | STATION |
| CFS | CUBIC FEET PER SECOND | INV | INVERT | TBD | TO BE DETERMINED |
| CMs | CONSERVATION MEASURES | LN | LANE | TBM | TEMPORARY BENCHMARK |
| CY | CUBIC YARDS | MAX | MAXIMUM | TYP | TYPICAL |
| ° | DEGREES | MIN | MINIMUM | U.S. | UNITED STATES |
| DIA | DIAMETER | NOAA | NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION | VERT | VERTICAL |
| EL or ELEV | ELEVATION | | | WSDOT | WASHINGTON STATE DEPARTMENT OF TRANSPORTATION |
| EXIST | EXISTING | OHW | ORDINARY HIGH WATER | | |
| FT or ' | FEET | % | PERCENT | WSE | WATER SURFACE ELEVATION |
| HWY | HIGHWAY | RD | ROAD | YR | YEAR |
| | | | | YRWP | YAKIMA RESERVATION WATERSHED PROJECT |

| NO. | BY | DATE | REVISION DESCRIPTION |
|---|---|---|---|
| | | | |

BB, NS, JR DRAWN | MM, PL, EA, MB DESIGNED | PL, JG CHECKED

MM APPROVED | MAR 2025 DATE | 200203 PROJECT

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GENERAL NOTES

SHEET 2 OF 32

MICHAEL R. McALLISTER STATE OF WASHINGTON 18139 REGISTERED PROFESSIONAL ENGINEER
EXPIRES 09-26-2025

## SUMMARY OF QUANTITIES - GRADING

| Description | Cut (CY) | Fill (CY) | Source |
|---|---|---|---|
| SOUTH CANAL PLUG | 0 | 32,000 | ONSITE STOCKPILE |
| CENTER CHANNEL PLUG | 0 | 600 | CONNECTOR CHANNEL 3 |
| CONNECTOR CHANNEL 1 | 1,850 | 0 | |
| CONNECTOR CHANNEL 2 | 800 | 60 | ONSITE |
| CONNECTOR CHANNEL 3 | 600 | 0 | |
| CHANNEL CONNECTION | 70 | 70 | DISTRIBUTED ON ADJACENT BAR, NO HAUL |
| SEDIMENT AUGMENTATION - PLACED IN CHANNEL | 0 | 2,430 | SOUTH CANAL AT PLUG FOOTPRINT |
| SEDIMENT AUGMENTATION - CUT FROM UNDER SOUTH PLUG | 2,430 | 0 | |
| CONSTRUCTED RIFFLE - SUBGRADE CUT -DOES NOT INCLUDE RIFFLE CONST. | 8,520 | 0 | |
| CONSTRUCTED RIFFLE - STREAMBED MATERIAL | 0 | 4,400 | IMPORTED - SIZE SPECIFICS |
| FLOODPLAIN BERM | 0 | 9,530 | ONSITE |
| DECOMMISSION 2-TRACK | 750 | 750 | BALANCED |

NOTE: QUANTITIES ARE ESTIMATES ONLY FOR EVALUATING THE SCALE OF THE WORK. QUANTITIES MAY NOT INCLUDE ALL WORK ITEMS. CONTRACTOR RESPONSIBLE FOR VERIFYING QUANTITIES NEEDED TO COMPLETE THE WORK SHOWN ON THE PLANS.

## SUMMARY OF QUANTITIES - MATERIALS

| Description | Unit | Quantity | Source |
|---|---|---|---|
| CONSTRUCTED RIFFLE - STREAMBED BOULDERS - TYPE 4 | EA | 50 | IMPORTED |
| LARGE WOOD WITH ROOTWADS | EA | 103 | IMPORTED LW |
| POST ASSISTED ROUGHNESS STRUCTURES (POSTS AND SLASH) | EA | 40 | POSTS IMPORTED, SLASH SITE GENERATED |
| FLOODPLAIN ROUGHNESS WEED-FREE STRAW BALES | LF | 6,500 | IMPORTED |
| FLOODPLAIN ROUGHNESS WILLOW/ COTTONWOOD TRENCHS | LF | 11,500 | LIVE STAKES AND SLASH |
| REVEGETATION SEEDING/ PLANTING | AC | 120 | RIPARIAN AND UPLAND COMBINED |




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ESTIMATED QUANTITIES & JURISDICTIONAL IMPACTS



MICHAEL R. McALLISTER
STATE OF WASHINGTON
38129
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 09-22-2025

## 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 IS JULY 1- OCTOBER 30.

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.

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BB, NS, JR — DRAWN | MM, PL, EA, MB — DESIGNED | PL, JG — CHECKED
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YAKAMA NATION FISHERIES
POST-FIRE POM POM, TOPPENISH CREEK RESTORATION
FINAL

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HIP CONSERVATION MEASURES (1 OF 3)

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

C. SAMPLE PROCESSING.

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

D. BULL TROUT ELECTROFISHING.

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

E. LARVAL LAMPREY ELECTROFISHING.

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

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HIP CONSERVATION MEASURES (2 OF 3)

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## 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 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.

## CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES.

1. FISH PASSAGE.

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

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

2. CONSTRUCTION AND DISCHARGE WATER.

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

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

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

3. TIME AND EXTENT OF DISTURBANCE.

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

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

4. CESSATION OF WORK.

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

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

5. SITE RESTORATION.

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

B. PROJECT-RELATED WASTE WILL BE REMOVED.

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

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

6. REVEGETATION.

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

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

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

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

E. SURFACE FERTILIZER WILL NOT BE APPLIED WITHIN 50 FEET OF ANY STREAM, 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).

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HIP CONSERVATION MEASURES (3 OF 3)

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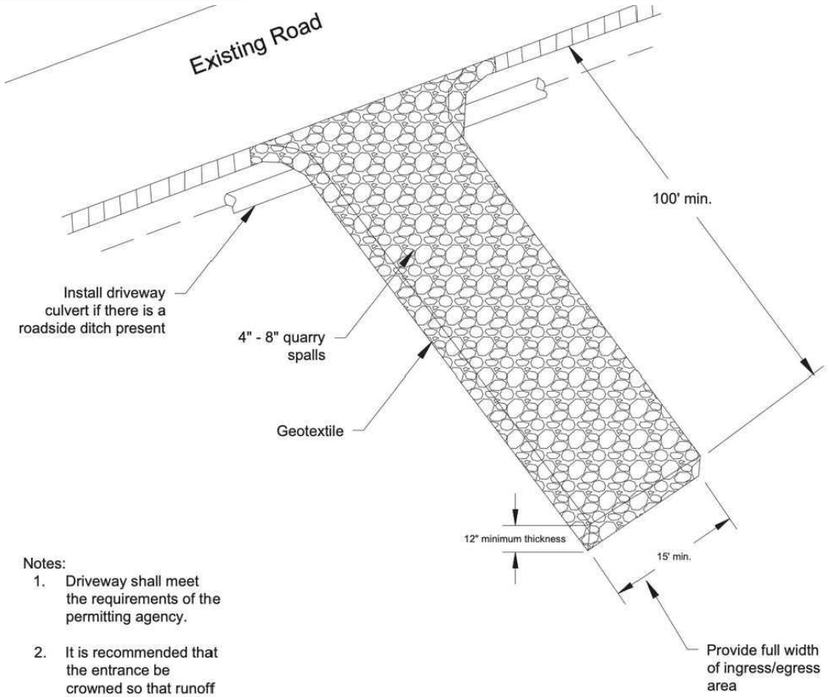
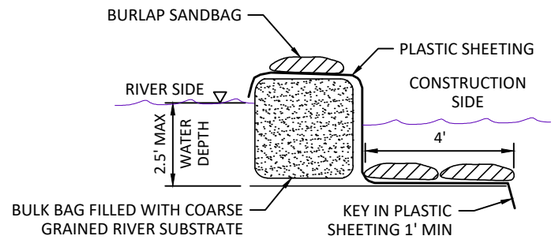



Notes:
1. Driveway shall meet the requirements of the permitting agency.
2. It is recommended that the entrance be crowned so that runoff drains off the pad.

1/7 STABILIZED CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE




SINGLE LAYER COFFERDAM
(WATER DEPTH LESS THAN 2.5')

2/7 TYPICAL DETAIL - TEMPORARY 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. THE PLASTIC SHEETING SHALL BE DRAPED ALONG THE CHANNEL BOTTOM ON THE RIVER SIDE 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.
3. THE TERMINAL ENDS OF BULK BAG COFFERDAM, WHERE IT CONNECTS TO CHANNEL BANK OR HIGH GROUND, SHALL BE SEALED WITH PLASTIC SHEETING AND STANDARD SANDBAGS.
4. 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.
5. 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.
6. 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 AND PLASTIC SHEETING SHALL BE REMOVED FROM THE SITE ONCE CONSTRUCTION IS COMPLETED.
7. MEASUREMENT AND PAYMENT FOR BULK BAG COFFERDAM, SAND BAGS, PLASTIC SHEETING, WASHED COBBLE PLACEMENT, AND MAINTENANCE AND REMOVAL OF ALL MATERIALS, SHALL BE INCIDENTAL TO THE LUMP SUM ALL INCLUSIVE COST FOR DIVERSION AND DEWATERING.
8. 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.
9. IF NECESSARY, GAPS BETWEEN BULK BAGS SHALL BE FILLED WITH WASHED STREAM GRAVEL TO IMPROVE COFFERDAM SEAL.
10. IF FLOW CONDITIONS ENCOUNTERED ON SITE DURING CONSTRUCTION DO NOT ALLOW FOR SUCCESSFUL DEWATERING USING THIS METHOD, SHEETPILE COFFERDAM (HIGH FLOWS) OR SAND BAG COFFERDAM (LOW FLOWS) MAY BE CONSIDERED.

TEMPORARY SITE STABILIZATION NOTE:

1. ALL AREAS IMPACTED BY CONSTRUCTION SHALL BE SEEDED WITH QUICK GUARD STERILE TRITICALE (*STERILE TRITICUM x SECALE)* AT A RATE OF 20 LBS/ ACRE WITHIN 3 DAYS OF STIE COMPLETION.
2. SEED MIX TO BE APPLIED WITH 50:50 RICE HULLS (BY VOLUME) TO FACILITATE EVEN DISTRIBUTION.
3. STRAW MULCH TO BE APPLIED AT A RATE OF 2 TONS/ACRE AND LEAVE APPROXIMATELY 25% OF THE GROUND SURFACE VISIBLE OVER ALL DISTURBED AREAS.

| NO. | BY | DATE | REVISION DESCRIPTION |
|---|---|---|---|
| | | | |

BB, NS, JR DRAWN | MM, PL, EA, MB DESIGNED | PL, JG CHECKED
MM APPROVED | MAR 2025 DATE | 200203 PROJECT

YAKAMA NATION FISHERIES
POST-FIRE POM POM, TOPPENISH CREEK RESTORATION
FINAL

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BMP

SHEET 7 OF 32

MICHAEL R. McALLISTER STATE OF WASHINGTON 28120 REGISTERED PROFESSIONAL ENGINEER
EXPIRES 09-26-2025

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0 400 800

SCALE IN FEET

## LEGEND

- NN — SURVEY CONTROL POINT
- EXISTING 2-FT CONTOURS
- W W — WATER MAIN
- OVERHEAD POWER LINE TO REMAIN
- EXISTING ACCESS ROAD
- EXISTING LOW FLOW (28 CFS)

NORTH CULVERT

CENTER CHANNEL CULVERT

ACCESS ROAD

SOUTH CULVERT

EXISTING POMPOM BRIDGE

100

101

POM POM RD

FLOOD FLOW SIDE CHANNEL
(HISTORICAL MAIN STEM)

MAINSTEM CHANNEL
(SOUTH CANAL)

TOPPENISH CREEK
EXISTING MAINSTEM
CHANNEL

SURVEY CONTROL POINTS

| Pt. No. | Easting | Northing | Elevation | Full Description |
|---|---|---|---|---|
| 100 | 1586986.25 | 366596.57 | 1031.57 | Aluminum Disk |
| 101 | 1586952.69 | 366480.90 | 1031.49 | Aluminum Disk |

MICHAEL R. McALLISTER
STATE OF WASHINGTON
38180
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 09-25-2025

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| BB, NS, JR | MM, PL, EA, MB | PL, JG |
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EXISTING CONDITIONS AND SURVEY CONTROL

SHEET
8 OF 32

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## LEGEND

- PROPOSED FILL AREA
- PROPOSED CHANNEL GRADING
- PROPOSED CHANNEL SEDIMENT AUGMENTATION
- PROPOSED 2-TRACK REGRADING
- CONSTRUCTION BY OTHERS (SEE KPFF PLANS)
- CLEARING LIMIT
- REQUIRED DEAD TREE REMOVAL ZONE
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE
- EXISTING OVERHEAD POWER LINE TO REMAIN
- EXISTING CULVERT
- EXISTING WATERMAIN
- EXISTING LOW FLOW (28 CFS)
- TEMPORARY ACCESS ROUTE
- PROPOSED STAGING / STOCKPILE AREA
- 150' BRIDGE LOCATION, BY OTHERS
- EXCLUSION FENCING (BY YWRP)
- BANK BURIED HABITAT LARGE WOOD, SEE SHEET 26
- POST-ASSISTED ROUGHNESS FEATURE

0 400 800

SCALE IN FEET

SEE SHEET 10 FOR PROPOSED UPSTREAM WORK AREAS

CHANNEL GRADING, SEE SHEET 25

FLOW

STABILIZED CONSTRUCTION ENTRANCE

STABILIZED CONSTRUCTION ENTRANCE

REFUELING AREA-150' SETBACK FROM WATER

STAGING AND STOCKPILE AREA 3

FLOW

REACTIVATED MAINSTEM TOPPENISH CREEK

STOCKPILE AREA 1 (NATURAL MATERIALS ONLY)

STOCKPILE AREA 2 (NATURAL MATERIALS ONLY)

POM POM RD

STOCKPILE AREA 4 (NATURAL MATERIALS ONLY, TOPPENISH 3-WAY SPOILS)

TOPPENISH CREEK EXISTING MAINSTEM CHANNEL

## NOTES:

1. EXISTING ROADS SHALL BE IMPROVED AS NEEDED FOR CONSTRUCTION ACCESS. IMPROVEMENTS SHALL BE APPROVED BY YRWP. ROAD CONDITION FOLLOWING CONSTRUCTION SHALL BE AS APPROVED BY YRWP. SEE SHEET 2 - "CONSTRUCTION ACCESS" FOR ADDITIONAL REQUIREMENTS
2. YRWP TO INSTALL EXCLUSION FENCING AFTER PROJECT COMPLETION

MICHAEL R. McALLISTER STATE OF WASHINGTON 18189 REGISTERED PROFESSIONAL ENGINEER

EXPIRES 09-26-2025

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| BB, NS, JR | MM, PL, EA, MB | PL, JG |
| APPROVED | DATE | PROJECT |
| MM | MAR 2025 | 200203 |

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PROPOSED OVERVIEW, STAGING, STOCKPILE & ACCESS

SHEET 9 OF 32

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## LEGEND

- PROPOSED FILL AREA
- PROPOSED CHANNEL GRADING
- CHANNEL SEDIMENT AUGMENTATION
- PROPOSED 2-TRACK REGRADING
- FLOODPLAIN ROUGHNESS ZONES, SEE SHEET 32
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE
- EXISTING OVERHEAD POWER LINE TO REMAIN
- EXISTING CULVERT
- EXISTING WATERMAIN
- EXISTING LOW FLOW (28 CFS)
- TEMPORARY ACCESS ROUTE
- PROPOSED STAGING / STOCKPILE AREA
- 150' BRIDGE LOCATION, BY OTHERS
- EXCLUSION FENCING (BY YRWP)
- CONSTRUCTION BY OTHERS (SEE KPFF PLANS)
- BANK-BURIED HABITAT LARGE WOOD, SEE SHEET 26
- POST-ASSISTED ROUGHNESS FEATURE

0 250 500

SCALE IN FEET

SEE SHEET 15

SEE SHEET 20

SEE SHEET 21

SEE SHEET 22

SEE SHEET 18

SEE SHEET 17

SEE SHEET 11

SEE SHEET 13

SEE SHEET 12

CONNECTOR 2

POST-ASSISTED ROUGHNESS

CONNECTOR 3

CENTER CHANNEL PLUG

SEDIMENT AUGMENTATION AND ROUGHNESS

CONSTRUCTED RIFFLE

BRIDGE AND SURROUNDING GRADING BY OTHERS

DITCH FILL, GRADING BY OTHERS

CULVERT 1 BY OTHERS

CULVERT 2 BY OTHERS

CULVERT 3 BY OTHERS

2-TRACK REGRADING

POM POM RD BRIDGE

POM POM RD

REACTIVATED MAINSTEM TOPPENISH CREEK CONNECTOR 1

FLOODPLAIN BERM

SOUTH CANAL PLUG

Floodflow

South Canal

| NO. | BY | DATE | REVISION DESCRIPTION |
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PROPOSED CONDITIONS OVERVIEW- POM POM ROAD

SHEET 10 OF 32

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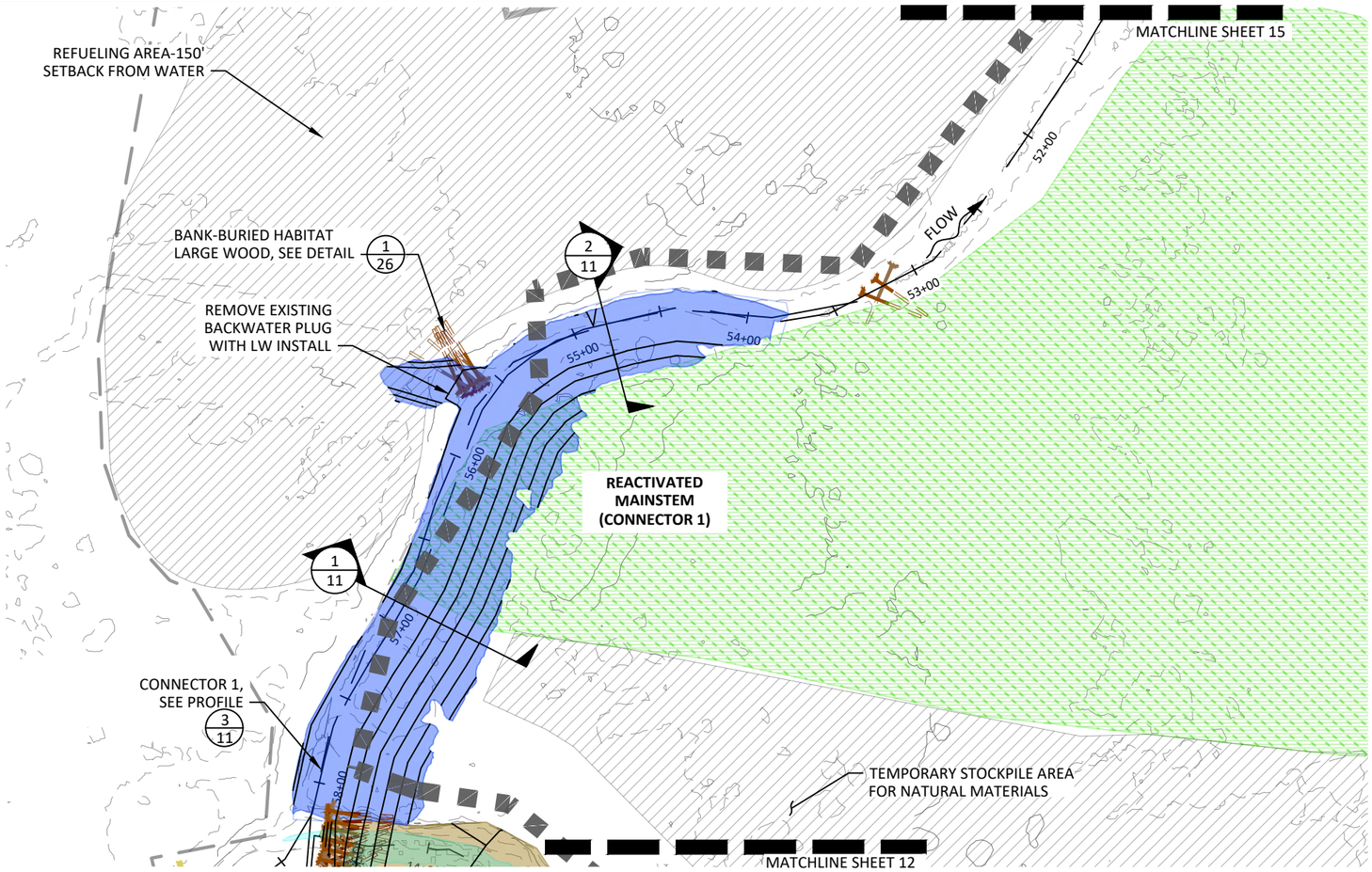
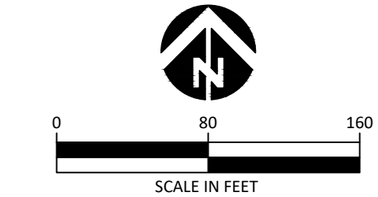
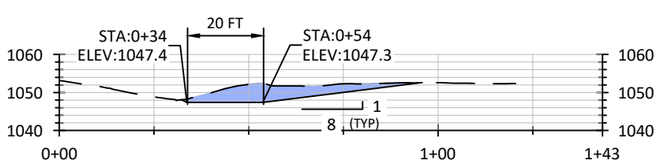


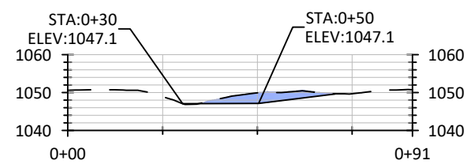




## LEGEND

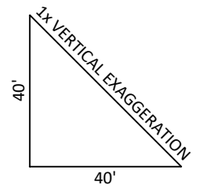
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE
- PROPOSED STAGING / STOCKPILE AREA
- PROPOSED FILL AREA
- PROPOSED CHANNEL GRADING
- FLOODPLAIN ROUGHNESS ZONES, SEE SHEET 32
- EXISTING LOW FLOW (28 CFS)
- BANK-BURIED HABITAT LARGE WOOD, SEE SHEET 26
- TEMPORARY ACCESS ROUTE




1/11 SECTION - PROPOSED MAINSTEM
REACTIVATED MAINSTEM CHANNNEL STA 56+88

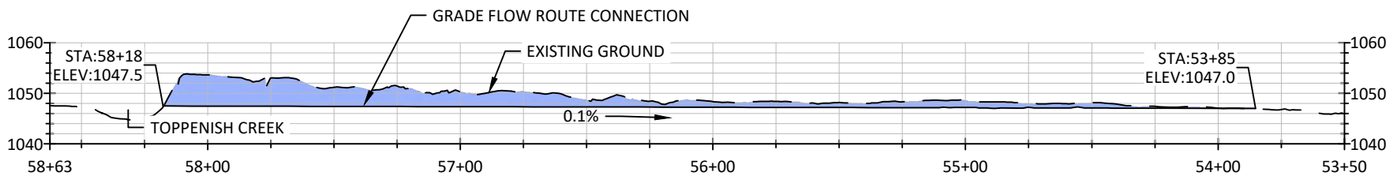



2/11 SECTION - PROPOSED MAINSTEM
REACTIVATED MAINSTEM CHANNEL STA 54+81

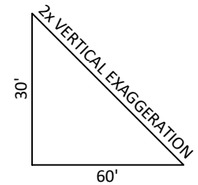



## LEGEND

- PROPOSED GRADE
- EXISTING GRADE
- PROPOSED CHANNEL GRADING




3/11 CONNECTOR 1 PROFILE
REACTIVATED MAINSTEM CHANNEL STA. 53+50 - 58+63





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| **APPROVED** | **DATE** | **PROJECT** |
| MM | MAR 2025 | 200203 |

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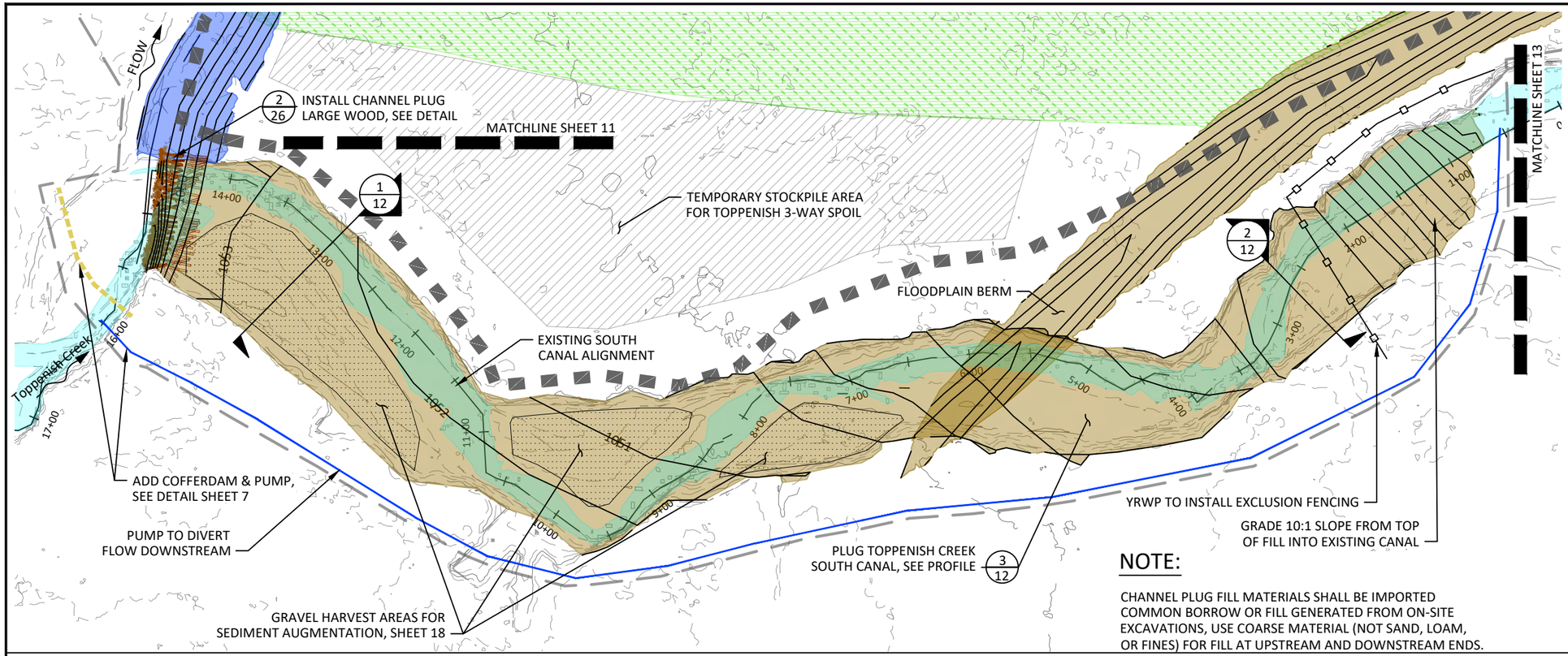
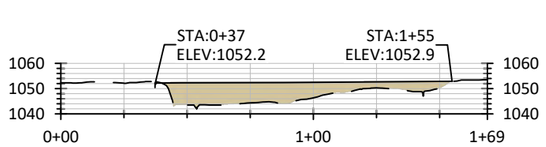
# PROPOSED REACTIVATED MAIN STEM PLAN, SECTIONS, & PROFILE

SHEET
11 OF 32



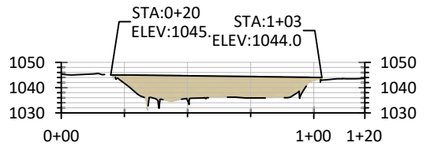

## NOTE:

CHANNEL PLUG FILL MATERIALS SHALL BE IMPORTED COMMON BORROW OR FILL GENERATED FROM ON-SITE EXCAVATIONS, USE COARSE MATERIAL (NOT SAND, LOAM, OR FINES) FOR FILL AT UPSTREAM AND DOWNSTREAM ENDS.

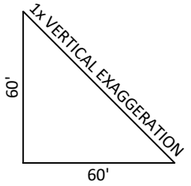


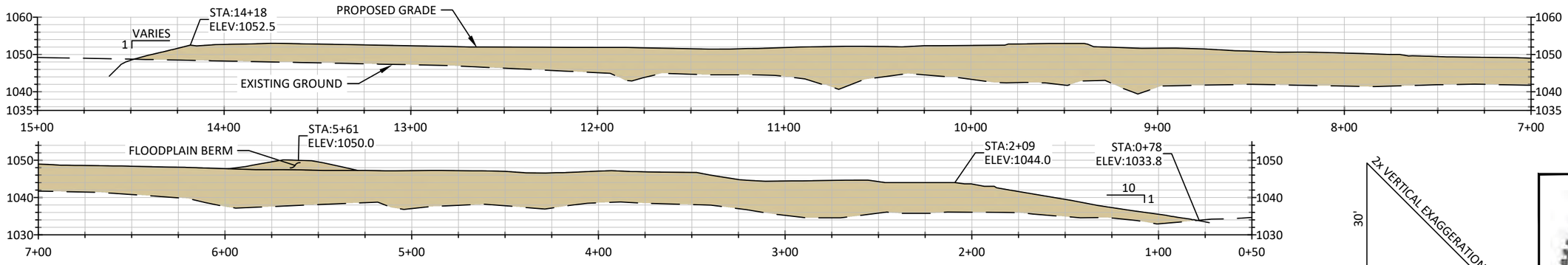

1/12 SECTION - SOUTH CANAL PLUG
SOUTH CANAL STA 7+32

LEGEND
PROPOSED GRADE
EXISTING GRADE
PROPOSED FILL AREA




2/12 SECTION - SOUTH CANAL PLUG
SOUTH CANAL STA 5+31




3/12 SOUTH CANAL PLUG PROFILE
SOUTH CANAL STA 0+50 - STA 15+00




| NO. | BY | DATE | REVISION DESCRIPTION |
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PROPOSED SOUTH CANAL PLUG PLAN, SECTIONS, & PROFILE

SHEET 12 OF 32

MICHAEL R. McALLISTER
STATE OF WASHINGTON
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EXPIRES 09-22-2025

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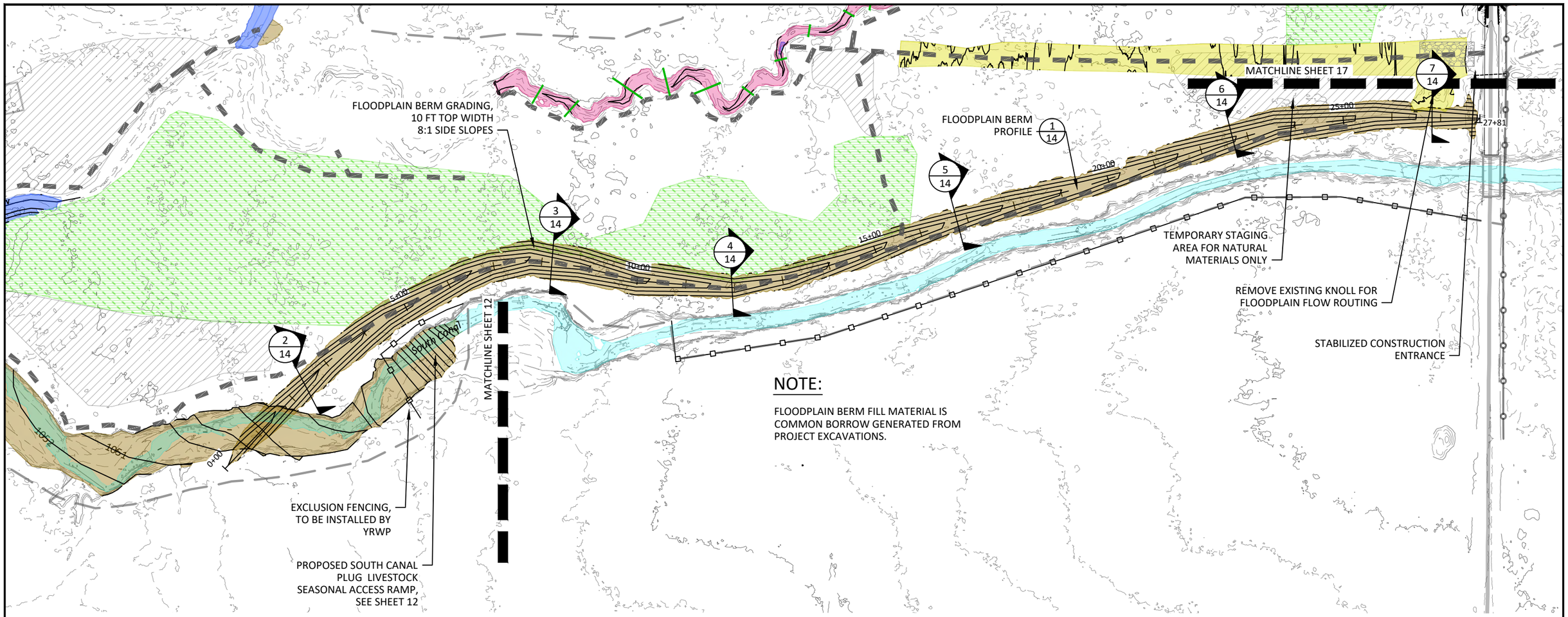


## NOTE:

FLOODPLAIN BERM FILL MATERIAL IS COMMON BORROW GENERATED FROM PROJECT EXCAVATIONS.

## LEGEND

- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE
- PROPOSED FILL AREA
- PROPOSED 2-TRACK REGRADING
- PROPOSED CHANNEL GRADING
- PROPOSED CHANNEL SEDIMENT AUGMENTATION
- PROPOSED STAGING / STOCKPILE AREA
- FLOODPLAIN ROUGHNESS ZONES, SEE SHEET 32
- EXISTING LOW FLOW (28 CFS)
- EXCLUSION FENCING (BY YWRP)
- EXISTING OVERHEAD POWER LINE TO REMAIN
- TEMPORARY ACCESS ROUTE

N

0 200 400

SCALE IN FEET

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PROPOSED FLOODPLAIN BERM

SHEET 13 OF 32

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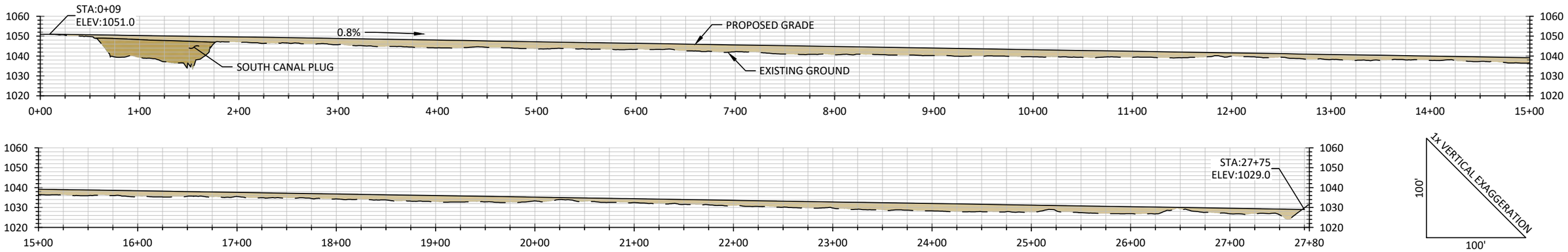
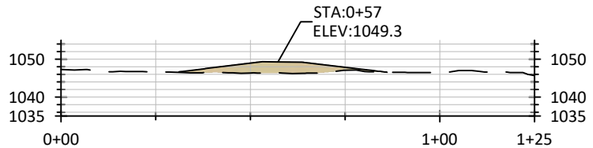
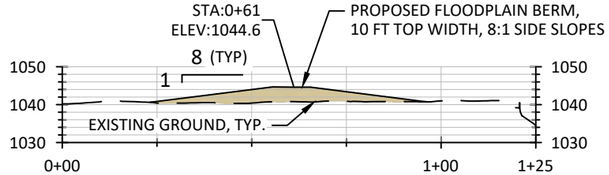


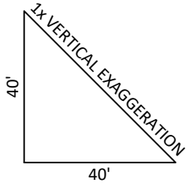

1/14 PROPOSED FLOODPLAIN BERM PROFILE
FLOODPLAIN BERM ALIGNMENT

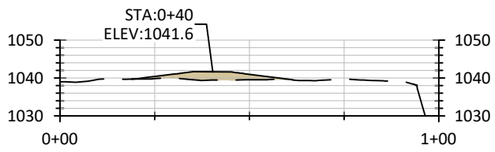



2/14 SECTION - PROPOSED FLOODPLAIN BERM
BERM STA 5+14

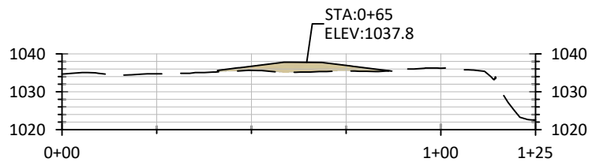



3/14 SECTION - PROPOSED FLOODPLAIN BERM
BERM STA 10+90



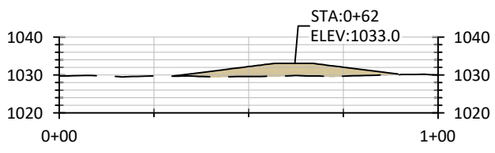

4/14 SECTION - PROPOSED FLOODPLAIN BERM
BERM STA 14+65



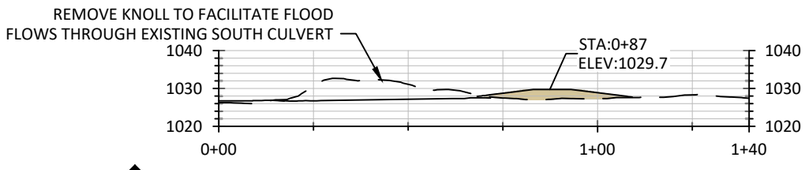

5/14 SECTION - PROPOSED FLOODPLAIN BERM
BERM STA 19+48

## LEGEND

- PROPOSED GRADE
- EXISTING GRADE
- PROPOSED FILL AREA




6/14 SECTION - PROPOSED FLOODPLAIN BERM
BERM STA 25+37




7/14 SECTION - PROPOSED FLOODPLAIN BERM
BERM STA 29+53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PROPOSED FLOODPLAIN BERM SECTIONS & PROFILE

SHEET 14 OF 32

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## LEGEND

- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE
- TEMPORARY ACCESS ROUTE
- PROPOSED STAGING / STOCKPILE AREA
- PROPOSED CHANNEL GRADING
- PROPOSED FILL AREA
- FLOODPLAIN ROUGHNESS ZONES, SEE SHEET 32
- BANK-BURIED HABITAT LARGE WOOD, SEE SHEET 26

0 70 140

SCALE IN FEET

FLOW

CONNECTOR 2

CONNECTOR 2, 15 FT BOTTOM WIDTH WITH 2:1 SIDE SLOPES TO EXISTING, SEE PROFILE

5/16

2/16

1/16

3/16

4/16

FILL LOW AREA

STAGING AREA

0+00 1+00 2+00 3+00 4+00 4+56 48+00 49+00 50+00 51+00 52+00 53+00 44+00 43+00 45+00 47+00 46+00 42+00 41+00 40+00 39+00

MATCHLINE SHEET 11

MATCHLINE SHEET 18

| NO. | BY | DATE | REVISION DESCRIPTION |
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| BB, NS, JR | MM, PL, EA, MB | PL, JG |
|---|---|---|
| DRAWN | DESIGNED | CHECKED |
| MM | MAR 2025 | 200203 |
| APPROVED | DATE | PROJECT |

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PROPOSED HABITAT ENHANCEMENTS & CONNECTOR 2

SHEET 15 OF 32

MICHAEL R. McALLISTER
STATE OF WASHINGTON
38180
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PROFESSIONAL ENGINEER
EXPIRES 09-25-2025

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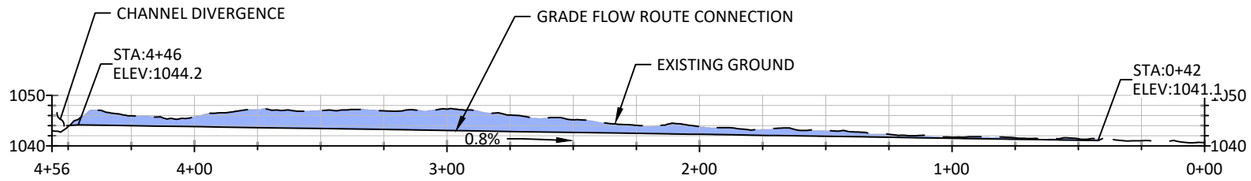
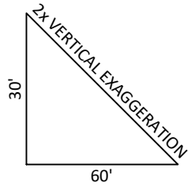
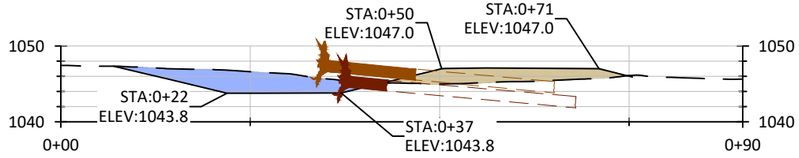



5/16 PROPOSED CONNECTOR 2 PROFILE

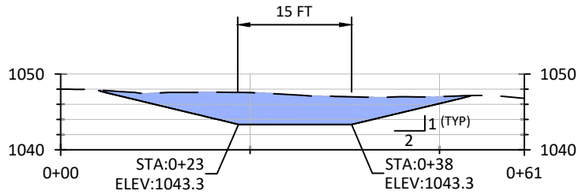
SECONDARY CHANNEL STA 0+00 - STA 4+56



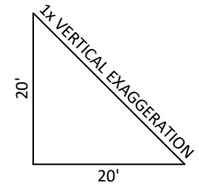

1/16 SECTION - CONNECTOR 2 CHANNEL

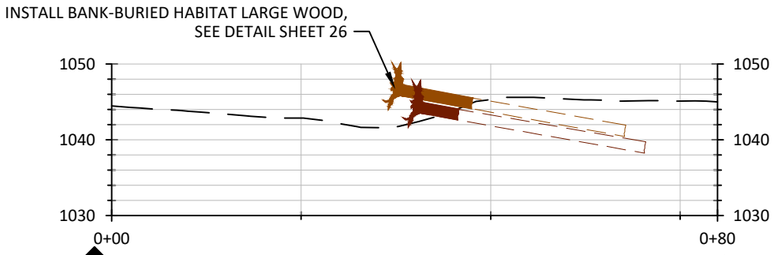
SECONDARY CHANNEL STA 3+94




2/16 SECTION - CONNECTOR 2 CHANNEL

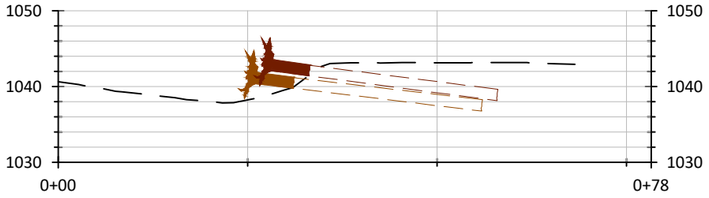
SECONDARY CHANNEL STA 3+35



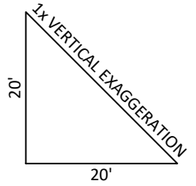

3/16 SECTION - LARGE WOOD HABITAT STRUCTURE 1

REACTIVATED MAINSTEM CHANNEL




4/16 SECTION - LARGE WOOD HABITAT STRUCTURE 3

REACTIVATED MAINSTEM CHANNEL




## LEGEND

- PROPOSED GRADE
- EXISTING GRADE
- PROPOSED CHANNEL GRADING
- PROPOSED FILL AREA


| NO. | BY | DATE | REVISION DESCRIPTION |
|---|---|---|---|
| | | | |

BB, NS, JR DRAWN | MM, PL, EA, MB DESIGNED | PL, JG CHECKED

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PROPOSED HABITAT ENHANCEMENTS AND CONNECTOR 2 PROFILES

SHEET 16 OF 32

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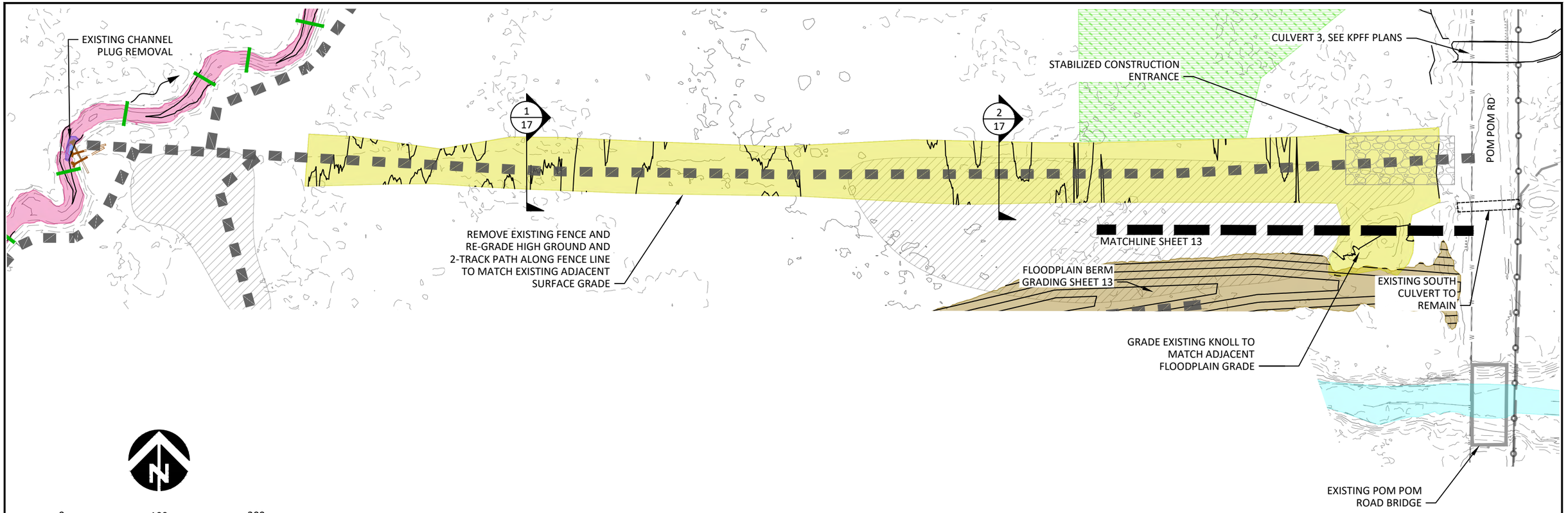
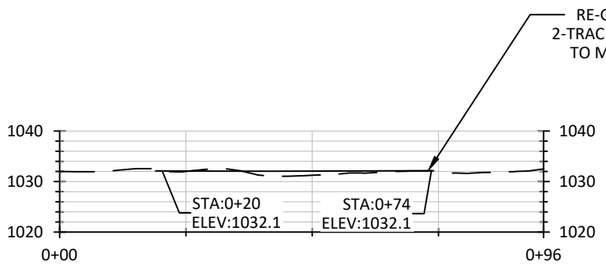
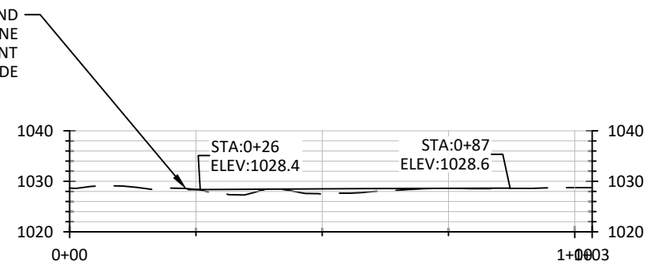



## LEGEND

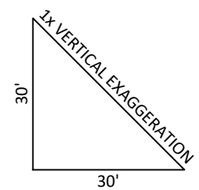
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- EXISTING OVERHEAD POWER LINE
- EXISTING WATERMAIN
- LIMIT OF CONSTRUCTION DISTURBANCE
- TEMPORARY ACCESS ROUTE
- EXISTING LOW FLOW (28 CFS)
- PROPOSED STAGING / STOCKPILE AREA
- PROPOSED EXISTING 2-TRACK REGRADING
- PROPOSED CHANNEL SEDIMENT AUGMENTATION
- PROPOSED FILL AREA
- FLOODPLAIN ROUGHNESS ZONES, SEE SHEET 32




1/17 SECTION - 2-TRACK REGRADE




2/17 SECTION - 2-TRACK REGRADE

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| DRAWN | DESIGNED | CHECKED |
|---|---|---|
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DECOMMISSION EXISTING 2-TRACK

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17 OF 32

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## LEGEND

- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE
- TEMPORARY ACCESS ROUTE
- PROPOSED STAGING / STOCKPILE AREA
- FLOODPLAIN ROUGHNESS ZONES, SEE SHEET 31
- PROPOSED FILL AREA
- CHANNEL SEDIMENT AUGMENTATION
- PROPOSED CHANNEL GRADING
- PROPOSED EXISTING 2-TRACK REGRADING
- BANK-BURIED HABITAT LARGE WOOD, SEE SHEET 26
- POST-ASSISTED ROUGHNESS FEATURE, SEE SHEET 19

NOTE:
1. CUT DOWN BURNED TREES AND INCORPORATE THEM INTO THE CHANNEL AND SEDIMENT AUGMENTATION CHANNEL FILL, SEE SHEET 27
2. SEDIMENT AUGMENTATION GRAVEL TO BE HARVESTED FROM SOUTH CANAL PLUG AREA, SEE SHEET 12

0 80 160

SCALE IN FEET

MATCHLINE SHEET 15

MATCHLINE SHEET 21

UPSTREAM END SEDIMENT AUGMENTATION AND ROUGHNESS

SEDIMENT AUGMENTATION AND ROUGHNESS, SEE PROFILE 1/19

2/19

3/19

39+00 38+00 37+00 36+00 35+00 34+00 33+00 32+00 31+00 30+00 29+00 28+00 27+00 26+00 25+00

REACTIVATED MAINSTEM CHANNEL

STAGING AREA (NATURAL MATERIALS ONLY)

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PROPOSED SEDIMENT AUGMENTATION AND ROUGHNESS

SHEET 18 OF 32

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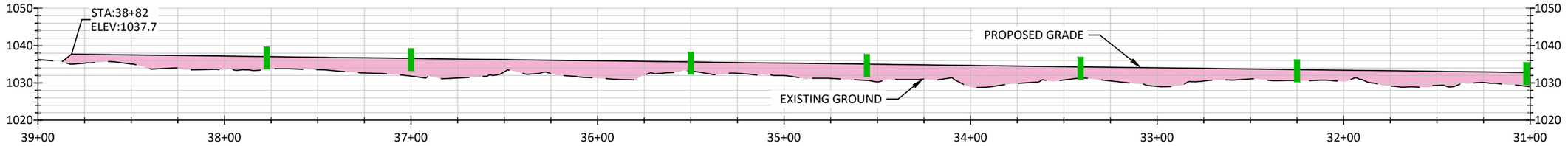
STATE OF WASHINGTON
23180
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 09-12-2025

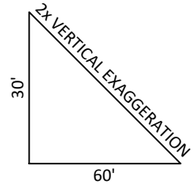


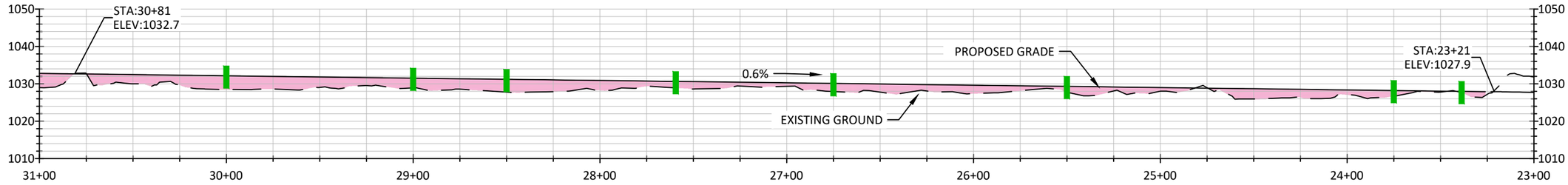

1/19 PROFILE-SEDIMENT AUGMENTATION
REACTIVATED MAINSTEM CHANNEL STA 39+00 - 31+00

## LEGEND

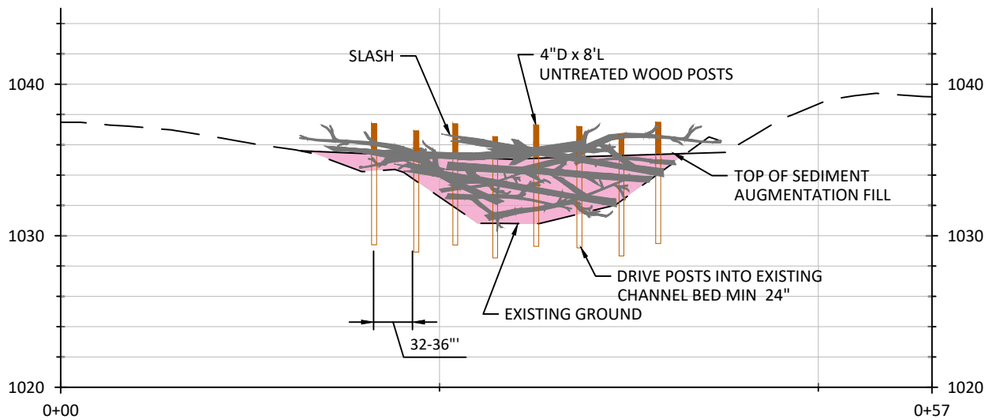
- PROPOSED GRADE
- EXISTING GRADE
- CHANNEL SEDIMENT AUGMENTATION
- POST-ASSISTED ROUGHNESS FEATURE

NOTE:
FILL CHANNEL TO DESIGN GRADE WITH SEDIMENT SOURCED FROM THE HARVEST AREA (SOUTH CANAL WITHIN PLUG FOOTPRINT). FILL TO BE MIXED WITH SLASH. POST ASSISTED ROUGHNESS FEATURES ALSO INSTALLED AT DESIGNATED LOCATIONS.

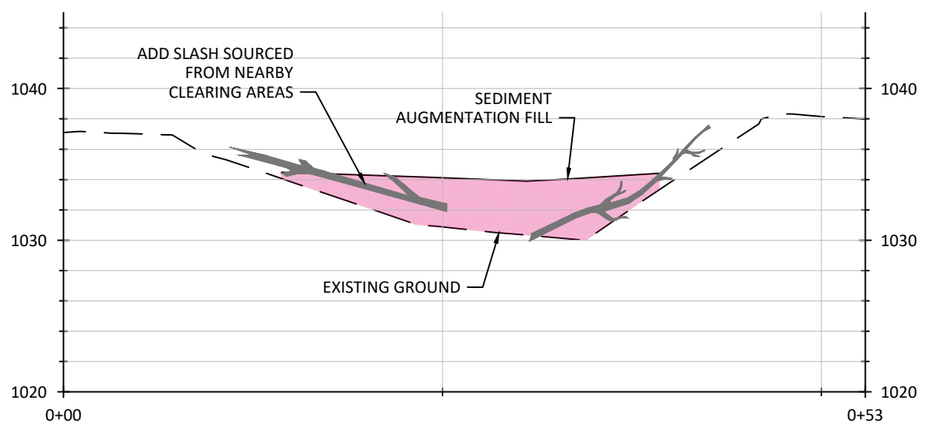


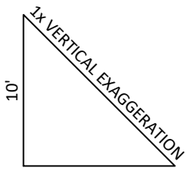

1/19 PROFILE-SEDIMENT AUGMENTATION
REACTIVATED MAINSTEM CHANNEL STA 31+00 - 23+00




2/19 SECTION - SEDIMENT AUGMENTATION & POST-ASSISTED ROUGHNESS FEATURE
REACTIVATED MAINSTEM CHANNEL STA 34+60




3/19 SECTION - SEDIMENT AUGMENTATION
REACTIVATED MAINSTEM CHANNEL STA 22+75





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PROPOSED SEDIMENT AUGMENTATION PROFILE & SECTIONS

SHEET 19 OF 32

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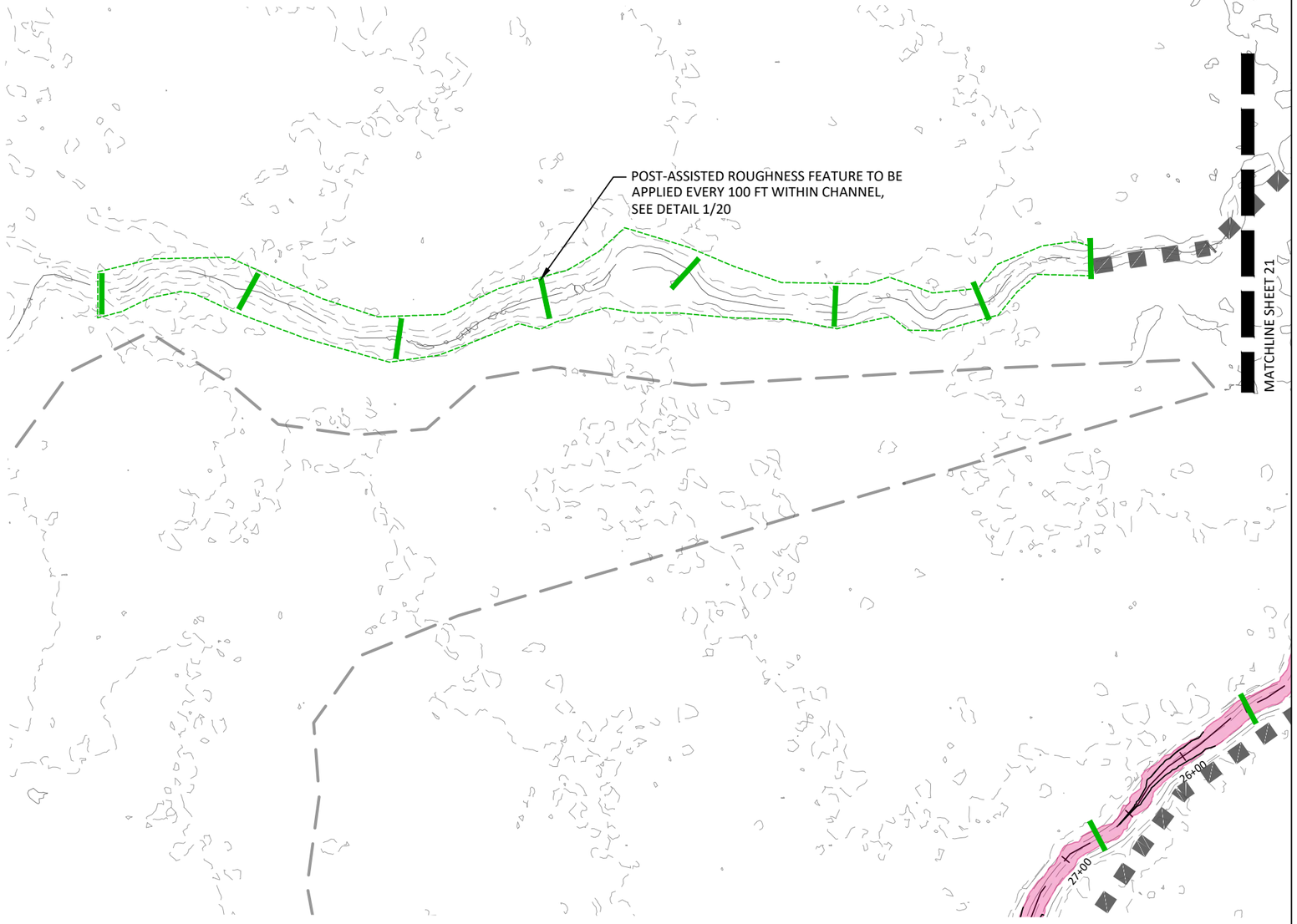
## LEGEND

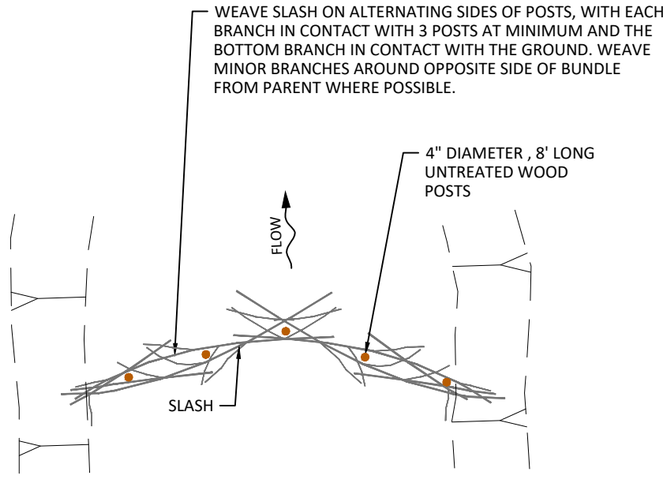
- EXISTING 2-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE
- TEMPORARY ACCESS ROUTE
- PROPOSED STAGING / STOCKPILE AREA
- POST-ASSISTED ROUGHNESS FEATURE

0 80 160

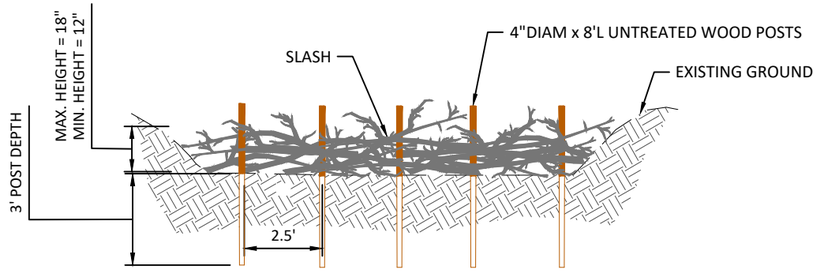
SCALE IN FEET

NOTE:
CUT DOWN BURNED TREES AND INCORPORATE THEM INTO THE CHANNEL , SEE SHEET 27




PLAN




SECTION

1/20 POST-ASSISTED ROUGHNESS FEATURE
NOT TO SCALE

MICHAEL R. McALLISTER
STATE OF WASHINGTON
21819
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 09-25-2025

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POST-ASSISTED ROUGHNESS PLAN & DETAIL

SHEET 20 OF 32

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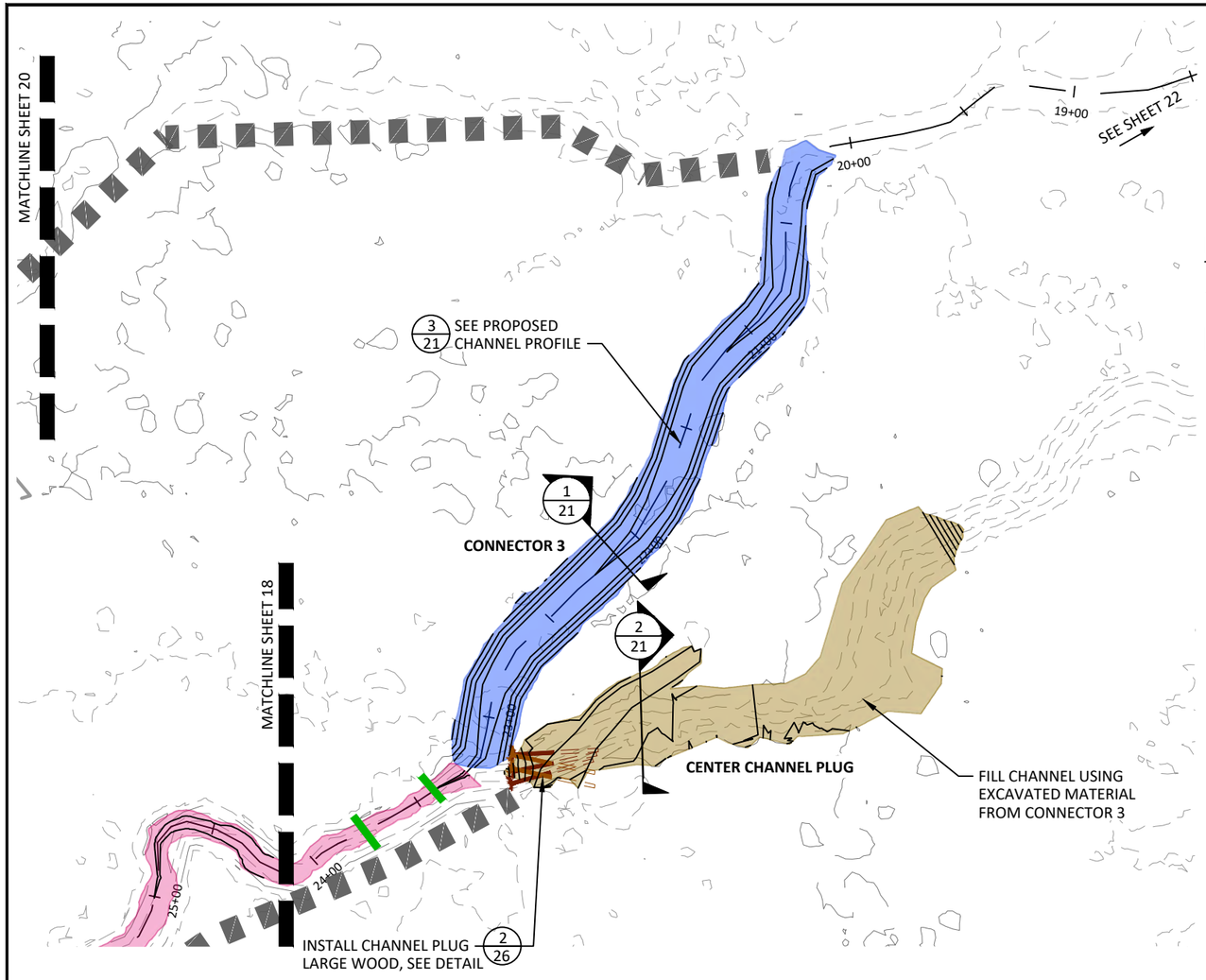
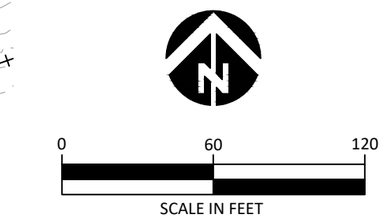
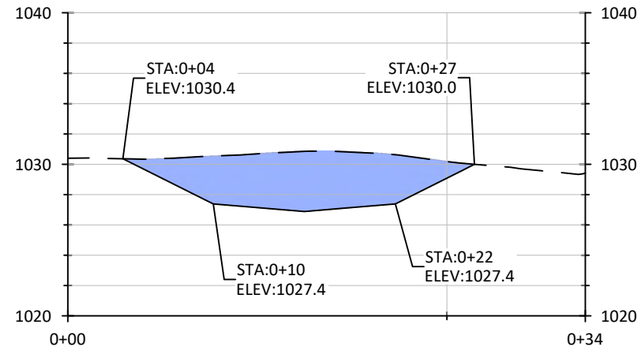


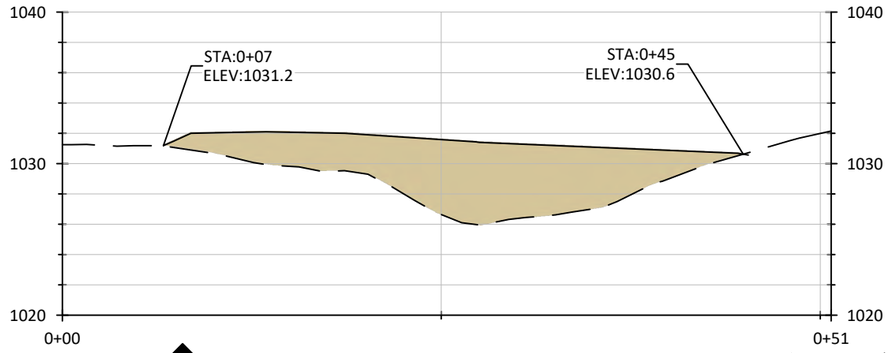




## LEGEND

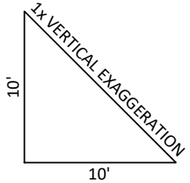
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- TEMPORARY ACCESS ROUTE
- PROPOSED FILL AREA
- CHANNEL SEDIMENT AUGMENTATION
- PROPOSED CHANNEL GRADING
- POST-ASSISTED ROUGHNESS FEATURE

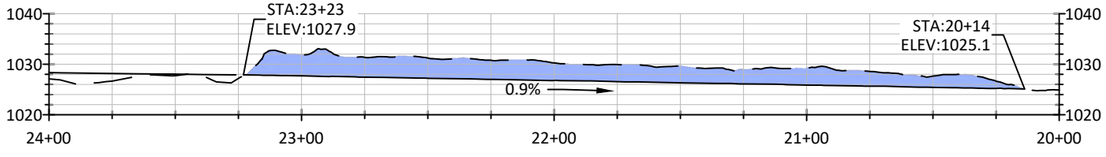



1/21 SECTION - CONNECTOR CHANNEL 3
REACTIVATED MAINSTEM CHANNEL STA 27+50

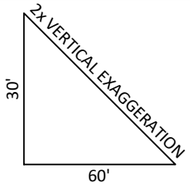



2/21 SECTION - PROPOSED CENTER CHANNEL PLUG




3/21 PROFILE-PROPOSED CONNECTOR CHANNEL 3
REACTIVATED MAINSTEM CHANNEL STA 20+15 - 23+25





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PROPOSED CONNECTOR 3
PLAN, SECTIONS, & PROFILE

SHEET
21 OF 32

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0 60 120

SCALE IN FEET

## LEGEND

- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- EXISTING OVERHEAD POWER LINE
- W EXISTING WATERMAIN
- LIMIT OF CONSTRUCTION DISTURBANCE
- CONSTRUCTED RIFFLE
- CONSTRUCTION BY OTHERS (SEE KPFF PLANS)
- PROPOSED CHANNEL GRADING
- TEMPORARY ACCESS ROUTE
- COFFER DAM

EXISTING NORTH CULVERT TO REMAIN

150 FT BRIDGE WITH CONSTRUCTED RIFFLE. REFER TO KPFF PLANS

WATER MAIN AND UTILITIES MANAGEMENT INCLUDED IN KPFF BRIDGE DESIGN PLANS

CONSTRUCTED RIFFLE

COFFERDAM, SEE DETAIL SHEET 7

FLOW

4+00

5+00

6+00

7+00

8+00

9+00

10+00

11+00

12+00

13+00

14+00

15+00

3 / 23

4 / 23

2 / 23

5 / 23

1 / 23

CONSTRUCTED RIFFLE

POM POM RD

PROPOSED MAINSTEM CONNECTOR 4, SEE PROFILE

RIFFLE CREST KEY

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE

REMOVE EXISTING CULVERT. SEE KPFF PLANS.

DITCH FILL

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## PROPOSED CONSTRUCTED RIFFLE

SHEET 22 OF 32

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38189
REGISTERED
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EXPIRES 09-26-2025

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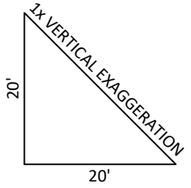
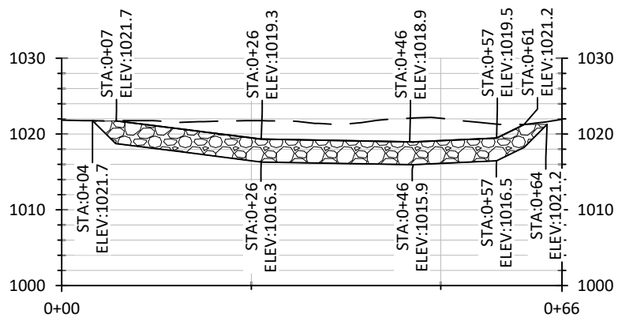
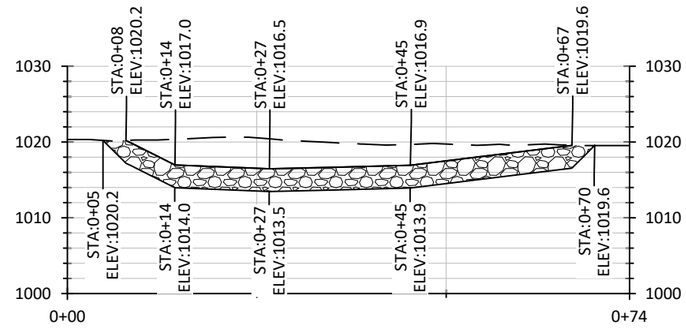
NOTE: SEE KPFF PLANS FOR BRIDGE AND EXISTING WATERLINE RELOCATION DESIGN

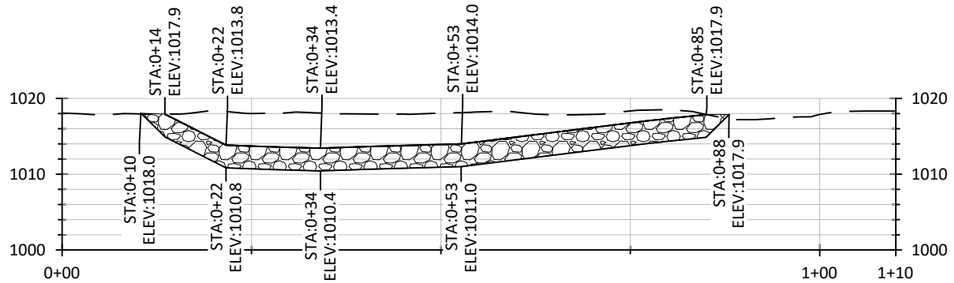


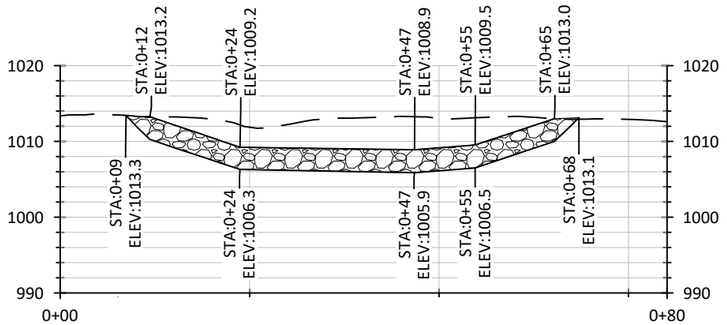

1 / 23 SECTION - CONSTRUCTED RIFFLE
REACTIVATED MAINSTEM CHANNEL STA 13+73



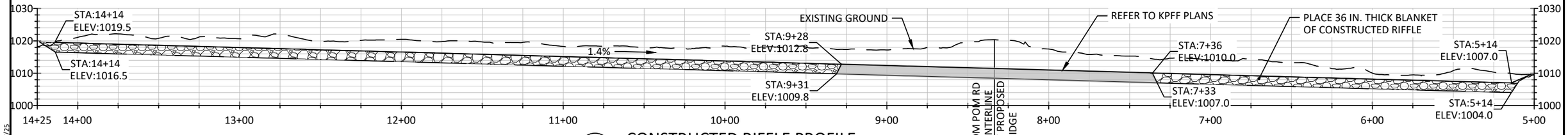

2 / 23 SECTION - CONSTRUCTED RIFFLE
REACTIVATED MAINSTEM CHANNEL STA 11+96




3 / 23 SECTION - CONSTRUCTED RIFFLE
REACTIVATED MAINSTEM CHANNEL STA 9+78




4 / 23 SECTION - CONSTRUCTED RIFFLE
REACTIVATED MAINSTEM CHANNEL STA 6+51



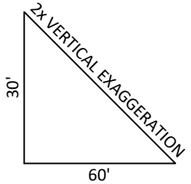

5 / 23 CONSTRUCTED RIFFLE PROFILE
REACTIVATED MAINSTEM CHANNEL

## LEGEND

PROPOSED GRADE

EXISTING GRADE

CONSTRUCTED RIFFLE

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PROPOSED CONSTRUCTED RIFFLE SECTIONS & PROFILES

SHEET 23 OF 32


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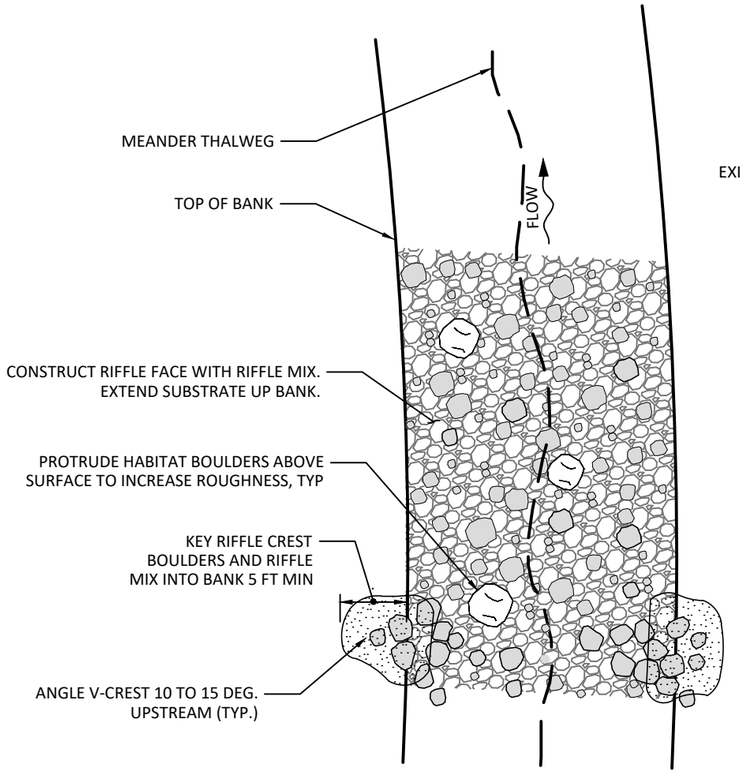
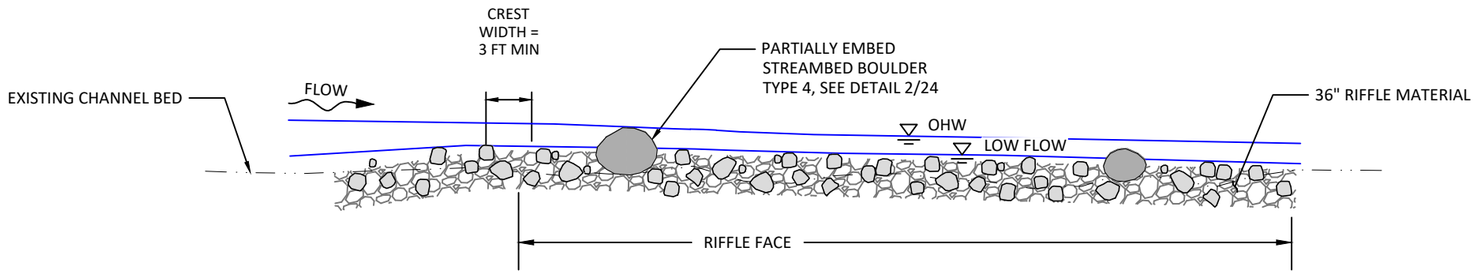


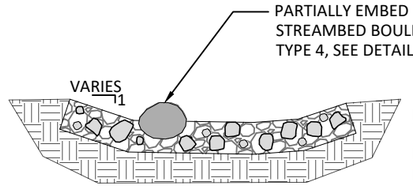

PLAN




PROFILE

NOTES:

1. LIMITS OF RIFFLE SHOWN ON THE PLAN AND PROFILE SHEETS.
2. WITHIN THE LIMITS OF THE RIFFLE STRUCTURES, EXTEND RIFFLE MIX TO THE TOP OF BANKFULL CHANNEL.
3. SHAPE RIFFLE BED TO CREATE A 1 FT DEEP LOW FLOW PATH.
4. WASH FINES TO SEAL BED PROPERLY AND PREVENT FLOWS FROM GOING SUBSURFACE.

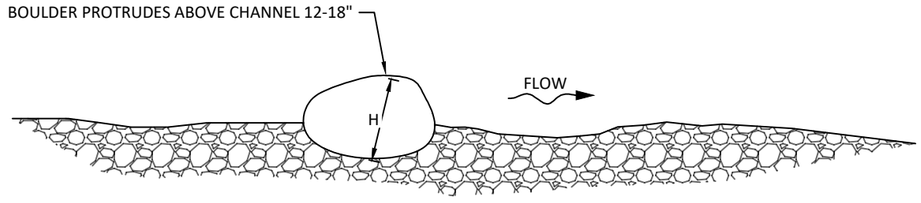



SECTION

NOTE:

KEY RIFFLE INTO IN-SITU GRAVEL/ COBBLE MATERIAL. IF APPROPRIATE IN-SITU GRAVEL/COBBLE MATERIAL IS NOT ENCOUNTERED, WIDTH OF RIFFLE KEYED INTO BANK SHALL BE INCREASED.

1/24 TYPICAL DETAIL - CONSTRUCTED RIFFLE
NOT TO SCALE




2/24 TYPICAL DETAIL - STREAMBED BOULDER TYPE 4
NOT TO SCALE



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TYPICAL DETAILS
CONSTRUCTED RIFFLE

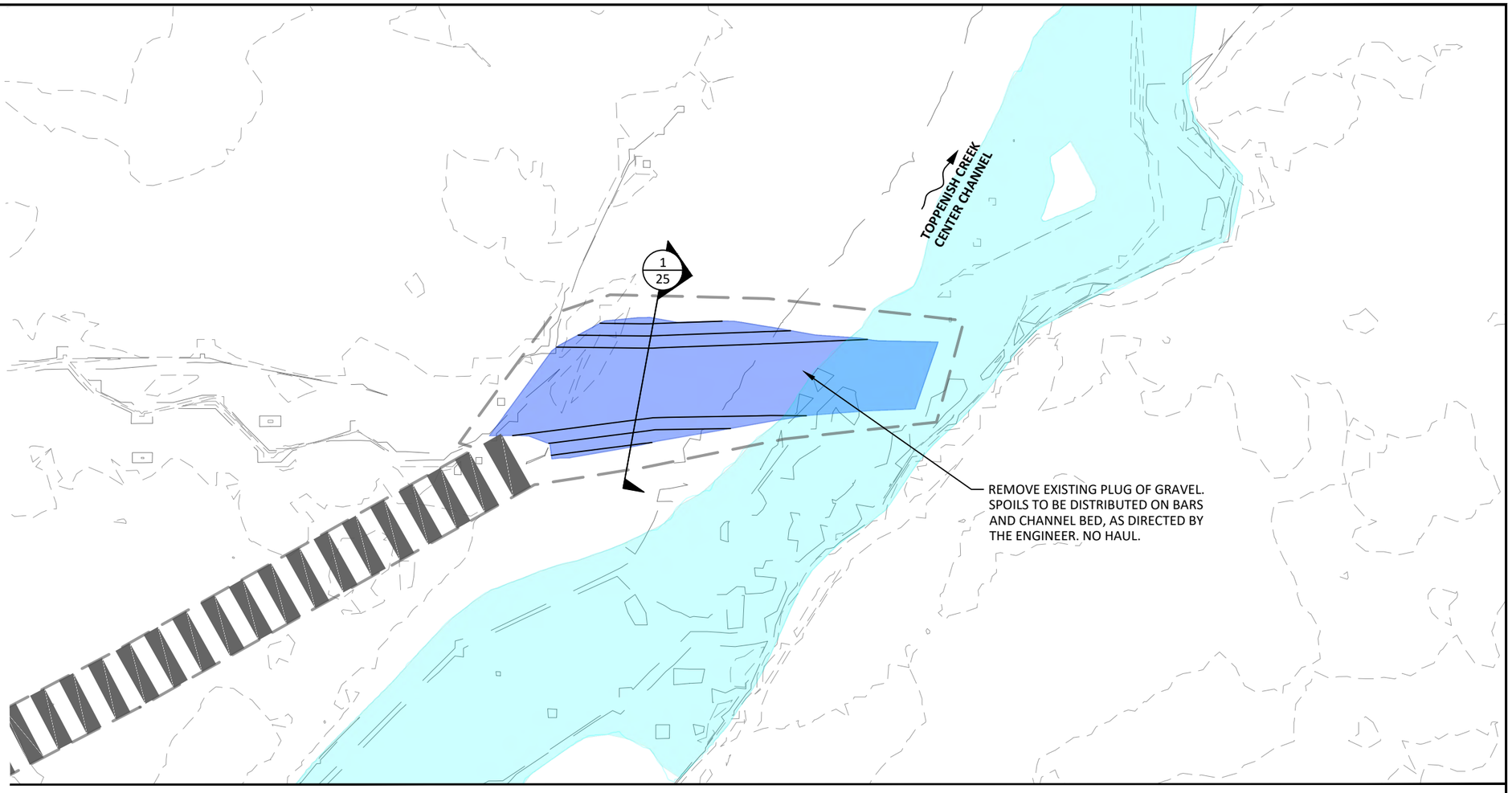
SHEET
24 OF 32

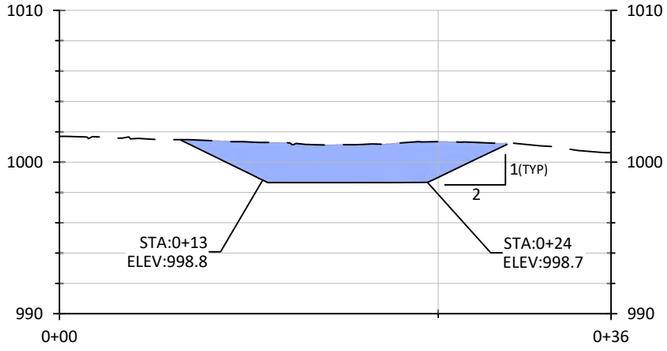
0 20 40

SCALE IN FEET

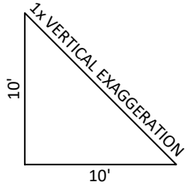
## LEGEND

- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- PROPOSED CHANNEL GRADING
- EXISTING LOW FLOW (28 CFS)
- LIMIT OF CONSTRUCTION DISTURBANCE
- TEMPORARY ACCESS ROUTE




1
25
SECTION - CHANNEL CONNECTION

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CHANNEL CONNECTION GRADING & SECTION

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25 OF 32

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STATE OF WASHINGTON
38189
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 09-22-2025

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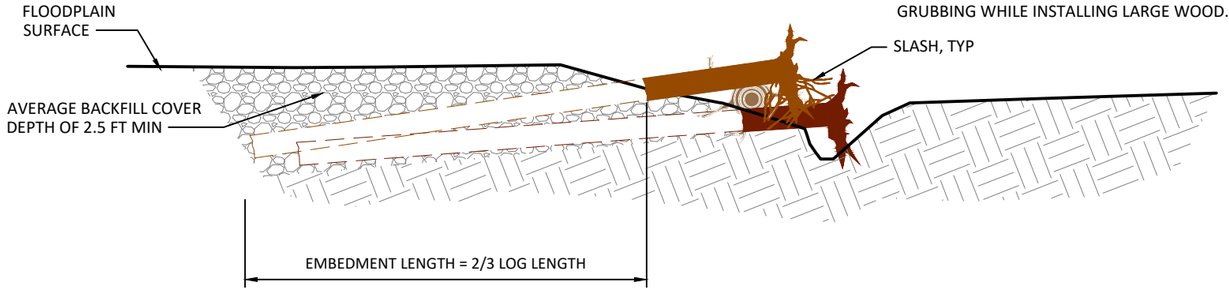
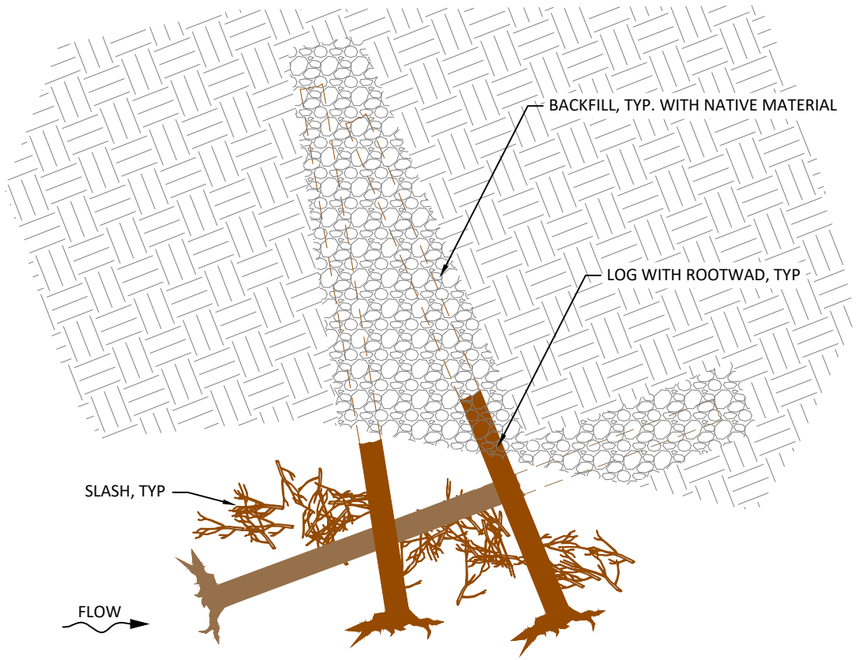
NOTES:

1. LARGE WOOD SHALL BE LOGS WITH ROOTS HAVING APPROXIMATE DIMENSIONS OF 40 FEET LONG AND 18 INCHES MINIMUM DIAMETER AT BREAST HEIGHT (DBH).
2. LARGE WOOD SIZES, LOCATIONS, AND ORIENTATIONS SHOWN IN THE PLANS ARE SUBJECT TO CHANGE IN THE FIELD.
3. INSTALLATION SHALL BE FIT-IN-THE FIELD GUIDED BY ENGINEER.
4. INSTALL SLASH SALVAGED FROM CLEARING AND GRUBBING WHILE INSTALLING LARGE WOOD.

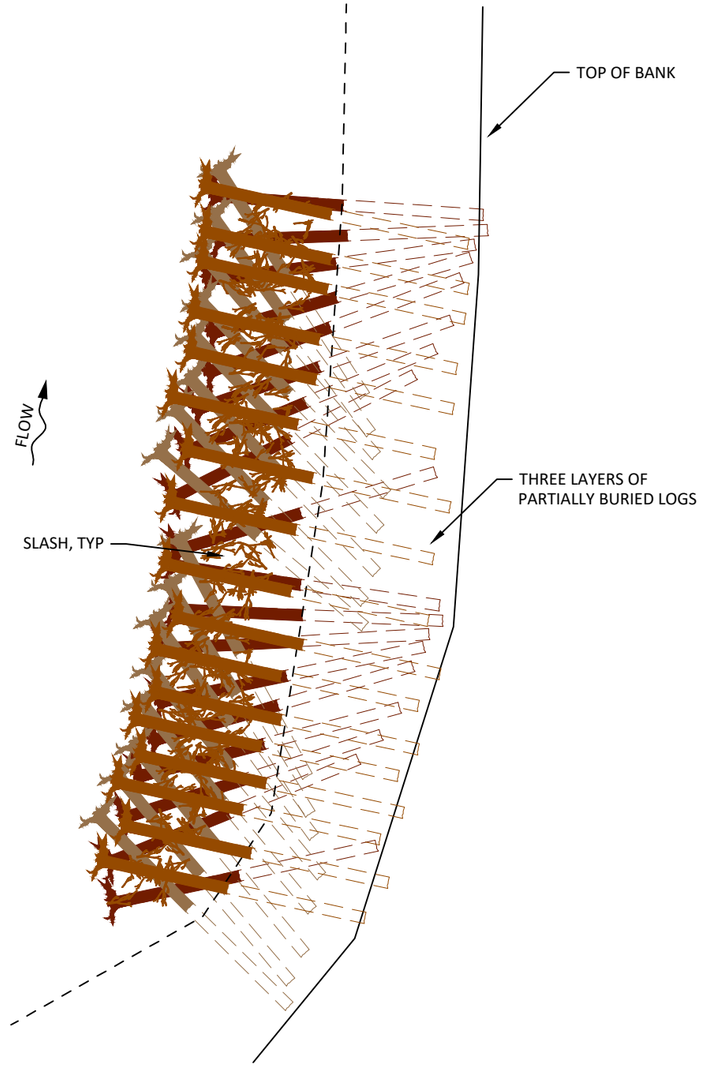



SECTION




PLAN

1/26 BANK-BURIED HABITAT LARGE WOOD
NOT TO SCALE




2/26 CHANNEL PLUG LARGE WOOD
NOT TO SCALE

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TYPICAL DETAILS LARGE WOOD HABITAT STRUCTURE

SHEET 26 OF 32

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0 250 500

SCALE IN FEET

## LEGEND

- CLEARING LIMITS
- CLEARING-RESTRICTED IMPACTS
- REQUIRED DEAD TREE REMOVAL ZONE
- EXISTING LOW FLOW (28 CFS)
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE

CLEARING NOTES:

1. REMOVE DEAD PORTIONS OF BURNED TREES IN DESIGNATED AREAS.
2. REUSE GENERATED MATERIAL ON SITE AS SLASH OR AS OTHERWISE DIRECTED BY CONTRACT REPRESENTATIVE.
3. CUT BURNED TREES NEAR THE BASE BUT ABOVE ALL LIVING BRANCHES AND SPROUTS.
4. REMOVE ALL BURNED TREES IN THE ZONE OF REQUIRED CLEARING.
5. CLEARING AREAS OUTSIDE OF THE REQUIRED REMOVAL ZONE SHALL BE CLEARED AS NEEDED TO GENERATE NEEDED MATERIAL - PRIORITIZING AREAS ALONG FLOW PATHS.

CLEARING-RESTRICTED IMPACTS NOTES:

1. THESE ARE ASPEN REGENERATION AREAS WHERE NO HEAVY EQUIPMENT SHALL BE ALLOWED.
2. BURNED TREE REMOVAL SHALL BE DONE BY HAND LABOR AND SMALL VEHICLES ONLY
3. REUSE GENERATED MATERIAL ON SITE AS SLASH OR AS OTHERWISE DIRECTED BY CONTRACT REPRESENTATIVE.
4. CUT BURNED TREES NEAR THE BASE BUT ABOVE ALL LIVING BRANCHES AND SPROUTS.

POM POM RD

SOUTH CANAL

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# DEAD TREE REMOVAL & SLASH SOURCE PLAN

SHEET
27 OF 32

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0 400 800

SCALE IN FEET

## LEGEND

- TRANSITIONAL SEEDING ZONE, SEE SHEET 29
- RIPARIAN SEEDING AND PLANTING ZONE, SEE SHEET 29
- EXISTING LOW FLOW (28 CFS)
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE

MARION DRAIN RD

SOUTH CANAL

POM POM RD

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## SEEDING & PLANTING PLAN

SHEET

28 OF 32

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STATE OF WASHINGTON
38189
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## SEED MIX

| TRANSITIONAL SEEDING AREA (56.7 ACRES) | | |
|---|---|---|
| Seeding rate: 60 lbs/acre (3402 lbs) | | |
| **COMMON NAME** | **SCIENTIFIC NAME** | **PERCENT OF WHOLE MIX** |
| Blue wildrye | *Elymus glaucus* | 24% |
| Bluebunch wheatgrass | *Pseudoroegneria spicata* var. *anatone* | 23% |
| Indian ricegrass | *Achnatherum hymenoides* | 20% |
| Sandbergs bluegrass | *Poa secunda* | 4% |
| Western Yarrow | *Achillea millefolium occidentalis* | 1% |
| Idaho fescue | *Festuca idahoensis* | 7% |
| Dryland Alfalfa | *Medicago sativa* | 13% |
| California oatgrass | *Danthonia californica* | 8% |

TRANSITIONAL SEEDING NOTES:

1. ALL AREAS IMPACTED BY CONSTRUCTION SHALL BE SEEDED WITHIN 3 DAYS OF WORK AREA COMPLETION.
2. SEED MIX TO BE APPLIED WITH 50:50 RICE HULLS (BY VOLUME) TO FACILITATE EVEN DISTRIBUTION.
3. STRAW MULCH TO BE APPLIED AT A RATE OF 2 TONS/ACRE AND LEAVE APPROXIMATELY 25% OF THE GROUND SURFACE VISIBLE OVER ALL DISTURBED AREAS.
4. STRAW MULCH IS CONSIDERED INCIDENTAL TO SEEDING.

## SEED MIX

| RIPARIAN SEEDING AREA (63.7 ACRES) | | |
|---|---|---|
| Seeding rate: 60 lbs/acre (3822 lbs) | | |
| **COMMON NAME** | **SCIENTIFIC NAME** | **PERCENT OF WHOLE MIX** |
| Blue wildrye | *Elymus glaucus* | 50% |
| Thickspike wheatgrass | *Elymus lanceolatus* var. *critana* | 44% |
| Bluejoint reedgrass | *Calamagrostis canadensis* | 1% |
| Analogue sedge | *Carex simulata* | 5% |

RIPARIAN SEEDING NOTES:

1. ALL AREAS IMPACTED BY CONSTRUCTION SHALL BE SEEDED WITHIN 3 DAYS OF WORK AREA COMPLETION.
2. ALL RIPARIAN SEED WILL BE APPLIED BY HAND CREWS USING A SEED DRILL OR BROADCAST SPREADER.
3. SEED MIX TO BE APPLIED WITH 50:50 CRACKED CORN (BY VOLUME) TO FACILITATE EVEN DISTRIBUTION.
4. STRAW MULCH TO BE APPLIED OVER ALL DISTURBED AREAS.
5. STRAW MULCH IS CONSIDERED INCIDENTAL TO SEEDING.

## PLANTING TABLES

| RIPARIAN PLANTING AREA (63.7 ACRES) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **COMMON NAME** | **SCIENTIFIC NAME** | **STRATA** | **TYPE** | **SIZE** | **DENSITY** | **PERCENT OF MIX** | **QUANTITY (EA)** |
| Black cottonwood | *Populus balsamifera* ssp. *trichocarpa* | Overstory | Plug | 40 cubic inch | 20 feet on center | 50% | 3470 |
| Coyote willow | *Salix exigua* | Overstory | Plug | 40 cubic inch | 20 feet on center | 50% | 3470 |
| Black hawthorn | *Crataegus douglasii* | Understory | Plug | 40 cubic inch | 10 feet on center | 20% | 4160 |
| Mock orange | *Philadelphus lewisii* | Understory | Plug | 40 cubic inch | 10 feet on center | 15% | 3120 |
| Red osier dogwood | *Cornus sericea* | Understory | Plug | 40 cubic inch | 10 feet on center | 20% | 4160 |
| Pacific willow | *Salix lucida* spp. *lasiandra* | Understory | Plug | 40 cubic inch | 10 feet on center | 15% | 3120 |
| Woods' rose | *Rosa woodsii* | Understory | Plug | 40 cubic inch | 10 feet on center | 15% | 3120 |
| Western serviceberry | *Amelanchier alnifolia* | Understory | Plug | 40 cubic inch | 10 feet on center | 15% | 3120 |

| LIVE CUTTING TRENCHES (11460 LF) | | | | | | |
|---|---|---|---|---|---|---|
| **COMMON NAME** | **SCIENTIFIC NAME** | **TYPE** | **SIZE** | **DENSITY** | **PERCENT OF MIX** | **QUANTITY (EA)** |
| Black cottonwood | *Populus balsamifera* ssp. *trichocarpa* | Live pole | 1-1/2" to 3-1/2" diameter, 5-6 ft long | 10 feet on center | 100% | 1200 |
| Coyote willow | *Salix exigua* | Live stake | 3/4" to 1-1/2" diameter, 5-6 ft long | 2 feet on center | 50% | 2290 |
| Pacific willow | *Salix lucida* spp. *lasiandra* | Live stake | 3/4" to 1-1/2" diameter, 5-6 ft long | 2 feet on center | 50% | 2290 |

LIVE PLANTING AND LIVE CUTTING TRENCH NOTES:

1. QUANTITY REFERS TO NUMBER OF INDIVIDUAL LIVE CUTTINGS.
2. LOCALIZED ADJUSTMENTS TO THE NEAREST APPROPRIATE LOCATION MAY BE MADE TO OPTIMIZE PLANTING CONDITIONS (WITHIN 5 FEET LATERALLY OF THE DESIGNATED SPACE) SUCH AS AVOIDING PLANTING ON LOGS, OTHER PLANTS, COMPACTED SLASH, ROCK OUTCROPS, COBBLE, GRAVEL, OR STANDING WATER MAY BE MADE.
3. SPECIES COMPOSITION SHALL BE EVENLY MIXED THROUGHOUT THE FULL SPATIAL EXTENT OF THE RIPARIAN PLANTING AREA AND BE CHOSEN IN ACCORDANCE WITH THE RIPARIAN REVEGETATION AREA SPECIES.

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SEED MIX AND PLANTING TABLES

SHEET 29 OF 32

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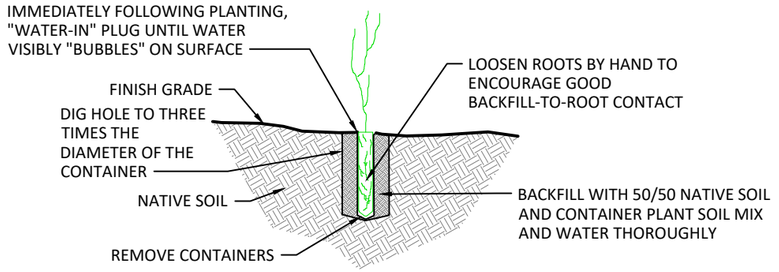
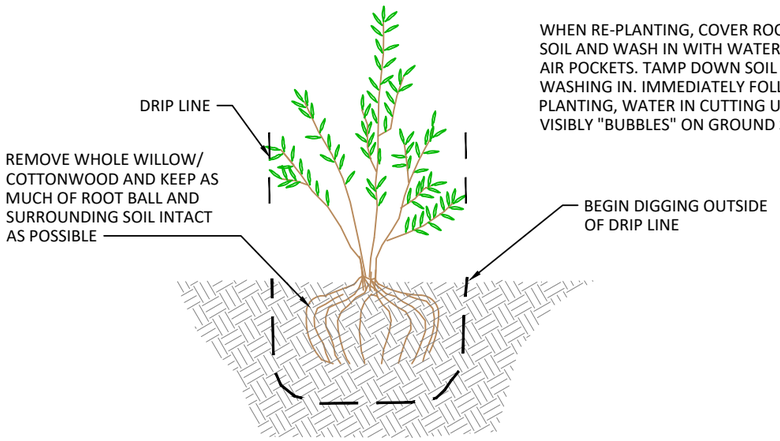


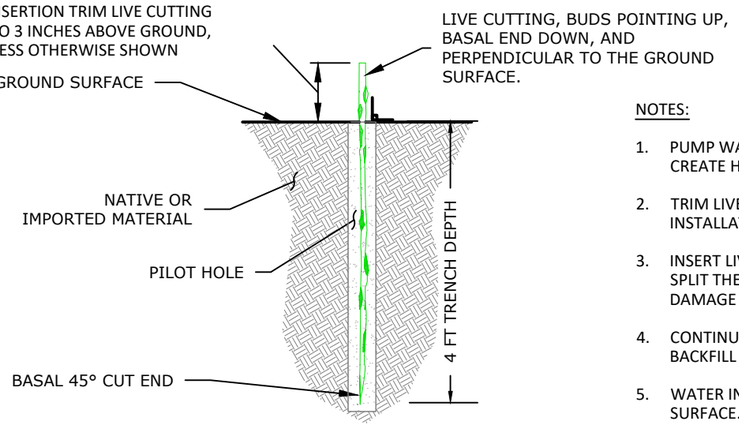

1/30 TYPICAL DETAIL - PLUG PLANTING

NOT TO SCALE




2/30 TYPICAL DETAIL - WILLOW/ COTTONWOOD SALVAGE

NOT TO SCALE

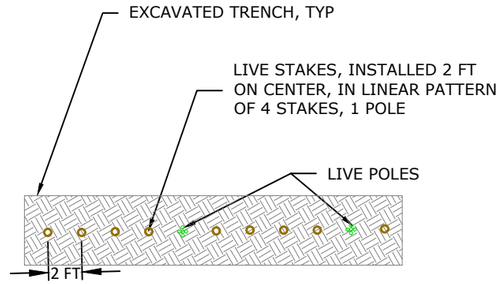



3/30 TYPICAL DETAIL - LIVE CUTTING

NOT TO SCALE

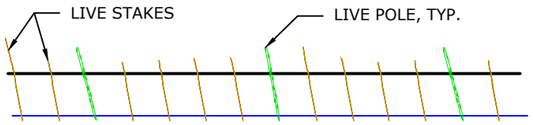
NOTES:

1. PUMP WATER INTO HOLE. LIVE CUTTINGS SHALL NOT BE USED TO CREATE HOLE.
2. TRIM LIVE CUTTING BASAL END AT 45 DEGREES JUST PRIOR TO INSTALLATION. NEW CUT SHALL BE 1 TO 2 INCHES FROM OLD CUT.
3. INSERT LIVE CUTTING INTO PILOT HOLE. INSERTION SHALL NOT SPLIT THE CUTTING, BRUISE OR STRIP BARK, OR OTHERWISE DAMAGE THE LIVE CUTTING.
4. CONTINUE TO PUMP WATER INTO HOLE AND COMPACT SOIL BACKFILL IN LIFTS TO IMPROVE CUTTING TO SOIL CONTACT.
5. WATER IN FINISHED CUTTING UNTIL WATER VISIBLY "BUBBLES" ON SURFACE.
6. TAMP IN MATERIAL AT GROUND SURFACE AROUND LIVE CUTTING.



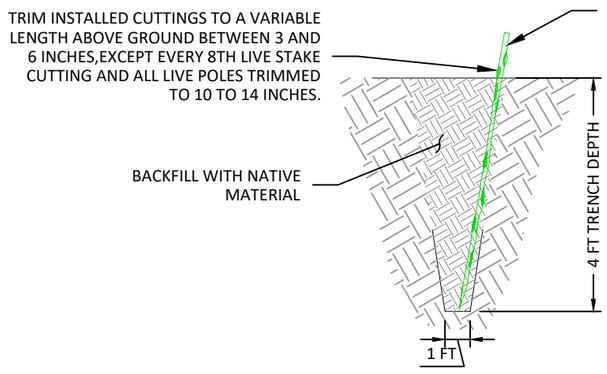

PLAN

NOT TO SCALE




ELEVATION VIEW

NOT TO SCALE




SECTION

NOT TO SCALE

NOTES:

1. ALL LIVE CUTTINGS TO BE CUT AT A 45 DEGREE ANGLE TO A POINT IMMEDIATELY PRIOR TO INSTALLATION.
2. PUMP WATER INTO TRENCH. INSTALL LIVE CUTTINGS WITH CUT ENDS IN TOE OF TRENCH.
3. IF INSTALLED BY TRENCHING, COMPACT BACKFILL IN 12 INCH LIFTS TO IMPROVE CUTTING TO SOIL CONTACT
4. PUMP WATER INTO THE TRENCH WHILE BACKFILLING EACH LIFT UNTIL WATER VISIBLY "BUBBLES" ON SURFACE
5. TAMP IN MATERIAL AT GROUND SURFACE AROUND LIVE CUTTING

4/30 TYPICAL DETAIL - LIVE CUTTING TRENCH

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TYPICAL PLANTING DETAILS

SHEET

30 OF 32

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EXPIRES 09-26-2025

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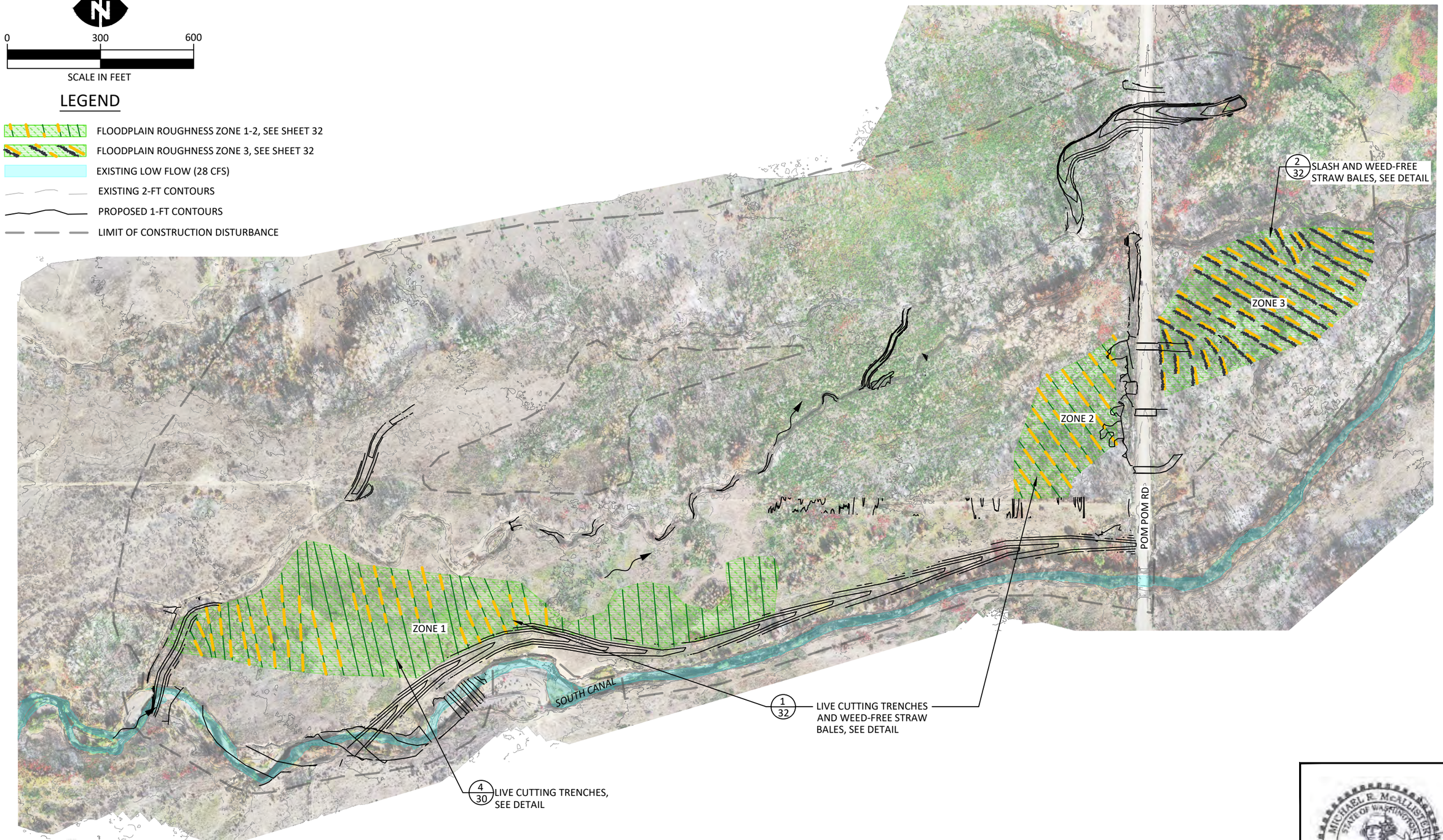
0 300 600

SCALE IN FEET

## LEGEND

- FLOODPLAIN ROUGHNESS ZONE 1-2, SEE SHEET 32
- FLOODPLAIN ROUGHNESS ZONE 3, SEE SHEET 32
- EXISTING LOW FLOW (28 CFS)
- EXISTING 2-FT CONTOURS
- PROPOSED 1-FT CONTOURS
- LIMIT OF CONSTRUCTION DISTURBANCE

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## FLOODPLAIN ROUGHNESS PLAN

SHEET 31 OF 32

MICHAEL R. McALLISTER
STATE OF WASHINGTON
38189
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES 07-12-2025

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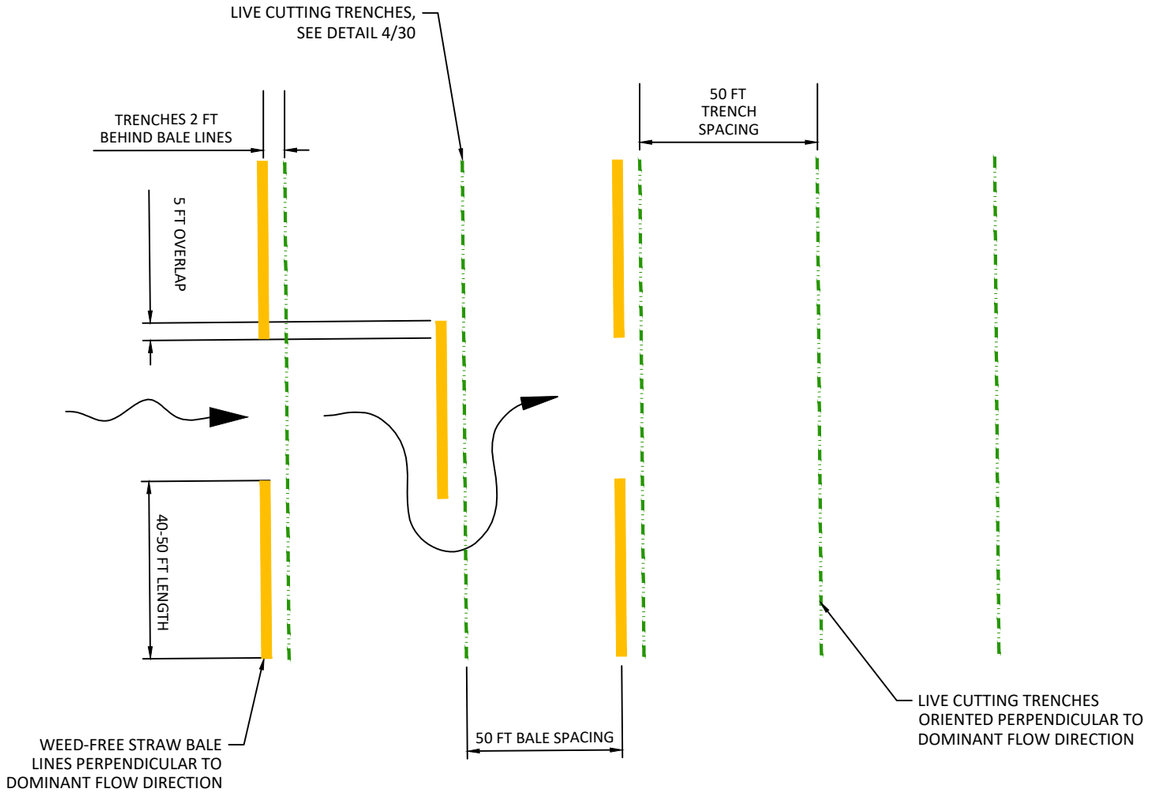
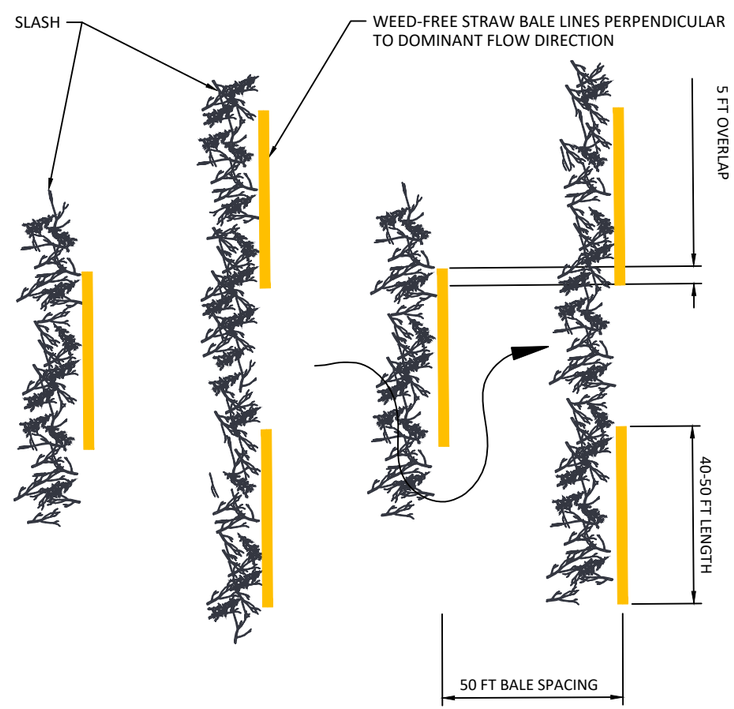
NOTES:

1. WILLOW TRENCH PLACEMENT WILL BE ADJUSTED DURING CONSTRUCTION AT THE DIRECTION OF THE ENGINEER TO AVOID DAMAGE TO EXISTING STRAW WATTLES.
2. EXISTING STRAW WATTLES MAY ALSO BE MOVED AT THE DIRECTION OF THE ENGINEER.
3. TWO 3' WOODEN STAKES THROUGH EACH BALE AT 18" INTO UNDERLYING SOIL.




1/32 LIVE CUTTING TRENCHES AND STRAW BALES FOR FLOODPLAIN ROUGHNESS ZONES 1 & 2
NOT TO SCALE




2/32 SLASH AND STRAW BALES FOR FLOODPLAIN ROUGHNESS ZONE 3
NOT TO SCALE

| NO. | BY | DATE | REVISION DESCRIPTION |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

BB, NS, JR — DRAWN
MM, PL, EA, MB — DESIGNED
PL, JG — CHECKED
MM — APPROVED
MAR 2025 — DATE
200203 — PROJECT

YAKAMA NATION FISHERIES
POST-FIRE POM POM, TOPPENISH CREEK RESTORATION
FINAL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FLOODPLAIN ROUGHNESS DETAILS

SHEET 32 OF 32

MICHAEL R. McALLISTER — STATE OF WASHINGTON — 38189 — REGISTERED PROFESSIONAL ENGINEER
EXPIRES 09-21-2025

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# SPECIFICATION
# POM POM: TOPPENISH CREEK RESTORATION

# DIVISION 2
# EARTHWORK

## 2-01 CLEARING, GRUBBING, AND ROADSIDE CLEANUP

### 2-01.1 Description

Section 2-01.1 is supplemented with the following:
(******)

Clearing includes removing dead trees and shrubs and debris within designated clearing limits. Dead trees cleared during the project shall be defined as “Usable Material” and primarily used as slash incorporated into construction of Large Wood, Post Assisted Roughness Structures, and Floodplain Roughness Zones. Any remaining usable material shall be scattered on-site.

“Debris” means all unusable material produced by clearing or roadside cleanup.

### 2-01.2 Disposal of Usable Material and Debris

Section 2-01.2 is revised to read:
(******)

The Contractor shall dispose of all debris by one or more of the disposal methods described below.

**1. Disposal Method No. 1 – Incorporation into Other Work**

Trees removed as part of the Work shall be incorporated as Slash concurrently with the construction of Large Wood (8-27), Post-Assisted Roughness Structures (8-28), and Floodplain Roughness Zones (8-32).

**2. Disposal Method No. 2 – Scatter**

After Disposal Method No.1 is completed, dispose of remaining Usable Material by scattering at areas identified by the Contract Representative such as decommissioned access routes and staging areas.

**3. Disposal Method No. 3 – Waste Site**

Cleared materials that are not wood, such as trash or metal debris designated by the Owner for removal shall be hauled to a waste site obtained and provided by the Contractor in accordance with Section 2-03.3(7)C.

### 2-01.3 Construction Requirements

Section 2-01.3 is supplemented with the following:
(******)

**2-01.3(1) Clearing**

Clearing shall be removing dead portions of burned trees marked in the field by the Contract Representative to be reused on site as usable material to be incorporated into the work as Disposal Method No. 1, or as otherwise directed by the Contract Representative.

The lower portions of most of the burned trees are alive and sprouting new stems and leaves. Cut each burned tree near the base but above live branches. Remove the cut trees from clearing area and use at designated areas as Disposal Method No.1.

Zones of required Clearing are designated in the Plans for removing burned trees near the new bridge and culverts. Clearing areas outside of the required removal zone shall be cleared as needed to develop additional Slash to complete work in Disposal Method No.1.

Areas designated in the Plans as “Clearing - Restricted Impacts” are aspen regeneration areas where no heavy equipment shall be allowed, and where burned tree removal shall be by hand labor and small vehicles only. Remove the cut trees from the restricted impacts clearing area and use at designated areas as Disposal Method No.1.

Clearing limits shown in the Plans for “Clearing”, “Required Clearing”, and “Clearing - Restricted Impacts” are approximate, to be field-fit as directed by the Contract Representative. The quantities in the bid form for “Clearing” and “Clearing - Restricted Impacts” reflect the approximate areas shown in the Plans.

**2-01.3(4) Roadside Cleanup**

Section 2-01.3(4) is supplemented with the following:

(******)

1. Decompact access roads and staging areas by scarifying the earth to a depth of 6 inches.
2. Scatter Usable Materials stockpiled as Disposal Method No.2 of Clearing.

**2-01.4 Measurement**

Section 2-01.4 is supplemented with the following:

(******)

All clearing work includes installing Slash in other Work under Disposal Method No.1. Installing Slash shall be incidental to clearing work.

“Clearing” will be measured per acre. “Clearing - Restricted Impacts” will be measured per acre. There is no unit of measurement for “Roadside Cleanup”.

**2-01.5 Payment**

Section 2-01.5 is supplemented with the following:

(******)

“Clearing”, per acre
“Clearing - Restricted Impacts”, per acre
“Roadside Cleanup”, lump sum

## 2-03 ROADWAY EXCAVATION AND EMBANKMENT

### 2-03.1 Description

Section 2-03.1 is supplemented with the following:
(******)

The Work includes Channel Excavation Incl. Haul for constructing channel finish grade or sub-grade where indicated in the Plans, and hauling excavated materials to Embankment Construction areas designated in the Plans. The Work includes Embankment Compaction for placement of fill to build berms or fill channels at areas indicated in the Plans. Common Borrow Incl. Haul refers to stockpiles of fill material that have already been delivered to the project site by others to be used as Embankment Construction areas designated in the Plans.

### 2-03.3(14) Embankment Construction

Section 2-03.3(14) is supplemented with the following:
(******)

Embankment Construction shall be at fill areas designated in the Plans utilizing Earth Embankment materials sourced from Channel Excavation Incl. Haul or Common Borrow Incl. Haul that has been placed in stockpiles or hauled directly to placement areas. All materials used for Embankment Construction shall be considered Earth Embankment.

Embankment Construction areas are labeled in the Plans. Embankment Construction areas indicated in the Plans are designated for Earth Embankment from particular sources as follows:

| Channel Excavation Incl. Haul | Embankment Construction |
|---|---|
| Constructed Riffle Subgrade – 8,520 cy | Floodplain Berm – 8,520 cy |
| Connector Channel 1 – 1,850 cy | Floodplain Berm – 1,850 cy |
| Connector Channel 2 – 800 cy | Floodplain Berm – 800 cy*** |
| Connector Channel 3 – 600 cy | Center Channel Plug – 600 cy |
| Toppenish Creek Gravel Harvest - 2,430 cy | Channel Sediment Augmentation – 2,430 cy |
| **Common Borrow Incl. Haul** | **Embankment Construction** |
| Common Borrow Type 1 - 30,000 cy* | South Canal Plug – 30,000 cy |
| Common Borrow Type 2 - 2,000 cy** | South Canal Plug – 2,000 cy |

* Common Borrow Type 1 is sourced from off-site, named “3 Way Spoils”, and stockpiled in 2025 near the South Canal Plug site. 3 Way Spoils shall only be used as Embankment Construction of South Canal Plug. The volume of Common Borrow Type 1 is approximately 30,000 loose cubic yards. A measurement of the fill pile will be made prior to construction.

** Common Borrow Type 2 is surplus fill sourced from on-site excavations from bridge, road, and culvert construction by others and stockpiled in 2025 on site. The Owner will survey to measure Common Borrow Type 2 fill piles prior to use. Common Borrow Type 2 shall be used as Embankment Construction of South Canal Plug or, if needed, as supplemental fill to achieve compacted finish grade of the Floodplain Berm.

***From surface subtraction methods of designed cut and fill areas, 11,170 in-place cy are to be used for the Floodplain Berm, which is 9,530 in-place cy. Therefore, approximately 1,640 in-place cy of surplus fill has been calculated. This is available for compaction "shrink" when constructing the Floodplain Berm.

**After completion of all Embankment Construction Areas, any remaining fill material shall be disposed of on-site as Earth Embankment at the South Canal Plug. There will be no measurement for surplus fill.**

**2-03.3(14)C Compacting Earth Embankments**

Section 2-03.3(14)C is supplemented with the following:

(******)

The Contractor shall use Earth Embankment Compaction Method A.

**2-03.3(14)F Vacant**

Section 2-03.3(14)K is replaced with the following:

(******)

**2-03.3(14)F Grading**

Grading areas include local excavation and fill to improve a channel connection, or to decommission a 2-track dirt road by leveling the ground by scraping high areas to fill low areas.

**2-03.3(14)K Select or Common Borrow Including Haul**

Section 2-03.3(14)K is supplemented with the following:

(******)

The Contractor shall install Common Borrow meeting the requirements of 9-03.14(3) unless otherwise approved by the Contracting Agency. Soil plasticity index testing and requirements will not apply.

**2-03.4 Measurement**

Section 2-03.4 is supplemented with the following:

(******)

Hauling Earth Embankment to Embankment Construction areas shall be incidental to Channel Excavation Incl. Haul or Common Borrow Incl. Haul bid items.

"Grading" will be measured by the cubic yard.

All excavated material will be measured in the position it occupied before the excavation was performed. The original ground will be compared with the planned finished section shown in the Plans. Slope/ground intercept points defining the limits of the measurement will be as staked, or as approved by the Owner.

No additional measurement will be made for material that is stockpiled, re-excavated, and moved again.

**2-03.5 Payment**

Section 2-03.5 is supplemented by the following:
(******)

“Channel Excavation Incl. Haul”, per cubic yard.
“Common Borrow Incl. Haul”, per cubic yard.
“Grading”, per cubic yard.

## DIVISION 8
## MISCELLANEOUS CONSTRUCTION

### 8-01 Erosion Control and Water Pollution Control

#### 8-01.4 Measurement

Section 8-01.4 is revised as follows:
(******)

Stabilized construction entrances will be measured by the square yard by ground slope measurement for each entrance constructed.

ESC lead will be measured per day for each day that an inspection is made and a report is filed.

There will be no measurement for Water Management.

#### 8-01.5 Payment

Section 8-01.5(2) is supplemented with the following:
(******)

“Stabilized Construction Entrance”, square yard.
“ESC Lead”, per day.
“Water Management”, lump sum.

No payment shall be made for items specified under 8-01.5(2) which are not included on the Bid Form.

### 8-02 Roadside Restoration

#### 8-02.3 Construction Requirements

#### 8-02.3(2) Work Plans

Section 8-02.3(2) is revised to read:
(******)

1. Revegetation Work Plan: This plan is required when trees or native vegetation will be removed. The Contractor shall submit a Type 3 Working Drawing within 15 calendar days prior to any earth disturbing activities.

#### 8-02.3(2)A Roadside Work Plan

Section 8-02.3(2)A is revised to read:
(******)

### 8-02.3(2)A Revegetation Work Plan

The Revegetation Work Plan shall define the expected impacts to the project area and restoration resulting from Work necessary to meet all Contract requirements. The Contractor shall define how the restoration Work included in the Contract will be phased and coordinated with project Work such as earthwork, staging, access, erosion and water pollution control, irrigation, etc. The Revegetation Work Plan shall include the following:

1. Means and methods for vegetation protection (in accordance with Section 1-07.16(2)).
2. Locations outside of clearing limits where vegetation shall be removed to provide access routes or other needs to accomplish the Work.
3. Plans for removal, preservation and stockpile of topsoil or other native materials, if outside of clearing and grubbing limits and within the project limits.
4. Plan for ground preparation for planting and installation of plants.
5. Means and methods to limit soil compaction where seeding and planting are to occur, such as steel plates, hog fuel access roads, wood mats for sensitive areas (including removal) and decompaction for unavoidable impacts.
6. Plan and timing to incorporate or remove erosion control items.

### 8-02.3(8)B Plant Installation

Section 8-02.3(8)B is revised as follows:
(******)
The Contractor must coordinate with the Owner for live cutting delivery and storage to ensure that cuttings do not desiccate (dry out) before planting. No more cuttings than can be planted within 24 hours after removal from storage shall be delivered to an installation location. Live cuttings that are not used in a day shall be wrapped in wet burlap sacks and stored in a location with an air temperature between 37 ºF and 65 ºF until the next planting day or returned to storage.

Cuttings shall be properly stored. If cold storage is necessary, the collected and soaked cuttings shall be stored for no more than an additional 10 days at 37 ºF to 41 ºF until planting. After the cuttings have been removed from cold storage, they shall be soaked for no more than another 5 days to complete soaking and ensure hydration before and after storage. During installation, a pumper truck will provide water to fill the bottom of the trenches, water in live cuttings, and keep the live cuttings wet at all times.

### 8-26 Vacant

Section 8-26 is revised to read:
(******)

### 8-26 CONSTRUCTED RIFFLE

### 8-26.1 Description

This Work consists of acquiring, importing, handling, mixing, and placing rock materials at the locations and in conformity with the lines and dimensions shown in the Plans designated as Constructed Riffle. Materials shall be in accordance with sections 9-03.11 of the standard specifications, and as amended by these special provisions.

**8-26.1(1) Definitions**

Blended Streambed Aggregate - Blended streambed aggregates are defined as a mix of the aggregates with the associated ratios in accordance with 8-26.2(2).

**8-26.2 Materials**

**8-26.2(1) Streambed Aggregates**

Streambed Aggregates shall be in accordance with 9-03.11

**8-26.2(2) Constructed Riffle**

Constructed Riffle material shall be a mixture of Streambed Aggregates meeting the material requirements set forth in standard specification 9-03.11, and having the following gradation:

| | Diameter (in) | |
|---|---|---|
| Percent Smaller | min | max |
| 100 | 22.9 | 25.9 |
| 84 | 18.3 | 21.4 |
| 50 | 15.3 | 17.5 |
| 32 | 4.9 | 5.6 |
| 16 | 1.2 | 1.4 |
| 10 | 0.4 | 0.5 |
| 5 | | 0.1 |
| supplement with streambed sand | | |

Material larger than 18” diameter shall be angular or sub-angular. Material sized 12-17” diameter may be angular, sub-angular, or rounded.

**8-26.2(3) Streambed Boulders Type Four**

Streambed Boulders Type Four shall be as described in 9-03.11(5).

**8-26.3 Construction Requirements**

**8-26.3(1) Streambed Preconstruction Conference**

A streambed preconstruction conference shall be held at least seven (7) calendar days prior to the Contractor beginning streambed construction. The Contractor shall notify the Contract Representative fourteen (14) calendar days prior to the meeting taking place and should indicate within the notice if they intend to evaluate native streambed materials for use on the project. The purpose of the meeting is to discuss the goals, objectives, intent, streambed construction procedures, critical functions during stream work, potential use of native streambed excavation materials, quality control steps to control mixing ratios, personnel, equipment to be used, and other elements of construction.

Those attending shall include:

1. (Representing the Contractor) The superintendent or on-site supervisors, the Environmental Compliance Lead and other personnel or subcontractors that will have on-site responsibility for in-channel streambed Work.

2. (Representing the Contracting Agency) The Contract Representative, Owner, and other key staff as appropriate will be invited by the Contracting Agency.

**8-26.3(2) Mixing of Streambed Aggregates**

Streambed aggregates will be separately tested and accepted by the Contract Representative prior to delivery, placement in a stockpile or blending activities.

After acceptance by the Contract Representative, streambed aggregates shall be thoroughly blended before placement. Acceptance of the final mixture of blended streambed aggregate will be based upon visual inspection by the Contract Representative.

Native streambed aggregates may be available from the existing channel grading limits as shown in the Contract Plans. Components of the excavated streambed which meet the criteria for the specific material may be used to supplement imported streambed aggregates. The Contractor shall be responsible for any costs associated with separating, stockpiling, hauling, and handling excavated native streambed aggregates for incorporation into the blended aggregate mixes.

If the Contracting Agency grants access to the off-site spoils pit near Toppenish Creek, the engineer will pre-approve suitable borrow areas. If the Contractor elects to use this borrow, the contractor is responsible for sorting and mixing the spoils pit material with imported larger coarse rock to meet the gradation requirements.

**8-26.3(3) Construction Stakeout**

Prior to placement of streambed aggregates, the Contractor shall clearly establish stakes or references which depict the finished channel bed elevations, lines, and grades as shown in the Plans including offsets and intermediate breaklines at regular intervals to clearly define the finished surface of the Constructed Riffle.

The Contractor may elect to utilize a single set of construction stakes for both sub-grade preparation and Constructed Riffle construction. If a single set of stakes is utilized, the stakes shall be inspected and refreshed or re-established as necessary following sub-grade preparation.

The Contract Representative will review construction stakes following preparation of the sub-grade and prior to placement of any Streambed Aggregates. The Contractor shall closely coordinate the Work with the Contract Representative and shall make allowances within the schedule of Work to allow for inspection of the prepared sub-grade prior to placing Streambed Aggregates. Construction stakeout points will be provided by the Contracting Agency; the Contractor shall be responsible for generating and staking out sufficient offset stakes necessary to allow for ready inspection of the Work. Digital data will also available should the Contractor choose to generate additional stakeout points or utilize machinery equipped with GPS-assist.

**8-26.3(4) Placement of Streambed Aggregates**

**8-26.3(4)A Stockpiling Aggregate**

Streambed aggregates, as described above, shall be blended into single well-graded stockpiles separate from other aggregates.

**8-26.3(4)B Placing Blended Streambed Aggregates in Streambed**

Blended streambed aggregate shall be placed in the prepared channel excavation to the lines and grades shown on the Plans and in such a way as to prevent material segregation. Blended streambed aggregate shall be placed in lifts no thicker than 12 inches. Blended streambed aggregate in its final location shall be a well graded mix.

Placement of blended streambed aggregate shall be constructed to ensure that a flow rate of 30 gallons per minute is conveyed above each channel lift. The Contractor shall apply water at 30 gallons per minute and Streambed Sand to facilitate filling the interstitial voids of the blended streambed aggregate. Adjustment of the flow rate may be required to ensure that the voids are satisfactorily filled. The voids are satisfactorily filled when the 30 gallons per minute flow rate does not go subsurface and there is no perceivable difference in the flow rate from upstream of the project limits to the downstream of project limits. The Contractor shall apply water at the 30 gallons per minute flow rate to the stream channel for visual acceptance by the Contract Representative. Water shall be free from contaminates, chlorination and additives that have the potential to pose a risk to fish and other ecological life.

**8-26.3(4)C Placing Blended Streambed Aggregates in Streambank**

Blended streambed aggregate placed in the streambanks shall be placed in lifts no thicker than 12 inches. The Contractor shall compact each lift to be uniformly dense and unyielding as approved by the Contract Representative.

Larger individual clasts making up the blended Rock Riffle aggregate mix shall project 30%-50% of the diameter of the clast above the finished grade of the streambed to provide hydraulic variability and increased surficial roughness.

While constructing the top lift of the Constructed Riffle, the Contractor shall selectively place larger particles with a diameter greater than approximately 12-inches for use in forming the banks of the finished channel. Particles greater than 12-inches shall be placed strategically as directed by the Contract Representative to form a stable bank with maximum contact between individual particles as the design gradation allows. Minor adjustments to the finished channel bed may be required based on site specific conditions; any such modifications will not result in appreciable changes to overall shape or elevation of the finished channel bed.

**8-26.3(4)D Placing Streambed Boulders**

Streambed Boulders shall be placed at locations directed by the Contract Representative. Place boulders before applying smaller streambed aggregates so that each boulder is partially buried.

**8-26.3(4)E Additional Streambed Grading**

Minor adjustments to the finished channel bed may be required based on site specific conditions to transition to existing ground, or to develop a low-flow channel and small pools and bars.

**8-26.4 Measurement**

Blended Streambed Aggregates shall be measured by the cubic yard furnished and placed for Riffle Construction as described in this section. Streambed Boulders will be measured per each.

### 8-26.5 Payment

Payment will be made for each of the following Bid items that are included in the Proposal:

"Constructed Riffle", cubic yard
"Streambed Boulders Type Four", per each

The unit Contract price per cubic yard for "Constructed Riffle", and "Streambed Boulders Type Four" shall be full payment for all costs to perform the Work as specified including blending and placement of streambed aggregates, and watering in each lift, including supply and application of streambed sand and water to facilitate filling the interstitial voids.

## 8-27 Vacant

Section 8-27 is revised to read:
(******)

## 8-27 LARGE WOOD

### 8-27.1 Description

Work under this item shall consist of furnishing all material, labor, tools, and equipment necessary to install Large Wood in accordance with the Plans, Standard Specifications, and these Special Provisions. Large Wood locations and configurations will be based upon the locations shown in the Plans; however, final placement shall be considered fit-in-the-field and may be adjusted by the Contract Representative. Logs shall be arranged, placed, and/or buried as indicated in the Plans or directed by the Contract Representative. The Contractor shall understand that because of the irregularities of natural logs, adjustments to log placements will be needed, and additional payment will not be made.

### 8-27.2 Materials

Large Wood will consist of logs with attached roots. Species shall be Douglas fir, Spruce, Larch, Grand fir, or Western Red-Cedar. Pine is not acceptable. Each log with attached roots shall have the following dimensions:

Length = 40 feet;
Diameter at breast height (DBH) greater than 15 inches.

Slash shall be comprised of trees, limbs, branches, and other woody debris developed for "Disposal Method No.1" of Clearing (2-01.2).

### 8-27.3 Construction Requirements

The Contractor is encouraged to carefully examine the Plans to provide equipment best-suited for installation of Large Wood. Difficult construction conditions shall not be grounds for additional compensation as part of this Contract.

At all times when Large Wood is being handled, loaded, unloaded, and placed, the Contractor shall exercise care to minimize damage to the log, branches, and roots. Each log with roots shall be handled by grasping the bole of the log; transporting or lifting log by grabbing the rootwad with an excavator bucket or similar equipment can damage roots and shall not be allowed without permission from the Contract Representative.

The Contract Representative may direct the Contractor to incorporate available slash material generated through on-site clearing into Large Wood structures, either intertwined with logs or mixed with backfill.

The Contractor shall place Large Wood and slash, generally as shown on the Plans but with field-fit placement and adjustment. Placing Large Wood requires careful manipulation of large and small pieces of wood. The Contract Representative may request adjustments during placement of Large Wood.

The Contractor shall perform any excavation necessary for installation of Large Wood as part of the Work. Excavated material shall temporarily be staged adjacent to the Work area. Excavated material shall be backfilled following placement of Large Wood and slash (as directed by the Contract Representative). Backfilled material shall be placed in lifts of not more than 18 inches and compacted with the bucket of an excavator or similar means.

The Contract Representative may direct the Contractor to cut or break logs to facilitate field-fit installation of Large Wood.

All costs associated with slash placement shall be made incidental to the Clearing bid item.

### 8-27.4 Measurement

"Large Wood" will be measured per each.

Installation of Slash is incidental to Clearing.

### 8-27.5 Payment

"Large Wood", per each.

The unit contract price paid for "Large Wood" shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for completing all Work required for installation as described in the Plans and these Special Provisions which may include, but is not limited to the following: temporary staging of woody material; hauling, and placement of any additional necessary materials as shown on the project plans; excavation and backfill associated with placement of Large Wood, placement of Large Wood and slash, and other work that may be needed. No payment shall be made until the Contract Representative has reviewed and approved a completed all Large Wood placements. Any deficiencies noted shall be the responsibility of the Contractor and payment will not be released until the noted deficiencies are addressed to the satisfaction of the Contract Representative.

## 8-28 Vacant

Section 8-28 is revised to read:
(******)

## 8-28 POST ASSISTED ROUGHNESS STRUCTURES

### 8-28.1 Description

This item includes all work associated with delivery and installation of posts to form a staggered line of upright wood posts and installing Slash generated from Clearing.

### 8-28.2 Materials

Wood posts shall have the following characteristics: 8’ long, 4” diameter;

Slash shall be small and large woody material developed from “Disposal Method No.1” of Clearing (2-01.2).

### 8-28.3 Construction Requirements

Installation locations of Post Assisted Roughness Structures shall generally be as indicated on the Plans; however, final locations and dimensions will be fit in the field as directed by the Engineer.

Install posts to locations, depths shown in the plans. Approximately eight wood posts per structure. After wood posts are installed, apply slash and press down with excavator bucket to weave slash between posts and seal slash to streambed. Repeat with 2-3 layers. Use approximately 10 cubic yards of Slash per structure.

### 8-28.4 Measurement

Installation of Slash is incidental to Clearing. There shall be no measurement for installation of Slash.

“Post Assisted Roughness Structure” shall be measured per each completed structure.

### 8-28.5 Payment

“Post Assisted Roughness Structure”, Each.

The unit contract prices for “Post Assisted Roughness Structure”, per each, shall be full compensation for all costs incurred for equipment, materials and labor for installation as outlined in the plans and these special provisions.

## 8-32 Vacant

Section 8-32 is revised to read:
(******)

## 8-32 FLOODPLAIN ROUGHNESS ZONES

### 8-32.1 Description

This item includes all work necessary to deliver and/or install materials Floodplain Roughness Zones in accordance with the Plans. Three types of floodplain roughness are shown in the Plans:

1. Straw Bales (provided by owner)
2. Live Cutting Trenches
3. Slash

### 8-32.2 Materials

Straw bales shall be weed-free, between 3 and 4 feet in length, and shall be secured with plastic-free baling twine (provided by owner).

Live Cuttings (provided by owner) will be Live Stakes and Live Poles. Handling and care of Live Cutings shall be in accordance with Section 8-02.3(8)B.

Slash shall be small and large woody material developed from “Disposal Method No.1” of Clearing (Section 2-01.2).

### 8-33.3 Construction Requirements

**8-32.3(1) Straw Bales**

1. Install strawbales abutted end to end to form line segments as shown in the Plans.
2. Drive two 3’ wooden stakes through each bale and minimum 18” into underlying soil.

**8-32.3(2) Live Cutting Trenches**

Where indicated in the Plans as Live Cutting Trenches, the Contractor shall install live cuttings as follows:

1. Excavate trench 4 feet deep.
2. Install Live Stakes and Live Poles at spacings indicated in the Plans.
3. Backfill trench carefully so that plants are not damaged and remain upright and protruding from ground.

**8-32.3(3) Slash**

1. Install Slash in rows between straw bales, approximately 2’ high compacted slash piles. Compact slash without crushing.

### 8-32.4 Measurement

“Straw Bales” shall be measured per linear foot.
“Live Cutting Trenches” shall be measured per linear foot.
Installation of Slash is incidental to Clearing. There shall be no measurement for installation of Slash.

### 8-32.5 Payment

“Straw Bales”, linear foot.
“Live Cutting Trenches”, linear foot.

The unit contract prices for “Straw Bales” and “Live Cutting Trenches” shall be full compensation for all costs incurred for equipment, materials, and labor for installation as outlined in the Plans and these special provisions.