CHEWUCH RIVER MILE 4
FISH HABITAT ENHANCEMENT PROJECT

SITE LOCATION:
LATITUDE: 48°31'16"
LONGITUDE: -120°11'05"
OKANOGAN COUNTY, WASHINGTON
WATERBODY: CHEWUCH RIVER
TRIBUTARY OF: METHOW RIVER

LOCATION MAP

PROJECT LOCATION

VICTINITY MAP

SEATTLE
WINCHESTER
ELLENSBURG
YAKIMA

LOCATION MAP

SEATTLE
WINCHESTER
ELLENSBURG
YAKIMA
BPA HIP III

This project was designed with accordance with the BPA Habitat Improvement Program, Programmatic Biological Opinion (HIP III). HIP III General Conservation Measures (GCM) are included on sheets 3 and 4. Site specific direction is included in the following general notes. Any variances from HIP III are requested by owner.

EXISTING DATA

Topographic survey collected by Inter-Fluve, Inc. by RTK GPS and Total Station in 2017-18. Referenced to NAD83 Washington State Plane, North Zone US feet NAD83.

CULTURAL RESOURCES

A Yakama Nation Archeologist will be on site during construction. Encountering the following cultural resources requires the immediate discontinuation of all ground disturbing activity:

- Native American cultural artifacts (example: flakes, arrowheads, stone tools, bone tools, pottery, etc.)
- Historic era artifacts (example: building foundations, homesteads, shipwrecks, mining camps, etc.)

Do not touch or move the objects and maintain the confidentiality of the site. Follow the procedures listed in the BPA Inadvertent Discovery Procedure and await further direction from the archeologist and BPA's Cultural Resources Staff.

INVASIVE SPECIES CONTROL

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

DISTURBANCE LIMITS

Access routes and clearing limits will be staked in the field by the owner prior to construction. Access for channel construction shall utilize an "inside-out" approach to construction and haulinig routes, which shall remain within the channel construction footprint.

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.

All sapling and trees to be removed for access will be approved and clearly marked by the owner's representative.

All trees removed within clearing limits shall be removed whole with roots intact and utilized in the channel construction as directed by owner's representative.

ABBREVIATIONS

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>APPRO</td>
<td>Approximate</td>
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<tr>
<td>CY</td>
<td>Cubic Yards</td>
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<tr>
<td>LIM</td>
<td>Linear</td>
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<tr>
<td>WAP</td>
<td>Water Area Project</td>
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<tr>
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<tr>
<td>LARG</td>
<td>Large Woody Material</td>
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<td>MUD</td>
<td>Mud</td>
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<td>Maximum</td>
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<tr>
<td>ERO</td>
<td>Erosion and Sediment Control</td>
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<td>CON</td>
<td>Control</td>
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<td>Existing</td>
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<td>TYP</td>
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<tr>
<td>FB</td>
<td>Full Bed</td>
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<td>DF</td>
<td>Deck Foot</td>
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<td>HORIZ</td>
<td>Horizontal</td>
</tr>
<tr>
<td>VERT</td>
<td>Vertical</td>
</tr>
<tr>
<td>SRL</td>
<td>Surface Elevation</td>
</tr>
<tr>
<td>YR</td>
<td>Year</td>
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YAKAMA NATION FISHERIES PROGRAM

CHEWUCH RIVER MILE 4.2

FISH HABITAT ENHANCEMENT

501 Portway Avenue, Suite 101
Hood River, OR 97831
541-386-9003
www.inter-fluve.com
D) Temporary Stream Crossings:  
A) Existing Stream Crossings Will Be Preferentially Used When Reasonable, and the Number of Temporary Stream Crossings Will Be Minimized. 
B) Temporary Stream Crossings Include Construction Equipment and Vehicles Crossings Over Perennials Streams During Construction; Treated Wood Shall Not Be Used on Temporary Bridge Sites. 
C) Equipment and Vehicles Will Cross the Stream in the Wet Zone Only Where: 
1) The Streambed Is Dry; or 
2) Erosion Control Measures Are Placed in the Stream and Used as a Crossing. 
D) Vehicles and Machinery Will Cross at Right Angles to the Main Channel Whenever Possible. 
E) The Location of the Temporary Crossing Will Avoid Areas That May Increase the Risk of Stream Channel Re-routing or Avulsion. 
F) Potential Spawning Habitat (i.e., Pool, Shallows, and Pools) Will Be Avoided to the Maximum Extent Possible. 
G) No Stream Crossings Will Occur at Active Spawning Sites, When Hosted Adult Lists Are Present. 
H) When Eggs or Alevins Are in the Gravel, the Appropriate State Fish and Wildlife Agency Will Be Contacted for Specific Time Information. 
I) After Project Completion, Temporary Stream Crossings Will Be Obliterated and the Stream Channel and Habitat Restored. 

III. Temporary Erosion Controls Will Be in Place Before Any Significant Alteration of the Site. 
A) Erosion Control Measures Will Be Prepared and Carried Out, and Contaminated Sediment Will Be Removed. 
B) Temporary Erosion Controls Will Be in Place Before Any Significant Alteration of the Site and Appropriately Installed Downstream of Project Activity Within the Riparian Buffer Area. 
C) Riparian Buffer Rehabilitation Is In-place Before Operation. 
D) If There Is a Potential for Erosion-Sediment to Enter the Stream, Sediment Barriers Will Be Installed and Maintained for the Duration of the Project Activity. 
E) Temporary Erosion Control Measures May Include Fiber Whittles, Silt Fences, Jute Matttress, Fiber Mulch, and Soil Binder. On Geotechnical Roads and Paths, the Following Will Be Preferentially Used When Reasonable and the Number and Length of Temporary Access Roads and Paths Through Riparian Areas and Floodplains Will Be Minimized: 
1) Temporary Access Roads and Paths Will Not Be Built on Slopes Where Grade, Soil, or Other Geotechnical Features Indicated the Likelihood of Sediment Erosion or Failure. 
2) If Slopes Are Steep, a Temporary Access Road Will Be Established By a Civil Engineer With Experience in Steep Road Design. 
3) The Use of Temporary Access Roads in Riparian Areas Will Be Minimized. When Temporary Vegetation Removal Is Required, Vegetation Will Be Cut at Ground Level and Not Grubbed. 
4) At Project Completion, All Temporary Access Roads and Paths Will Be Obliterated, and the Soil Will Be Restored to the Precisely Defined Channel and pavement Rights-of-Way (ROW). 
5) The Use of Comprehensive Degree of Decommissioning and Involves Disconsuming the Surface and Ditch, Pulling the Road Material, and Replanting to Match the Original Contour. 

D) Access Roads and Paths In Wet Areas or Areas prone to Flooding Will Be Obliterated By the End of the In-Water Work Window.
WORK AREA ISOLATION & FISH SALVAGE.

ANY WORK AREA WITHIN THE WETTED CHANNEL WILL BE ISOLATED FROM THE ACTIVE STREAM WHENEVER ESA-LISTED FISH ARE REASONABLY CERTAIN TO BE PRESENT, OR OF THE WORK AREA IS LESS THAN 300 FEET UPSTREAM FROM KNOWN SPawning HABITATS. WHEN WORK AREA ISOLATION IS REQUIRED, DESIGN PLANS WILL INCLUDE ALL ISOLATION ELEMENTS, FISH RELEASE AREAS, AND, WHEN A FLAP IS USED TO DEACTIVATE THE ISOLATION AREA AND FISH ARE PRESENT, A FISH SCREEN THAT MEETS NMFS FISH SCREEN CRITERIA (NMFS 2011, OR MOST CURRENT) WORK AREA ISOLATION AND FISH CAPTURE ACTIVITIES WILL OCCUR DURING PERIODS OF THE COOLEST AIR TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING CONDITIONS APPROPRIATE TO MINIMIZE STRESS AND DEATH OF SPECIES PRESENT.

FOLLOW STEPS 1 AND 2, OR WHEN OTHER MEANS OF FISH CAPTURE MAY NOT BE FEASIBLE OR EFFECTIVE. DEWATERING AND REWATERING (STEPS 4 AND 5) WILL BE IMPLEMENTED UNLESS ELECTROFISHING (STEP 3) CAN BE IMPLEMENTED TO ENSURE ALL FISH HAVE BEEN REMOVED EFFECTIVE. IF ELECTROFISHING WILL BE USED TO CAPTURE FISH FOR SALVAGE, THE SALVAGE Operation WILL BE LED BY AN EXPERIENCED FISHERIES BIOLOGIST AND THE FOLLOWING GUIDELINES WILL BE FOLLOWED:

A) THE NMFS ELECTROFISHING GUIDELINES (NMFS 2000);

B) ONLY DIRECT CURRENT (DC) OR PULSED DIRECT CURRENT (PDC) WILL BE USED, IF PHYSICALLY FEASIBLE OR EFFECTIVE. IF ELECTROFISHING WILL BE USED TO CAPTURE FISH FOR SALVAGE, THE SALVAGE Operation WILL BE LED BY AN EXPERIENCED FISHERIES BIOLOGIST AND THE FOLLOWING GUIDELINES WILL BE FOLLOWED:


- HTTP://WWW.FWS.GOV/PACIFIC/FISHERIES/SPHABCON/LAMPREY/PDF/BEST%20MANAGEMENT%20PRACTICES%20FOR%20PACIFIC%

- LAMPREY%20APRIL%202010%20VERSION.PDF

- HTTP://WWW.NWR.NOAA.GOV/SALMON-HYDROPOWER/FERC/UPLOAD/FISH-PASSAGE-DESIGN.PDF

- D) SALVAGE WILL BE SUPERVISED BY A QUALIFIED FISHERIES BIOLOGIST EXPERIENCED WITH WORK PERFORMANCE OF ANY SPECIES FOR WHICH AN INTRA-AQUATIC STAGING AREA IS NEEDED DURING CONSTRUCTION.

- A) BLOCK NETS WILL BE INSTALLED AT UPSTREAM AND DOWNSTREAM LOCATIONS AND MAINTAINED IN A SECURED POSITION TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.

- B) BLOCK NETS WILL BE SECURED TO THE STREAM CHANNEL BED AND BANKS UNLESS FISH CAPTURE AND TRANSPORT ACTIVITIES ARE COMPLETE. BLOCK NETS MAY BE LEFT IN PLACE FOR THE DURATION OF THE PROJECT TO EXCLUDE FISH.

- C) IF BLOCK NETS REMAIN IN PLACE MORE THAN ONE DAY, THE NETS WILL BE MONITORED AT LEAST DAILY TO ENSURE THEY ARE SECURED TO THE BANKS AND FREE OF ORGANIC ACCUMULATION. THE PROJECT IS WITHIN BULL TROUT SPawning AND REARING HABITAT. THE BLOCK NETS MUST BE CHECKED EVERY HOUR TO ENSURE SPECIES ARE NOT TRAPPED ON THE NET. LESS FREQUENT INTERVALS MUST BE APPROVED THROUGH A VARIANCE REQUEST.

- D) ONLY DIRECT CURRENT (DC) OR PULSED DIRECT CURRENT (PDC) WILL BE USED FOR ALL ELECTROFISHING ACTIVITIES. ELECTROFISHING WILL BEGIN WITH A MINIMUM PULSE WIDTH AND RECOMMENDED VOLTAGE AND CONDUCTIVITY CHECKED, AND PROCEDURES ADJUSTED OR ELECTROFISHING POSTPONED TO REDUCE MORTALITY.

- E) DIVERSION AROUND THE CONSTRUCTION SITE MAY BE ACCOMPLISHED WITH A COFFER DAM AND A BY-PASS CHANNEL OR PUMP, OR A LINE, NON-ERODIBLE DIVERSION DITCH. WHERE GRAY TURKEY IS NOT A POSSIBLE AUMP, A PUMP MAY BE USED, BUT MUST BE OPERATED IN SUCH A WAY AS TO AVOID RECREATING THE DIVERSION AND RECAPTURE OF SPECIES WHERE WORK AREA ISOLATION IS NECESSARY ACCORDING TO CONDITIONS ABOVE. ELECTROFISHING (STEP 3) CAN BE USED TO ENSURE ALL FISH HAVE BEEN REMOVED EFFECTIVE. IF ELECTROFISHING WILL BE USED TO CAPTURE FISH FOR SALVAGE, THE SALVAGE Operation WILL BE LED BY AN EXPERIENCED FISHERIES BIOLOGIST AND THE FOLLOWING GUIDELINES WILL BE FOLLOWED:

- F) AS RAPIDLY AS POSSIBLE (ESPECIALLY FOR TEMPERATURE-SENSITIVE BULL TROUT), FISH WILL BE RELEASED IN AN AREA THAT PROVIDES ADEQUATE COVER AND FLOW REFUGE. UPSTREAM RELEASE IS GENERALLY PREFERRED, BUT FISH RELEASED DOWNSTREAM WILL BE SUITABLY OUTSIDE OF THE INFLUENCE OF CONSTRUCTION.

- G) SALVAGE WILL BE SUPERVISED BY A QUALIFIED FISHERIES BIOLOGIST EXPERIENCED WITH WORK AREA ISOLATION AND COMPETENT TO ENSURE THE SAFE HANDLING OF ALL FISH.

- H) DIVERSION AROUND THE CONSTRUCTION SITE MAY BE ACCOMPLISHED WITH A COFFER DAM AND A BY-PASS CHANNEL OR PUMP, OR A LINE, NON-ERODIBLE DIVERSION DITCH. WHERE GRAY TURKEY IS NOT A POSSIBLE AUMP, A PUMP MAY BE USED, BUT MUST BE OPERATED IN SUCH A WAY AS TO AVOID RECREATING THE DIVERSION AND RECAPTURE OF SPECIES WHERE WORK AREA ISOLATION IS NECESSARY ACCORDING TO CONDITIONS ABOVE. ELECTROFISHING (STEP 3) CAN BE USED TO ENSURE ALL FISH HAVE BEEN REMOVED EFFECTIVE. IF ELECTROFISHING WILL BE USED TO CAPTURE FISH FOR SALVAGE, THE SALVAGE Operation WILL BE LED BY AN EXPERIENCED FISHERIES BIOLOGIST AND THE FOLLOWING GUIDELINES WILL BE FOLLOWED:

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YAKAMA NATION FISHERIES PROGRAM
CHEWUCH RIVER MILE 4.2
FISH HABITAT ENHANCEMENT

EXISTING CONDITIONS

PROPERTY LINE
EXISTING WETLAND
OHV

LEGEND

SCALE IN FEET
0
200
100

CONE POINT
INLET
PROPERTY LINE
EXISTING WETLAND

HINES ET AL. MAY

CHEWUCH RIVER FLOODPLAIN

12/31/19

YAKAMA NATION FISHERIES PROGRAM
CHEWUCH RIVER MILE 4.2
FISH HABITAT ENHANCEMENT

EXISTING CONDITIONS
PROJECT SITE DESIGN OVERVIEW

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CHEWUCH RIVER MILE 4.2
FISH HABITAT ENHANCEMENT

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

LEGEND

PROPERTY LINE

EXISTING BANK

OHV

TEMP ACCESS

DISTURBANCE LIMITS (EARTHWORK)

STOCKPILE/STAGING

EXISTING TREES >24", <24"

TREE TO BE REMOVED

TEMPORARY COFFERDAM

WOOD PLACMENTS

1. Stockpile area for logs, stream gravel, and transferring fill to road haulers.

2. Inlet log structure.

3. Riverbank log structure.

4. Temporary haul route.

5. Side channel length ~1,300 ft. See sheets 10-12.

6. Chewuch River.

7. Chewuch River Mile 4.2.

8. Fish habitat enhancement.


10. Stockpile/log structure.

11. Inlet log structure.

12. Riverbank log structure.

13. Temporary haul route.


15. Existing trees >24", <24".

16. Tree to be removed.

17. Refueling area.

18. Access via driveway from Red Dog Lane.

19. After project completion, place gravel surfacing top course at driveway and parking areas on this parcel.

20. Temporary stockpile/stocking.


22. Existing trees >24", <24".

23. Tree to be removed.
1. Riverbank log structure is in-water work to be performed during the authorized in-water work window.
2. Log locations, size, and alignments depicted here are typical. Some adjustments in the field may occur based on actual materials.
3. Shrubs 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.
4. Backfill using coarse materials (cobble) on lower level and on waterward-edge. Place finer material (sand) on upper layer. Bucket compact fill in 12" lifts.
5. 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 15'. Final depth to be determined by pullout test results.
NOTES
1. INLET LOG STRUCTURE IS IN-WATER WORK TO BE PERFORMED DURING THE AUTHORIZED IN-WATER WORK WINDOW.
2. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
3. SHRUBS 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.
4. BACKFILL USING COARSE MATERIALS (COBBLE) ON LOWER LEVEL AND ON WATERWARD EDGE. PLACE FINER MATERIAL (SAND) ON UPPER LAYER. BUCKET COMPACT FILL IN 12” LIFTS.
5. 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 15’. FINAL DEPTH TO BE DETERMINED BY PULLOUT TEST RESULTS.
NOTES:
1. PRESERVE TREES OUTSIDE OF THE LIMITS OF DISTURBANCE.
2. ALL TREES AND SHRUBS REMOVED FROM SIDE CHANNEL CONSTRUCTION AREA SHALL BE TEMPORARILY STORED ON FLOODPLAIN TO BE RE-USED AS SALVAGED TREES AND SLASH DURING CHANNEL CONSTRUCTION.
3. THE ACCESS ROUTE SHALL BE WITHIN THE CONSTRUCTION FOOTPRINT.
4. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.

LEGEND

- EXISTING TREES >24", <24"
- EXISTING WETLAND
- LOGS TO BE REMOVED
- LIMITS OF EXCAVATION
- COFFERDAM
- TYPICAL LOW WATER
- LARGE WOOD PLACEMENTS

TYPICAL SIDE CHANNEL LARGE WOOD CONFIGURATION

SIDE CHANNEL CONSTRUCTION
1.3 AC CLEAR AND GRUB
5,900 CY EXCAVATION, HAUL, DISPOSAL
300 CY EXCAVATE AND BACKFILL (LOG BURIAL)
72 LOGS WITH ROOTS
20 SALVAGE TREES

COFFERDAM AT SIDE CHANNEL OUTLET (IN-WATER WORK)
NOTES
1. PRESERVE TREES OUTSIDE OF THE LIMITS OF DISTURBANCE.
2. ALL TREES AND SHRUBS REMOVED FROM SIDE CHANNEL CONSTRUCTION AREA SHALL BE TEMPORARILY STORED ON FLOODPLAIN TO BE RE-USED AS SALVAGED TREES AND SLASH DURING CHANNEL CONSTRUCTION.
3. THE ACCESS ROUTE IS TYPICAL. ACCESS ROUTE WILL BE ADJUSTED IN FIELD TO MINIMIZE IMPACTS TO VEGETATION.
4. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.

LEGEND
- EXISTING TREES >24", <24"
- TREE TO BE REMOVED
- TEMP ACCESS
- LIMITS OF EXCAVATION
- COFFERDAM
- TYPICAL LOW WATER
- LARGE WOOD PLACEMENTS

NOTES
1. PRESERVE TREES OUTSIDE OF THE LIMITS OF DISTURBANCE.
2. ALL TREES AND SHRUBS REMOVED FROM SIDE CHANNEL CONSTRUCTION AREA SHALL BE TEMPORARILY STORED ON FLOODPLAIN TO BE RE-USED AS SALVAGED TREES AND SLASH DURING CHANNEL CONSTRUCTION.
3. THE ACCESS ROUTE IS TYPICAL. ACCESS ROUTE WILL BE ADJUSTED IN FIELD TO MINIMIZE IMPACTS TO VEGETATION.
4. LOG LOCATIONS, SIZE, AND ALIGNMENTS DEPICTED HERE ARE TYPICAL. SOME ADJUSTMENTS IN THE FIELD MAY OCCUR BASED ON ACTUAL MATERIALS.
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.

WHERE SAND OR SOFT SOILS ARE ENCOUNTERED AT FINISH GRADE, OVEREXCAVATE 6" AND APPLY 6" LAYER OF STREAMBED SEDIMENT

PLAN VIEW - TYPICAL SIDE CHANNEL LARGE WOOD CONFIGURATIONS

SECTION VIEW - TYPICAL POOL AND LWD

PROFILE VIEW - TYPICAL POOL AND RIFFLE

TYPICAL SECTIONS

12 OF 17
BOLTED CONNECTION NOTES

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

TIMBER PILE NOTES:

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

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

TESTING
1. TESTING OF PILES SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER. UP TO FOUR LOAD TESTS SHALL BE APPLIED TO EACH TESTED PILE. EACH OF THE FOUR LOAD TESTS SHALL BE APPLIED TO THE PILE WITH A DIFFERENT INSTALLED DEPTH. PROOF TESTS SHALL BE MADE AT UP TO FOUR EMBEDMENT DEPTHS. DEPTHS SHALL BE DETERMINED IN THE FIELD. AS A GUIDELINE, TEST EMBEDMENT DEPTHS MIGHT INCLUDE 8 FT, 10 FT, 11 FT, AND 12 FT.
2. EACH PILE TEST SHALL HAVE UPWARD LOAD GRADUALLY INCREASED AND AS ALIGNED TO THE LONG AXIS OF THE PILE. RECORD THE PILE DIAMETER, EMBEDMENT DEPTH AND MAXIMUM FORCE REQUIRED TO MOVE THE PILE VERTICALLY APPROXIMATELY 1 INCH. THEN DRIVE THE PILE TO A NEW DEPTH. APPLY NEW LOAD AND RECORD MAX FORCE THAT CAUSES THE PILE TO MOVE VERTICALLY 1 INCH. REPEAT FOR THIRD AND FOURTH TEST.
3. EXCAVATOR SHALL BE NO CLOSER TO PILE THAN NEEDED TO GENERATE DESIRED LOADING. LIMIT COMpressive LOADING OF THE TRACKS ON THE GROUND BY DRIVING THE EXCAVATOR ONTO LOGS LAID ON THE GROUND TO DISTRIBUTE THE WEIGHT OVER A LARGER AREA.
4. 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.
5. PILE EMBEDMENT DEPTH SPECIFIED IN THESE DRAWINGS MIGHT BE INCREASED AT NO ADDITIONAL COST TO THE OWNER PENDING PULL OUT TEST RESULTS. ASSUMED RESISTANCE IS 20,000 POUNDS. IF TESTING REVEALS FIELD PULLOUT RESISTANCE VALUES THAT ARE LESS THAN THE ASSUMED VALUES, PILES MAY BE REQUIRED TO BE DRIVEN UP TO 5 FT DEEPER THAN INDICATED IN PLANS.
ITEM 001 - TESC, SPCC Plan and Implementation

This item 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 0-17.15 of the Standard Specifications, and as amended by these Special Provisions.

1. The Contractor shall submit a TESC plan for the project to the Owner for approval. The TESC plan shall satisfy the requirements of the Washington Department of Ecology 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 or her 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 the Plan, and submitting SPCC material. 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 creases 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.

4. Provide certified weed-free straw, and apply it as a 3’ layer to all disturbed ground. Disturbed ground estimated to be 2.2 acres. Disturbed ground exceeding 2.2 acres shall be treated with seed and mulch at no cost to the owner. Seed mix will be provided by the Owner.

Payment:
Payment shall be considered full compensation for all equipment, labor, tools, materials, and services necessary to complete this work as specified. Payment will be made in accordance with Section 0-10.4 for the following bid items: TESC, SPCC Plan and Implementation per lump sum.

ITEM 002 - MATERIALS

This item shall consist of preparation work and placing of materials by the Contractor in accordance with the specifications 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 plan. Minor deviations to the alignments may occur as directed by the Owner to preserve sensitive areas or, for example, to avoid features identified in the field. Deviations from all alignments shown in the plans shall be approved by Owner prior to use.

2. Prior to the development of temporary access routes shall be required to be designed and constructed to the following standards.

3. An entrance log archway has been temporarily removed from the roadway to facilitate construction access. Upon demobilization, the contractor shall design and install a new 14’ high log arch. Log arch shall be suitably and aesthetically designed and installed for use by the Owner.

4. Approximately 10 dead cottonwood trees near the archway installation area shall be removed and hauled to the channel area to be incorporated as salvaged trees in channel construction.

Measurement and Payment:
Payment for mobilization shall be by lump sum contract price for, "mobilization," partial payment shall be provided as in Section 0-17.15 of the Standard Specifications. Payment shall be considered full compensation for all equipment, labor, materials, and incidental necessary to complete this work as specified.

ITEM 003 - TRAFFIC CONTROL

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

Measurement:
Traffic Control, lump sum.

Payment:
Traffic Control, lump sum.

ITEM 004 - CLEAVING AND GRUBBLING

This item comprises clear and grubbing for construction as shown on the plans including those areas required for Temporary Access Routes and in accordance with Section 2-10 of the Special Specifications, and as amended by these Special Provisions.

1. Areas for Cleaving 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 area required for Cleaving and Grubbing along the right-of-way by the Contractor and Clearing and Grubbling 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 26’ diameter at breast height (dbh). Salvaged Trees shall be installed as large woody material during construction of the Side Channel. To the maximum practicable extent, the Contractor shall execute to loosen soil around each rooted and then push over the trees in order to salvage logs with intact rootballs. Salvaged Trees may be temporarily placed outside of the clearing limits but within reach of the excavator during side channel construction.

3. Trees and shrubs smaller than 12” dish that are removed during cleaving and grubbing shall be placed outside of the limits of the suggested, to be used in planting during installation of Logs. Unused salvage slash may remain on site. Slash remaining on site shall not be left in large individual piles, but shall be evenly distributed.

4. Vegetation protection and revegetation per Section 1-07.16(2) shall be incidental to Cleaving and Grubbling.

Payment:
Removal and Salvage of trees and shrubs shall be incidental to Cleaving and Grubbling. 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.

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

Payment will be made in accordance with Section 0-10.4 for the following bid items: Cleaving and Grubbing per lump sum.

ITEM 005 - CHANNEL EXCAVATION INCL. HAUL

This item is applicable to excavation at the Side Channel site.

This item consists of excavating, loading, hauling, placing, and embankment compaction, 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," See Special Provisions (Sheet 18).

3. This item includes hauling of excavated material to an off-site disposal site provided by the Contractor. The contract unit 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. Pool shape and cross section points defining the limits of the measurement will be as stated by the Owner. No additional compensation will be made for excavated material that is stockpiled, re-escavated, and moved again.

"Cofferdam" of the inlet and outlet of Side Channel, and "Pumping" associated with preventing turbidity from entering the river, shall be incidental to "Channel Excavation Incl. Haul per cubic yard.

Payment:
Payment shall be considered full compensation for all equipment, labor, tools, materials, and incidental 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.

ITEM 006 - STREAMBED SEDIMENT

Description:
Streambed Sediment shall be installed on "Select materials" where finish grade soils are found to be too sandy or soft. In such cases, a subgrade shall be prepared by overexcavating and installing streambed sediment. This work consists of furnishing and installing channel bottom and longitudinal material to tapered subgrade or base in accordance with these specifications and as established by the Engineer.

Materials:
Materials shall meet the requirements of the following sections:

1. Streambed Sediment shall be a mix of rounded rock meeting the gradation requirements of 0-30.101 and quality requirements of 0-30.11.

Construction Requirements:
The depth of build and thickness of the Streambed Sediment layer may be adjusted to achieve the finished grades set forth in the Plans, however excess material that is used to fill over-accumulation of subgrade or that results in higher grades than designed shall not be paid without prior approval of the Owner.

The Contractor shall excavate to subgrade where the placement of Streambed Sediment is found to be needed by the Engineer. The excavation shall be kept levelled until Streambed Sediment is placed.

Measurement:
Streambed Sediment shall be measured per cubic yard, complete in place.

Payment:
Payment will be made in accordance with Section 1-04.1, for the following bid item: The Contractor will provide per cubic yard for "Streambed Sediment," shall be full compensation for all labor, materials, tools and equipment necessary to satisfactorily procure, deliver, stockpile, haul, and construct and place Streambed Sediment, excavation to subgrade, and deposition of excavated materials, as set forth in these specifications, and as directed by the Engineer.
NEW 007 - LOGS (SIDE CHANNEL SITE)

Description:
Logs include all work associated with delivery and installation of logs with roots, bumper logs, upright logs, timber piles, threaded rods, sloped trees at the Side Channel Site.

This item includes movement of materials from stockpiles to the project sites and to installation areas, and excavation and backfill to partially bury logs.

Quantities:
Logs and Logs with roots will be supplied by the Owner. The Contractor shall load and haul the logs from the Owner's stockpile at 1215 E Mellow Valley Hwy, Twisp, WA, 13 miles from the project site. Quantities for each site are shown in the Plans.

1. Logs: Owner supplied Logs will have the following characteristics:

- Logs: 40'-long and >12'-diameter at scarred end.
- Logs with Roots: 40'-long and 18-24'-d.bh.

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

3. Sloped Trees: Sloped Trees are whole trees including roots, sloped from the clearing limits of side channel work.

4. Slash: Slash includes shrub and small trees removed within the clearing limits.

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

Construction Requirements:
Logs: Installation locations of Logs and Logs with Roots shall generally be as indicated on the Plans. However, final locations will depend upon the site, and shape of supplied materials. 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.

Sloped Trees: Sloped trees shall be installed as directed by the Owner. Care shall be taken when moving and installing sloped trees so that branches and roots remain attached to the tree. Sloped Trees shall be stabilized by partial burial, bracing to Upright Logs or standing trees, or held down by other partially buried logs. Some Sloped Trees shall be moved up to 300 feet to their installation sites.

Slash: Slash cleared from within the clearing shall be incorporated into log structures as directed by the Owner. Intermingle, mix, and incorporate slash material into 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 installation.

Coordination with vegetation contractor: Construction contractor will coordinate with the Owner and the revegetation contractor to schedule hauling of revegetation supplies to locations within the site.

Measurement:
Measurement will be based on the portion of work completed as measured, completed and measured at each site. Logs will be measured by lump sum.

Material:
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 1-009 for the following bid items: 'Logs' as lump sum.

NEW 008-009 - LOG STRUCTURE

Description:
Log Structure includes inlet Log Structure and Riverbank Log Structure as shown in Plans.

'Log Structure' includes all work associated with delivery and installation of logs, logs with roots, timber piles, whole trees, stockpiled trees, slash, berming, and securing with threaded rod in the Plans. This item inclused movement of materials from stockpiles to installation areas, excavation and backfill to partially bury Log Structure, berming and securing with excess fill at. Cofferdams and pumping are required at Log Structure.

This item includes movement of materials from stockpiles to the project sites and to installation areas, and excavation and backfill to partially bury Logs.

Quantities:
Logs, Logs with roots, and Timber Piles will be supplied by the Owner. The Contractor shall load and haul the logs from the Owner's stockpile at 1215 E Mellow Valley Hwy, Twisp, WA, 13 miles from the project site. Quantities for each site are shown in the Plans.

1. Logs: Owner supplied Logs will have the following characteristics:

- Logs with Roots: 40'-long and 18-24'-d.bh.
- Logs: 40'-long and 12-18'-diameter at scarred end.

2. Timber Piles: Quantities for each site are shown in the Plans. Timber Piles will have the following characteristics: 40'-long and 18'-diameter in middle of log.

3. Sloped Trees: Sloped Trees are whole trees including roots sloped from within the limits of disturbance of side channel work. Trees include deciduous and coniferous varieties.

4. Slash: Slash includes shrub and small (<12'-d.bh) trees removed within the clearing limits, or provided by the Owner at stockpiles near the site.

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

Construction Requirements:
See Special Provisions (Sheet 16) for 'Cofferdams' and 'Pumping'.

Location of Logs and Logs with Roots shall generally be as indicated on the Plans. However, final locations will depend upon the site, shape and quantity of material delivered or sloped. 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 Threaded Rod. The ends of cut logs shall not be left on site, but 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 the approximate number 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:

- Timber Piles shall be installed at various angles and with varying heights above ground to break up a uniform appearance.
- Each Timber Pile shall have a broken top unless directed otherwise by the Owner's representative. The preferred method will be to break off the top 4-8 feet before installing the pile. Grading or mixing multiple piles cut with slope to provide a roughened top are also acceptable methods.
- Timber Piles shall be installed by vibratory hammer. Vibratory hammer shall have the following characteristics:
  - Minimum of 900 ft.-lb (690 cm) of centrifugal force.
  - Side grip with maximum 16'-0" space between ends of jacks so that 16'-0" diameter log will fit into the jacks.

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 test equipment and associated hardware.

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

Sloped Trees: Sloped 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 sloped trees so that branches and roots remain attached to the tree. Sloped 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, mix, and incorporate slash material into the installed logs and piles to emulate natural accumulations of wood material.

Earthwork: Where partial burial of logs is required, excavate trench 5'-0" wide and 3'-0" deep for each pile. Fill within the designated disturbance area. Mix materials by general sorts, separating piles for coarse and fine materials. Stockpile the logs as each layer is installed. Use course fill in lower layer and using downward 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 completed site. 'Log Structure' will be measured by lump sum.

Payment:
Payment will be made in accordance with Section 1-009 for the following bid items: 'Log Structure' as lump sum per site. [Logs for Side Channel Site is not included in this item]. 'Cofferdams' and 'Pumping' shall be incidental to 'Log Structure'.

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 sloped trees as outlined in the Plans. Earthwork, installing slash and threaded rod shall be incidental to Log Structures.
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<td>YAKAMA NATION FISHERIES PROGRAM</td>
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<td><strong>PUMPING</strong> (Incidental to other Items)</td>
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<td>This item includes de-watering and controlling turbidity within construction areas isolated from the river by Cofferdams. <strong>Description</strong></td>
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<td>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. <strong>Materials</strong></td>
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<td>1. Two 6&quot; 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&quot; 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 NFPS fish screen criteria (NFPS 1997; NFPS 2008). No pumping can occur until fish screens have been approved by Owner prior to installation. 4. Pumps shall be placed within rigid, or flexible pool to contain fuel or oil spills. Dispers will be stored at each pump. 5. Environmental Protection Measures such as stone holes, perforated pipe for discharge flow distribution, geotextiles, filter bags, or other means of controlling water and turbidity. No turbidity shall be allowed to enter the river or wetlands. <strong>Construction Requirements</strong></td>
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<td>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&quot; trash pumps(s) to lower the water surface within the isolated areas and discharge to an infiltration area. c. 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 upstream activity continues. b. If exceedences 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 measures, such as pumping into settling basins or filtration: geotextile fabric shall be required of the Contractor’s expense. d. 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 'Channel Excavation Inc. Hoe' and 'Log Structure'.</td>
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811 BLADING (2/02)  
**Description:**  
This work consists of surface blading the traveled way to a condition to facilitate traffic and provide proper drainage. Blading includes shaping the crown or slope of traveled way, and drainage ditches, in accordance with this specification. Watering shall be incidental to this item.

**Maintenance Requirements:**

**A. General:**
1. Blade and shape the existing traveled way and shoulders, including turnouts when otherwise ordered, to produce a surface which is uniform, consistent to grade, and crowned or cross-sloped as indicated by the character of the existing surface, unless otherwise specified. Thoroughly loosen surfacing material to no less than 2 inches depth or the depth of potholes or corrugations.
2. Apply water during blading when sufficient moisture is not present to prevent surface material segregation. Water supply, hauling, and application shall be in accordance with Section 891 (see below).
3. Shape existing native rock or aggregate surfaced drainage ditches to divert surface runoff to existing outlet devices, ditches, and discharge locations. 
4. Establish a blading pattern which provides a uniform driving surface over the traveled surface, and provides a freestreaming drainage pattern to keep drainage ditches flowing and not diverted by potholes or corrugations.
5. Establish a blading pattern which provides a uniform driving surface and maintains the surfacing on the roadbed, and provides a freestreaming drainage pattern to keep drainage ditches flowing and not diverted by potholes or corrugations.

**B. Routine Blading:**
Shape roadbed width in excess of the dimensions shown only as needed to provide drainage away from the traveled way. Do not remove established grasses and other vegetation from the excess width except as incidental to providing drainage or unless otherwise directed.

**C. Undercutting - Undercutting roadway back slope is not permitted.**

**D. Intersections - At intersections, blade the roadbeds of side roads which are not closed or restricted from vehicular use to ensure smooth transitions.**

**E. Cleaning of Structures - Do not allow materials resulting from work under this Section to remain on or in structures, such as bridges, culverts, cattle guards, or drainage ditches.**

**F. Smooth Blading - Smooth Blading may be used as an interim measure to remove loose surfacing material from the wheel paths and store it in a recoverable windrow until blade processing, as described in this section, is feasible.**
Watering will not be required for smooth blading. Accomplish smooth blading without disturbing the existing cross-slope or crown of the traveled way. Move and store loose surfacing materials on the high side of super-elevated curves and sections with uniform slope or Boutique. In crowned sections, store the material on either or both sides as elected. Windrow and place stored materials to provide not less than 12 feet of smooth traveled way on one-lane segments. Cut holes through windrows, which may collect water on the road, for drainage at least every 500 feet.

**G. Signing - Place suitable temporary traffic warning signs at each end of the work area. Such signing shall conform to the Federal Highway Administration’s publication “Manual for Uniform Traffic Control Devices”, or MUTCD.** An appropriate sign is the W21-3, measuring 36” x 36”,”ROAD MACHINERY AHEAD”, black text on reflective orange background. Such signing should be placed on temporary supports, where it is readily visible to oncoming traffic but does not pose a hazard to vehicles.

**Measurement:**
*Road Maintenance and Dust Abatement” will be lump sum. Water Supply and Watering shall be incidental to this item.

**Payment:**
*Road Maintenance and Dust Abatement”, lump sum.