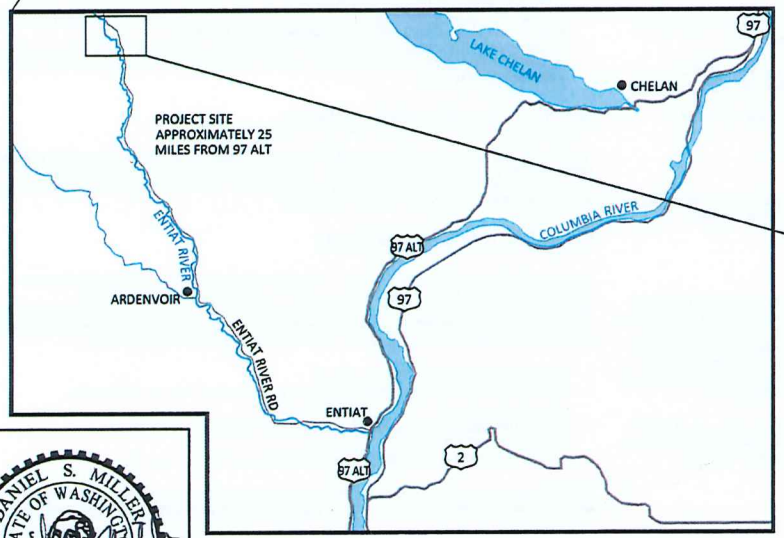
Attachment 3

ENTIAT RIVER UPPER STILLWATERS HABITAT ENHANCEMENT FINAL DESIGN

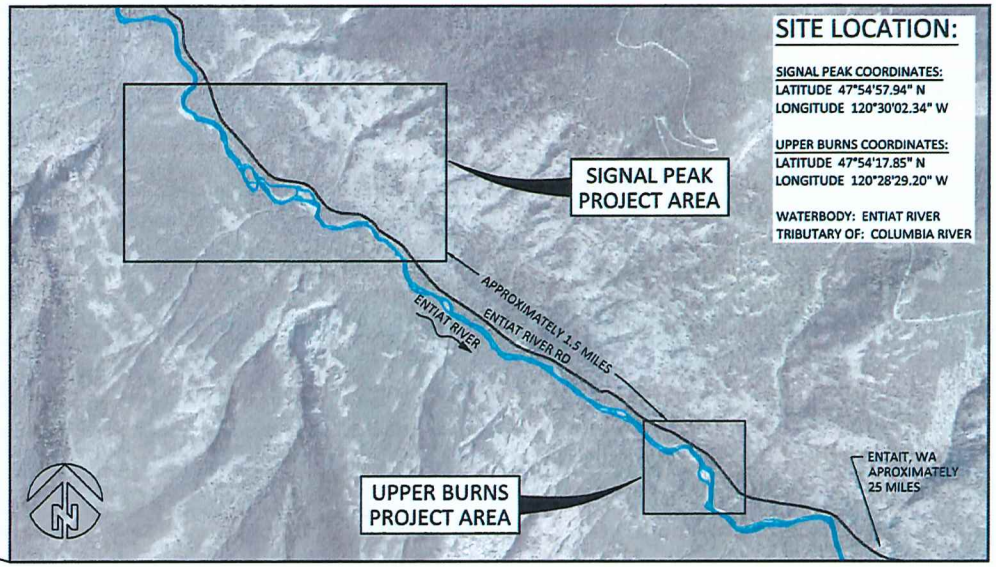
CHELAN COUNTY, WASHINGTON

DECEMBER, 2016

LOCATION MAP STATE OF WASHINGTON
NOT TO SCALE



VICINITY MAP



PROJECT SITE MAP

SHEET INDEX:

ABBREVIATIONS:

APPROX	APPROXIMATE
DBH	DIAMETER AT BREAST HEIGHT
E	EAST
FT	FEET
FTR	FULLY THREADED ROD
IN	INCHES
LWM	LARGE WOODY MATERIAL
MAX	MAXIMUM
MIN	MINIMUM
N	NORTH
NTS	NOT TO SCALE
RD	ROAD
RM	RIVER MILE
S	SOUTH
SF	SQUARE FEET
TYP	TYPICAL
W	WEST

DANIEL S. MILLER
STATE OF WASHINGTON
34208
REGISTERED
PROFESSIONAL ENGINEER

NO.	BY	DATE	REVISION DESCRIPTION

NS DRAWN	GJ, DM, LH DESIGNED	GJ,DM CHECKED
DM APPROVED	12/14/2016 DATE	140205 PROJECT

YAKAMA NATION FISHERIES
ENTIAT UPPER STILLWATERS
HABITAT ENHANCEMENT PRELIMINARY DESIGN

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

COVER, SHEET INDEX, VICINITY MAP & ABBREVIATIONS

SHEET 1 OF 13

THE CONTRACTOR SHALL ATTEND A MANDATORY PRE-BID SITE MEETING.

THE CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING WITH OWNER AND OWNER'S REPRESENTATIVE PRIOR TO MOBILIZING TO SITE AND 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 WILL PREVAIL.

WDFW IN-WATER WORK PERIODS

WORK SHALL OCCUR DURING THE PERMITTED IN-WATER WORK PERIOD STATED IN THE HYDRAULIC PROJECT APPROVAL.

EXISTING DATA

TOPOGRAPHIC DATA WAS COLLECTED BY INTER-FLUVE USING RTK AND TOTAL STATION IN OCTOBER 2014 AND NOVEMBER 2015.

HORIZONTAL DATUM: STATE PLANE NAD83 WASHINGTON NORTH
VERTICAL DATUM: NAVD88

HYDROLOGY INFORMATION PROVIDED BY USBR.

HYDRAULIC MODELING BY INTER-FLUVE USING USACE HEC-RAS 2D (5.0 BETA 2015-09-28).

GIS DATA INCLUDING AERIAL PHOTOGRAPHY, LIDAR, FISH USE, LAND OWNERSHIP, AND TRANSPORTATION ROUTES PROVIDED BY VARIOUS AGENCIES.

SOILS

FOUR SHALLOW SOILS PITS WERE EXCAVATED ALONG THE UPPER STILLWATERS SIDE CHANNEL. MEMORANDUM IS AVAILABLE FROM YAKAMA NATION UPON REQUEST. NO OTHER SUBSURFACE SOILS INVESTIGATIONS HAVE BEEN COMPLETED.

CONTRACTOR SHALL CONDUCT OWN INVESTIGATIONS IF ADDITIONAL DATA IS REQUIRED AT NO ADDITIONAL COST.

UTILITIES

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

THE CONTRACTOR SHALL CALL (800-424-5555) FOR UTILITY LOCATE PRIOR TO CONSTRUCTION.

THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE AFFECTED UTILITY SERVICE TO REPORT ANY DAMAGED OR DESTROYED UTILITIES.

THE CONTRACTOR SHALL PROVIDE EQUIPMENT AND LABOR TO AID THE AFFECTED UTILITY SERVICE IN REPAIRING DAMAGED OR DESTROYED UTILITIES AT NO ADDITIONAL COST.

CONSTRUCTION STAKING

OWNER'S REPRESENTATIVE WILL PROVIDE STAKING OF PROJECT LIMITS, GRADE STAKES, AND ELEVATION CONTROL POINTS. SOME FIELD ADJUSTMENTS TO THE LINES AND GRADES ARE TO BE EXPECTED.

CONTRACTOR SHALL MEET WITH THE OWNER AND OWNER'S REPRESENTATIVE TO DEFINE AND MARK LIMITS OF DISTURBANCE PRIOR TO MOBILIZATION OF EQUIPMENT OR MATERIALS ONTO THE SITE.

THE CONTRACTOR SHALL REPLACE DAMAGED OR DESTROYED CONSTRUCTION STAKES AT NO ADDITIONAL COST.

CONSTRUCTION MATERIALS

LOCATION, ALIGNMENT, AND ELEVATION OF LOGS AND LOGS WITH ROOTWADS ARE SUBJECT TO ADJUSTMENT BASED ON FIELD CONDITIONS AND MATERIAL SIZE.

OWNER PROVIDED LOGS, LOGS WITH ROOTWADS AND VERTICAL LOGS ARE TO BE LOCATED IN THE STOCKPILE/STAGING AREA KNOW AS THE USFS PRESTON PIT LOCATION, LOCATED AT ROAD MILE 22.5 ALONG THE ENTIAT RIVER ROAD. ANY EXCESS CONSTRUCTION MATERIALS SHALL BE NEATLY STORED AT THE APPROVED STAGING LOCATION; PRESTON PIT. UPON COMPLETION OF THE PROJECT ANY EXCESS MATERIALS, WITH THE EXCEPTION OF ANY LARGE WOODY MATERIAL (LWM), WILL BECOME THE PROPERTY OF THE CONTRACTOR AND HAULED OFFSITE IN A TIMELY MANNER AND LEGALLY DISPOSED OF. ADDITIONALLY, UPON PROJECT COMPLETION THE CONTRACTOR WILL BE RESPONSIBLE FOR HAULING ANY EXCESS LWM OFFSITE TO THE PRESTON PIT LOCATION AND PLACED AT AN APPROVED LOCATION WITHIN THE PRESTON PIT BOUNDARIES.

CONSTRUCTION ACCESS/TRAFFIC CONTROL

CONTRACTOR SHALL SUBMIT AN ACCESS, STAGING, AND STOCKPILE PLAN TO THE OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO MOBILIZATION.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR OBTAINING ANY REQUIRED TRAFFIC CONTROL OR ACCESS PERMITS.

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

ALL SAPLINGS AND TREES TO BE TRANSPLANTED OR REMOVED SHALL BE CLEARLY MARKED AND APPROVED BY THE OWNER AND OWNER'S REPRESENTATIVE.

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

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

CONTRACTOR SHALL IMPLEMENT MEASURES TO CONTROL AND MINIMIZE WIND BLOWN DUST FROM THE SITE.

ALL DISTURBED AREAS INCLUDING ROADS, DRIVEWAYS AND ACCESS ROUTES SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER AND RE-VEGETATED PER PLANS BY WILDLANDS.

AT PROJECT COMPLETION, PAVEMENT SHALL BE CLEANED PER WASHINGTON DEPARTMENT OF TRANSPORTATION STANDARD. CLEANING SHALL BE INCIDENTAL TO MOBILIZATION/DEMOBILIZATION.

ALL DISTURBED AREAS OUTSIDE THE LIMITS OF DISTURBANCE SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER AT NO ADDITIONAL COST.

EROSION CONTROL

CONTRACTOR SHALL BE SOLELY RESPONSIBLE AT OWN EXPENSE FOR PROVIDING AND MAINTAINING ALL NECESSARY EROSION CONTROL FACILITIES TO COMPLY WITH APPLICABLE EROSION CONTROL REGULATIONS AND TO MAINTAIN CLEAN ACCESS ROUTES.

STABILIZE SOILS AND PROTECT SLOPES

FROM MAY 1 THROUGH SEPTEMBER 30, ALL EXPOSED SOILS SHALL BE PROTECTED FROM EROSION BY MULCHING, HYDROSEED COVERING, OR OTHER APPROVED MEASURES WITHIN THREE DAYS OF GRADING. FROM OCTOBER 1 THROUGH APRIL 30, ALL EXPOSED SOILS MUST BE PROTECTED WITHIN 2 DAYS OF GRADING. SOILS SHALL BE STABILIZED BEFORE A WORK SHUTDOWN, HOLIDAY OR WEEKEND IF NEEDED BASED ON THE WEATHER FORECAST. SOIL STOCK PILES MUST BE STABILIZED AND PROTECTED WITH SEDIMENT TRAPPING MEASURES. HYDROSEED ALL DISTURBED AREAS NOT INDICATED IN THE CONTRACT DOCUMENTS FOR OTHER PERMANENT STABILIZATION MEASURES AS SOON AS PRACTICAL.

DESIGN, CONSTRUCT, AND PHASE CUT AND FILL SLOPES IN A MANNER THAT WILL MINIMIZE EROSION. REDUCE SLOPE VELOCITIES ON DISTURBED SLOPES BY PROVIDING TEMPORARY BARRIERS. STORMWATER FROM OFF SITE SHOULD BE HANDLED SEPARATELY FROM STORMWATER GENERATED ON SITE.

AFTER FINAL SITE STABILIZATION

ALL TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY BEST MANAGEMENT PRACTICES (BPMs) ARE NO LONGER NEEDED. TRAPPED SEDIMENT SHALL BE REMOVED FROM THE SITE OR INCORPORATED INTO FINISHED GRADING. DISTURBED SOIL AREAS RESULTING FROM REMOVAL SHALL BE PERMANENTLY STABILIZED.

EROSION/SEDIMENTATION CONTROL PLAN

THE EROSION AND SEDIMENT CONTROL (ESC) PLAN PROVIDED IS FOR INFORMATIONAL PURPOSES ONLY, THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROVIDING EROSION CONTROL MEASURES TO COMPLY WITH APPLICABLE REGULATIONS.

THE RECOMMENDATIONS FOR AN ESC PLAN INCLUDED HEREIN WILL PROVIDE A GUIDELINE FOR THE CONTRACTOR TO DEVELOP AND IMPLEMENT AN ESC PLAN.

A. THE IMPLEMENTATION OF AN ESC PLAN AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
B. THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
C. ESC FACILITIES AS APPROXIMATELY SHOWN ON THIS PLAN ARE TO BE CONSTRUCTED PRIOR TO CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT ENTER SURFACE WATERS, THE DRAINAGE SYSTEM, OR VIOLATE APPLICABLE WATER STANDARDS.
D. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED AT NO ADDITIONAL COST FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
E. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
F. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 24 HOURS FOLLOWING A STORM EVENT.
G. STABILIZED CONSTRUCTION ENTRANCES AND ADDITIONAL MEASURES MAY BE REQUIRED AND SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT TO ENSURE ALL ACCESS ROADS ARE KEPT CLEAN AT NO ADDITIONAL COST.

INSPECTION AND MAINTENANCE

ALL ESC FACILITIES SHALL BE INSPECTED, MAINTAINED, AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. ALL ESC FACILITIES SHALL BE INSPECTED DAILY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.5 INCHES OF RAIN PER 24 HOUR PERIOD AND AFTER EVENTS EXCEEDING 2 HOURS DURATION.

CONTRACTOR'S ESC RECORD

WEEKLY REPORTS SUMMARIZING THE SCOPE OF INSPECTIONS, THE PERSONNEL CONDUCTING THE INSPECTION, THE DATE(S) OF THE INSPECTION, MAJOR OBSERVATIONS RELATING TO THE IMPLEMENTATION OF THE CONTRACTOR'S EROSION AND SEDIMENT CONTROL PLAN, AND ACTIONS TAKEN AS A RESULT OF THESE INSPECTIONS SHALL BE PREPARED AND RETAINED ON SITE BY THE CONTRACTOR. IN ADDITION, A RECORD OF THE FOLLOWING DATES SHALL BE INCLUDED IN THE REPORTS:

1. WHEN MAJOR GRADING ACTIVITIES OCCUR.
2. DATES OF RAINFALL EVENTS EITHER EXCEEDING 2 HOURS DURATION OR MORE THAN 0.5 INCHES/24 HOURS.
3. WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON SITE, OR ON A PORTION OF THE SITE.
4. WHEN STABILIZATION MEASURES ARE INITIATED FOR PORTIONS OF THE SITE.

ESC RECORDS SHALL BE MADE AVAILABLE TO THE OWNER AND OWNER'S REPRESENTATIVE ON REQUEST AND SHALL BE PROVIDED FOR REVIEW AND APPROVAL PRIOR TO APPLICATION FOR PAYMENT.

NO.	BY	DATE	REVISION DESCRIPTION

NS	GJ, DM, LH	GJ,DM
DRAWN	DESIGNED	CHECKED
DM	12/14/2016	140205
APPROVED	DATE	PROJECT

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GENERAL NOTES

SHEET
2 OF 13

RIVER DIVERSION

DIVERSIONS MAY BYPASS THE RIVER AROUND SMALLER WORK AREAS AT CONTRACTOR'S DISCRETION.

DEWATERING OF IN-CHANNEL WORK AREA(S) SHALL OCCUR CONCURRENT WITH FISH RESCUE. CONTRACTOR SHALL COORDINATE WITH THE YAKAMA NATION FISHERIES FOR FISH RESCUE. CONTRACTOR SHALL PROVIDE YAKAMA FISHERIES AMPLE TIME TO SCHEDULE FISH RESCUE. IF DIVERSION FAILS DUE TO CONTRACTOR NEGLIGENCE, FISH RESCUE SHALL BE REPEATED BY YAKAMA FISHERIES CREWS AT CONTRACTOR'S EXPENSE.

IF ADDITIONAL PUMPING IS REQUIRED TO DEWATER DURING CONSTRUCTION, PUMPED DISCHARGE SHALL RELEASE SEDIMENT-LADEN WATER AT AN UPLAND DISCHARGE LOCATION IN A MANNER THAT DOES NOT CAUSE EROSION, CONTAMINATION OR INCREASE TURBIDITY OF SURFACE WATERS (SEE CONSTRUCTION DEWATERING).

OWNER'S REPRESENTATIVE SHALL APPROVE DEWATERING DISCHARGE LOCATION PRIOR TO IMPLEMENTATION.

CONSTRUCTION DEWATERING

CONTRACTOR SHALL PERFORM CONSTRUCTION DEWATERING IN SUCH A MANNER AS TO AVOID THE RELEASE OF TURBID OR SEDIMENT-LADEN WATER IN ORDER TO PREVENT CONTAMINATION OR INCREASE TURBIDITY OF SURFACE WATERS. SEDIMENT LADEN WATER MAY BE PUMPED TO AN UPLAND DISCHARGE LOCATION AND ALLOWED TO SHEET FLOW THROUGH EXISTING VEGETATION BEFORE INFILTRATING INTO THE GROUND. IF THIS METHOD IS NOT SUFFICIENT TO PREVENT RETURN OF TURBID WATER TO SURFACE WATERS OF THE ENTIAT RIVER AND FLOODPLAIN, A 'DIRT-BAG' OR SEDIMENT RETENTION STRUCTURE MAY BE REQUIRED AS NECESSARY TO COMPLY WITH LAWS AND PERMIT REQUIREMENTS AT NO ADDITIONAL COST.

CONTRACTOR SHALL PROVIDE VISQUEEN, GEOTEXTILE LINER, PLYWOOD, OR METAL PLATING AS NECESSARY TO DISSIPATE PUMP DISCHARGE JET TO PREVENT EROSION.

FISH RESCUE

ALL FISH RESCUE EFFORTS SHALL BE SUPERVISED BY A 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 WILL BE CAREFULLY COLLECTED BY SEINE AND/OR DIP NETS AND PLACED IN CLEAN TRANSFER CONTAINERS WITH ADEQUATE VOLUME OF FRESH RIVER WATER.

CAPTURED FISH SHALL BE IMMEDIATELY RELEASED INTO ENTIAT RIVER SURFACE WATER.

LIVE TREES

ALL TREES NOT MARKED FOR REMOVAL SHALL BE LEFT STANDING UNDISTURBED. CONSTRUCTION ACTIVITY SHALL NOT DEBARK OR DAMAGE LIVE TREES.

KEEP OUT OF DRIP LINE OF EXISTING TREES TO REMAIN.

WETLANDS AND WATERS OF THE US

THE WETLAND BOUNDARIES DISPLAYED IN THIS DESIGN PACKAGE WERE DETERMINED BY INTER-FLUVE STAFF. THESE LINES ARE BASED UPON ANALYSIS, MODELING, AND BEST PROFESSIONAL JUDGEMENT.

THESE DO NOT NECESSARILY REPRESENT JURISDICTIONAL BOUNDARIES. WITHIN THE STATE OF WASHINGTON, THE ARMY CORPS OF ENGINEERS AND THE DEPARTMENT OF ECOLOGY HAVE THE FINAL AUTHORITY IN DETERMINING WATERS AND WETLAND BOUNDARIES AND REGULATIONS.

TREE SALVAGE

ALL TREES AND SLASH REMOVED FOR CONSTRUCTION SHALL TEMPORARILY BE STOCKPILED WITHIN LIMITS OF DISTURBANCE. STOCKPILED TREE/SLASH SHALL BE REINCORPORATED INTO FINISHED PROJECT.

ANY REMOVED VEGETATION GREATER THAN 6 INCHES DIAMETER AND 15 FEET LONG SHOULD BE INCORPORATED INTO LOG STRUCTURES. CONTRACTOR IS RESPONSIBLE FOR REMOVING SMALLER CLEARING AND GRUBBING DEBRIS FROM THE SITE AND DISPOSING AT A LEGAL LOCATION AT THE END OF THE PROJECT UNLESS DIRECTED BY THE OWNER'S REPRESENTATIVE.

ALL TREES REMOVED WITHIN CLEARING LIMITS SHALL BE REMOVED WHOLE WITH ROOTWAD AND UTILIZED IN CONSTRUCTION AS DIRECTED BY OWNER'S REPRESENTATIVE.

PAVING

ROAD PAVEMENT REPAIR SHALL CONFORM TO WSDOT STANDARD SPECIFICATIONS CURRENT EDITION FOR HOT MIX ASPHALT (SECTION 5.04) OR APWA AS AMENDED BY THE USFS.

DAMAGED PAVEMENT SHALL BE REMOVED TO A SAW CUT A MINIMUM OF 3FT INTO GOOD PAVEMENT, PERPENDICULAR TO THE TRAVEL LANE AND FULL WIDTH OF AFFECTED LANE.

REPLACEMENT PAVEMENT THICKNESS SHALL BE THE GREATER OF THE THICKNESS OF EXISTING PAVEMENT OR WSDOT OR USFS SPECIFICATIONS.

SUBGRADE SHALL BE LEVELED AND COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY PER ASTM D1557 TEST METHOD (MODIFIED PROCTOR). SUBGRADES SHALL BE INSPECTED AND APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO PLACING EMBANKMENTS, ENGINEERED FILLS OR FINE GRADING FOR BASE ROCK.

ENGINEERED FILLS SHALL BE CONSTRUCTED IN 6 INCH LIFTS OVER APPROVED SUBGRADES. EACH LIFT IN THE PUBLIC RIGHT OF WAY SHALL BE COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY PER ASTM D1557 TEST METHOD (MODIFIED PROCTOR).

CRUSHED ROCK SHALL CONFORM TO WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION, CURRENT EDITION. COMPACT TO 95% OF THE MAXIMUM DRY DENSITY PER ASTM D1557 TEST METHOD (MODIFIED PROCTOR). WRITTEN COMPACTION TEST RESULTS FROM AN INDEPENDENT TESTING LABORATORY SHALL BE RECEIVED BY THE OWNER'S REPRESENTATIVE PRIOR TO PLACING HOT MIX ASPHALT (HMA) PAVEMENT.

HMA PAVEMENT SHALL CONFORM TO WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, CURRENT EDITION. MIX SHALL BE COMMERCIAL, CL 1/2INCH, GRADE PG 64-28. PAVEMENT SHALL BE COMPACTED TO MINIMUM OF 91% OF MAXIMUM DENSITY AS DETERMINED BY THE RICE STANDARD METHOD.

UNLESS OTHERWISE SHOWN ON THE DRAWINGS, STRAIGHT GRADES SHALL BE RUN BETWEEN ALL FINISHED GRADES ELEVATIONS AND/OR FINISHED CONTOUR LINES SHOWN.

FINISHED PAVEMENT GRADES AT TRANSITION IN EXISTING PAVEMENT SHALL MATCH EXISTING PAVEMENT GRADES OR BE FEATHERED PAST JOINTS WITH EXISTING PAVEMENT AS REQUIRED TO PROVIDE A SMOOTH, FREE DRAINING SURFACE.

THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT ALL REQUIRED OR NECESSARY INSPECTIONS ARE COMPLETED BY THE OWNER'S REPRESENTATION PRIOR TO PROCEEDING WITH SUBSEQUENT WORK WHICH COVERS OR THAT IS DEPENDENT ON THE WORK TO BE INSPECTED. FAILURE TO OBTAIN NECESSARY INSPECTIONS AND APPROVALS SHALL RESULT IN THE CONTRACTOR BEING FULLY RESPONSIBLE FOR ALL PROBLEMS ARISING FROM UNINSPECTED WORK.

MINIMUM TESTING SCHEDULE FOR STREETS SUBGRADE, BASE ROCK AND ASPHALT SHALL BE ONE TEST PER 4000 SQUARE FEET PER LIFT WITH A MINIMUM OF 2 TESTS BY AN INDEPENDENT TESTING AGENCY.

THIS TESTING SCHEDULE IS NOT COMPLETE, AND DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF OBTAINING ALL NECESSARY INSPECTIONS FOR ALL WORK PERFORMED, REGARDLESS OF WHO IS RESPONSIBLE FOR PAYMENT.

QUANTITIES ESTIMATE

Location	Item	Qty	Unit	Total
Type 1 Wood Structures- Side Channel				
	Large wood (no rootwads) hauled from staging and installed	1	EA	2
	Large wood (rootwads) hauled from staging and installed	1	EA	2
	Excavation for LWM (geometry varies per structure)	15	CY	30
	Imported gravel/cobble/topsoil for LWM trench backfill (volume varies per structure)	9	CY	18
Type 2 Wood Structures- Side Channel				
	Large wood (no rootwads) hauled from staging and installed	2	EA	8
	Large wood (rootwads) hauled from staging and installed	4 to 7	EA	19
	Vertical log installation	5 to 7	EA	12
	Excavation for LWM (geometry varies per structure)	varies	CY	520
	Imported gravel/cobble/topsoil for LWM trench backfill (volume varies per structure)	varies	CY	240
Individual Wood- Side Channel				
	Large wood (rootwads) hauled from staging and installed	1	EA	13
Type 3 Large Wood Structures with Bumper Log				
	Large wood (no rootwads) hauled from staging and installed	1	EA	4
	Large wood (rootwads) hauled from staging and installed	3 to 7	EA	10
	Vertical log installation	3 to 16	EA	19
	Excavation for LWM (geometry varies per structure)	varies	CY	165
	Imported gravel/cobble/topsoil for LWM trench backfill (volume varies per structure)	varies	CY	70
Type 4 Large Wood Structures				
	Large wood (no rootwads) hauled from staging and installed	2 to 3	EA	10
	Large wood (rootwads) hauled from staging and installed	2 to 5	EA	14
	Ballast boulder with FTR connection	4 to 6	EA	20
Rip-Rap Enhancement Site A				
	Large wood (no rootwads) hauled from staging and installed	20	EA	20
	Large wood (rootwads) hauled from staging and installed	22	EA	22
	Boulders hauled from staging and installed	84	EA	84
	Pavement repair (300ft x 24ft)	800	SY	800
Rip-Rap Enhancement Site B				
	Large wood (no rootwads) hauled from staging and installed	12	EA	12
	Large wood (rootwads) hauled from staging and installed	30	EA	30
	Boulders hauled from staging and installed	84	EA	84
	Pavement repair (275ft x 24ft)	733	SY	733
Rip-Rap Enhancement Site C				
	Large wood (no rootwads) hauled from staging and installed	6	EA	6
	Large wood (rootwads) hauled from staging and installed	18	EA	18
	Vertical log installation	0	EA	0
	Boulders hauled from staging and installed	46	EA	48
	Pavement repair (175ft x 24ft)	467	SY	467
Side Channel Inlet				
	Excavation (5ft bottom width, 2H:1V side slopes)	95	CY	95
	Levee removal to flood plain elevation	200	CY	200
Site Restoration				
	Seed and mulch	59	MSF	59
Wetland Bench				
	Excavation (760sf x 12in deep)	varies	CY	28
	Imported wetland soil for backfill (760sf x 9in deep)	varies	CY	21

CY = cubic yards
EA = each
MSF = 1,000-square feet
SY = square yards

NOTE:

ESTIMATED MATERIAL VOLUMES ARE APPROXIMATE IN-PLACE QUANTITIES AND NOT FACTORED FOR EXPANSION OF EXCAVATED MATERIAL OR COMPACTION OF PLACED MATERIAL. MEASUREMENT AND PAYMENT SHALL NOT BE BASED ON WEIGHT TICKETS OR TRUCK MEASURE WITHOUT PRIOR WRITTEN APPROVAL.

DANIEL S. MILLER
STATE OF WASHINGTON
34208
REGISTERED
PROFESSIONAL ENGINEER

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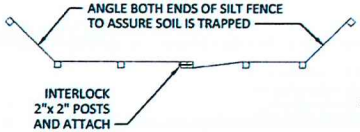
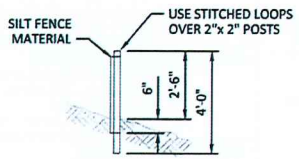
GENERAL NOTES, QUANTITIES ESTIMATE

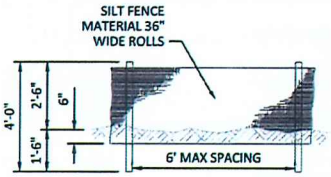
SHEET
3 OF 13



TOP VIEW
NTS



SIDE VIEW
NTS

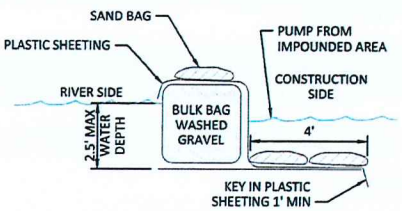


FRONT VIEW
NTS

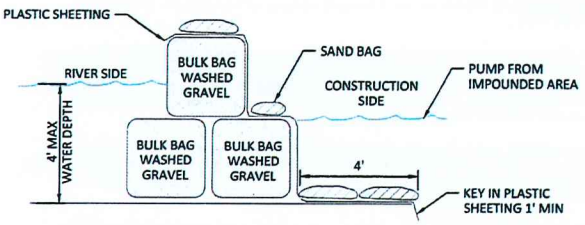
SILT FENCES GENERAL NOTES:

1. THE SILT FENCE SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, SILT FENCE SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM 6 INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST. ALTERNATIVELY, OVERLAP AND INTERLOCK TWO POSTS WITH ATTACHED FABRIC AS REQUIRED TO MEET APPLICABLE REGULATIONS.
2. THE SILT FENCE IS TO BE INSTALLED AT LOCATIONS SHOWN ON THE PLAN ALONG THE DOWNHILL PERIMETER OF CONSTRUCTION AREAS. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES.
3. THE SILT FENCE SHALL HAVE A MINIMUM VERTICAL BURIAL OF 6 INCHES. ALL EXCAVATED MATERIAL FROM SILT FENCE INSTALLATION SHALL BE BACK-FILLED AND COMPACTED ALONG THE ENTIRE DISTURBED AREA.
4. STANDARD OR HEAVY DUTY SILT FENCE SHALL HAVE MANUFACTURED STITCHED LOOPS FOR 2 INCHES X 2 INCHES POST INSTALLATION.
5. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY PROTECTED AND STABILIZED, OR AS DIRECTED BY OWNER'S REPRESENTATIVE.

1/4 TYPICAL DETAIL - SILT FENCE
NTS



TEMPORARY COFFERDAM SECTION IN WATER DEPTHS LESS THAN 2.5'
NTS



TEMPORARY COFFERDAM SECTION IN WATER DEPTHS GREATER THAN 2.5'
NTS

BULK BAG GENERAL NOTES:

1. BULK BAG COFFERDAM SHALL BE CONSTRUCTED OF SEVERAL UNITS OF BULK BAGS FILLED WITH WASHED GRAVEL, AND ABUTTED SIDE BY SIDE TO CREATE A ROW THAT ISOLATES THE CONSTRUCTION SITE.
2. IF WATER DEPTH EXCEEDS 85% OF THE BULK BAG HEIGHT, AN ADDITIONAL TOP ROW OF BULK BAGS SHALL BE INSTALLED, SUPPORTED BY TWO BOTTOM ROWS OF BULK BAGS. BULK BAG COFFERDAM SHALL BE SEALED BY COVERING THE COFFERDAM WITH PLASTIC SHEETING HELD IN PLACE BY STANDARD SANDBAGS PLACED IN ROWS ON TOP OF COFFERDAM, AND AT TOE OF COFFERDAM.
3. THE PLASTIC SHEETING SHALL BE DRAPED ALONG THE CHANNEL BOTTOM ON BOTH SIDES OF THE COFFERDAM WITH OUTWARD EDGE OF SHEETING MINIMUM 4-FEET FROM TOE OF COFFERDAM. THE DRAPED PORTION OF PLASTIC SHEETING SHALL BE PINNED TO THE CHANNEL BED BY MINIMUM TWO ROWS OF STANDARD SANDBAGS.
4. THE CONSTRUCTION SIDE EDGE OF PLASTIC SHEETING SHALL BE TOED INTO THE CHANNEL BED MINIMUM 1-FT. TOEING IN THE OUTWARD EDGE OF PLASTIC SHEETING SHALL OCCUR AFTER THE COFFERDAM IS CLOSED TO PREVENT TURBIDITY RELEASE TO THE WATERWAY.
5. 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.
6. BULK BAGS SHALL BE CUBE-SHAPED POLYPROPYLENE WOVEN FABRIC BAGS WITH FULLY OPEN TOP, FLAT BOTTOM, FOUR LOOPS, MINIMUM 2-TON WEIGHT CAPACITY, MINIMUM 5:1 SAFETY FACTOR.
7. PLASTIC SHEETING SHALL BE MINIMUM 6-MIL THICKNESS. ROLL LENGTH SHALL BE LONG ENOUGH TO ENSURE THAT ENTIRE LENGTH OF COFFERDAM WILL BE COVERED WITHOUT A SEAM. MINIMUM 12-FT WIDE ROLL SHALL BE USED FOR SINGLE LAYER BULK BAG COFFERDAM. MINIMUM 16-FT WIDE ROLL SHALL BE USED FOR 2-LAYER STACKED BULK BAG COFFERDAM.
8. BULK BAG COFFERDAM SHALL BE COMPLETELY REMOVED AFTER CONSTRUCTION IS COMPLETED AND TURBIDITY HAS BEEN REMOVED. WASHED GRAVEL SHALL BE REMOVED FROM SITE UNLESS OTHERWISE DIRECTED BY OWNER.
9. MEASUREMENT AND PAYMENT FOR BULK BAG COFFERDAM, SAND BAGS, PLASTIC SHEETING, WASHED GRAVEL PLACEMENT, MAINTENANCE AND REMOVAL OF ALL MATERIALS SHALL BE INCIDENTAL TO THE LUMP SUM ALL INCLUSIVE COST FOR DIVERSION AND DEWATERING.
10. ALTERNATE COFFERDAM MATERIALS AND CONFIGURATIONS MAY BE ALLOWED BUT SHALL NOT BE IMPLEMENTED WITHOUT REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AND/OR VENDOR CUT SHEETS FOR SUBSTITUTIONS.

2/4 TYPICAL DETAIL - BULK BAG COFFERDAM
NTS

NO.	BY	DATE	REVISION DESCRIPTION

NS	GJ, DM, LH	GJ,DM
DRAWN	DESIGNED	CHECKED
DM	12/14/2016	140205
APPROVED	DATE	PROJECT

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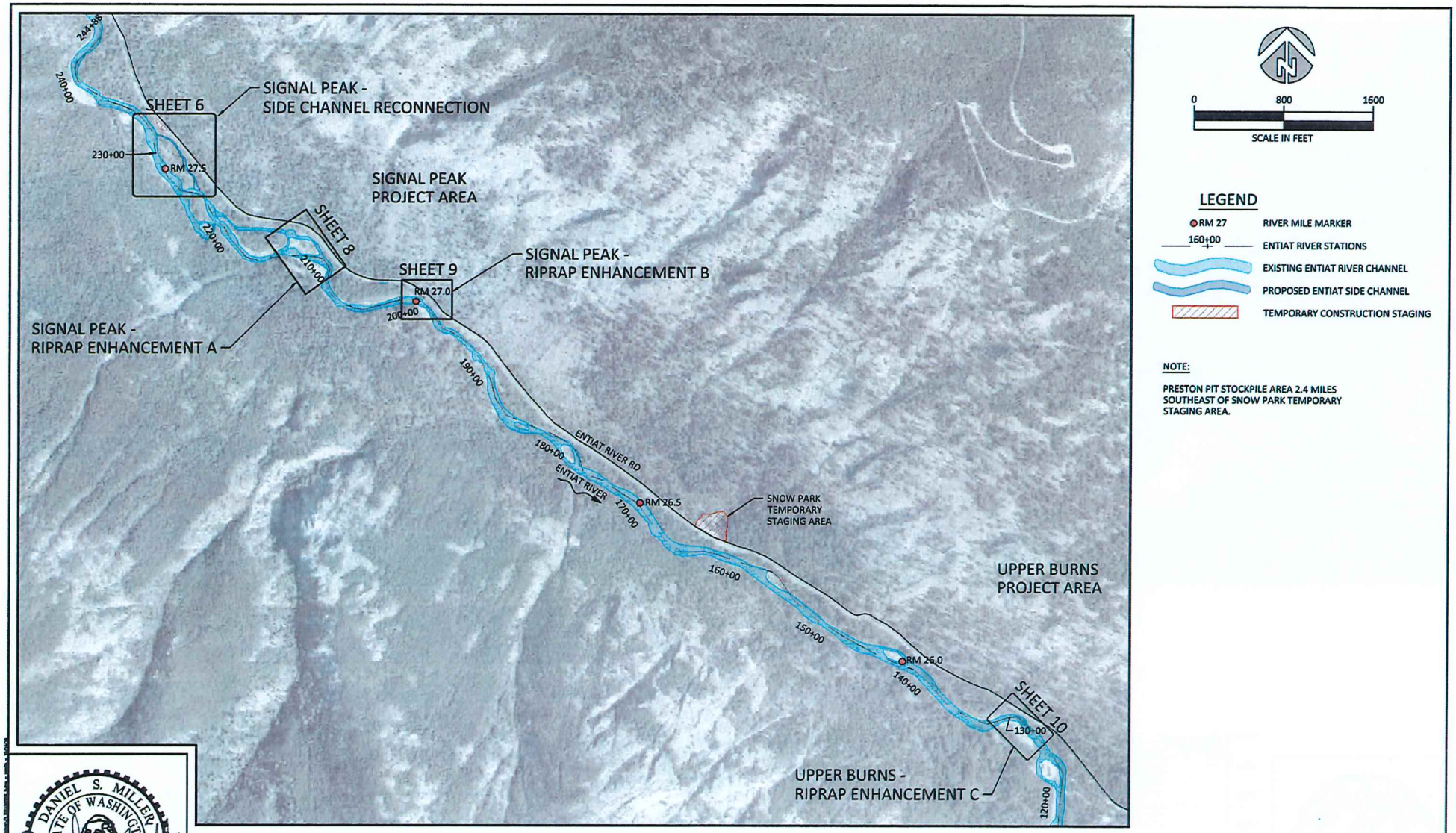
EROSION CONTROL AND COFFERDAM DETAILS

SHEET
4 OF 13



NOTE:

PRESTON PIT STOCKPILE AREA 2.4 MILES SOUTHEAST OF SNOW PARK TEMPORARY STAGING AREA.

PLAN VIEW

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34208
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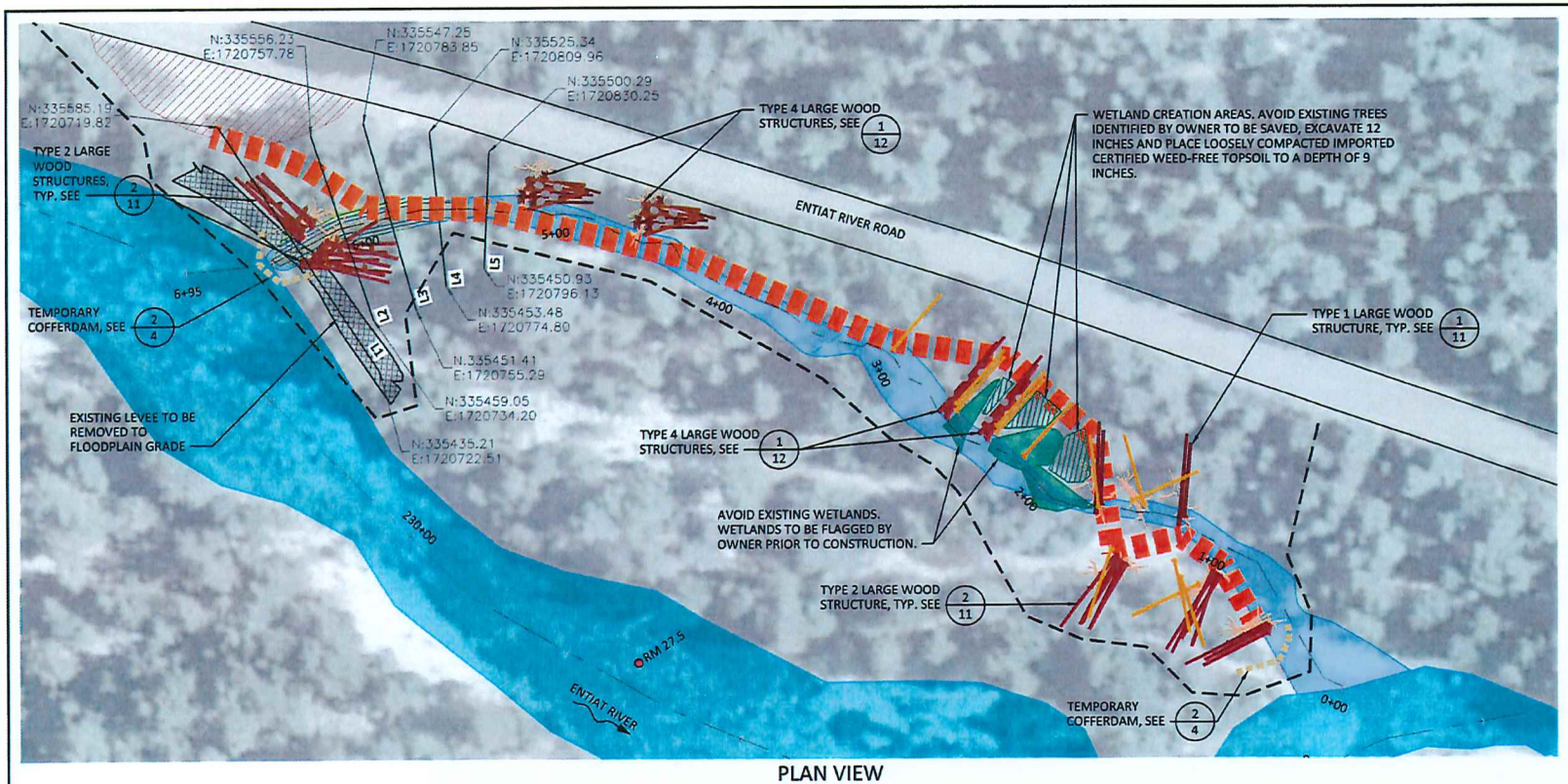
SITE OVERVIEW AND SHEET KEY

SHEET 5 OF 13



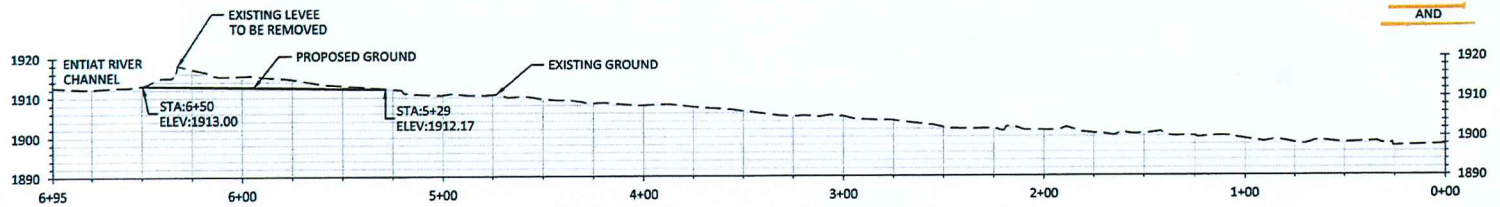
PLAN VIEW

0 60 120

SCALE IN FEET

LEGEND

- PROPOSED CONTOURS (1FT)
- 160+00 ENTIAT RIVER AND SIDE CHANNEL STATIONS
- LIMITS OF DISTRUBANCE
- L1 SIDE CHANNEL CROSS SECTION, SEE 3/7
- EXISTING ENTIAT RIVER CHANNEL
- PROPOSED ENTIAT RIVER SIDE CHANNEL
- SIDE CHANNEL EXCAVATION AREA
- EXISTING WETLAND
- WETLAND CREATION AREA
- EXISTING LEVEE TO BE REMOVED
- TEMPORARY CONSTRUCTION STAGING
- TEMPORARY CONSTRUCTION ACCESS
- TEMPORARY COFFERDAM, SEE 2/4
- SLASH
- TYPE 1 LARGE WOOD STRUCTURE, SEE 1/11
- TYPE 2 LARGE WOOD STRUCTURE, SEE 2/11
- TYPE 4 LARGE WOOD STRUCTURE, SEE 1/12
- AND SINGLE LOG PLACEMENT



PROFILE VIEW

DANIEL S. MILLER
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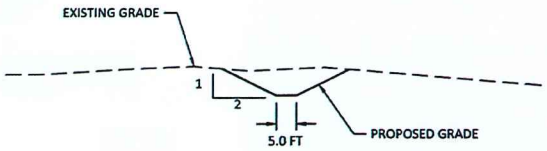
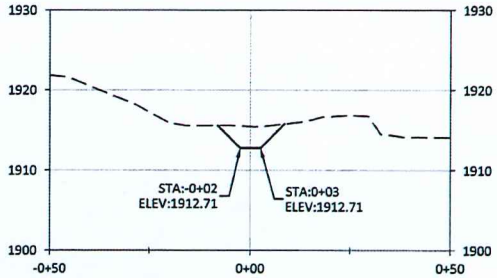
SIGNAL PEAK SIDE CHANNEL RECONNECTION PLAN AND PROFILE

SHEET 6 OF 13

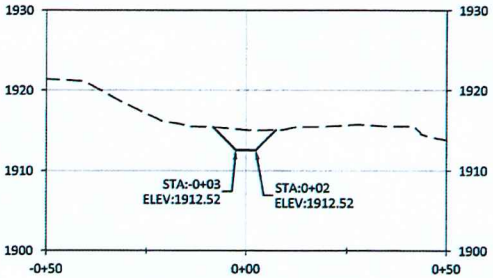


1/7 TYPICAL SECTION - SIDE CHANNEL STA 5+29 TO 6+39

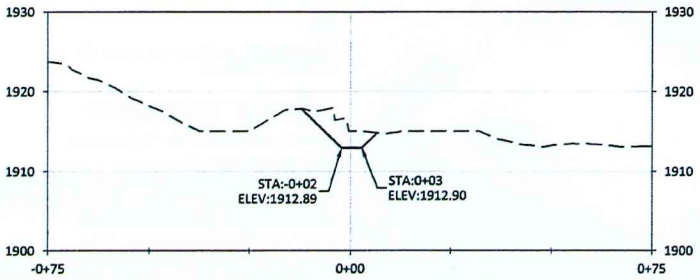
1" = 30'



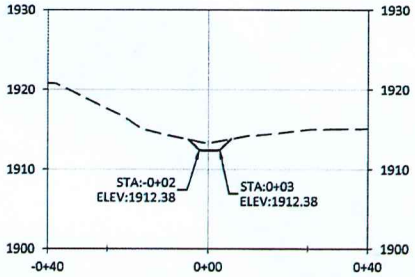
SIDE CHANNEL 6+10 (L2)



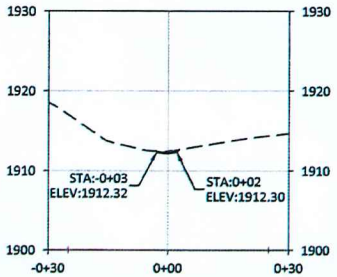
SIDE CHANNEL STA 5+85 (L3)



SIDE CHANNEL STA 6+35 (L1)

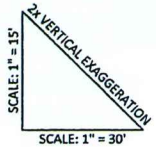


SIDE CHANNEL STA 5+60 (L4)



SIDE CHANNEL 5+35 (L5)

2/7 SIDE CHANNEL CROSS-SECTIONS



LEGEND

EXISTING GROUND

PROPOSED GROUND

NOTE:

SECTION ORIENTATION IS LEFT TO RIGHT LOOKING DOWNSTREAM

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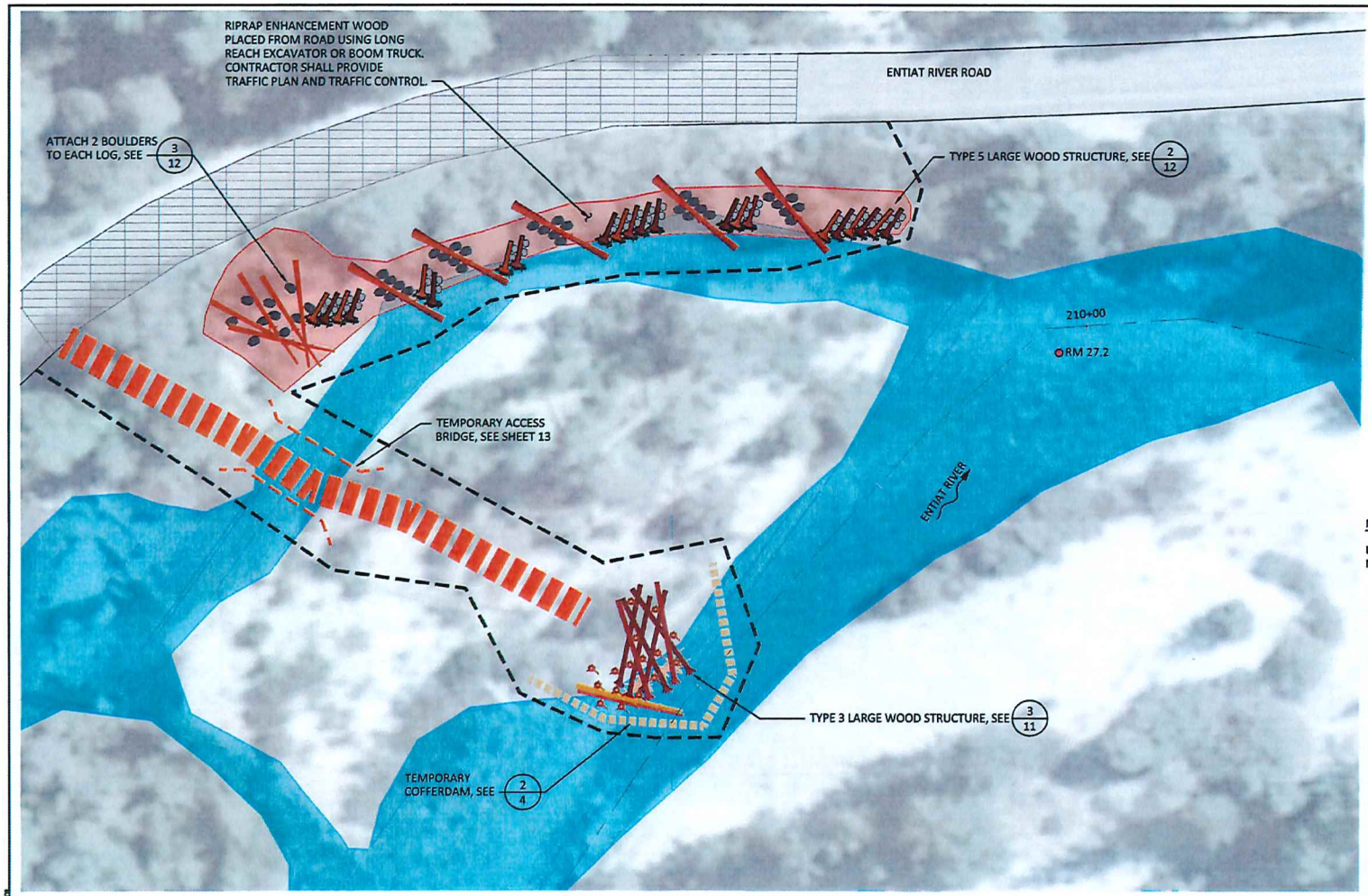
SIGNAL PEAK SIDE CHANNEL CROSS-SECTIONS

SHEET 7 OF 13



PLAN VIEW

0 40 80

SCALE IN FEET

LEGEND

- RM 28 — RIVER MILE MARKER
- 160+00 — ENTIAT RIVER STATIONS
- LIMITS OF DISTURBANCE
- EXISTING ENTIAT RIVER CHANNEL
- LARGE WOOD ENHANCEMENT OF EXISTING RIPRAP, SEE 2/12
- TEMPORARY CONSTRUCTION ACCESS
- APPROX PAVEMENT REPAIR AREA, SEE PAVING NOTES ON SHEET 3
- TEMPORARY COFFERDAM, SEE 2/4
- SLASH

NOTE:

UTILIZE OFF-SITE, NEARBY STAGING AREA TO MINIMIZE SITE IMPACTS.

CONSTRUCTION SEQUENCE

ACCESS TO THE SITE IS FROM ENTIAT RIVER ROAD.

BOULDER BALLASTED LOG STRUCTURES

BOULDERS AND LOGS SHALL BE CLEANED TO REMOVE SEDIMENT. EACH LOG SHALL BE BALLASTED BY TWO 32 INCH DIAMETER BOULDERS BOLTED TO THE LOG. INSTALL EACH BALLASTED LOG BY LOWERING INTO THE RIVER BY CRANE OR LONG REACH EXCAVATOR.

"BUMPER" LOGS SHALL BE STACKED AT THE UPSTREAM FACE OF EACH STRUCTURE. EACH SET OF BUMPER LOGS SHALL CONSIST OF THREE 18" DBH, 30' LONG LOGS AND SHALL BE BALLASTED BY SIX 36" BOULDERS.

VERTICAL LOG BALLASTED LOG STRUCTURE

INSTALL TEMPORARY COFFERDAM AND PUMP.

EXCAVATE TO SUBGRADE.

THE STRUCTURE SHALL BE COMPOSED OF THREE LAYERS OF LOGS BALLASTED BY VERTICAL LOGS AND GRAVEL/COBBLE BACKFILL. ALL LOGS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO INSTALLATION. INCORPORATE CLEARED BRUSH/SLASH AS SMALL WOODY DEBRIS INTERMINGLED WITH INSTALLED LOGS.

"BUMPER" LOGS SHALL BE STACKED AT THE UPSTREAM FACE OF THE STRUCTURE.

INSTALL VERTICAL LOGS AND BOLT LOGS TO VERTICAL LOGS. BACKFILL STRUCTURE.

REMOVE COFFERDAM.

SEED AND MULCH ALL DISTURBED GROUND.

DANIEL S. MILLER — STATE OF WASHINGTON — 34208 — REGISTERED PROFESSIONAL ENGINEER

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DM	12/14/2016	140205
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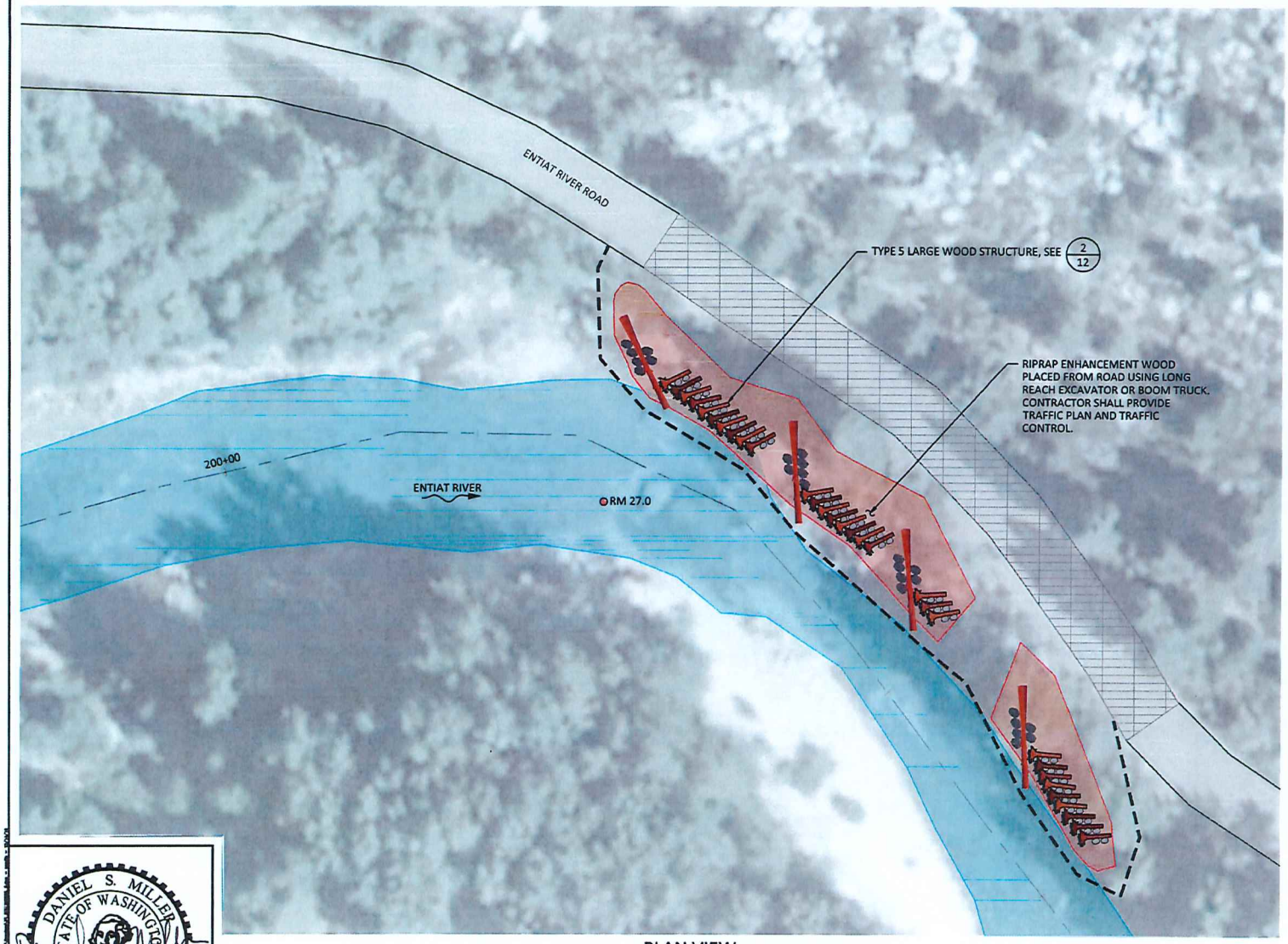
SIGNAL PEAK RIPRAP ENHANCEMENT SITE A

SHEET 8 OF 13



PLAN VIEW

0 40 80

SCALE IN FEET

LEGEND

- RM 28 — RIVER MILE MARKER
- 160+00 — ENTIAT RIVER STATIONS
- LIMITS OF DISTURBANCE
- EXISTING ENTIAT RIVER CHANNEL
- LARGE WOOD ENHANCEMENT OF EXISTING RIPRAP, SEE SHEET 12
- APPROX PAVEMENT REPAIR AREA, SEE PAVING NOTES ON SHEET 3

NOTE:

UTILIZE OFF-SITE, NEARBY STAGING AREA TO MINIMIZE SITE IMPACTS.

CONSTRUCTION SEQUENCE NOTES:

ACCESS TO THE SITE IS FROM ENTIAT RIVER ROAD.

BOULDER BALLASTED LOG STRUCTURES

CONSTRUCTION SHALL OCCUR FROM THE TOP OF A RIPRAP LEVEE. BOULDERS AND LOGS SHALL BE CLEANED TO REMOVE SEDIMENT. EACH LOG SHALL BE BALLASTED BY TWO 32 INCH DIAMETER BOULDERS BOLTED TO THE LOG. INSTALL EACH BALLASTED LOG BY LOWERING INTO THE RIVER BY CRANE OR LONG REACH EXCAVATOR.

"BUMPER" LOGS SHALL BE STACKED AT THE UPSTREAM FACE OF EACH STRUCTURE. EACH SET OF BUMPER LOGS SHALL CONSIST OF THREE 18" DBH, 30' LONG LOGS AND SHALL BE BALLASTED BY SIX 36" BOULDERS.

DANIEL S. MILLER
STATE OF WASHINGTON
34208
REGISTERED PROFESSIONAL ENGINEER

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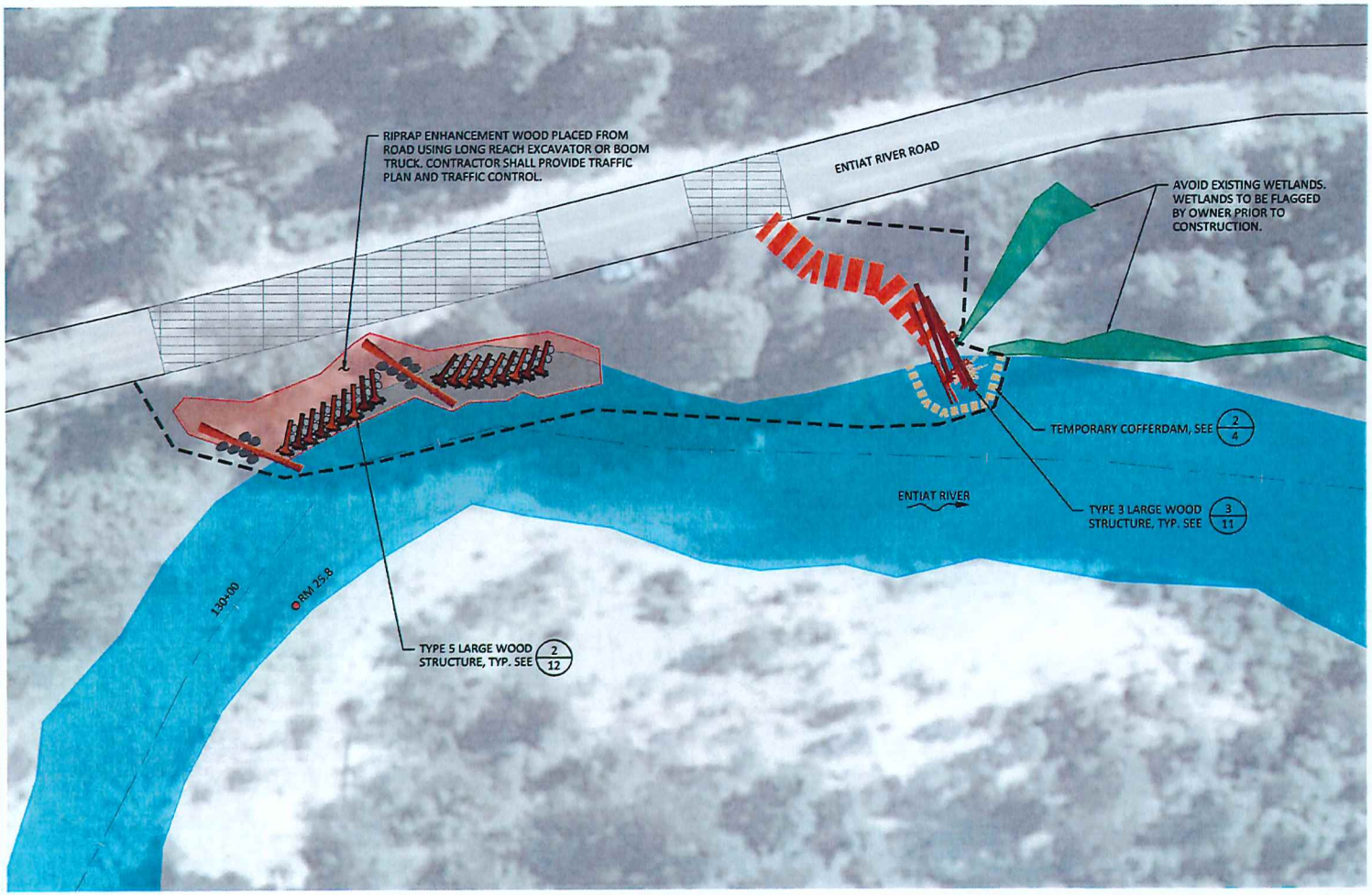
SIGNAL PEAK RIPRAP ENHANCEMENT SITE B

SHEET 9 OF 13



PLAN VIEW

0 40 80

SCALE IN FEET

LEGEND

- RM 28 — RIVER MILE MARKER
- 160+00 — ENTIAT RIVER STATIONS
- LIMITS OF DISTURBANCE
- EXISTING ENTIAT RIVER CHANNEL
- LARGE WOOD ENHANCEMENT OF EXISTING RIPRAP, SEE SHEET 9
- EXISTING WETLANDS
- TEMPORARY CONSTRUCTION ACCESS
- APPROX PAVEMENT REPAIR AREA, SEE PAVING NOTES ON SHEET 3
- TEMPORARY COFFERDAM, SEE 2/4
- SLASH

NOTE:

UTILIZE OFF-SITE, NEARBY STAGING AREA TO MINIMIZE SITE IMPACTS.

CONSTRUCTION SEQUENCE NOTES:

ACCESS TO THE SITE IS FROM ENTIAT RIVER ROAD.

BOULDER BALLASTED LOG STRUCTURES
CONSTRUCTION SHALL OCCUR FROM THE TOP OF A RIPRAP LEVEE. BOULDERS AND LOGS SHALL BE CLEANED TO REMOVE SEDIMENT. EACH LOG SHALL BE BALLASTED BY TWO 32 INCH DIAMETER BOULDERS BOLTED TO THE LOG. INSTALL EACH BALLASTED LOG BY LOWERING INTO THE RIVER BY CRANE OR LONG REACH EXCAVATOR.

"BUMPER" LOGS SHALL BE STACKED AT THE UPSTREAM FACE OF EACH STRUCTURE. EACH SET OF BUMPER LOGS SHALL CONSIST OF THREE 18" DBH, 30' LONG LOGS AND SHALL BE BALLASTED BY SIX 36" BOULDERS.

DANIEL S. MILLER — STATE OF WASHINGTON — 34208 — REGISTERED PROFESSIONAL ENGINEER

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DM APPROVED	12/14/2016 DATE	140205 PROJECT

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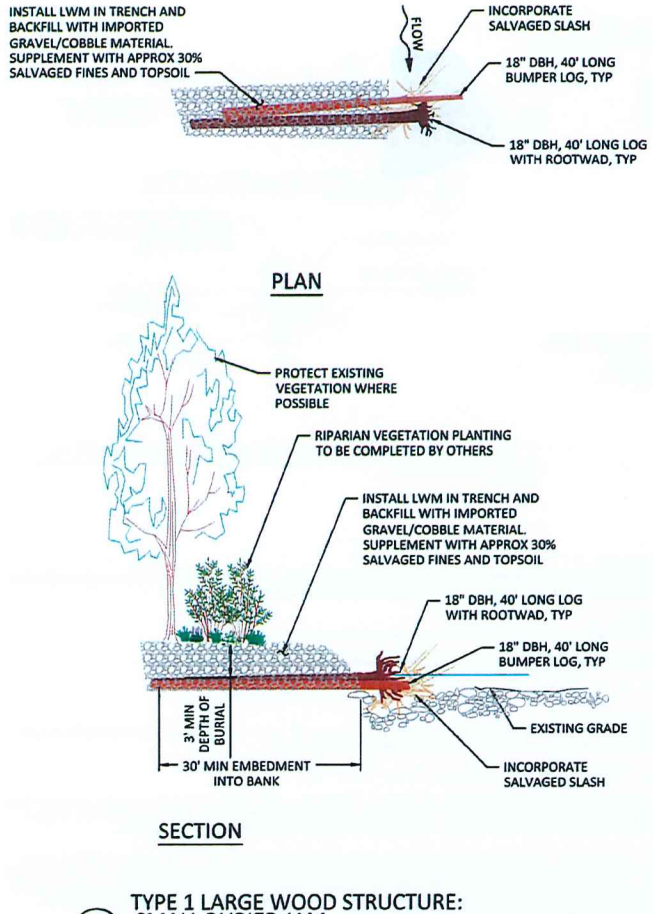
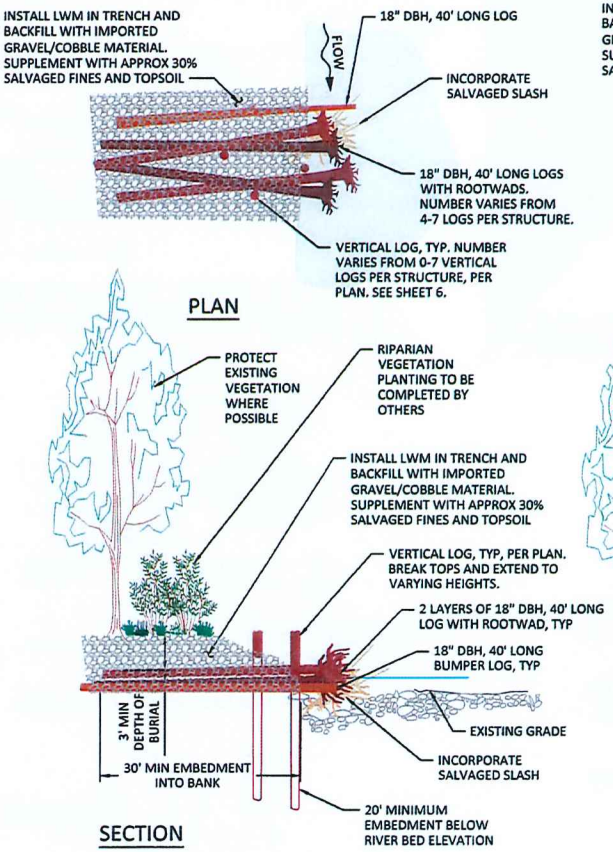
UPPER BURNS RIPRAP ENHANCEMENT SITE C

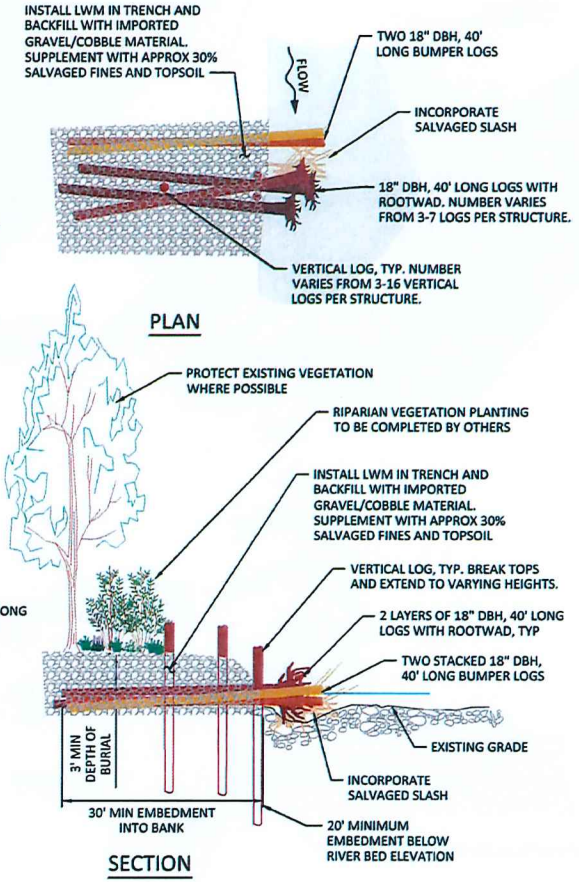
SHEET 10 OF 13



1/11 TYPE 1 LARGE WOOD STRUCTURE: SMALL BURIED JAM
NOT TO SCALE



2/11 TYPE 2 LARGE WOOD STRUCTURE: LARGE BURIED JAM
NOT TO SCALE



3/11 TYPE 3 LARGE WOOD STRUCTURE: BURIED JAM WITH BUMPER LOG
NOT TO SCALE

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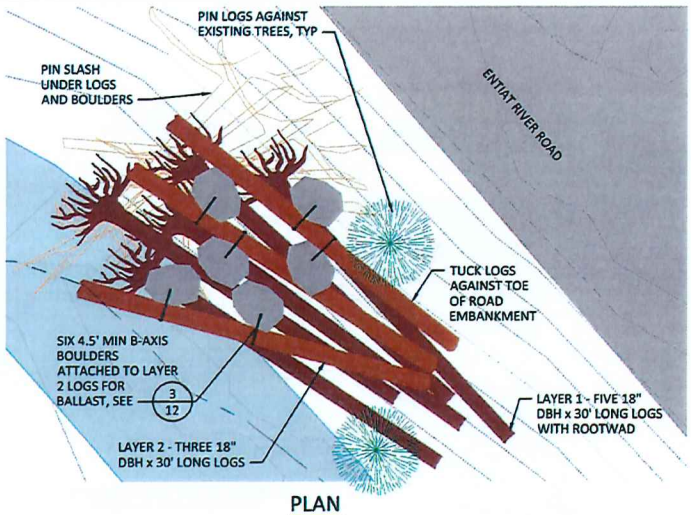
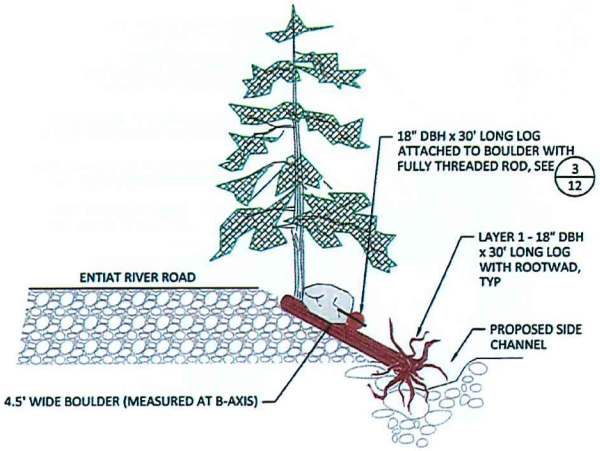
LARGE WOOD DETAILS

SHEET 11 OF 13



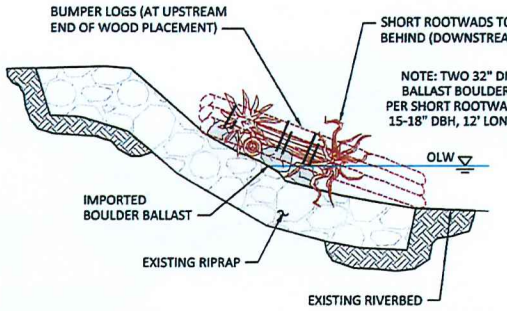
PLAN



SECTION

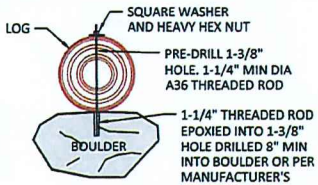
1/12 TYPE 4 LARGE WOOD STRUCTURE: ROAD EMBANKMENT/ SURFACE DEFLECTOR JAM

NOT TO SCALE



2/12 TYPICAL SECTION- TYPE 5 LARGE WOOD STRUCTURE: BOULDER BALLASTED RIPRAP ENHANCEMENT

NOT TO SCALE

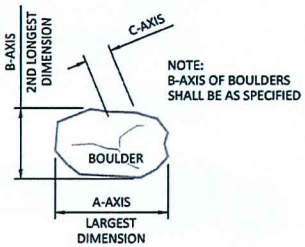


3/12 BOULDER BALLAST DETAIL

NOT TO SCALE

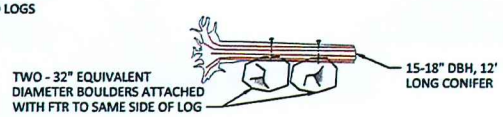
LOG ANCHORED TO BOULDER

1. SECURE LOG WITH 1-1/4" MIN DIAMETER A36 THREADED ROD THROUGH LOG EPOXIED INTO BOULDER.
2. INSTALL STEEL PLATE(S) AND HEAVY HEX NUT(S).
3. SECURE NUT(S) BY CHISELING THREADS.
4. FILE OR GRIND OFF SHARP EDGES. INSTALL PLASTIC BOLT CAP(S).



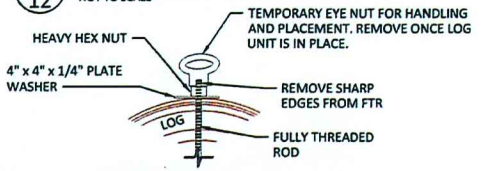
4/12 BOULDER SIZING DETAIL

NOT TO SCALE



5/12 LOG AND BOULDER DETAIL

NOT TO SCALE



6/12 FULLY THREADED ROD AND EYE NUT DETAIL

NOT TO SCALE

DESCRIPTION

THIS WORK CONSISTS OF PRE-ASSEMBLING LOG UNITS AND INSTALLING WITH BOOM TRUCK OR LONG REACH EXCAVATOR AS SHOWN ON THE PLANS AND AS DIRECTED BY THE OWNERS REPRESENTATIVE.

MATERIALS

FULLY THREADED RODS SHALL BE 1-1/4" MINIMUM DIAMETER A36 THREADED RODS

BOULDERS SHALL BE NON-FRACTURED BASALT WITH A MINIMUM SPECIFIC GRAVITY OF 2.65.

EPOXY FOR ANCHORING SHALL BE HILTI HIT RE 500 ADHESIVE OR APPROVED EQUAL.

CONSTRUCTION

FINAL POSITIONING OF THE ANCHORED LOG STRUCTURES SHALL BE IN THE APPROXIMATE LOCATION AS SHOWN ON THE PLANS AND AS APPROVED IN THE FIELD BY THE OWNERS REPRESENTATIVE.

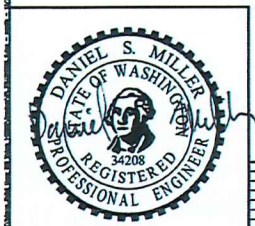
BALLAST BOULDERS SHALL BE SECURED AS SHOWN ON THE PLANS.

PIN LOG IN PLACE WITH ONE END SUSPENDED OFF THE GROUND. DRILL HOLE THROUGH LOG. MOVE BOULDER INTO PLACE, LEAVING A SMALL SPACE BETWEEN THE LOG AND THE BOULDER. DRILL BOULDER USING A 36" LONG DRILL BIT, PASSED THROUGH THE HOLE IN THE LOG TO DRILL THE BALLAST BOULDER ALONG A CONTINUOUS ALIGNMENT.

DRILL HOLES IN SOLID ROCK AND AVOID ANY CRACKS OR FRACTURES. HOLES SHALL BE 1-3/8" INCH IN DIAMETER. HOLES SHALL BE DRILLED 8 INCHES, MINIMUM, INTO ROCK. HOLES SHALL BE CLEANED OF LOOSE ROCK FRAGMENTS AND POWDER WITH A BRUSH AND WATER. HOLES SHALL BE CLEAN OF ALL DUST, DEBRIS, OIL, AND SOAP RESIDUES. THE HOLES SHALL BE FLUSHED CLEAR TO INSURE NO MATERIAL EXISTS BETWEEN THE FULLY THREADED ROD, EPOXY, AND ROCK SURFACE. INSTALL EPOXY PER MANUFACTURER'S RECOMMENDATIONS.

WIPE FULLY THREADED ROD WITH CLEAN ACETONE SOAKED RAG TO REMOVE OILS AND GREASES PRIOR TO INSERTION INTO EPOXY FILLED HOLE. FILL DRILL HOLES ENOUGH TO ENSURE COMPLETE COVERAGE WITH EPOXY. INSERT FULLY THREADED ROD INTO HOLE SO THAT END OF ROD HITS THE BOTTOM OF THE HOLE. ROTATE FULLY THREADED ROD DURING INSERTION TO FILL THREAD VALLEYS WITH EPOXY. EXCESS EPOXY SHOULD COME OUT OF THE TOP OF THE HOLE AS ROD IS SEATED IN DRILL HOLE.

ATTACH A SECOND BOULDER, USING THE SAME METHOD, ON THE SAME SIDE OF THE LOG. ATTACH A HEAVY EYE NUT TO THE END OF EACH FULLY THREADED ROD AND USE THE EYE NUTS TO LIFT THE UNIT AND MOVE INTO PLACE. REMOVE THE EYE NUTS ONCE THE UNIT IS PLACED IN ITS FINAL ALIGNMENT.



NO.	BY	DATE	REVISION DESCRIPTION

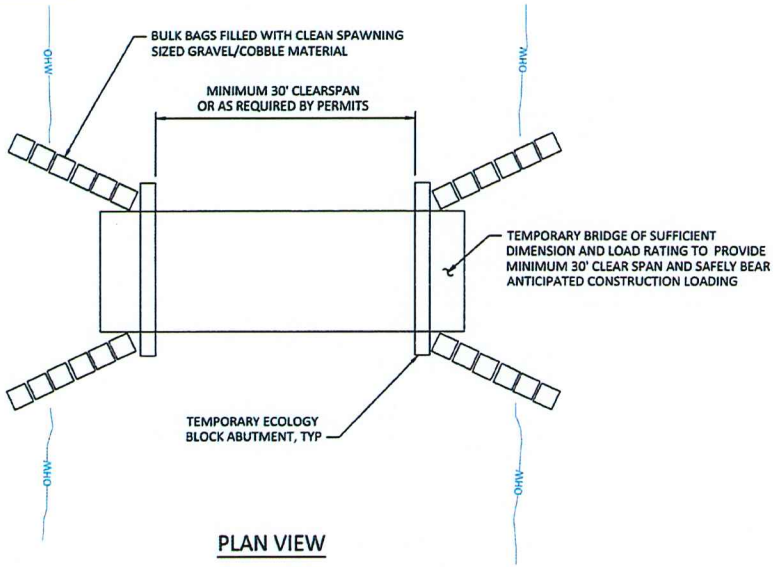
NS	GJ, DM, LH	GJ,DM
DRAWN	DESIGNED	CHECKED
DM	12/14/2016	140205
APPROVED	DATE	PROJECT

YAKAMA NATION FISHERIES
ENTIAT UPPER STILLWATERS
HABITAT ENHANCEMENT PRELIMINARY DESIGN

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

LARGE WOOD AND BOULDER BALLAST DETAILS

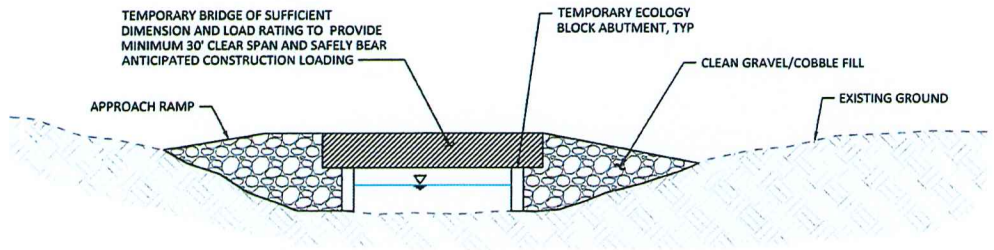
SHEET 12 OF 13



PLAN VIEW

NOTE:

TEMPORARY BRIDGE, ECOLOGY BLOCK ABUTMENTS, CLEAN GRAVEL/COBBLE FILL AND BULK BAGS SHALL BE REMOVED AT PROJECT COMPLETION AND SITE RESTORED TO PRE-PROJECT GRADE AND CONDITIONS.



SECTION VIEW

1/13 TEMPORARY BRIDGE CROSSING
NTS

DANIEL S. MILLER
STATE OF WASHINGTON
34208
REGISTERED
PROFESSIONAL ENGINEER

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TEMPORARY ACCESS BRIDGE
TYPICAL DETAILS

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