

# ENTIAT RIVER - STORMY A STREAM & FLOODPLAIN ENHANCEMENTS

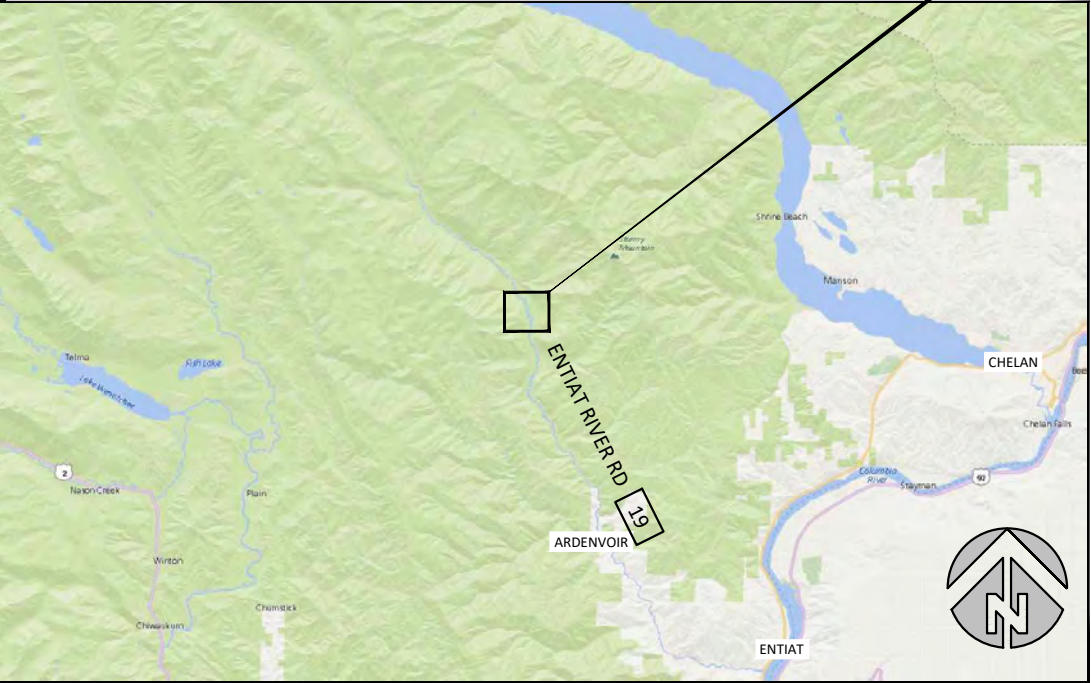
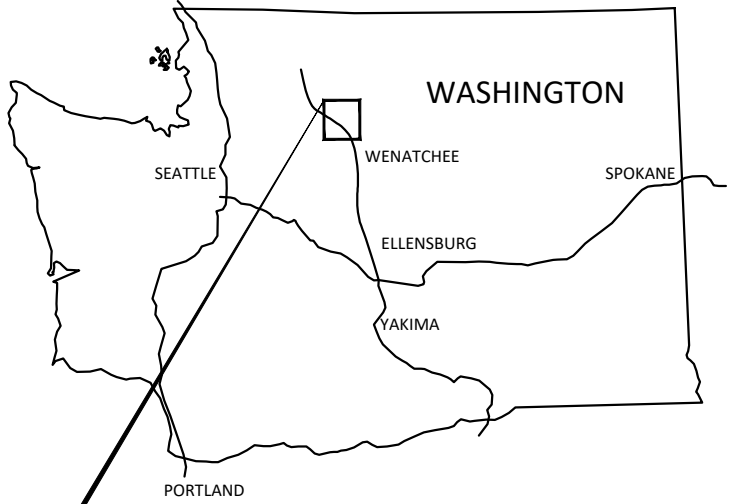
60% DESIGN



YAKAMA NATION FISHERIES  
1885 S. WENATCHEE AVE.  
WENATCHEE, WA. 98801

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**VICINITY MAP**  
NOT TO SCALE

COORDINATES:  
LATITUDE: 47.84958  
LONGITUDE: 120.42064

SECTION 14, TOWNSHIP 27N, RANGE 19E

WATERBODY: ENTIAT RIVER  
TRIBUTARY OF: COLUMBIA RIVER



**SITE MAP**  
NOT TO SCALE



NO.	BY	DATE	REVISION DESCRIPTION

MM, GS DRAWN	MM DESIGNED	DM CHECKED
GJ APPROVED	4/11/18 DATE	--- PROJECT

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Hood River, OR 97031  
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TITLE SHEET

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

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

ALL WORK SHALL CONFORM TO THE 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 OWNER.

## EXISTING DATA

TOPOGRAPHIC SURVEY IS REFERENCED TO NAD83 WASHINGTON STATE PLANE, NORTH ZONE US FEET NAVD 88.

PROPERTY BOUNDARIES PROVIDED BY CHELAN COUNTY.

WETLAND BOUNDARIES DISPLAYED IN THIS SET ARE THE RESULT OF A WETLAND ASSESSMENT PERFORMED BY XXXX. IN XXX 20XX.

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

HYDRAULIC MODELING BY INTER-FLUVE USING USACE HEC-RAS (5.2.0). MODEL CALIBRATED USING SURVEYED WATER SURFACE ELEVATIONS AND EXISTING HIGH WATER MARKS.

## SOILS

ENTIAT RIVER ALLUVIUM (GRAVEL/SAND) AND FLOODPLAIN SOILS (SILT/SAND).

## UTILITIES

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

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

## WDFW IN-WATER WORK PERIODS

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

## FISH RESCUE

ALL FISH RESCUE EFFORTS SHALL BE SUPERVISED BY A QUALIFIED 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.

## CULTURAL RESOURCES

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

## TREE SALVAGE

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

ALL REMOVED VEGETATION SHALL BE INCORPORATED INTO HABITAT STRUCTURES AS DIRECTED BY THE

OWNER'S REPRESENTATIVE. IF EXCESS MATERIAL NEEDS DISPOSAL OUTSIDE OF CHANNEL WORK, IT SHALL BE DISTRIBUTED ON THE FLOODPLAIN AS DIRECTED BY THE OWNER'S REPRESENTATIVE.

ALL TREES REMOVED WITHIN CLEARING LIMITS SHALL BE REMOVED WHOLE WITH ROOTS INTACT AND UTILIZED IN THE SIDE CHANNEL CONSTRUCTION OR IN MAINSTEM WORK AS DIRECTED BY OWNER'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.

## IMPORTED LOGS

LOGS WILL BE PROVIDED BY THE OWNER. CARE SHALL BE EXERCISED TO PRESERVE ROOTS.

## PLANTINGS

PLANTS SHALL BE INSTALLED DURING LOG STRUCTURE CONSTRUCTION AS DIRECTED BY THE OWNER. OWNER SUPPLIED PLANTS WILL BE AVAILABLE AT THE YNF OFFICE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO STORE PLANTS IN SHADE AND WATER THEM THREE TIMES DAILY ONCE THEY ARE ON THE PROJECT SITE UNTIL THEY ARE INSTALLED.

## CONSTRUCTION ACCESS

THE CONTRACTOR IS ADVISED THAT ACCESS TO THE SITE WILL BE BY RURAL ROADS OF LIMITED WIDTH.

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.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADHERING TO THE CONSERVATION MEASURES DETAILED IN THE FOREST SERVICE ROAD USE PERMIT.

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.

WHEN TEMPORARY VEGETATION REMOVAL IS REQUIRED FOR SITE ACCESS, VEGETATION SHALL BE CUT TO GROUND LEVEL (NOT GRUBBED).

## CONSTRUCTION STAKING

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

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.

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

## STAGING, STORAGE, AND STOCKPILE AREAS

NATURAL MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION, SUCH AS LARGE WOOD, SLASH, PLANTINGS, GRAVEL, AND TOPSOIL MAY BE STAGED WITHIN THE 100-YEAR FLOODPLAIN AT STOCKPILE AREAS SHOWN IN PLANS. CONSTRUCTION EQUIPMENT STORAGE, VEHICLE STORAGE, FUELING, SERVICING, AND HAZARDOUS MATERIAL STORAGE SHALL BE 150 FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND, OR ON AN ADJACENT ESTABLISHED ROAD AREA. INSTALL, MONITOR, AND MAINTAIN BEST MANAGEMENT PRACTICES (BMPS) TO PREVENT OR INTERCEPT CONTAMINANTS FROM ENTERING STREAM OR FLOODPLAIN.

EXCAVATED MATERIALS SHALL BE STOCKPILED NEATLY IN AN APPROVED LOCATION WITHIN THE STOCKPILE AREA.

ANY MATERIAL NOT USED IN RESTORATION, AND NOT NATIVE TO THE FLOODPLAIN, SHALL BE REMOVED TO A LOCATION OUTSIDE OF THE 100-YEAR FLOODPLAIN FOR DISPOSAL.

## EQUIPMENT

MECHANIZED EQUIPMENT AND VEHICLES SHALL 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). ALL VEHICLES AND OTHER MECHANIZED EQUIPMENT SHALL BE:

- STORED, FUELED, AND MAINTAINED IN A VEHICLE STAGING AREA PLACED 150 FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND OR ON AN ADJACENT, ESTABLISHED ROAD AREA
- REFUELED IN A VEHICLE STAGING AREA PLACED 150 FEET OR MORE FROM A NATURAL WATERBODY OR WETLAND, 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)
- BIODEGRADABLE LUBRICANTS AND FLUIDS SHALL BE USED IN EQUIPMENT OPERATING IN AND ADJACENT TO THE STREAM CHANNEL AND LIVE WATER.
- INSPECTED DAILY FOR FLUID LEAKS BEFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION WITHIN 150 FEET OF ANY NATURAL WATER BODY OR WETLAND
- THOROUGHLY CLEANED BEFORE OPERATION BELOW ORDINARY HIGH WATER, AND AS OFTEN AS NECESSARY DURING OPERATION, TO REMAIN GREASE FREE.

## ABBREVIATIONS

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



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**NOTES & LEGEND**

SHEET  
**2** OF 26

**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.

**EROSION/SEDIMENTATION CONTROL (ESC) 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 GUIDELINES FOR THE CONTRACTOR TO DEVELOP AND IMPLEMENT AN ESC PLAN. THE CONTRACTOR'S ESC PLAN SHALL BE SUBMITTED TO THE OWNER PRIOR TO MOBILIZATION.

- 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.

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 THE DRAINAGE SYSTEM.

**STABILIZE SOILS AND PROTECT SLOPES**

FROM MAY 1 THROUGH SEPTEMBER 30, ALL EXPOSED SOILS SHALL BE PROTECTED FROM EROSION BY MULCHING, PLASTIC SHEETING, 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 STOCKPILES MUST BE STABILIZED AND PROTECTED WITH SEDIMENT TRAPPING MEASURES. MULCH AS SOON AS PRACTICAL ALL DISTURBED AREAS NOT INDICATED IN THE CONTRACT DOCUMENTS FOR OTHER PERMANENT STABILIZATION MEASURES. HAY, STRAW, AND MULCH USED ON SITE MUST BE 99.9% WEED-FREE.

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 BMPS 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.

**DUST CONTROL**

THE CONTRACTOR SHALL CONTROL DUST FOR THE DURATION OF THE PROJECT. CONTROL MEASURES SHALL BE IN ACCORDANCE WITH APPLICABLE REGULATIONS.

**INVASIVE SPECIES CONTROL**

THE FOLLOWING MEASURES WILL BE FOLLOWED TO AVOID INTRODUCTION OF INVASIVE PLANTS AND NOXIOUS WEEDS INTO PROJECT AREAS:

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.

WATERCRAFT, WADERS, BOOTS, AND ANY OTHER GEAR TO BE USED IN OR NEAR WATER WILL BE INSPECTED FOR AQUATIC INVASIVE SPECIES.

WADING BOOTS WITH FELT SOLES ARE NOT TO BE USED DUE TO THEIR PROPENSITY FOR AIDING IN THE TRANSFER OF INVASIVE SPECIES.

**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. EXCAVATION OF DEWATERING SUMPS BEYOND LIMITS SHOWN SHALL BE AT NO ADDITIONAL COST. 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 OR SENSITIVE FLOODPLAIN AREAS, 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, OPERATE, AND MAINTAIN NUMBER AND SIZE OF PUMPS AS NECESSARY TO ACHIEVE DEWATERING NEEDS. AT A MINIMUM, CONTRACTOR SHALL PROVIDE A 6" DRI-PRIME DIESEL POWERED PUMP AND A PORTABLE 2" PUMP. ADDITIONAL PUMPS AND OF DIFFERENT CAPACITIES MAY BE REQUIRED AT CONTRACTOR'S EXPENSE.

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

- A. 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.
- B. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
- C. 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.
- D. STABILIZED CONSTRUCTION ENTRANCES AND ADDITIONAL MEASURES MAY BE REQUIRED AND SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT.

**SPILL PREVENTION, CONTROL, AND COUNTER MEASURES**

THE USE OF MECHANIZED MACHINERY INCREASES THE RISK FOR ACCIDENTAL SPILLS OF FUEL, LUBRICANTS, HYDRAULIC FLUID, OR OTHER CONTAMINANTS INTO THE RIPARIAN ZONE OR DIRECTLY INTO THE WATER. THE PROJECT SPONSOR WILL ADHERE TO THE FOLLOWING MEASURES:

A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES WILL BE AVAILABLE ON-SITE.

WRITTEN PROCEDURES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES WILL BE POSTED AT THE WORK SITE.

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.

WORKERS WILL BE TRAINED IN SPILL CONTAINMENT PROCEDURES AND WILL BE INFORMED OF THE LOCATION OF SPILL CONTAINMENT KITS.

ANY WASTE LIQUIDS GENERATED AT THE STAGING AREAS WILL BE TEMPORARILY STORED UNDER AN IMPERVIOUS COVER, SUCH AS A TARPULIN, UNTIL THEY CAN BE PROPERLY TRANSPORTED TO AND DISPOSED OF AT A FACILITY THAT IS APPROVED FOR RECEIPT OF HAZARDOUS MATERIALS.

VEGETABLE BASED HYDRAULIC FLUIDS (BIODEGRADABLE OIL) WILL BE USED IN ANY VEHICLE THAT WILL BE OPERATED NEAR THE WATER.

**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.



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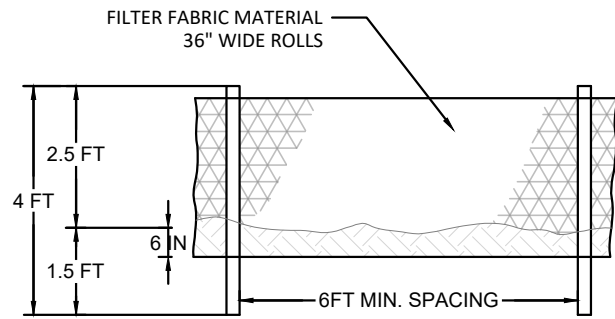
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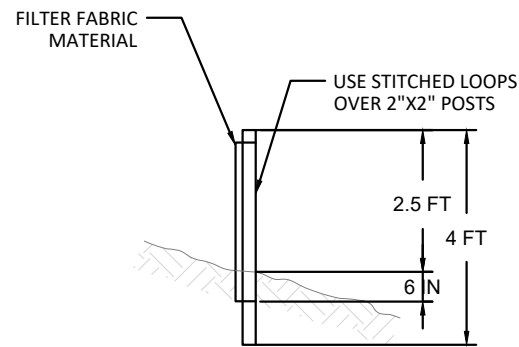


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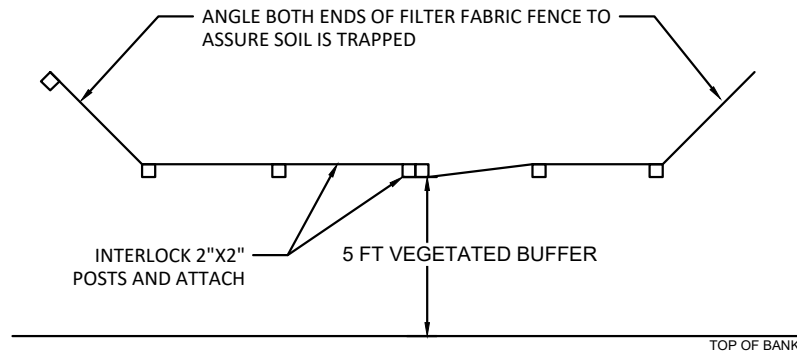
**EROSION CONTROL PLAN**



**FRONT VIEW**  
NOT TO SCALE



**SIDE VIEW**  
NOT TO SCALE

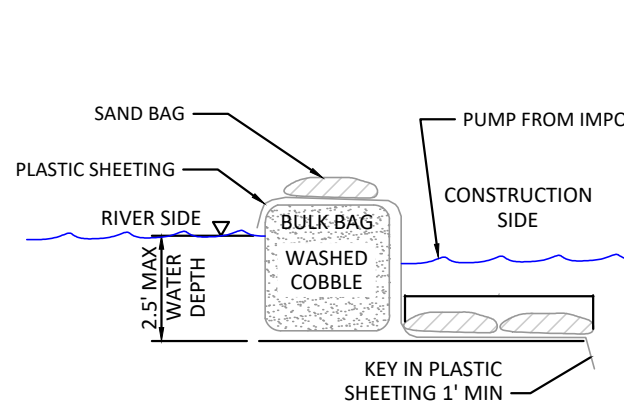


**PLAN VIEW**  
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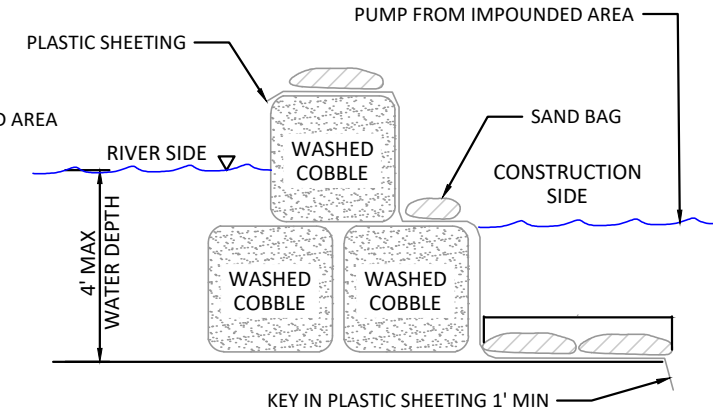
**1** TYPICAL DETAIL  
**4** SILT FENCE  
NOT TO SCALE

**SILT FENCE NOTES:**

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH 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 APPROVED BY THE OWNER'S REPRESENTATIVE.
2. THE SILT FENCE IS TO BE INSTALLED AT LOCATIONS SHOWN ON THE PLAN ALONG THE DOWNHILL PERIMETER OF DISTURBED AREAS. THE FENCE POST SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 24 INCHES APART.
3. THE FILTER FABRIC 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 THE OWNER'S REPRESENTATIVE.



**TEMPORARY COFFER DAM SECTION**  
NOT TO SCALE



**COFFER DAM SECTION IN WATER DEPTHS GREATER THAN 2.5'**  
NOT TO SCALE

**2** TYPICAL DETAIL  
**4** BULK BAG COFFER DAM  
NOT TO SCALE

**BULK BAG 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.
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.

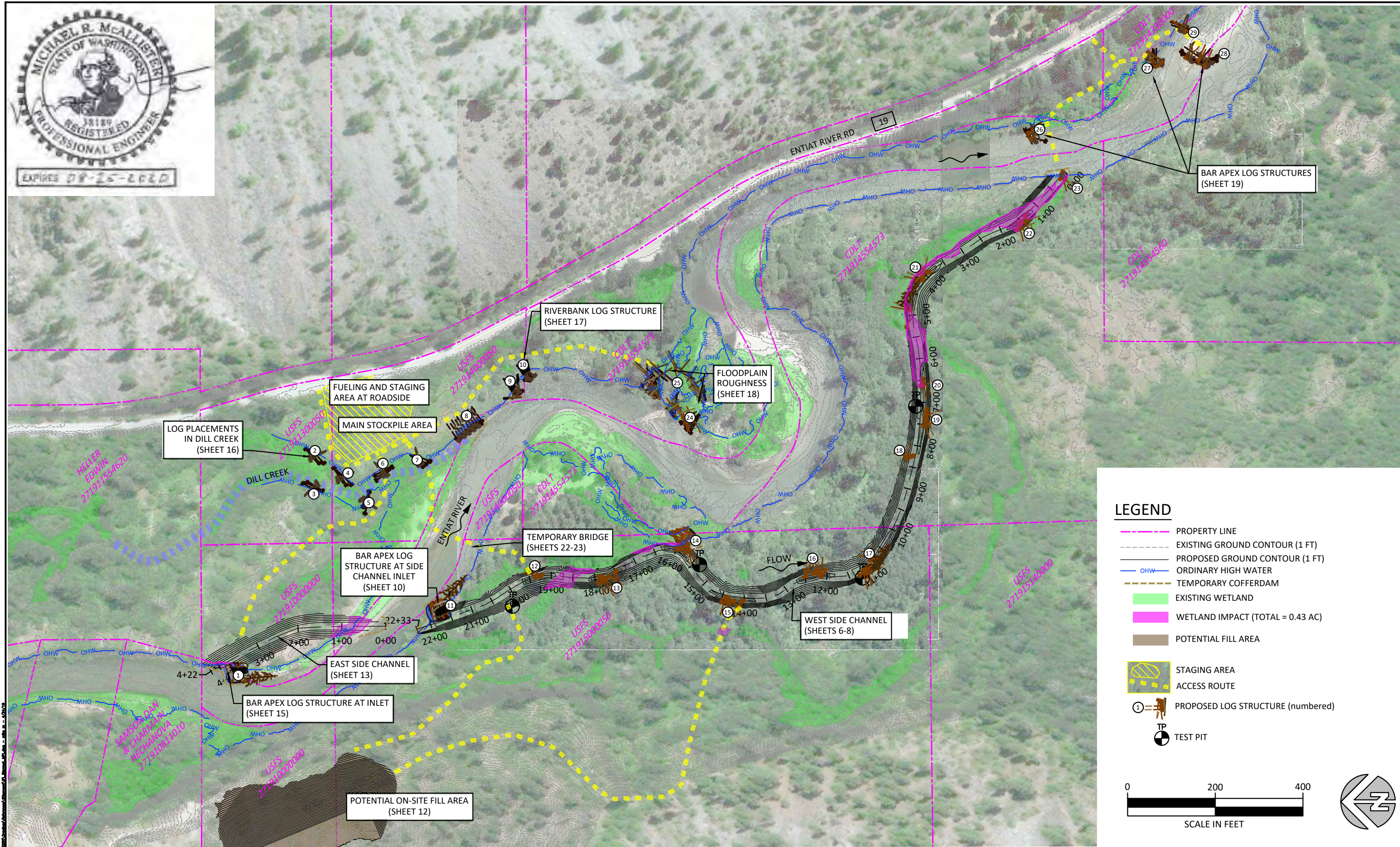
NO.	BY	DATE	REVISION DESCRIPTION

MM, GS DRAWN	MM DESIGNED	DM CHECKED
GJ APPROVED	4/11/18 DATE	--- PROJECT

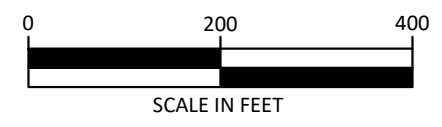
ENTIAT RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN



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- LEGEND**
- PROPERTY LINE
  - EXISTING GROUND CONTOUR (1 FT)
  - PROPOSED GROUND CONTOUR (1 FT)
  - OHW - ORDINARY HIGH WATER
  - TEMPORARY COFFERDAM
  - EXISTING WETLAND
  - WETLAND IMPACT (TOTAL = 0.43 AC)
  - POTENTIAL FILL AREA
  - STAGING AREA
  - ACCESS ROUTE
  - PROPOSED LOG STRUCTURE (numbered)
  - TEST PIT



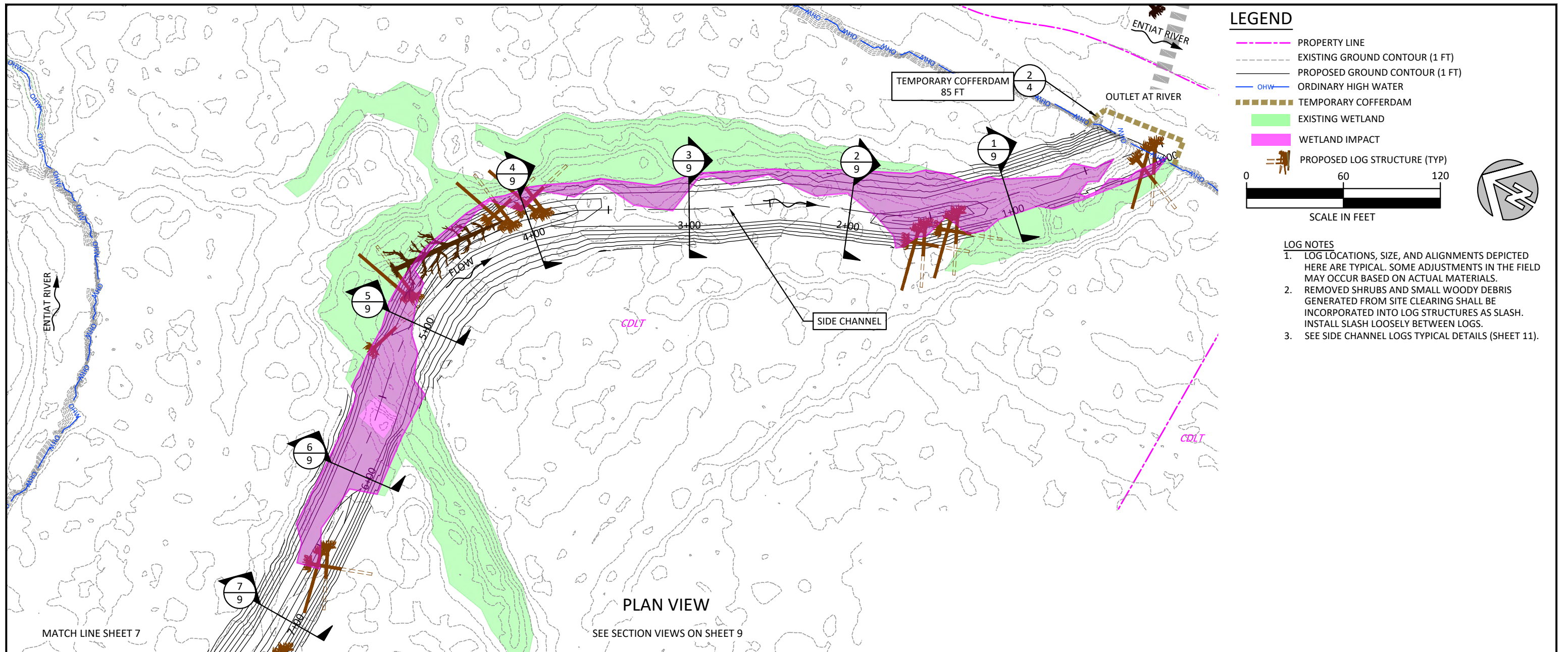
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MM, GS	MM	DM
DRAWN	DESIGNED	CHECKED
GJ	4/11/18	---
APPROVED	DATE	PROJECT

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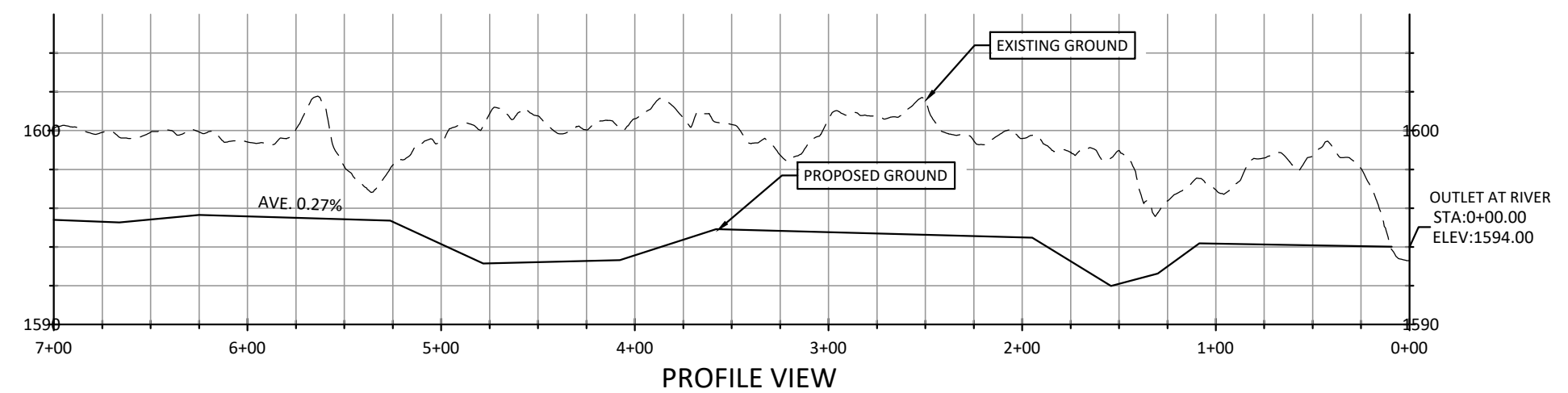


**LEGEND**

- PROPERTY LINE
- EXISTING GROUND CONTOUR (1 FT)
- PROPOSED GROUND CONTOUR (1 FT)
- ORDINARY HIGH WATER
- TEMPORARY COFFERDAM
- EXISTING WETLAND
- WETLAND IMPACT
- PROPOSED LOG STRUCTURE (TYP)

0 60 120  
SCALE IN FEET

- LOG NOTES**
1. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
  2. REMOVED SHRUBS AND SMALL WOODY DEBRIS GENERATED FROM SITE CLEARING SHALL BE INCORPORATED INTO LOG STRUCTURES AS SLASH. INSTALL SLASH LOOSELY BETWEEN LOGS.
  3. SEE SIDE CHANNEL LOGS TYPICAL DETAILS (SHEET 11).

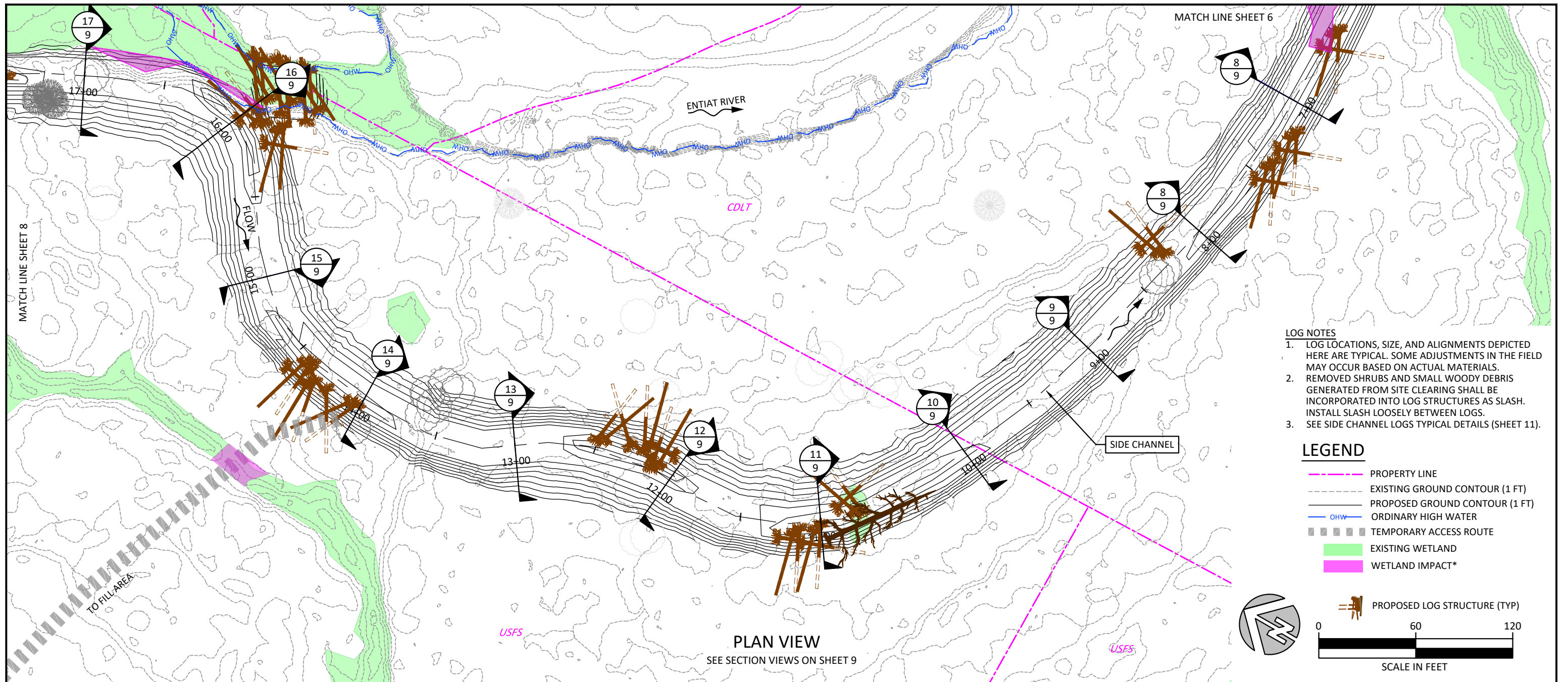


NO.	BY	DATE	REVISION DESCRIPTION

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GJ APPROVED	4/11/18 DATE	--- PROJECT

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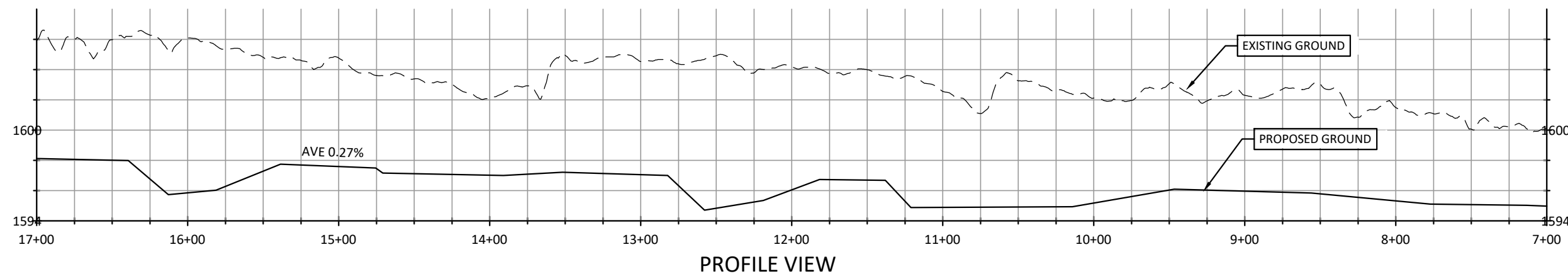


- LOG NOTES**
- LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
  - REMOVED SHRUBS AND SMALL WOODY DEBRIS GENERATED FROM SITE CLEARING SHALL BE INCORPORATED INTO LOG STRUCTURES AS SLASH. INSTALL SLASH LOOSELY BETWEEN LOGS.
  - SEE SIDE CHANNEL LOGS TYPICAL DETAILS (SHEET 11).

**LEGEND**

- PROPERTY LINE
- - - EXISTING GROUND CONTOUR (1 FT)
- PROPOSED GROUND CONTOUR (1 FT)
- OHW — ORDINARY HIGH WATER
- ■ ■ ■ ■ TEMPORARY ACCESS ROUTE
- EXISTING WETLAND
- WETLAND IMPACT\*
- — — PROPOSED LOG STRUCTURE (TYP)

0 60 120  
SCALE IN FEET

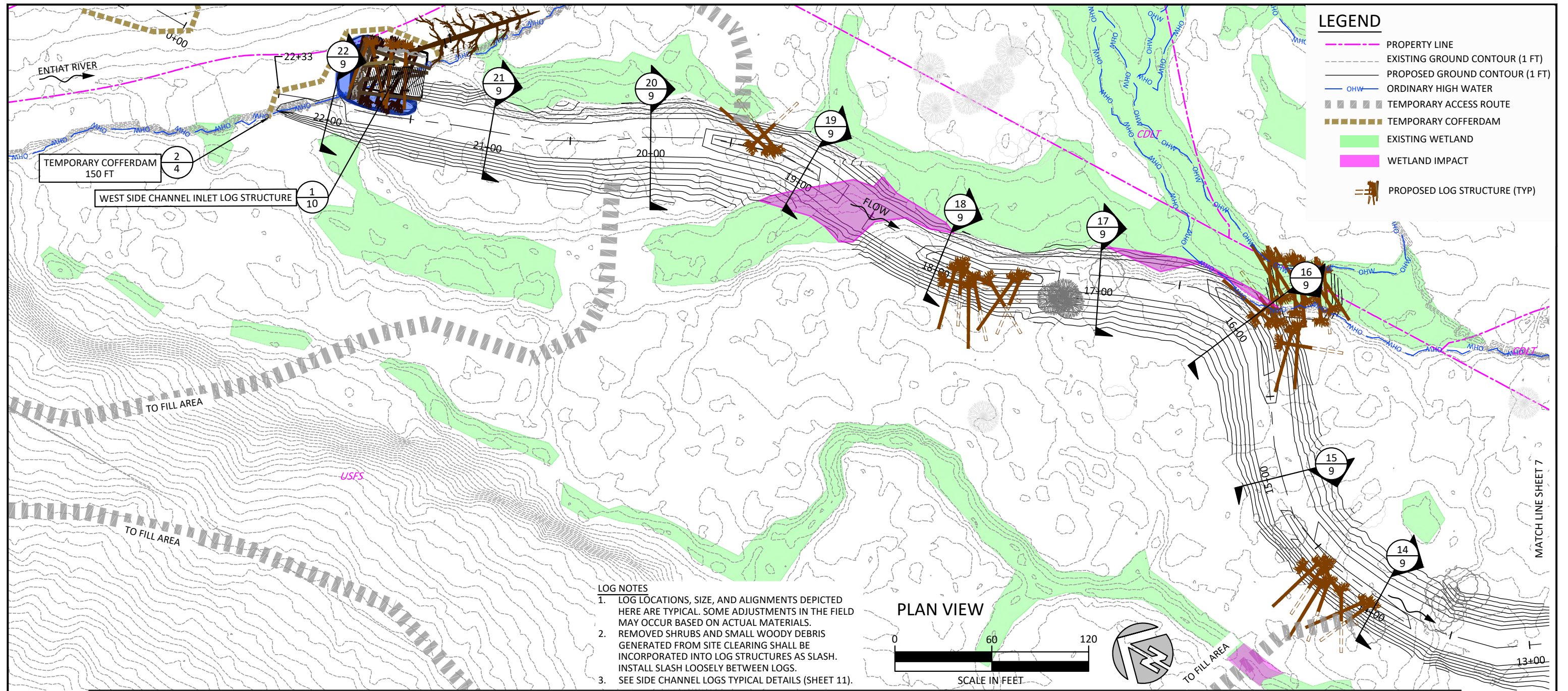


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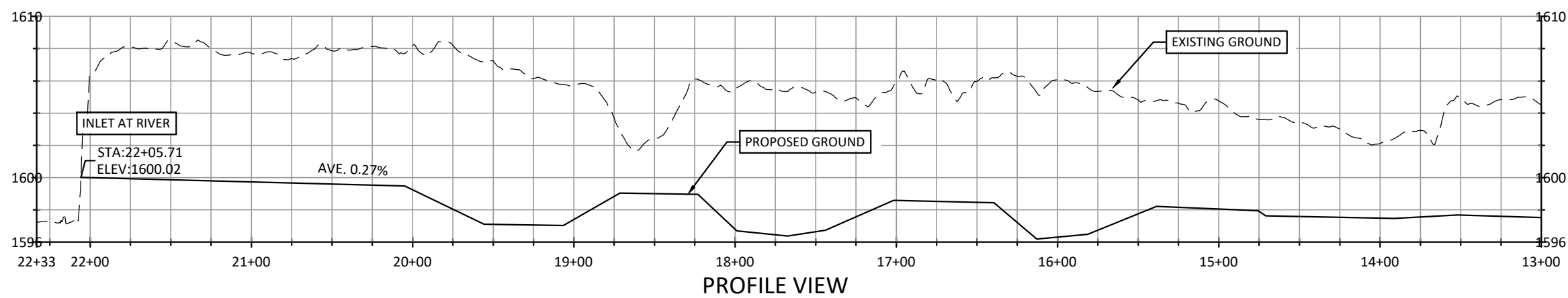
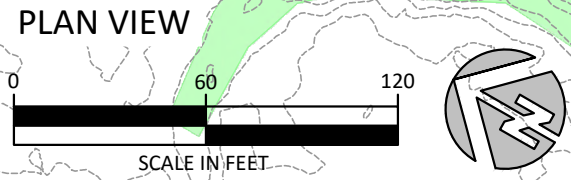
MM, GS DRAWN	MM DESIGNED	DM CHECKED
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- LOG NOTES**
- LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
  - REMOVED SHRUBS AND SMALL WOODY DEBRIS GENERATED FROM SITE CLEARING SHALL BE INCORPORATED INTO LOG STRUCTURES AS SLASH. INSTALL SLASH LOOSELY BETWEEN LOGS.
  - SEE SIDE CHANNEL LOGS TYPICAL DETAILS (SHEET 11).



NO.	BY	DATE	REVISION DESCRIPTION

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GJ APPROVED	4/11/18 DATE	--- PROJECT

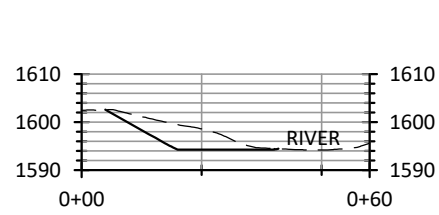
**ENTIAT RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
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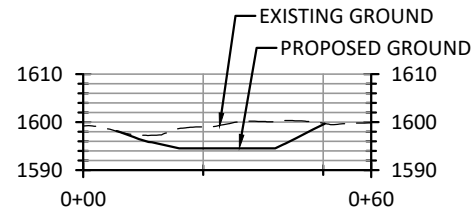
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541.386.9003  
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**WEST SIDE-CHANNEL  
17+00 TO 22+33**

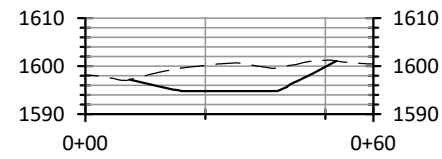




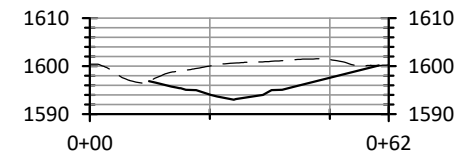
1  
9 STA: 1+00



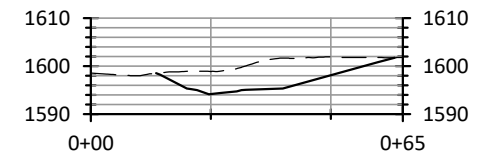
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9 STA: 2+00



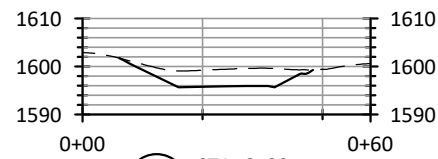
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9 STA: 3+00



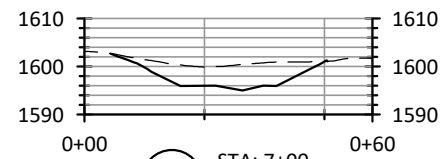
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9 STA: 4+00



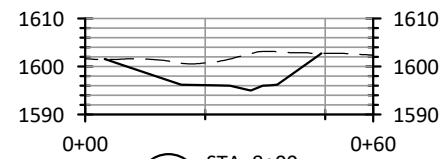
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9 STA: 5+00



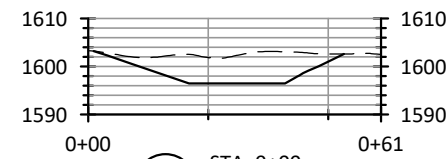
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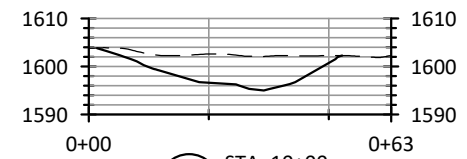
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9 STA: 7+00



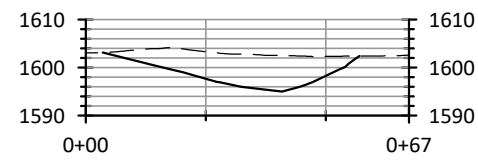
8  
9 STA: 8+00



9  
9 STA: 9+00



10  
9 STA: 10+00



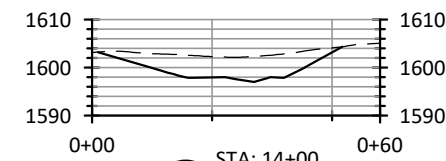
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9 STA: 11+00



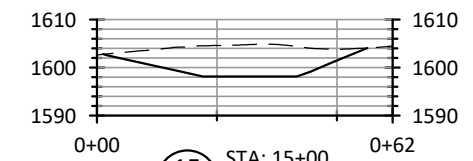
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9 STA: 12+00



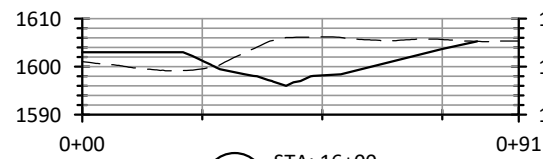
13  
9 STA: 13+00



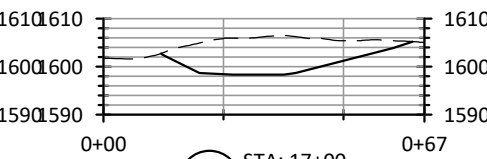
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9 STA: 14+00



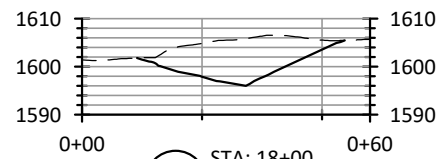
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9 STA: 15+00



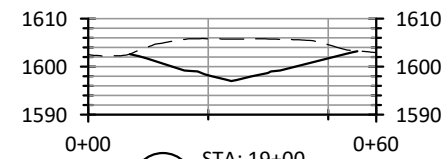
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9 STA: 16+00



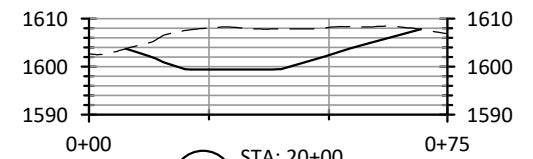
17  
9 STA: 17+00



18  
9 STA: 18+00



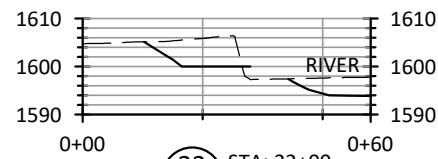
19  
9 STA: 19+00



20  
9 STA: 20+00



21  
9 STA: 21+00



22  
9 STA: 22+00

SECTION VIEWS ARE  
LOOKING DOWNSTREAM

NO.	BY	DATE	REVISION DESCRIPTION

MM, GS	MM	DM
DRAWN	DESIGNED	CHECKED
GJ	4/11/18	---
APPROVED	DATE	PROJECT

ENTIAT RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN

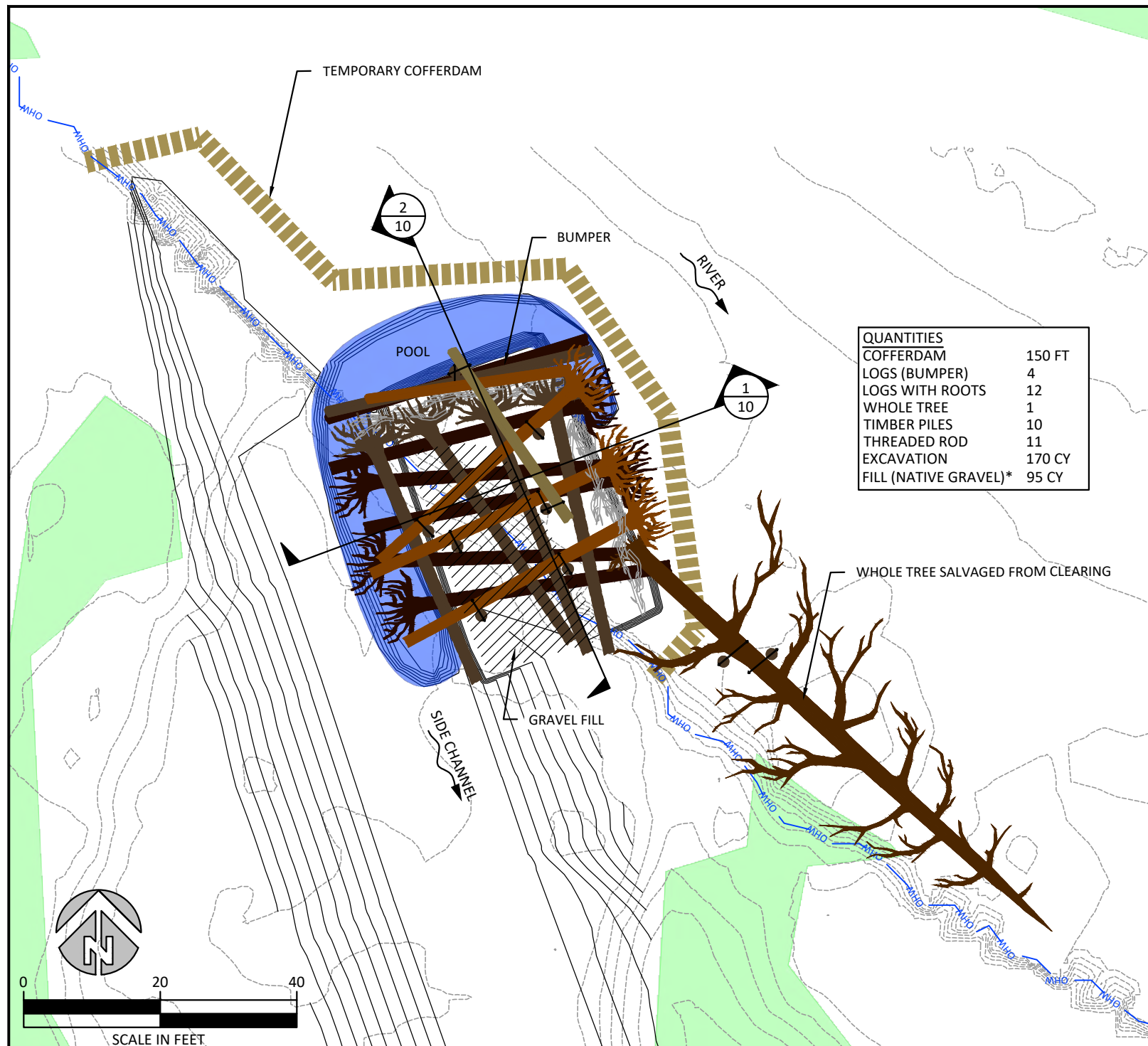


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WEST SIDE-CHANNEL  
SECTION VIEWS

SHEET

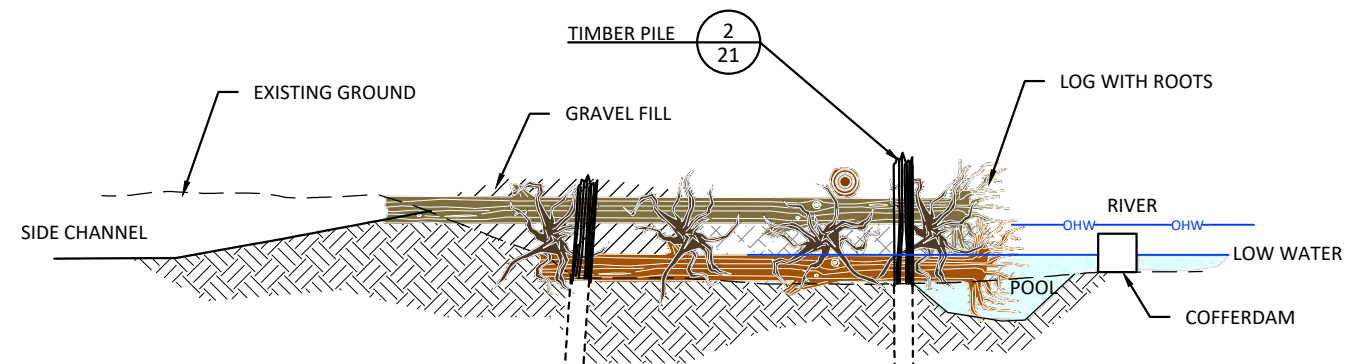
9 OF 26



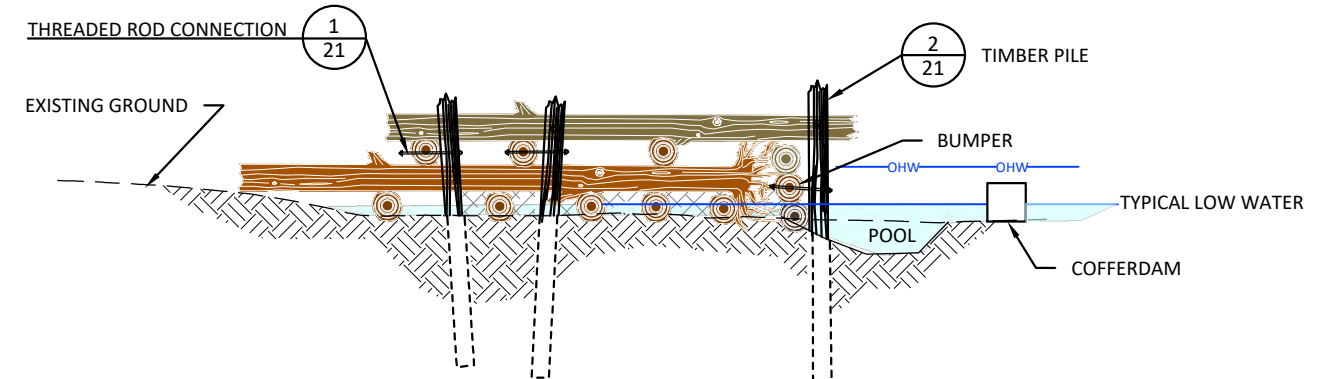
QUANTITIES	
COFFERDAM	150 FT
LOGS (BUMPER)	4
LOGS WITH ROOTS	12
WHOLE TREE	1
TIMBER PILES	10
THREADED ROD	11
EXCAVATION	170 CY
FILL (NATIVE GRAVEL)*	95 CY

**1**  
**10** PLAN VIEW  
WEST SIDE-CHANNEL INLET LOG STRUCTURE

**\*BACKFILL NOTE:**  
WHEN EXCAVATING THIS AREA, SORT MATERIALS BY GENERAL SIZES, KEEPING A STOCKPILE OF COARSE MATERIAL FOR BACKFILL. BACKFILL SHALL BE GRAVEL, COBBLE, AND NOT SAND OR MUCK.



**2**  
**10** SECTION VIEW



**3**  
**10** SECTION VIEW

**LEGEND**

- TEMPORARY ACCESS ROUTE
- OHW ORDINARY HIGH WATER
- TEMP. COFFERDAM
- PROPOSED LOG STRUCTURE



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GJ APPROVED	4/11/18 DATE	--- PROJECT

ENTIAT RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN

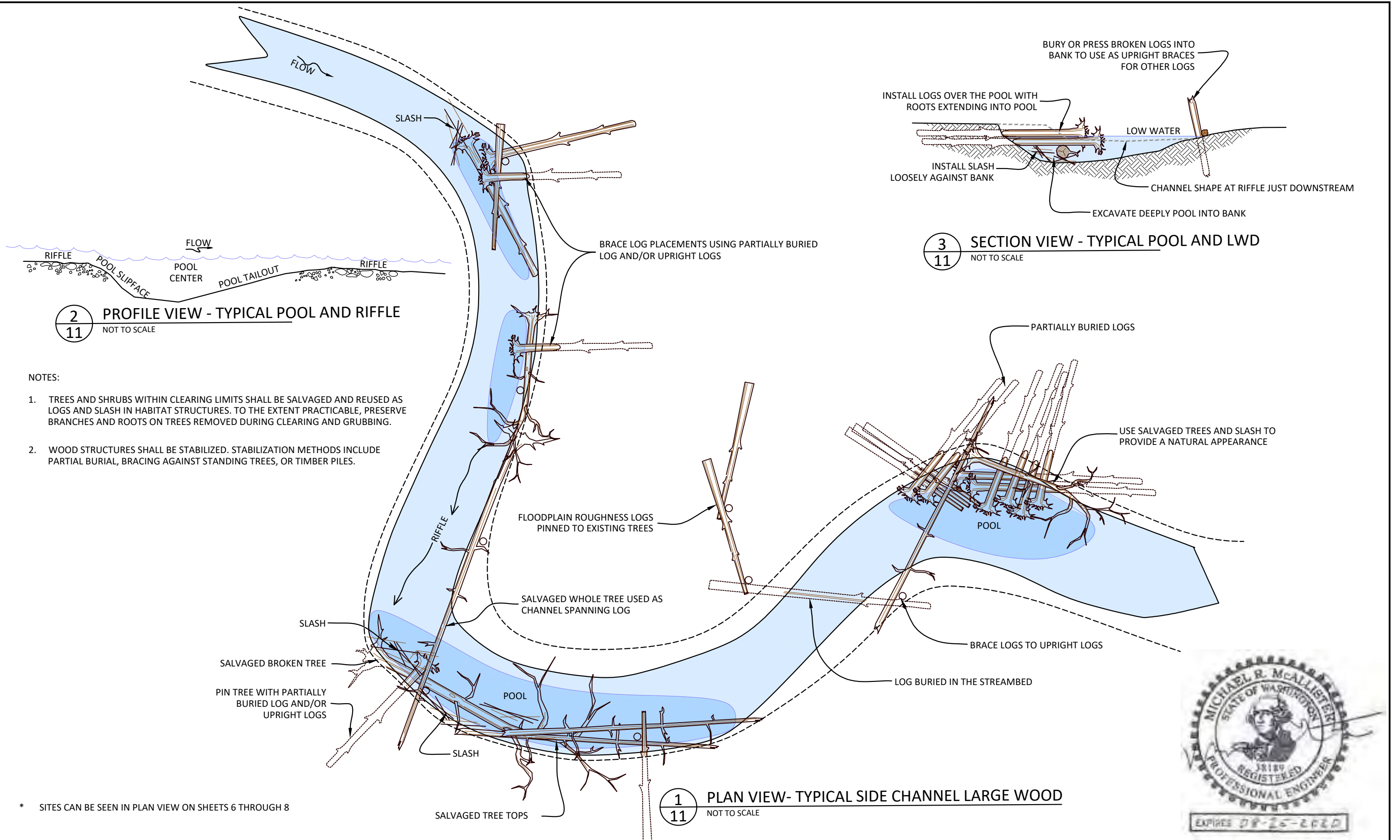


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WEST SIDE-CHANNEL INLET  
LOG STRUCTURE

SHEET

10 OF 26



- NOTES:
1. TREES AND SHRUBS WITHIN CLEARING LIMITS SHALL BE SALVAGED AND REUSED AS LOGS AND SLASH IN HABITAT STRUCTURES. TO THE EXTENT PRACTICABLE, PRESERVE BRANCHES AND ROOTS ON TREES REMOVED DURING CLEARING AND GRUBBING.
  2. WOOD STRUCTURES SHALL BE STABILIZED. STABILIZATION METHODS INCLUDE PARTIAL BURIAL, BRACING AGAINST STANDING TREES, OR TIMBER PILES.

\* SITES CAN BE SEEN IN PLAN VIEW ON SHEETS 6 THROUGH 8



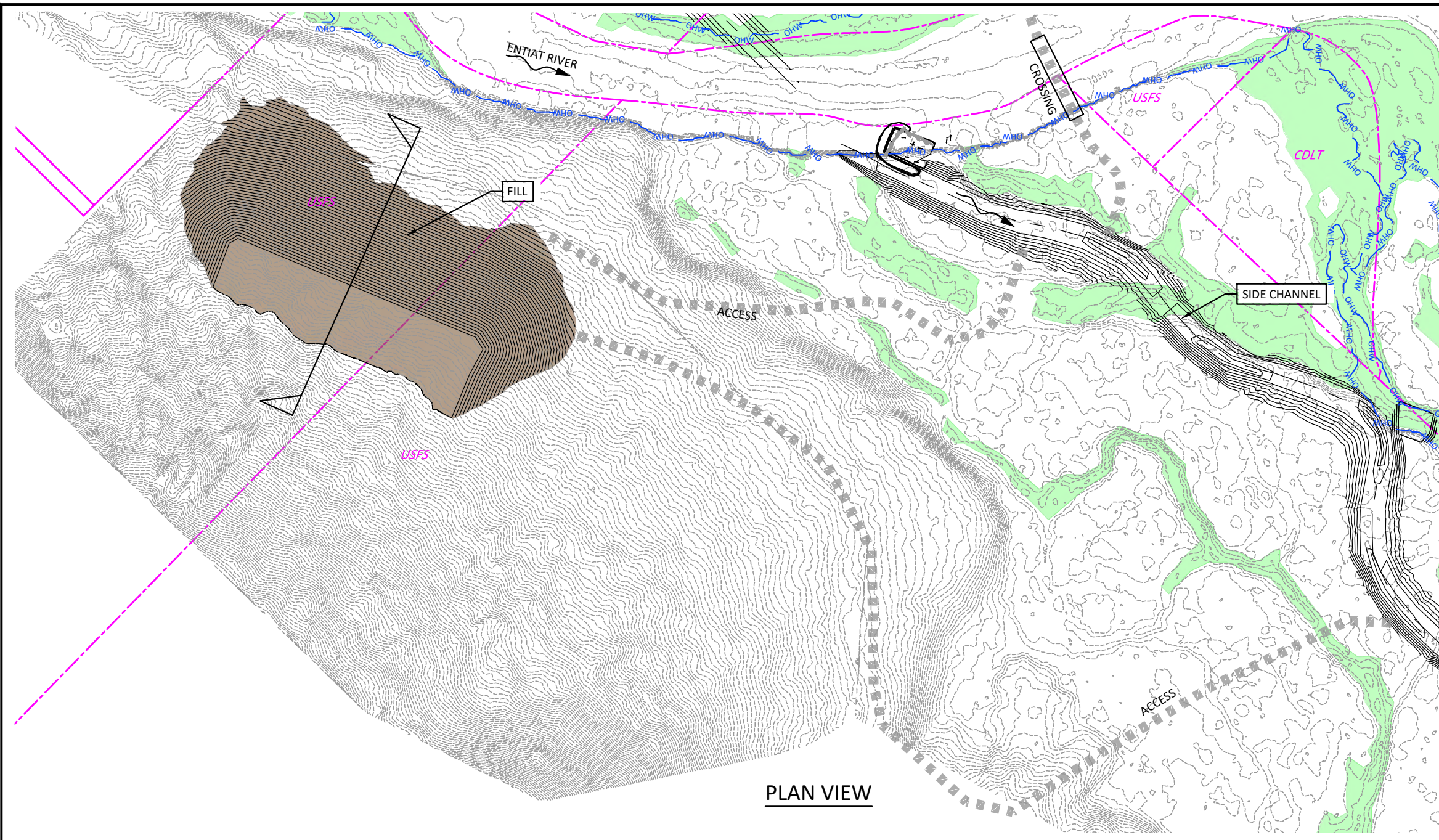
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TYPICAL DETAILS  
SIDE CHANNEL LOGS



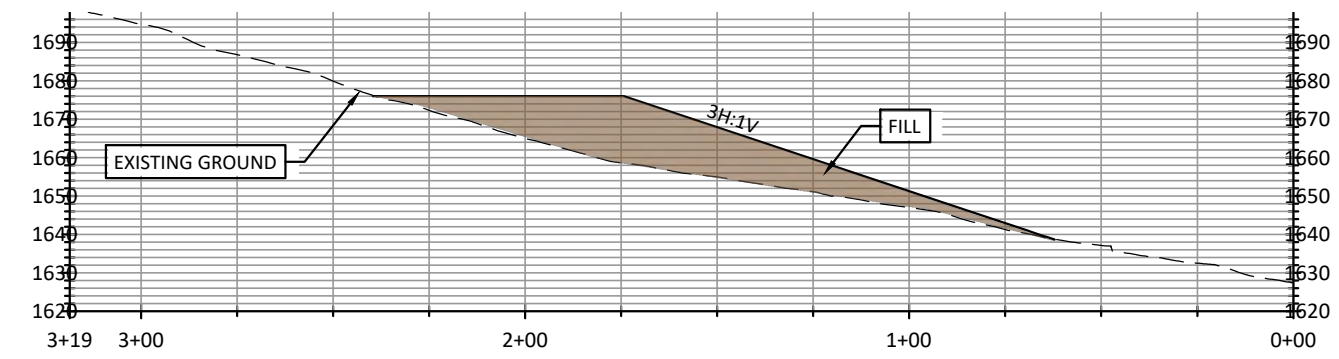
**LEGEND**

- PROPERTY LINE
- EXISTING GROUND CONTOUR (1 FT)
- PROPOSED GROUND CONTOUR (1 FT)
- TEMPORARY ACCESS ROUTE
- OHW ORDINARY HIGH WATER
- EXISTING WETLAND
- FILL AREA

0 120 240  
SCALE IN FEET

THIS SCHEME SHOWS A BALANCE OF PROJECT EARTHWORK ASSUMING:  
 WEST SIDE-CHANNEL CUT = 17,000 CY  
 EAST SIDE-CHANNEL = 2,400 CY  
 FILL = 19,400 CY

**PLAN VIEW**



**SECTION VIEW**



NO.	BY	DATE	REVISION DESCRIPTION

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GJ APPROVED	4/11/18 DATE	--- PROJECT

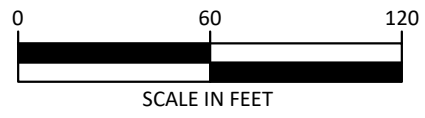
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 STREAM & FLOODPLAIN ENHANCEMENTS  
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**FILL AREA  
 GRADING PLAN**

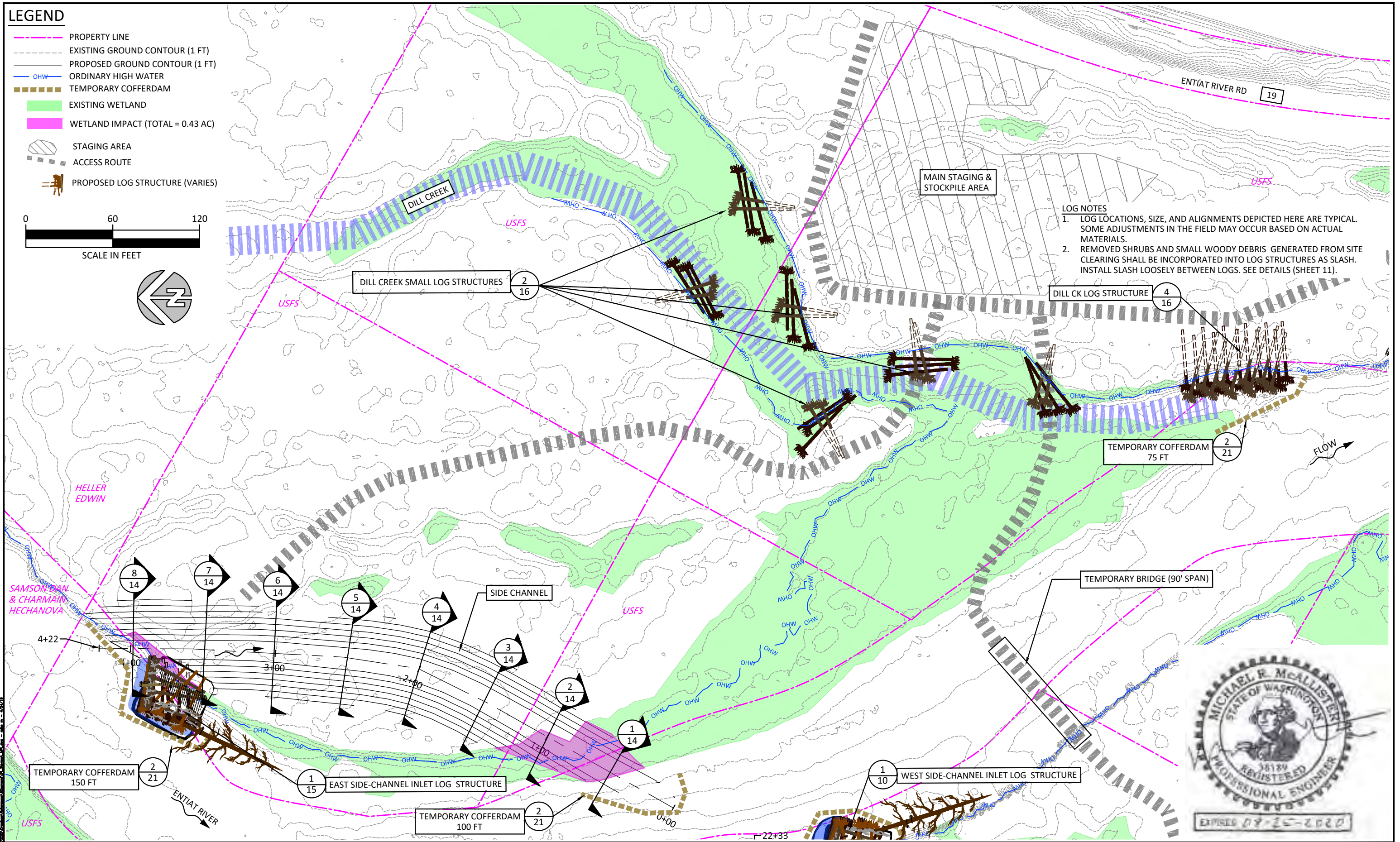
**LEGEND**

- PROPERTY LINE
- EXISTING GROUND CONTOUR (1 FT)
- PROPOSED GROUND CONTOUR (1 FT)
- ORDINARY HIGH WATER
- TEMPORARY COFFERDAM
- EXISTING WETLAND
- WETLAND IMPACT (TOTAL = 0.43 AC)
- STAGING AREA
- ACCESS ROUTE
- PROPOSED LOG STRUCTURE (VARIES)



**LOG NOTES**

1. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
2. REMOVED SHRUBS AND SMALL WOODY DEBRIS GENERATED FROM SITE CLEARING SHALL BE INCORPORATED INTO LOG STRUCTURES AS SLASH. INSTALL SLASH LOOSELY BETWEEN LOGS. SEE DETAILS (SHEET 11).



NO.	BY	DATE	REVISION DESCRIPTION

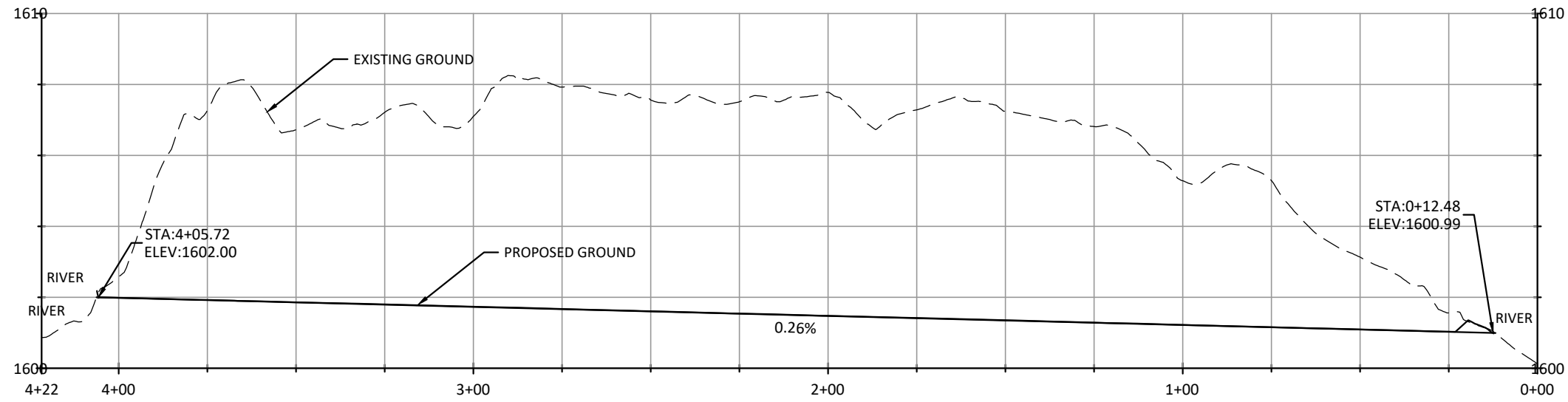
MM, GS DRAWN	MM DESIGNED	DM CHECKED
GJ APPROVED	4/11/18 DATE	 PROJECT

**ENTIAT RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN**

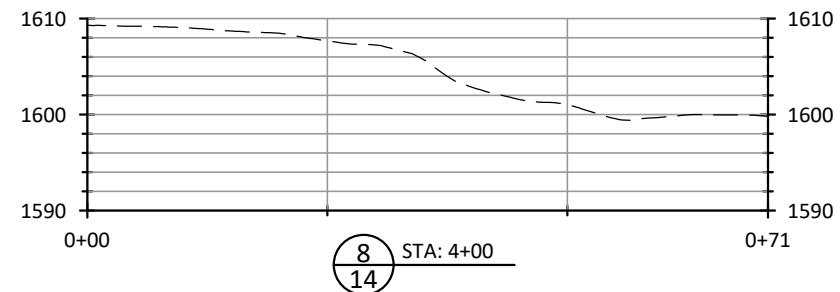
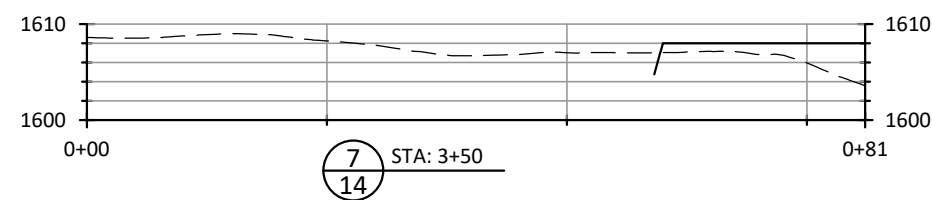
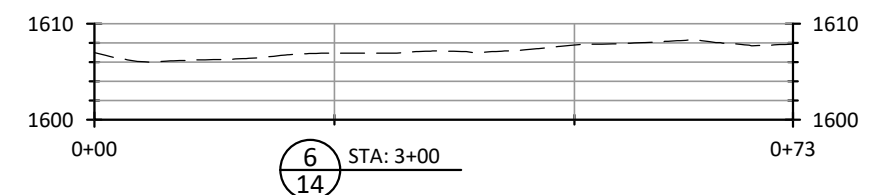
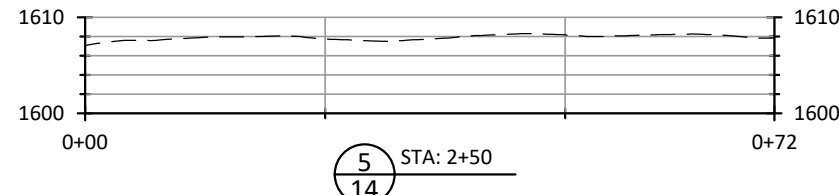
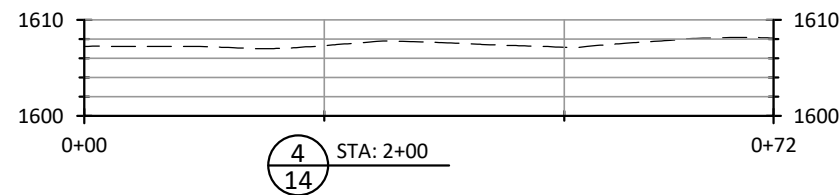
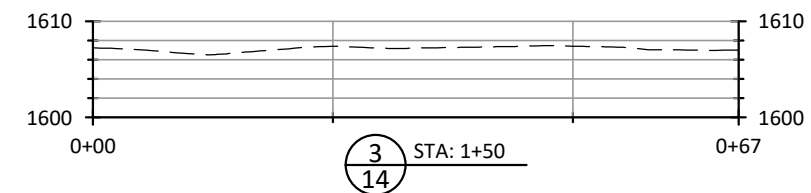
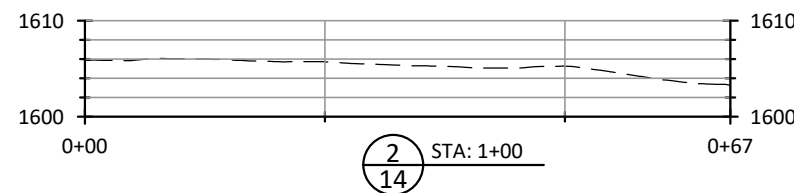
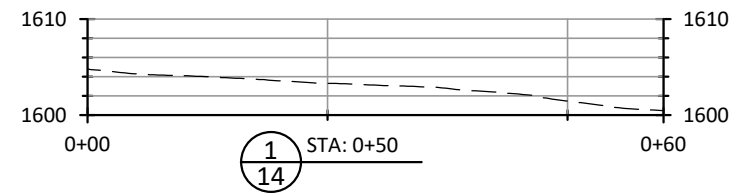


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**EAST SIDE-CHANNEL  
PLAN VIEW**



PROFILE VIEW - EAST SIDE CHANNEL



NO.	BY	DATE	REVISION DESCRIPTION

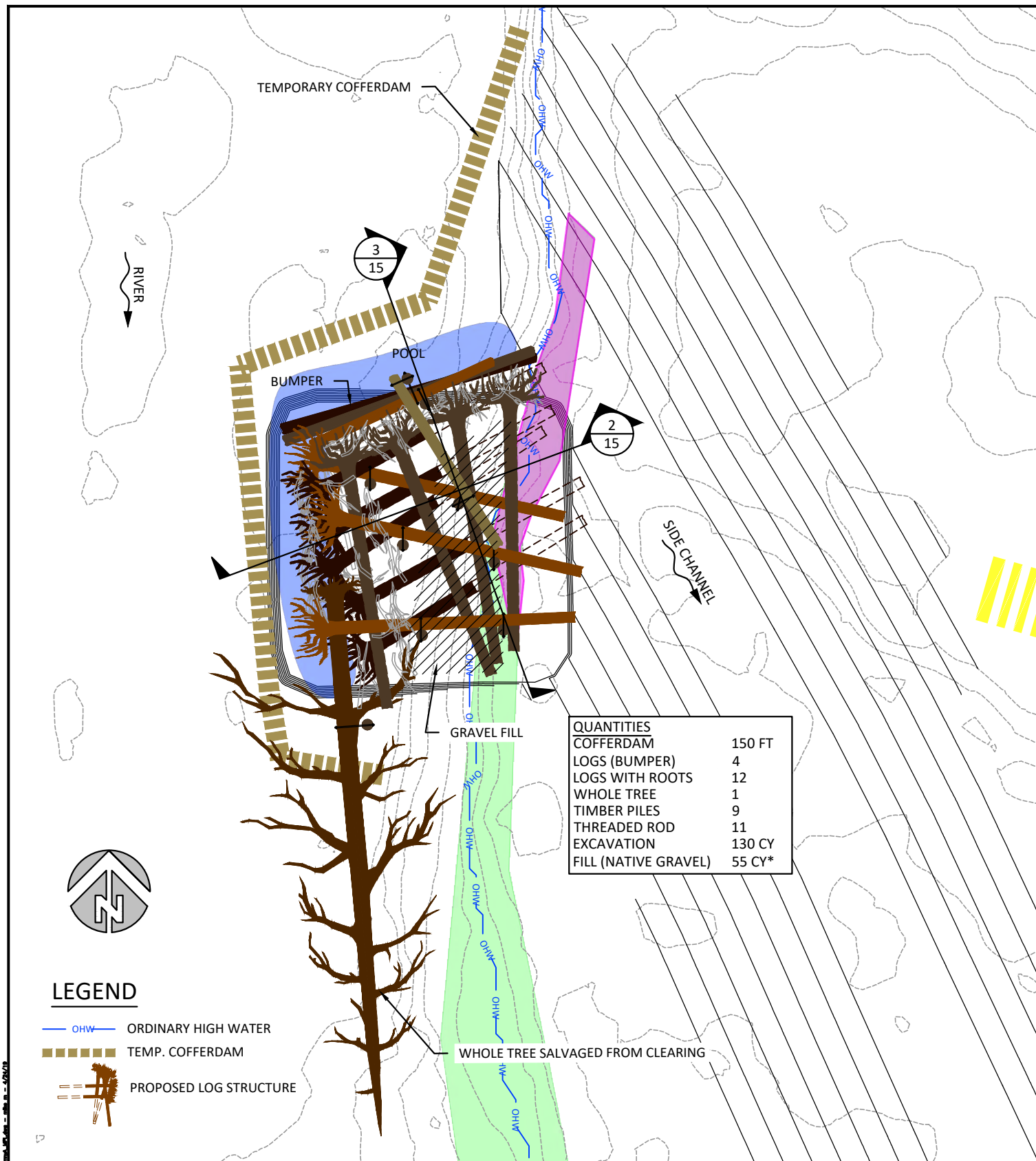
MM, GS	MM	DM
DRAWN	DESIGNED	CHECKED
GJ	4/11/18	---
APPROVED	DATE	PROJECT

ENTIAT RIVER - STORMY A  
 STREAM & FLOODPLAIN ENHANCEMENTS  
 60% DESIGN



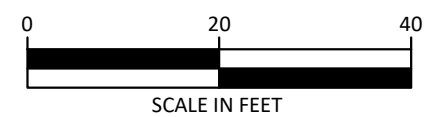
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EAST SIDE-CHANNEL PROFILE  
 & SECTION VIEWS

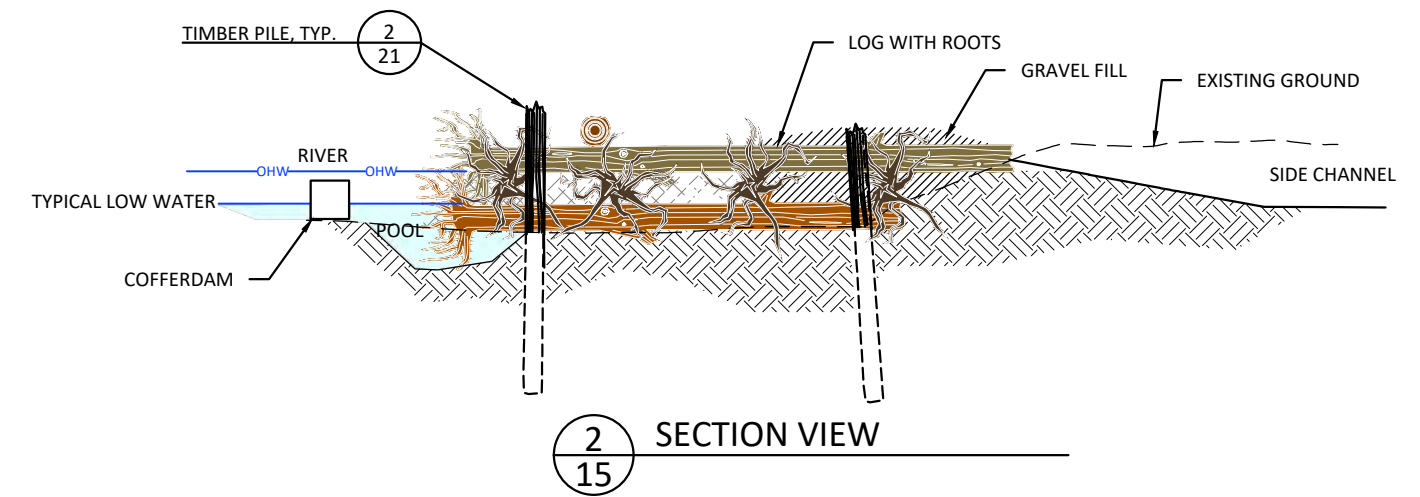


QUANTITIES	
COFFERDAM	150 FT
LOGS (BUMPER)	4
LOGS WITH ROOTS	12
WHOLE TREE	1
TIMBER PILES	9
THREADED ROD	11
EXCAVATION	130 CY
FILL (NATIVE GRAVEL)	55 CY*

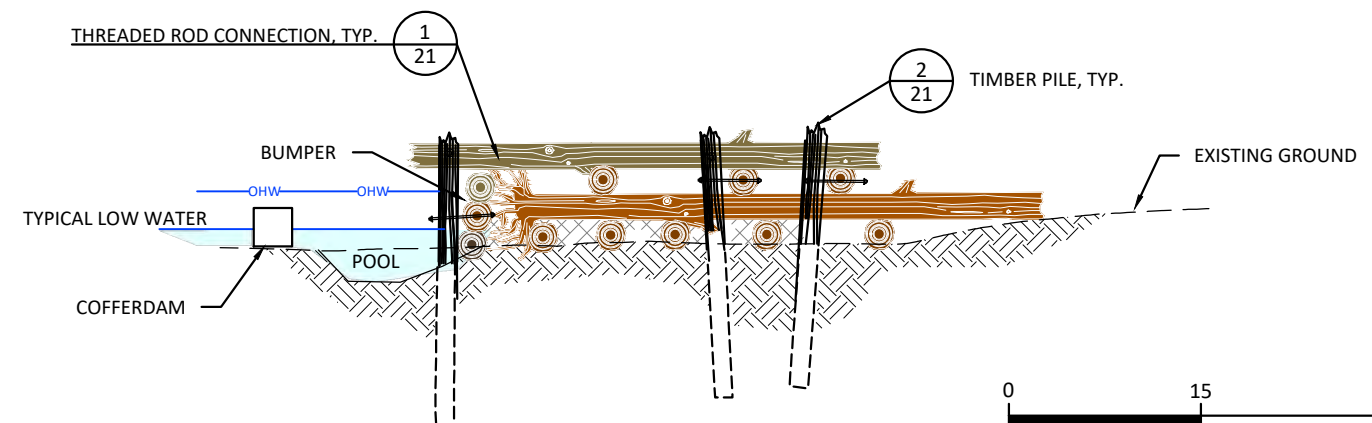
- LEGEND**
- ORDINARY HIGH WATER
  - TEMP. COFFERDAM
  - PROPOSED LOG STRUCTURE



**1**  
15 PLAN VIEW  
EAST SIDE-CHANNEL INLET LOG STRUCTURE



**2**  
15 SECTION VIEW



**3**  
15 SECTION VIEW



**\*BACKFILL NOTE:**  
WHEN EXCAVATING THIS AREA, SORT MATERIALS BY GENERAL SIZES, KEEPING A STOCKPILE OF COARSE MATERIAL FOR BACKFILL. BACKFILL SHALL BE GRAVEL, COBBLE, AND NOT SAND OR MUCK.



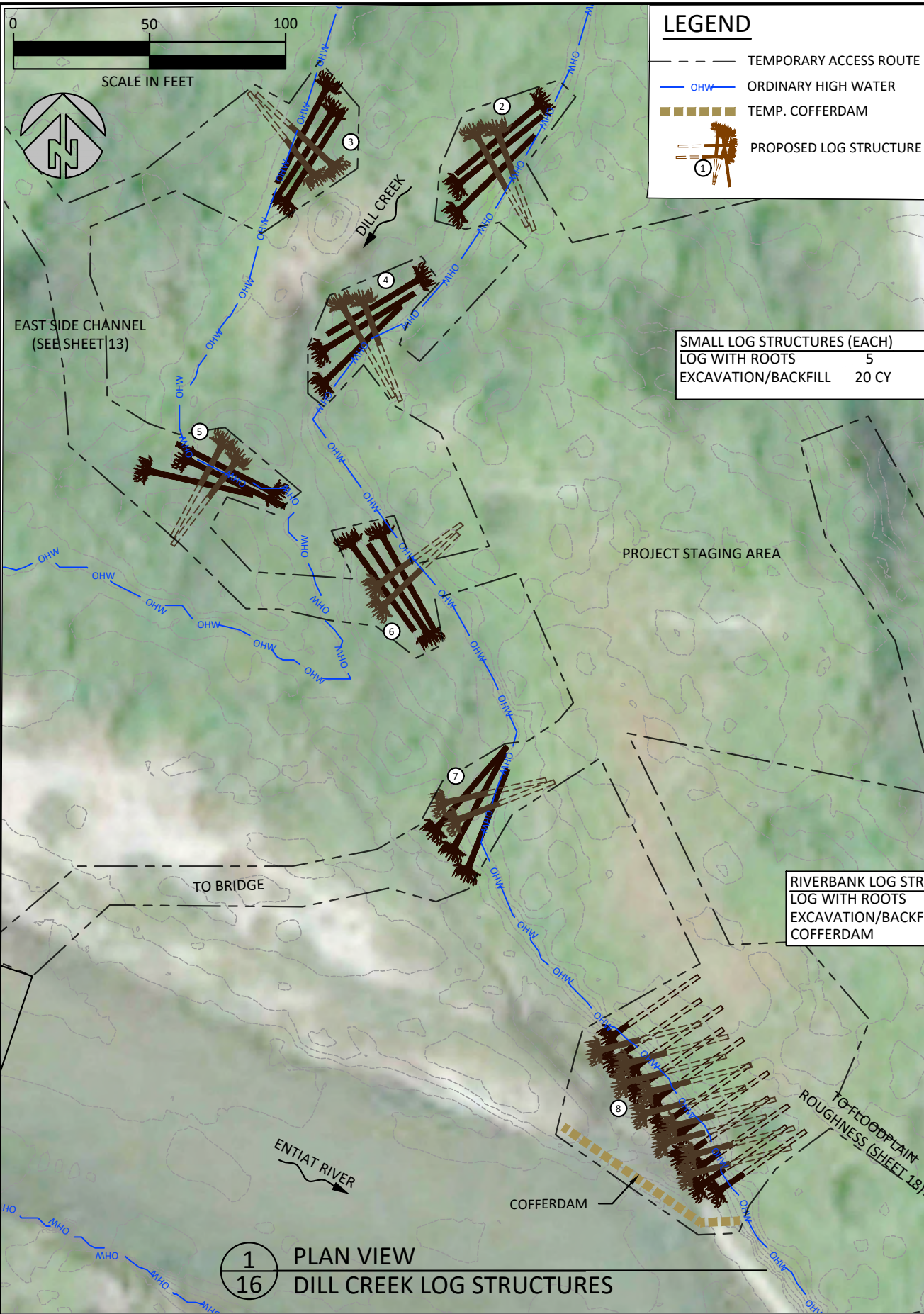
NO.	BY	DATE	REVISION DESCRIPTION

MM, GS DRAWN	MM DESIGNED	DM CHECKED
GJ APPROVED	4/11/18 DATE	--- PROJECT

ENTIAH RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN

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EAST SIDE-CHANNEL  
INLET LOG STRUCTURE



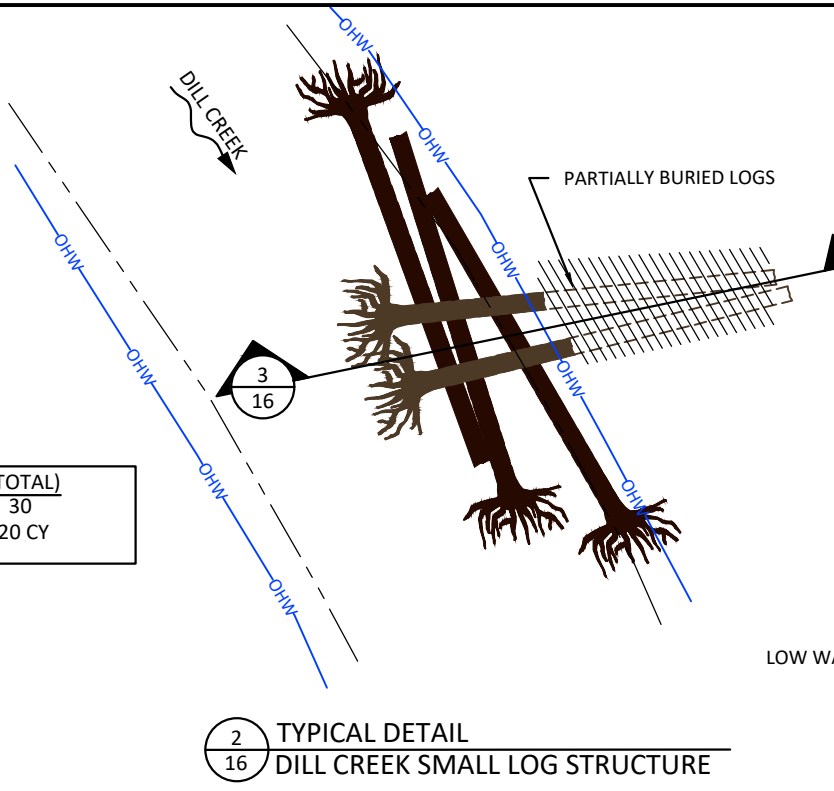
1 PLAN VIEW  
16 DILL CREEK LOG STRUCTURES

**LEGEND**

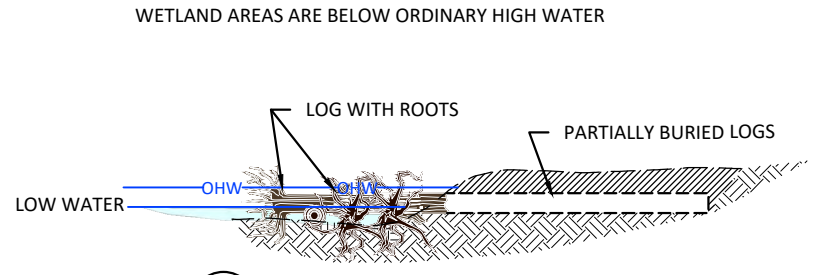
- TEMPORARY ACCESS ROUTE
- OHW — ORDINARY HIGH WATER
- ▨ TEMP. COFFERDAM
- ① PROPOSED LOG STRUCTURE

SMALL LOG STRUCTURES (EACH)	(TOTAL)
LOG WITH ROOTS	5 30
EXCAVATION/BACKFILL	20 CY 120 CY

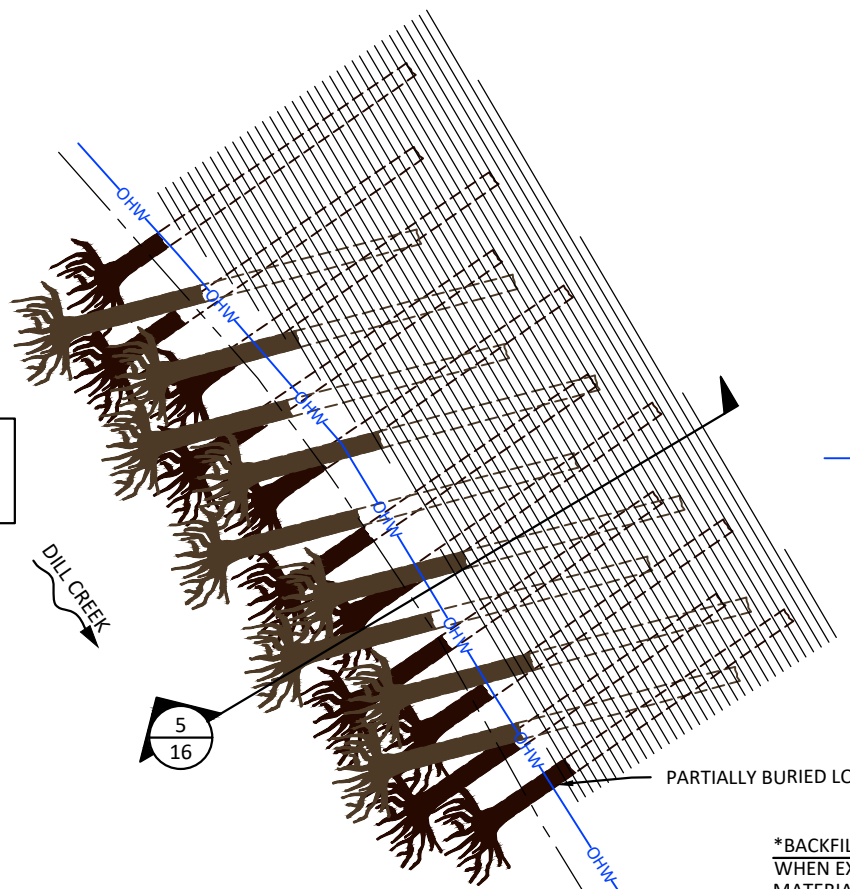
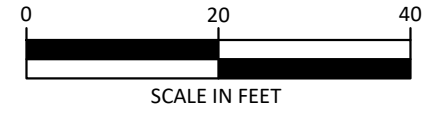
RIVERBANK LOG STRUCTURE	
LOG WITH ROOTS	20
EXCAVATION/BACKFILL	440 CY
COFFERDAM	75 FT



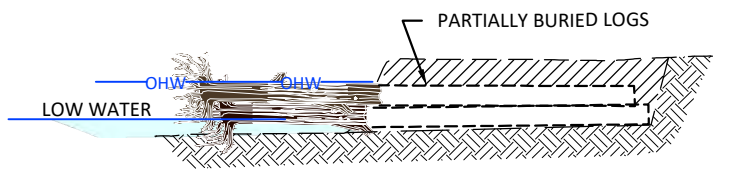
2 TYPICAL DETAIL  
16 DILL CREEK SMALL LOG STRUCTURE



3 SECTION VIEW  
16 DILL CREEK SMALL LOG STRUCTURE



4 TYPICAL DETAIL  
16 DILL CREEK LARGE LOG STRUCTURE



5 SECTION VIEW  
16 DILL CREEK LARGE LOG STRUCTURE

**\*BACKFILL NOTE:**  
WHEN EXCAVATING THIS AREA, SORT MATERIALS BY GENERAL SIZES, KEEPING A STOCKPILE OF COARSE MATERIAL FOR BACKFILL. BACKFILL ALONG WATERWARD EDGE SHALL BE GRAVEL, COBBLE, AND NOT SAND OR MUCK.



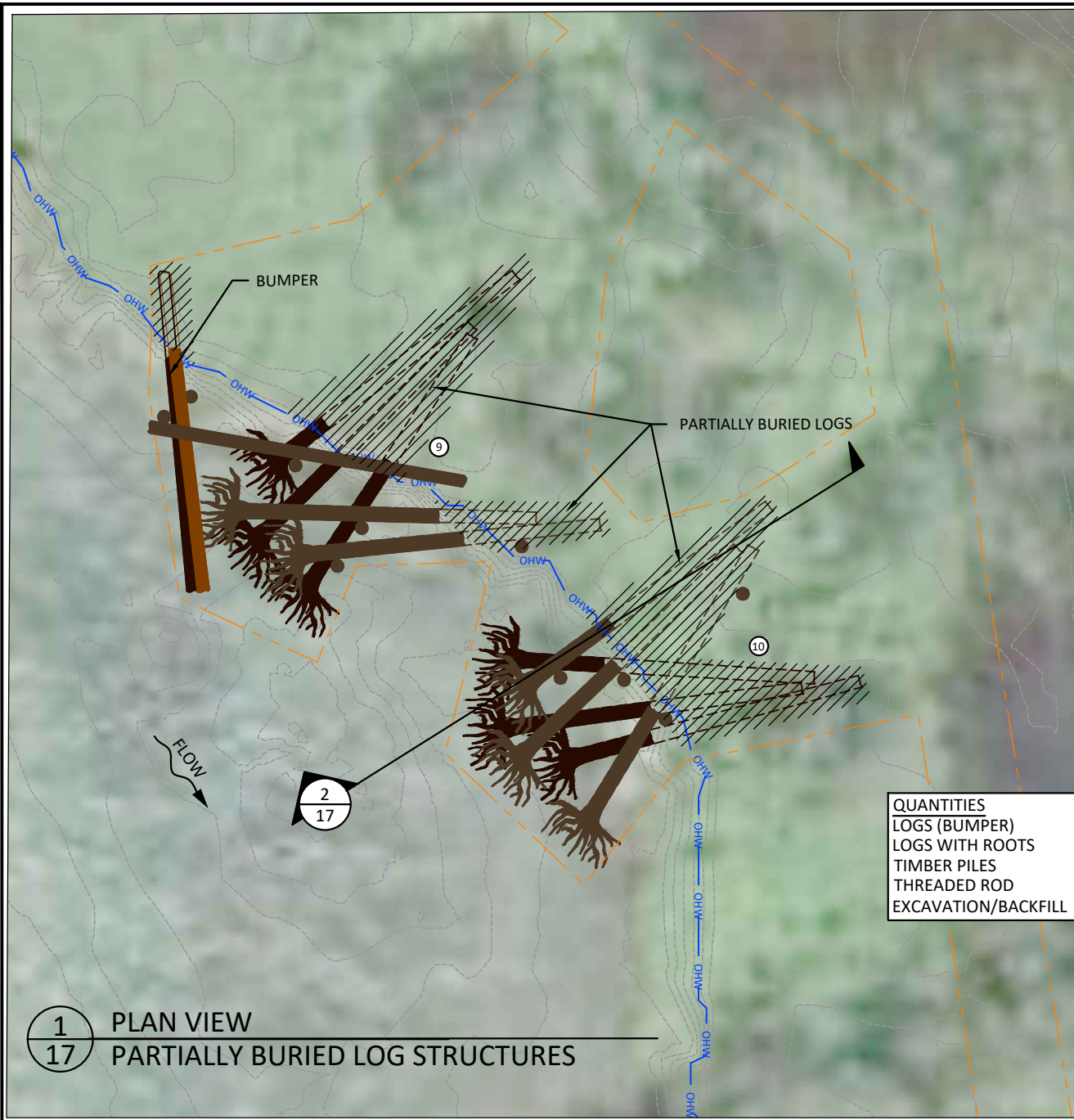
NO.	BY	DATE	REVISION DESCRIPTION

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DRAWN	DESIGNED	CHECKED
GJ	4/11/18	---
APPROVED	DATE	PROJECT

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STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN

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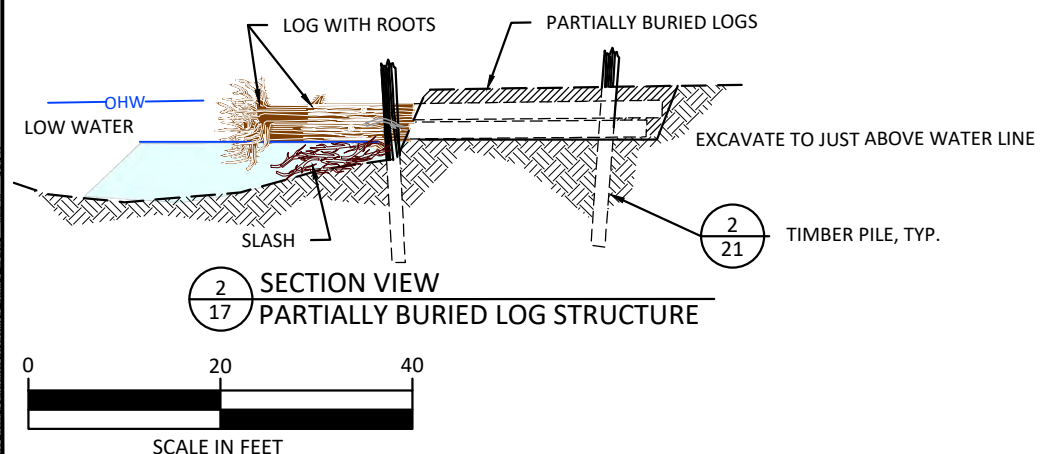
**LEGEND**

- TEMPORARY ACCESS ROUTE
- OHW ORDINARY HIGH WATER
- PROPOSED LOG STRUCTURE

0 20 40  
SCALE IN FEET

QUANTITIES	
LOGS (BUMPER)	3
LOGS WITH ROOTS	12
TIMBER PILES	10
THREADED ROD	10
EXCAVATION/BACKFILL	110 CY

**1**  
**17** PLAN VIEW  
PARTIALLY BURIED LOG STRUCTURES



**\*BACKFILL NOTE:**  
WHEN EXCAVATING THIS AREA, SORT MATERIALS BY GENERAL SIZES, KEEPING A STOCKPILE OF COARSE MATERIAL FOR BACKFILL. BACKFILL ALONG WATERWARD EDGE SHALL BE GRAVEL, COBBLE, AND NOT SAND OR MUCK.

**2**  
**17** SECTION VIEW  
PARTIALLY BURIED LOG STRUCTURE

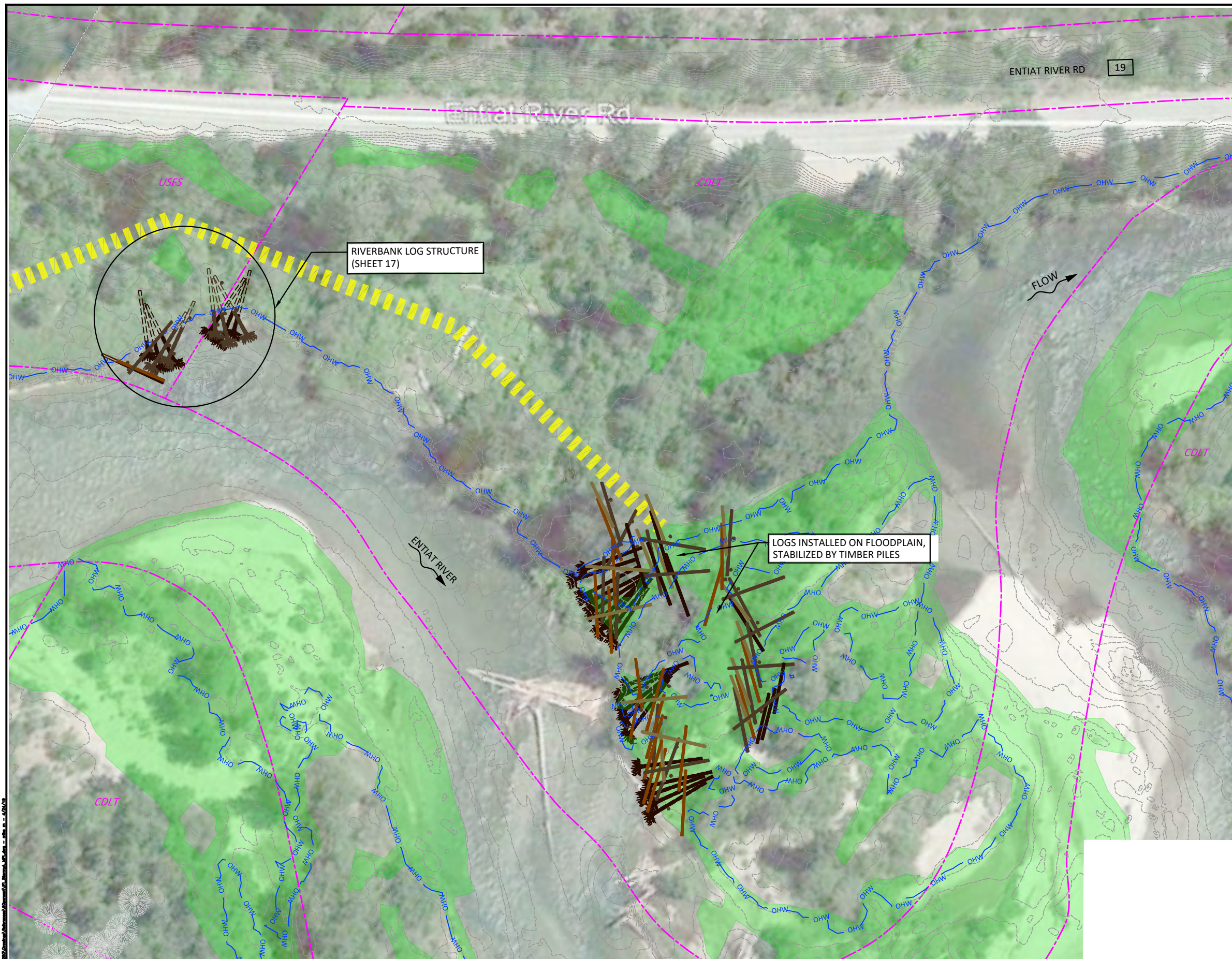


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DRAWN	DESIGNED	CHECKED
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**ENTIAT RIVER - STORMY A  
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**LEGEND**

- PROPERTY LINE
- EXISTING GROUND CONTOUR (1 FT)
- PROPOSED GROUND CONTOUR (1 FT)
- OHW ORDINARY HIGH WATER
- EXISTING WETLAND
- ACCESS ROUTE
- PROPOSED LOG STRUCTURE (VARIES)



**LOG NOTES**

1. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
2. SHURBS AND SLASH GENERATED FROM SITE ACCESS SHALL BE INCORPORATED INTO THE STRUCTURES AS SLASH. INSTALL SLASH LOOSELY BETWEEN LOGS NEAR THE WATERWARD EDGE OF THE STRUCTURE. DO NOT BURY SLASH.
3. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT TOP HEIGHTS. BREAK OR ROUGHEN THE TOP OF PILES FOR A NATURAL APPEARANCE. PILES SHALL BE INSTALLED BY VIBRATORY DRIVER. PILE DEPTH SHALL BE MINIMUM 14'. FINAL DEPTH TO BE DETERMINED BY PULLOUT TEST RESULTS.

**QUANTITIES**

LOGS	58
LOGS WITH ROOTS	19
TIMBER PILES	25
THREADED ROD	25



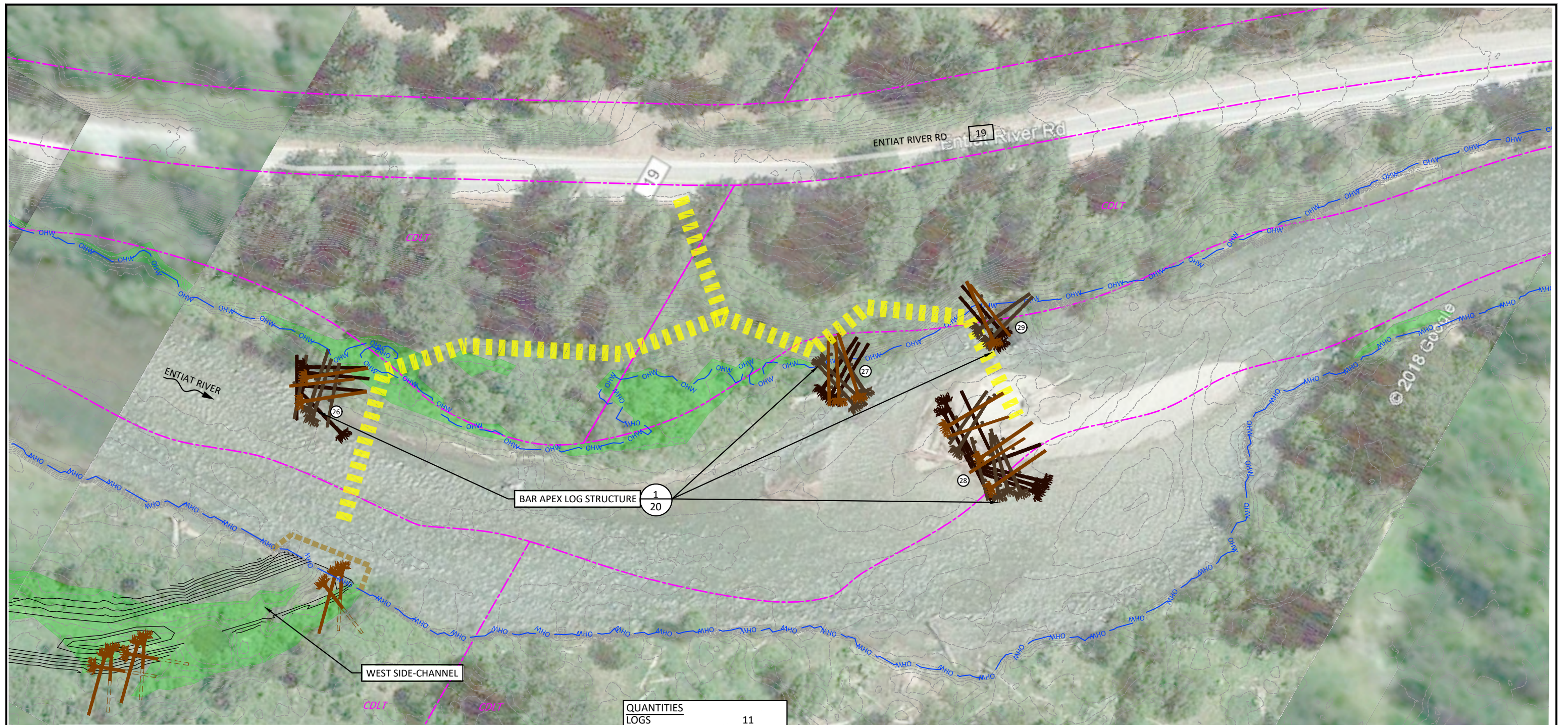
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**ENTIAT RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
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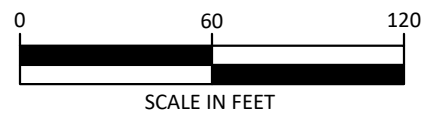
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**LEGEND**

- PROPERTY LINE
- EXISTING GROUND CONTOUR (1 FT)
- PROPOSED GROUND CONTOUR (1 FT)
- OHW ORDINARY HIGH WATER
- EXISTING WETLAND
- STAGING AREA
- ACCESS ROUTE
- PROPOSED LOG STRUCTURE (VARIES)

**PLAN VIEW**



QUANTITIES	
LOGS	11
LOGS WITH ROOTS	23
TIMBER PILES	29
THREADED ROD	29

**LOG NOTES**

1. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
2. SHURBS AND SLASH GENERATED FROM SITE ACCESS SHALL BE INCORPORATED INTO THE STRUCTURES AS SLASH. INSTALL SLASH LOOSELY BETWEEN LOGS NEAR THE WATERWARD EDGE OF THE STRUCTURE. DO NOT BURY SLASH.
3. VARY THE APPEARANCE OF TIMBER PILES BY INSTALLING THEM AT ANGLES AND WITH DIFFERENT TOP HEIGHTS. BREAK OR ROUGHEN THE TOP OF PILES FOR A NATURAL APPEARANCE. PILES SHALL BE INSTALLED BY VIBRATORY DRIVER. PILE DEPTH SHALL BE MINIMUM 14'. FINAL DEPTH TO BE DETERMINED BY PULLOUT TEST RESULTS.



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**ENTIAT RIVER - STORMY A  
STREAM & FLOODPLAIN ENHANCEMENTS  
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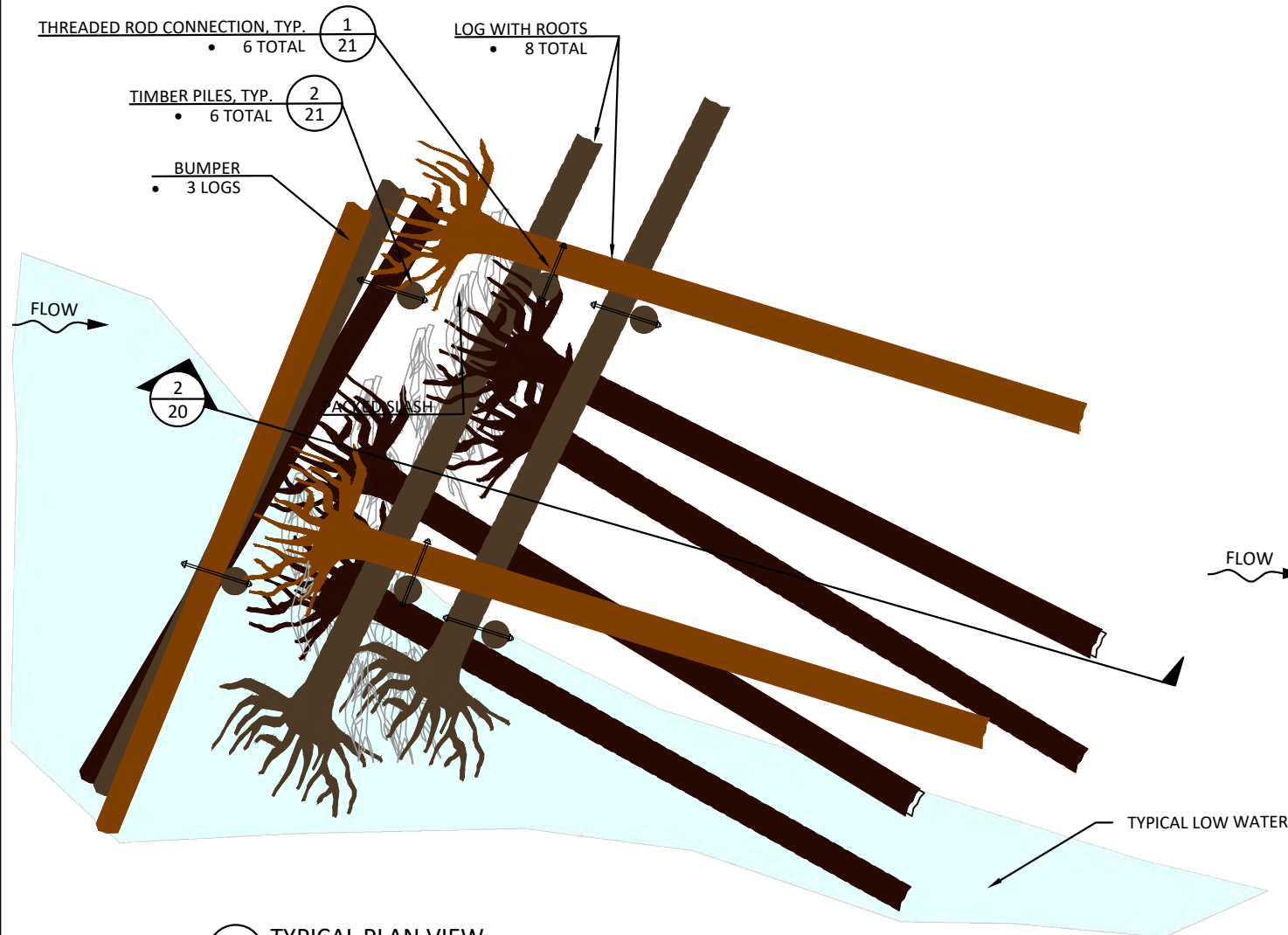


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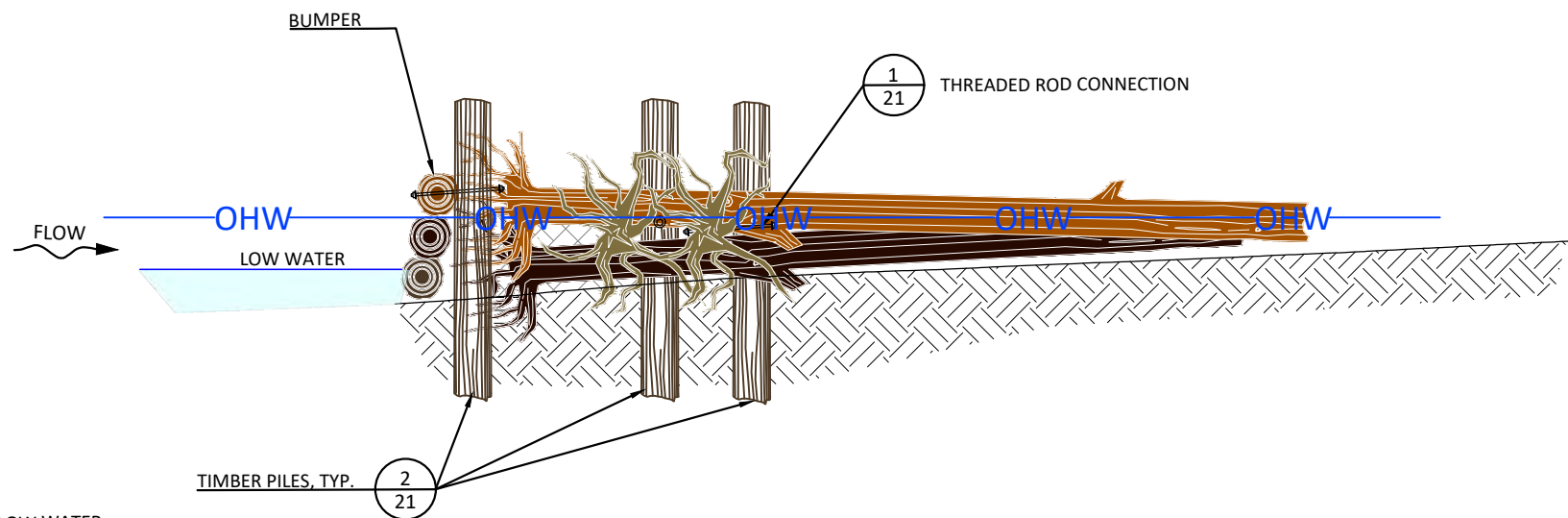
**BAR APEX LOG STRUCTURES**

SHEET

19 OF 26



1  
20 TYPICAL PLAN VIEW  
BAR APEX LOG STRUCTURE



2  
20 TYPICAL SECTION VIEW  
BAR APEX LOG STRUCTURE



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DRAWN	DESIGNED	CHECKED
GJ	4/11/18	---
APPROVED	DATE	PROJECT

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STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN



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BAR APEX LOG STRUCTURE  
DETAILS

**NOTES:**

**GENERAL**

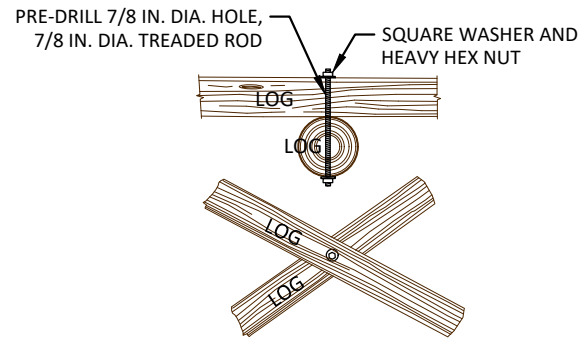
1. ALL CHANNEL WORK TO BE COMPLETED PER ONSITE DIRECTION OF ENGINEER.

**RIGGING**

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

**TESTING**

1. TESTING OF PILES SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER. UP TO FOUR LOAD TESTS SHALL BE APPLIED TO EACH TESTED PILE. EACH OF THE FOUR LOAD TESTS SHALL BE APPLIED TO THE PILE WITH A DIFFERENT INSTALLED DEPTH.
2. EACH PILE TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS CLOSELY ALIGNED TO AXIS OF PILE AS POSSIBLE. RECORD THE PILE DIAMETER, EMBEDMENT DEPTH AND MAXIMUM FORCE REQUIRED TO MOVE THE PILE VERTICALLY APPROXIMATELY 1 INCH. THEN DRIVE THE PILE TO A NEW DEPTH TO BE DETERMINED BY THE CONTRACTOR'S ENGINEER IN CONSULTATION WITH THE ENGINEER. APPLY NEW LOAD AND RECORD MAX FORCE THAT CAUSES THE PILE TO MOVE VERTICALLY 1 INCH. REPEAT FOR THIRD AND FOURTH TEST.
3. PROOF TESTS SHALL BE MADE AT UP TO FOUR EMBEDMENT DEPTHS FOR EACH PILE. DEPTHS SHALL BE DETERMINED IN THE FIELD. AS A GUIDELINE, TEST EMBEDMENT DEPTHS MAY INCLUDE 8 FT, 10 FT, 12 FT, AND 14 FT. TESTS AT 12 FT AND 14 FT WILL ONLY BE REQUIRED IF PILES MUST BE DRIVEN DEEPER THAN 10 FT TO ACHIEVE TARGET PULLOUT RESISTANCE. SEE NOTE BELOW.
4. EXCAVATOR CONDUCTING PULL OUT LOADING SHALL BE POSITIONED NO CLOSER THAN EMBEDMENT DEPTH OF PILE, IF POSSIBLE. IF A CLOSER POSITIONING IS REQUIRED, EXCAVATOR SHALL BE NO CLOSER THAN THAT REQUIRED TO GENERATE DESIRED LOADING WITH DISTANCE FROM PILE NOTED IN THE TEST RECORD. LIMIT COMPRESSIVE LOADING OF THE TRACKS ON THE GROUND BY DRIVING THE EXCAVATOR ONTO LOGS LAID ON THE GROUND TO DISTRIBUTE THE WEIGHT OVER A LARGER AREA.
5. PULL OUT RESISTANCE READING SHALL BE COMPARED AGAINST EXCAVATOR MAX LIFT OFFSET TABLE.
6. UP TO 10% OF PRODUCTION PILINGS SHALL BE PROOF TESTED. IF RESULTS VARY MORE THAN 50% THEN IT SHOULD BE ANTICIPATED THAT UP TO 25% OF THE PRODUCTION PILINGS SHALL BE PROOF TESTED.
7. PILE EMBEDMENT DEPTH SPECIFIED IN THESE DRAWINGS MAY BE INCREASED, AT NO ADDITIONAL COST, PENDING COMPARISON OF PULL OUT TEST RESULTS TO AN ASSUMED RAW PULLOUT RESISTANCE OF 15,000 POUNDS. IF TESTING REVEALS FIELD PULLOUT RESISTANCE VALUES THAT ARE LESS THAN THE ASSUMED VALUES, PILES MAY BE REQUIRED TO BE DRIVEN UP TO 5 FT DEEPER THAN INDICATED. ENGINEER WILL DETERMINE WHETHER THE NUMBER OF PILES MAY BE REDUCED IF TESTING YIELDS VALUES THAT EXCEED ASSUMED VALUES, BASED ON EVALUATION OF VERTICAL PULLOUT AND LATERAL BRACING OBJECTIVES AT EACH LOCATION.

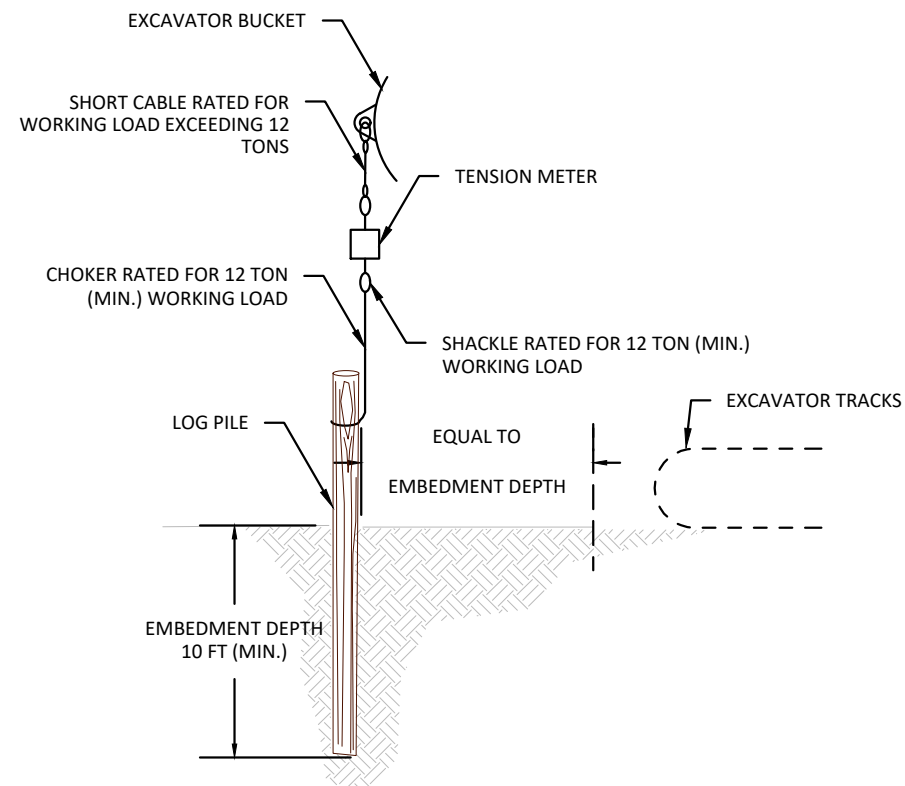


**1** TYPICAL DETAIL  
**21** LOG-LOG CONNECTIONS  
NOT TO SCALE

**BOLTED CONNECTION NOTES**

**PIN LOGS TO LOGS**

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



**2** TYPICAL DETAIL  
**21** LOG PULL OUT TEST  
NOT TO SCALE



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STREAM & FLOODPLAIN ENHANCEMENTS  
60% DESIGN

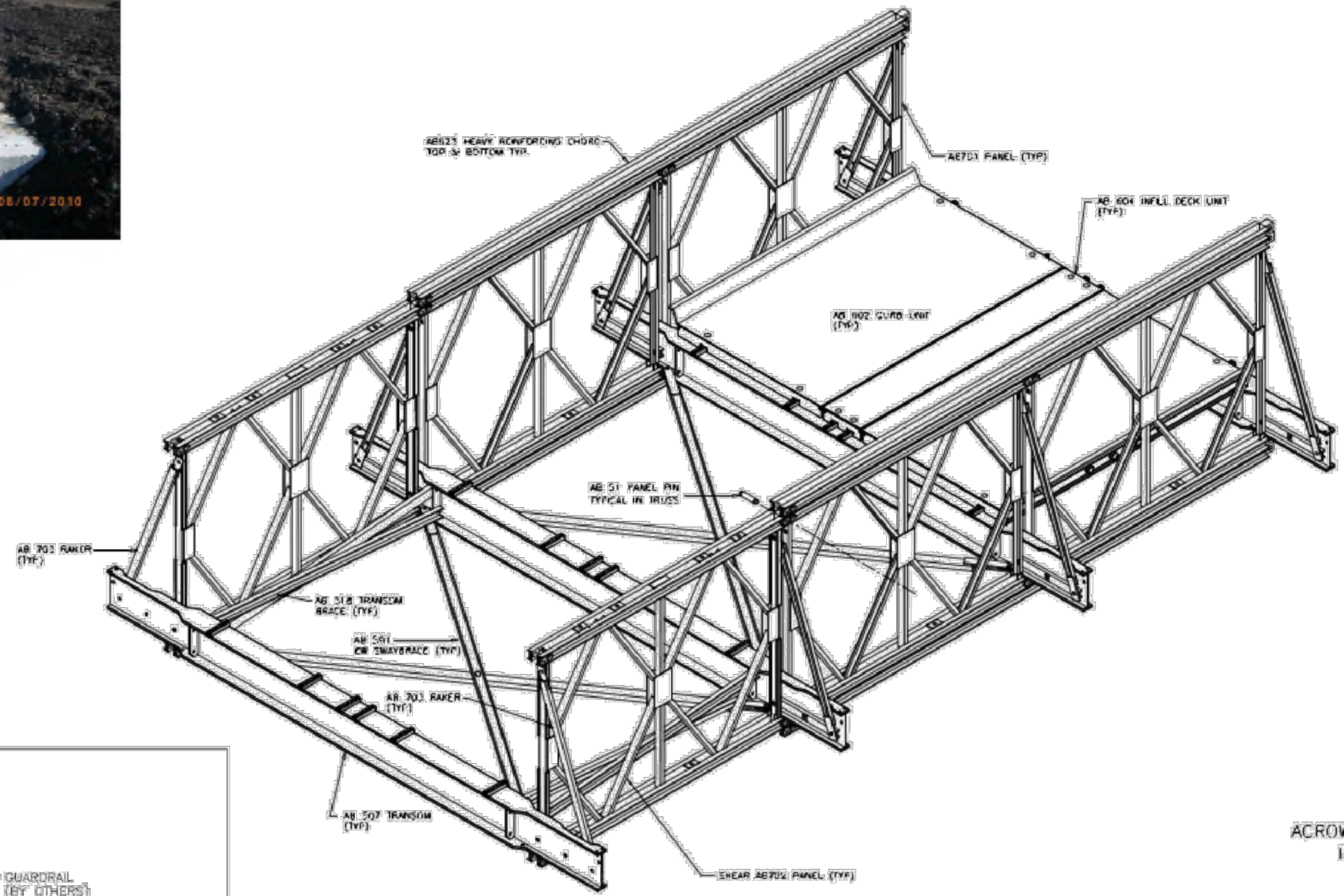


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TIMBER PILE DETAILS



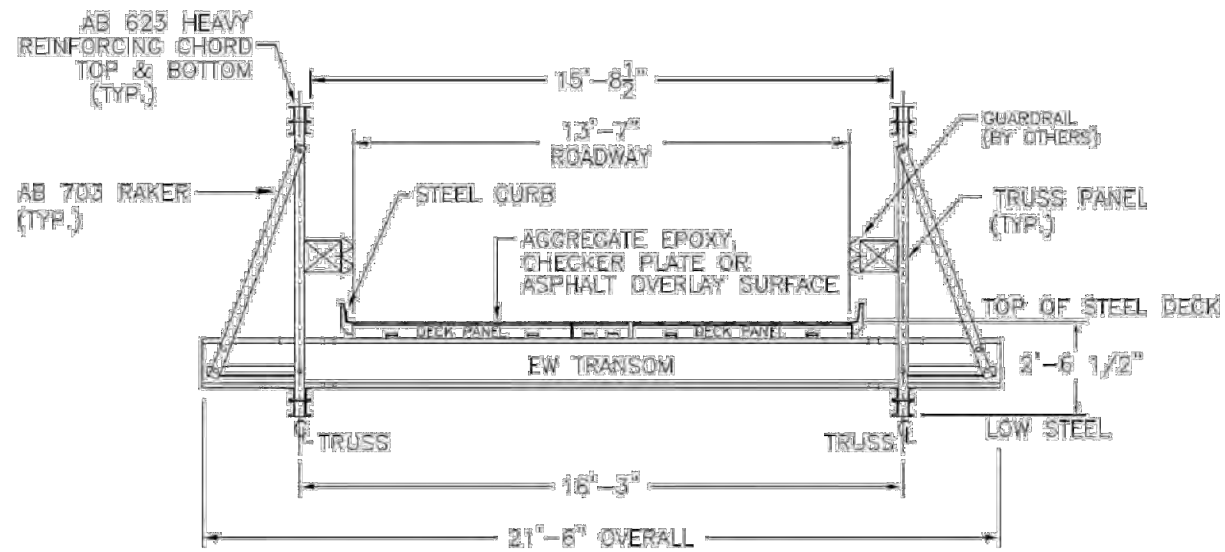
**TYPICAL ABUTMENTS**



ACROW 700XS PANEL BRIDGE  
ISOMETRIC VIEW OF  
SSRH EW BRIDGE

ISOMETRIC VIEW OF FEMALE END OF BRIDGE

NOTES:  
H-20 LOADING  
MIN DECK ELEVATION = 2159FT



EXTRA WIDE BRIDGE

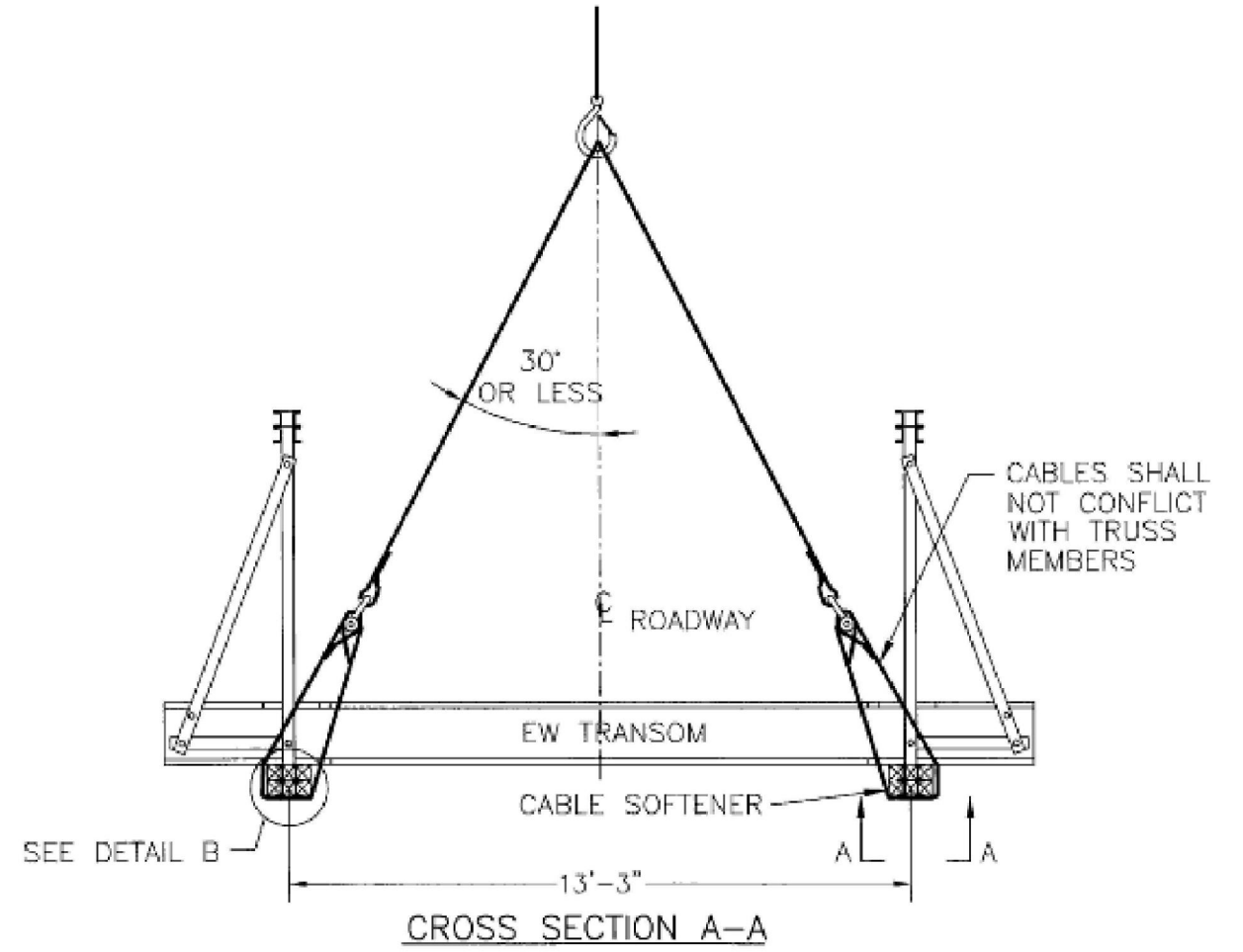
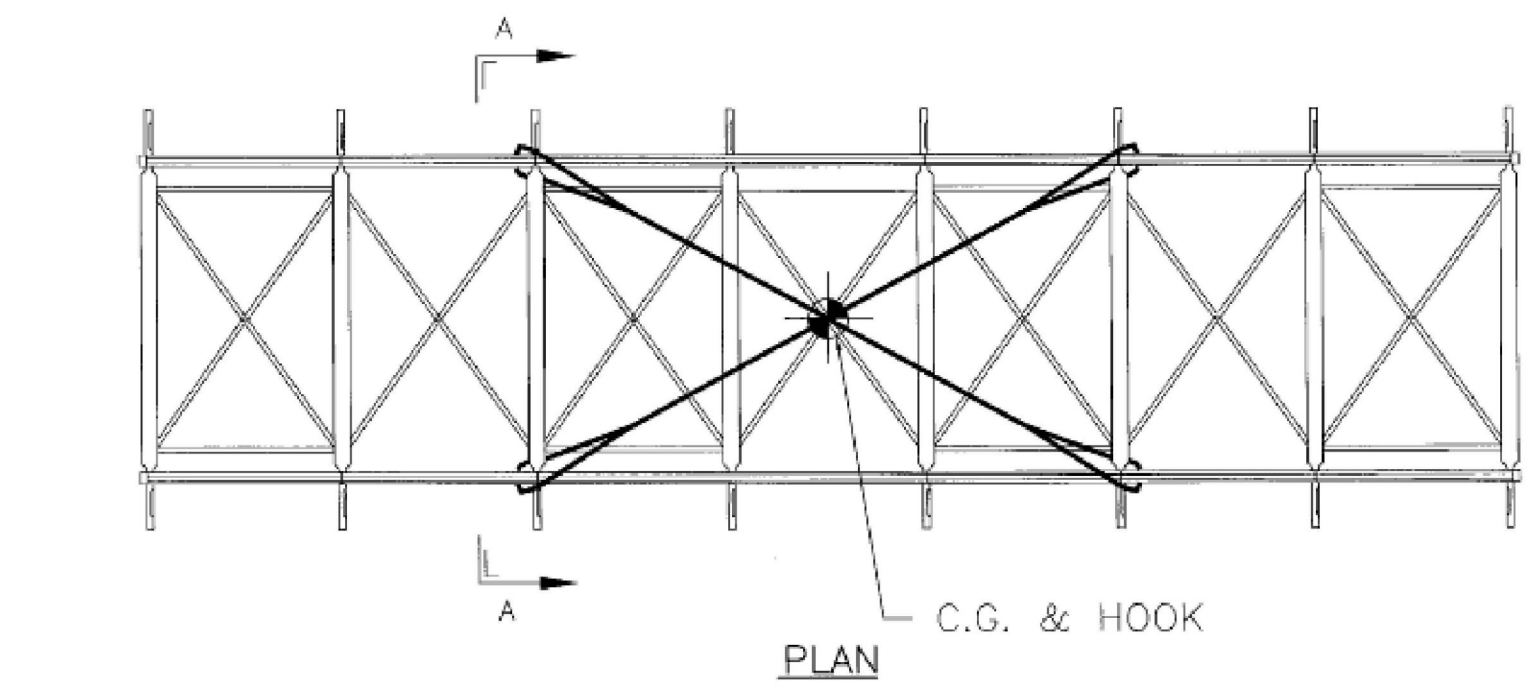
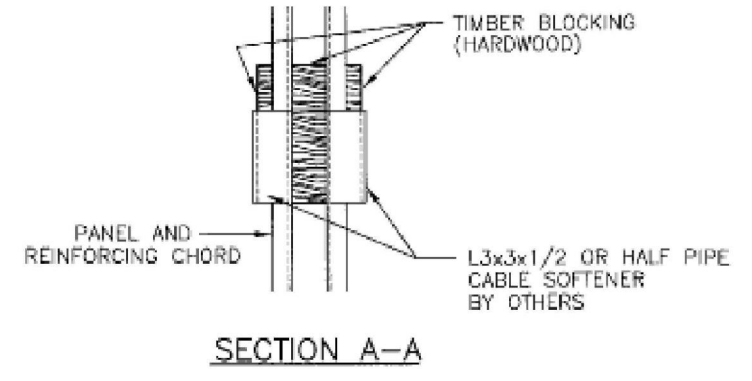
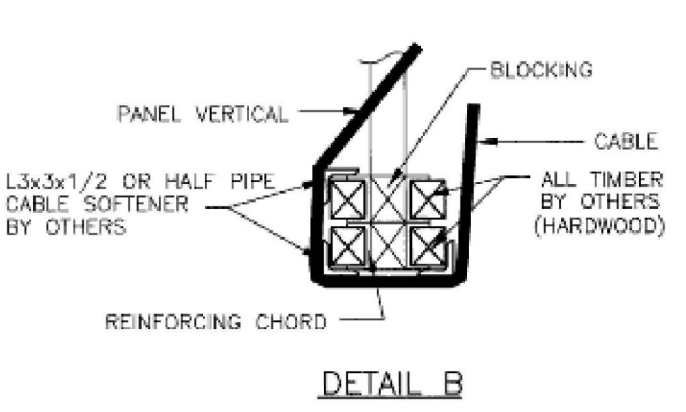
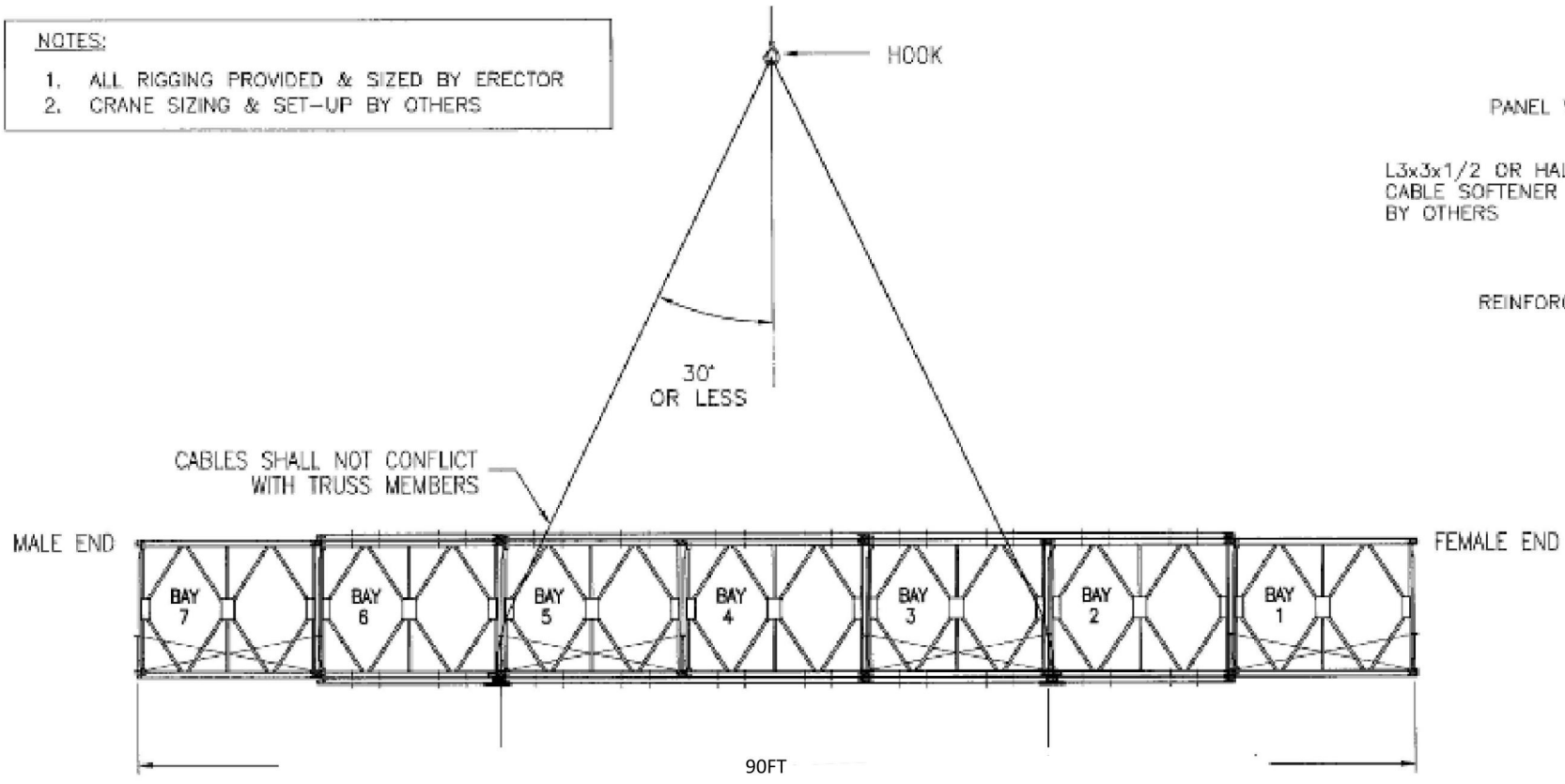
**ACROW**  
**BRIDGE**  
Building Bridges.  
Connecting People.  
Acrow Bridge  
181 New Road, Parsippany, NJ 07054

ACROW 700XS BRIDGE  
EXTRA WIDE SSRH  
CROSS SECTION

Drawn by: [Signature]	DATE: MAY 24, 2013	CONTRACT NO.:
Checked by: [Signature]	SCALE: (N.E.S.L.)	
Approved by: [Signature]		
DRAWING NO.:		PKG.:
SHEET NO.:		

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**NOTES:**  
 1. ALL RIGGING PROVIDED & SIZED BY ERECTOR  
 2. CRANE SIZING & SET-UP BY OTHERS



**APPROXIMATE WEIGHT WITHOUT DECK = 25 KIPS (12.5 TONS)**  
**APPROXIMATE WEIGHT WITH DECK = 48 KIPS (24 TONS)**

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REV.	DATE	DESCRIPTION	BY	APPR.	SEAL

**ACROW BRIDGE** Building Bridges. Connecting People.  
 Acrow Corporation of America  
 181 New Road, Parsippany, NJ 07054

ACROW PANEL 700XS BRIDGE  
 LIFTING/ RIGGING PLAN  
 70FT x SCW SSR BRIDGE  
 BOND SPRING RD. BRIDGE 399 REPLACEMENT  
 GRANT COUNTY, DPW  
 WENATCHEE, WASHINGTON

DRAWN BY: <u>RSJ</u>	DATE: <u>MAY 29, 2018</u>	CONTRACT NO.:
CHECKED BY: <u>TW</u>	SCALE: <u>AS SHOWN</u>	
APPROVED BY: <u>SP</u>		

WEST COMPANY CONSTRUCTION  
 AIRWAY HEIGHTS, WA

DRAWING NO. AB1741-LP  
 SHEET 1 OF 1

**Provisions**

**INTRODUCTION**

The Washington State Department of Transportation's Standard Specifications for Road, Bridge and Municipal Construction 2014 (WSDOT Standard Specifications) shall apply unless otherwise noted in the following Special Provisions. The "Contracting Agency" or "Owner" shall be the Confederated Tribes and Bands of the Yakama Nation. Additional specifications in the following contract sections are included for items not covered by the WSDOT Standard Specifications.

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

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

Description

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

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

2. A spill Containment Kit shall be on site and crews shall be trained in its use.

3. Biodegradable Hydraulic Fluid shall be installed into each piece of heavy machinery working within 50 feet of the river.

Measurement

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

Payment

Payment shall be considered full compensation for all equipment, labor, tools, materials, and incidentals necessary to complete this work as specified. Payment will be made in accordance with Section 1-04.1 for the following bid items: "TESC, SPCC Plan and Implementation" per lump sum.

**ITEM 002 - MOBILIZATION**

This item shall consist of preparation work and operations performed by the Contractor in accordance with the provisions of Section 1-09.7 of the Washington Department of Transportation Standard Specifications (Standard Specifications), and as amended by these Special Provisions.

1. Temporary site access shall be along alignments shown in the plans. Minor deviations to the alignments may occur as directed by the Owner to preserve sensitive areas or trees, or to avoid damage to other features identified in the field. Deviations from the alignments shown in the plans shall be approved by Owner prior to use.

2. Prior to demobilization, staging areas and site access routes shall be ripped to decompact soils to 18" or greater depth.

Measurement and Payment

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

**ITEM 003 - TRAFFIC CONTROL**

Temporary traffic control requirements shall include barricades and construction signage at the entrance to the project site and any other measures per Section 1-10 and local regulations.

Measurement

"Traffic Control" will be measured by lump sum.

Payment

"Traffic Control", lump sum.

**ITEM 004 - TEMPORARY BRIDGE**

A temporary bridge, 90 feet long, shall be required to access the west side channel site and fill area. A typical bridge is shown in the Plans and supplier information will be provided upon request. Contractor shall submit an access Plan including drawings showing details of proposed methods for providing access for equipment, including loaded haul trucks, to the sites. Review and approval of the Plan shall not relieve the Contractor from full responsibility for the adequacy and safety of the crossing.

The construction Contractor shall allow the bridge to be used by a separate vegetation contractor so that they may stockpile plants and supplies in the project area for later revegetation efforts.

Measurement

Installation, maintenance, and removal of Temporary Bridge and associated items such as abutments, footings, ramps, and sediment and water controls shall be included in this item.

"Temporary Bridge" will be measured by the lump sum.

Payment

Payment for "Temporary Bridge" will be made per lump sum.

**ITEM 005 - CLEARING AND GRUBBING**

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

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

2. Included in this item are the removal and salvage of approximately 40 trees, varying in size from 12" to 36" diameter at breast height (dbh). Salvaged Trees shall be installed as large woody material during construction of the Side Channel Site. To the maximum practicable extent, the Contractor shall excavate to loosen soil around each rootwad and then push over the trees in order to salvage logs with intact attached roots. Salvaged Trees may be temporarily stockpiled outside of the clearing limits but within reach of the excavator during side channel construction.

3. Trees and shrubs smaller than 12" dbh that are removed during clearing and grubbing shall be left on site, placed outside of limits of disturbance, to be used as slash during installation of Logs. Unused excess slash may remain on site. Slash remaining on site shall not be in left in large individual piles, but shall be evenly distributed.

4. Vegetation protection and restoration per Section 1-07.16(2) shall be incidental to Clearing and Grubbing.

Measurement

Removal and Salvage of trees and shrubs shall be considered incidental to Clearing and Grubbing.

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

"Clearing and Grubbing," including the above amendments to the item will be measured by lump sum.

Payment

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

**ITEMS 006-007 - CHANNEL EXCAVATION INCL. HAUL**

This item is applicable to excavation at the following sites:

1. West Side Channel
2. East Side Channel

This item consists of excavating, loading, hauling, placing, and embankment compacting, or otherwise disposing of the material in accordance with Section 2-03 of the Standard Specifications, and as amended by these Special Provisions.

1. Portions of work will be in water. The Contractor is advised that shallow groundwater may be encountered throughout excavation areas.

2. This item includes "Cofferdam" and "Pumping".

3. This item includes hauling of excavated material to an on-site disposal site provided by the Owner. The unit contract price per cubic yard shall include "Haul".

4. This item includes detail grading to shape the channel, including creating pools within the channel, as shown in the Plans. Pools shall be over-excavated into the streambank to provide room to install logs with roots and salvaged trees.

5. No work shall occur outside of the limits of disturbance shown in the Plans unless authorized by the Owner.

6. A cultural staff person will be present on site during all excavation activities.

Measurement

"Channel Excavation Incl. Haul" will be measured by cubic yard. All excavated material will be measured in the position it occupied before the excavation was performed. An original ground measurement was taken using digital terrain modeling survey techniques. 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 by the Owner. No additional compensation will be made for excavated material that is stockpiled, re-excavated, and moved again.

Payment

Payment shall be considered full compensation for all equipment, labor, tools, materials, and incidentals necessary to complete this work as specified. Payment will be made in accordance with Section 1-04.1 for the following bid items: "Channel Excavation Incl. Haul" per cubic yard.

**ITEMS 008 - SALVAGE COBBLE**

This item is including loading, hauling, stockpile, and placing native river cobble encountered during channel excavation, to be reserved in a stockpile for use as select fill as needed to replace soft soils or as backfill of log structures. 200 CY of cobble shall be stockpiled, of which some or all will be used as needed. Unused cobble shall be moved to the fill area.

Measurement

Onsite movement, stockpiling, and placement are included in this item.

"Salvage Cobble" will be measured by the cubic yard of stockpiled material.

Payment

Payment will be made for the following bid items: "Salvage Cobble" per cubic yard.



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**ITEMS 009-011 - LOGS {DILL CREEK AND SIDE CHANNEL SITES}**

Description

Logs includes all work associated with installation of logs with roots, bumper logs, upright logs, timber piles, threaded rod, salvaged trees at the following sites:

1. West Side Channel
2. East Side Channel
3. Dill Creek

This item includes movement of materials from stockpiles to installation areas, and excavation and backfill to partially bury Logs, and controlling water and turbidity using Cofferdams and Pumping.

Owner supplied logs will be stockpiled at the Preston Pit, approximately 3 miles from the project site. The Contractor will be given a key that must be returned immediately upon project completion. Logs become available beginning July 8, 2019.

Materials

**1. Logs:**

Logs and Logs with roots will be supplied by the Owner to the site staging areas. Quantities for each site are shown in the Plans. Owner supplied Logs will have the following characteristics:

Logs with Roots: 40' long and 18-24" dbh.

The Contractor shall make up to 20 Upright Logs by breaking 10-15 feet off of the cut end of imported Logs with Roots.

**2. Salvaged Trees:** Salvaged Trees are whole trees including roots, salvaged from the clearing limits of side channel work. Tree species may include deciduous and coniferous varieties.

**3. Slash:** Slash includes shrubs and small trees removed within the clearing limits.

Construction Requirements

See Plans and Provisions for "Cofferdam" and "Pumping" at the Dill Creek Site.

**Logs:** Locations of Logs and Logs with Roots shall generally be as indicated on the Plans. However, final location will depend upon the size, shape and quantity of material delivered or salvaged. Installation of Logs shall be understood to require a "fit in the field" approach as directed by the Owner. Logs shall be stabilized by partial burial and/or bracing provided by Upright Logs or standing trees.

**Salvaged Trees:** Salvaged trees shall be installed as directed by the Owner. Care shall be taken when moving and installing salvaged trees so that branches and roots remain attached to the tree. Salvaged Trees shall be stabilized by partial burial, bracing to Upright Logs or standing trees, or held down by other partially buried logs. Some Salvaged Trees shall be moved up to 500 feet to their installation sites.

**Slash:** Slash cleared from within the clearing shall be incorporated into log structures as directed by the Owner. Intermingle, stack, and rack slash material to the installed logs and piles to emulate natural accumulations of wood material.

**Earthwork:** Where partial burial of logs is required, excavate trench or pit as directed by the Owner. Stockpile the fill within the designated disturbance area. Backfill the logs as each layer is installed. A cultural staff person will be present on site during all excavation activities.

**Coordination with vegetation contractor:** Construction contractor will allow the use of temporary bridge while it is in place for revegetation contractor to haul reveg. supplies across to river right. Scheduling for this will be coordinated between the Owner and the construction contractor.

Measurement

Measurement will be based on the portion of work completed, measured as each completed site.

"Logs" will be measured by lump sum per Site.

Cofferdams at the Dill Creek site and at the inlets and outlets of Side Channel sites, and Pumping associated with preventing turbidity from entering the river, shall be incidental to the lump sum price for "Logs" at each site..

Payment

The contract price for "Logs" shall be full compensation for all costs incurred for equipment, materials and labor for loading and hauling logs from stockpile areas, and installing logs. Payment will be made in accordance with Section 1-09.9 for the following bid items: "Logs" as lump sum per site.

**ITEMS 012 - 014 - LOG STRUCTURE**

Description

Log Structure includes items shown in the plans as Bar Apex Log Structure, Riverbank Log Structure, or Floodplain Roughness.

This item is applicable to sites in the Plans labeled:

1. Bar Apex Log Structures
2. Riverbank Log Structure
3. Floodplain Roughness

"Log Structure" includes all work associated with onsite movement and installation of, logs, logs with roots, timber piles, whole trees, salvaged trees, slash, bumpers, and securing with threaded rod in the Plans. This item includes movement from stockpiles to installation areas, excavation and backfill to partially bury "Log Structure", hauling and disposal of excess fill. Cofferdam and pumping are not required at "Log Structure".

Owner supplied logs will be stockpiled at the Preston Pit, approximately 3 miles from the project site. The Contractor will be given a key that must be returned immediately upon project completion. Logs become available beginning July 8, 2019.

Materials

Material quantities for each site are shown in the Plans.

**1. Logs:** Logs and Logs with roots will be supplied by the Owner to the site staging areas. Quantities for each site are shown in the Plans. Owner supplied Logs will have the following characteristics:

Logs with Roots: 40' long and 18-24" dbh.

Logs: 40' long and 12-18" diameter at scaled end.

**2. Timber Piles:** Timber Piles will be supplied by the Owner to the site staging areas. Quantities for each site are shown in the Plans. Timber Piles will have the following characteristics: 40' long and 16" diameter in middle of log.

**3. Salvaged Trees:** Salvaged Trees are whole trees including roots salvaged from within the limits of disturbance of side channel. Tree species may include deciduous and coniferous varieties.

**4. Slash:** Slash includes shrubs and small trees removed within the clearing limits, or provided by the Owner at stockpiles near the sites.

**5. Threaded Rod:** Install threaded rod, washers, and nuts as specified in the Plans.

Construction Requirements

**Logs:** Locations of Logs and Logs with Roots shall generally be as indicated on the Plans. However, final location will depend upon the size, shape and quantity of material delivered or salvaged. Installation of Logs shall be understood to require a "fit in the field" approach as directed by the Owner. Logs shall be stabilized by partial burial and/or bracing provided by Timber Piles. Some Logs shall be secured to Timber Piles or other Logs via Fully Threaded Rod. The ends of cut logs shall not be left on site, but shall be disposed of off site at the Contractor's expense.

**Timber Piles:** Construction of Timber Piles shall include on-site movement and installation of timber piles to designated sites shown in the Plans. Timber Piles shall be per the approximate numbers and quantities indicated on the plans. Specific locations shall be determined in the field and directed by the Owner. The required embedment depth is indicated on the plans. Installed Timber Piles shall also have the following field-directed characteristics:

c. Timber Piles shall be installed at various angles and with varying heights above ground to break up a uniform appearance.

d. Each Timber Pile log shall have a broken top unless directed otherwise by the Owner's Representative. The preferred method shall be to break off the top 4-8 feet before installing the pile. Grinding or making multiple plunge cuts with chain saw to provide a roughened top are other acceptable methods.

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

a. Minimum of 800 kN (80 tons) of centrifugal force.

b. Side grip with minimum 16" space between ends of jaws so that 16" diameter log will fit into the jaws.

At each pile installation site, a minimum of one pile shall be tested for pullout resistance. Each test will require up to four individual pulls, each at a deeper depth. See details in Plans. The Contractor shall provide the tensiometer and associated hardware.

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

**Salvaged Trees:** Salvaged trees shall be installed in log structures as shown in the Plans or as directed by the Owner. Care shall be taken when moving and installing salvaged trees so that branches and roots remain attached to the tree. Salvaged Trees shall be stabilized by partial burial, bracing to Timber Piles or standing trees, or held down by other partially buried logs.

**Slash:** Slash cleared from within the clearing shall be incorporated into log structures as directed by the Owner.

Intermingle, stack, and rack slash material to the installed logs and piles to emulate natural accumulations of wood material.

**Earthwork:** Where partial burial of logs is required, excavate to subgrade. Stockpile the fill within the designated disturbance area. Sort materials by general sizes, separating piles for coarse and fine material. Backfill the logs as each layer is installed. Use coarse fill in lower layer and along waterward edge, and finer materials on top layer. Load and haul excess fill to the fill site provided by the Owner. A cultural staff person will be present on site during all excavation activities.

Measurement

Measurement will be based on the portion of work completed, measured as each completed site.

"Log Structure" will be measured by lump sum per Site.

Payment

Payment will be made in accordance with Section 1-09.9 for the following bid items: "Log Structure" as lump sum per site. {Logs for Side Channel Site is not included in this item}.

The contract price for "Log Structure" shall be full compensation for all costs incurred for equipment, materials and labor for loading and hauling logs from stockpile areas, installing and securing logs, timber piles, and salvaged trees as outlined in the plans. Earthwork, installing slash and threaded rod shall be incidental to Log Structures.



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**COFFERDAM {Incidental to "Logs"}**

Description

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

Cofferdam locations are as follows:

1. Dill Creek - 75 ft
2. East Side Channel - inlet 150 ft, outlet 100 ft
3. West Side Channel - inlet 150 ft, outlet 85 ft

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

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

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

Materials

The Contractor shall provide all required materials for the project. If Bulk Bag Cofferdam is the method to be used, see details for Bulk Bag Cofferdams on the Plans.

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

Construction Requirements

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

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

Measurement and Payment

Cofferdam shall be incidental to "Logs".

**PUMPING {Incidental to "Logs"}**

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

Description

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

Materials

1. Two 6" trash pumps, each with pumping capacity greater than 600 gpm, assuming 12 feet of vertical lift and 300 feet of discharge hose. To prevent turbidity from entering the river, pumps may need to run 24 hrs or until water is clear. Pumps shall have soundproofing. Electric pumps with generators and quiet packs are a preferred and pre-approved method.
2. One or more 2" pump(s) with 100 feet of discharge hose for each pump.
3. Each water intake shall have a fish screen installed, operated and maintained according to NMFS' fish screen criteria (NMFS 1997; NMFS 2008). No pumping can occur until fish screen has been approved by Owner prior to installation.
4. Pumps shall be placed within rigid or flexible pool to contain fuel or oil spills. Diapers shall be stored at each pump.
5. Environmental Protection Measures such as straw bales, perforated pipe for discharge flow distributors, geotextiles, filter bags, or other means of controlling water and turbidity. No turbidity shall be allowed to enter the river or wetlands.

Construction Requirements

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

Environmental Protection Measures

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

Measurement and Payment

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

Pumping shall be incidental to "Logs".



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