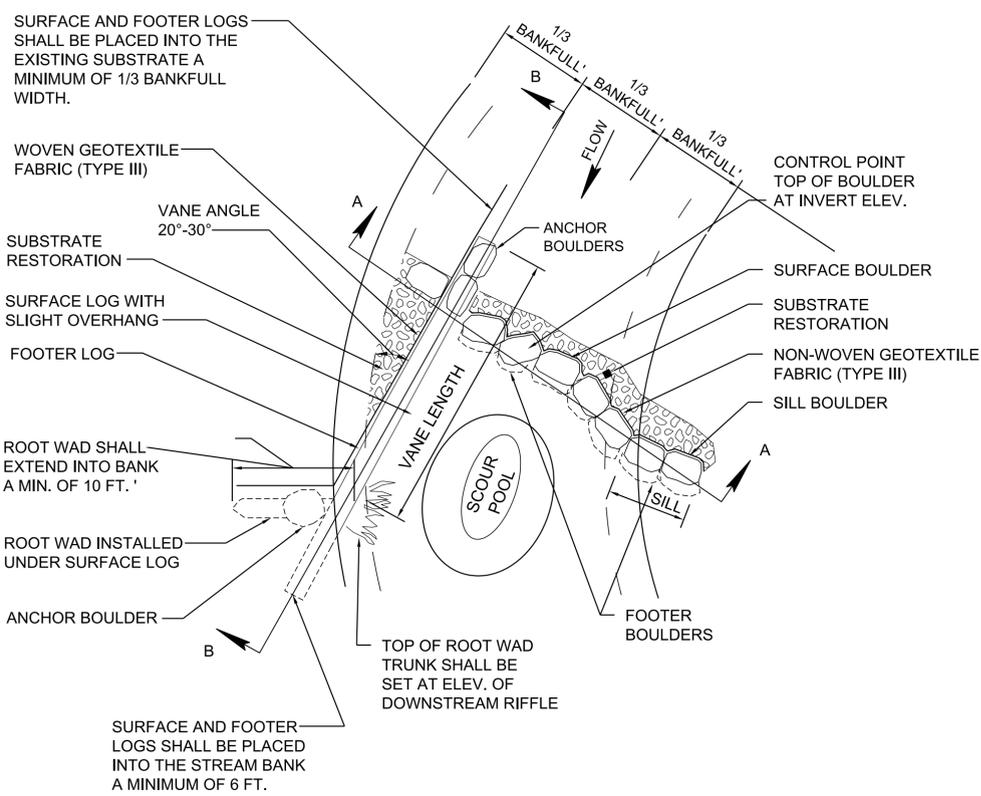
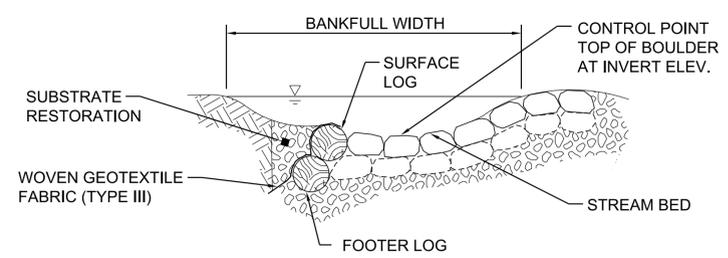


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PLAN VIEW

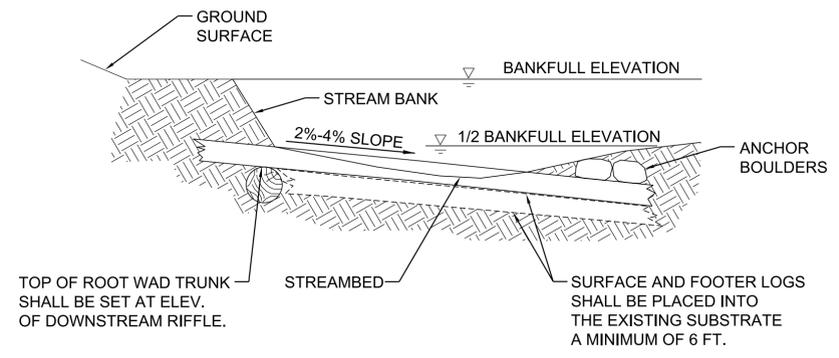


SECTION A-A

STREAM MITIGATION PLAN LEGEND:



LOG VANES, ROOT WADS AND BOULDER J-HOOK



SECTION B-B

LOG VANES, ROOT WADS AND BOULDER J-HOOK NOTES

- (A) LOG VANES AND LOG VANES WITH J-HOOKS ARE HYDRAULIC CONTROL MEASURES THAT ARE USED ALONG THE OUTSIDE BANKS OF MEANDER BENDS TO DIRECT FLOW AWAY FROM THE STREAM BANK, CONCENTRATE FLOWS INTO THE CENTER OF THE CHANNEL, AND ENHANCE HABITAT. WHEN BOULDER J-HOOKS ARE USED IN COMBINATION WITH LOG VANES, THEY ALSO PROVIDE GRADE CONTROL. ROOT WADS ARE USED AS A SILL TO PREVENT FLOW DIVERSION AND TO PROVIDE COVER HABITAT FOR FISH AND OTHER AQUATIC ORGANISMS IN THE DOWNSTREAM SCOUR POOL.
- (B) LOG VANES, ROOT WADS, AND J-HOOKS SHOULD BE PLACED AT THE STATIONS, OFFSETS, ELEVATIONS, AND CONFIGURATION INDICATED ON THE STREAM MITIGATION DATA TABLE IN THE PROJECT PLANS, STREAM MITIGATION PLAN, OR AS DIRECTED BY THE ENGINEER. AT A MINIMUM, THE BANKFULL WIDTH; MINIMUM LOG AND BOULDER DIMENSIONS; VANE, J-HOOK, AND SILL LENGTHS AND INVERT ELEVATIONS; SHOULD BE SPECIFIED IN THE STREAM MITIGATION DATA TABLE.
- (C) REFER TO D-NSD-37 "SPECIAL NOTES FOR NATURAL STREAM DESIGN".
- (D) LOGS SHALL BE RELATIVELY STRAIGHT, RECENTLY HARVESTED AND DECAY RESISTANT SPECIES SUCH AS CEDAR, WHITE OAK, ETC.
- (E) BOULDERS PRESENT IN THE EXISTING STREAM MEETING THE SPECIFIED TYPE AND SIZE SHOULD BE USED IN THE RESTORED CHANNEL SEGMENT.
- (F) THE LOG VANE SHALL EXTEND FROM THE STREAM BOTTOM ELEVATION AT ITS INSERTION INTO THE STREAM BED 1/3 BANKFULL WIDTH TO HALF THE BANKFULL ELEVATION AT ITS INSERTION INTO THE STREAM BANK (6-FOOT MINIMUM). THE SURFACE LOG SHALL BE PLACED ON ONE OR MORE FOOTER LOGS ALONG ITS LENGTH AND A ROOT WAD AT ITS INSERTION INTO THE BANK. ROOT WAD SHALL BE PLACED BENEATH THE SURFACE LOG AND PLACED SO THAT IT LOCKS THE SURFACE LOG INTO THE BANK SURFACE AND FOOTER LOGS AND ROOT WAD SHALL BE TIED SECURELY INTO THE BANK ALONG WITH A CUT-OFF SILL (6-FOOT MINIMUM) TO PREVENT THE POSSIBILITY OF STREAM FLOW DIVERTING AROUND THEM.
- (G) ANCHOR THE UPSTREAM END OF THE LOG VANE WITH BOULDERS PLACED ON TOP OF THE SURFACE LOG AND AT THE CHANNEL INVERT ELEVATION.
- (H) THE BOULDER J-HOOK SHOULD BE CONSTRUCTED FROM THE UPSTREAM END OF THE LOG VANE, ACROSS THE REMAINING TWO-THIRDS OF THE BANKFULL CHANNEL, TERMINATING WITH A BOULDER SILL. THE SURFACE BOULDERS IN THE CENTER OF THE J-HOOK ARE SET AT THE INVERT ELEVATION OF THE STRUCTURE.
- (I) CONSTRUCT LOG VANES, ROOT WADS, AND BOULDER J-HOOK BY:
  - (1) FIRST SHAPE THE CHANNEL AND FLOODPLAIN TO THE SPECIFIED GRADES AND DIMENSIONS.
  - (2) NEXT, EXCAVATE ENOUGH BED MATERIAL TO PLACE THE LOGS AND/OR BOULDERS, NON-WOVEN GEOTEXTILE FABRIC (TYPE III) AND ALLUVIUM OR SELECT MATERIAL BACKFILL.
  - (3) PLACE FOOTER LOG OR BOULDERS AND SURFACE BOULDERS AT THE CHANNEL INVERT, WITH THE SURFACE LOG OR BOULDERS SLIGHTLY UPSTREAM OF THE FOOTER LOG OR BOULDERS. SURFACE AND FOOTER LOGS SHOULD EXTEND A MINIMUM OF SIX FEET INTO EACH BANK AND THE STREAM BED.
  - (4) PLACE NON-WOVEN GEOTEXTILE FABRIC (TYPE III) ALONG THE ENTIRE UPSTREAM FACE OF THE STRUCTURE, EXTENDING FROM THE BOTTOM OF THE FOOTER TO THE FINISHED GRADE ELEVATION. ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED. FOR LOGS, NAIL GEOTEXTILE FABRIC (TYPE III) TO THE SURFACE LOG APPROXIMATELY ONE QUARTER OF THE CIRCUMFERENCE DOWN FROM THE TOP OF THE SURFACE LOG USING TWO-INCH GALVANIZED ROOFING NAILS ON ONE-FOOT SPACING ALONG THE ENTIRE LENGTH OF THE LOG.
  - (5) BACKFILL STRUCTURE AND NON-WOVEN GEOTEXTILE FABRIC (TYPE III) WITH EXCAVATED ON-SITE STREAM ALLUVIUM (IF AVAILABLE), OTHERWISE USE THE SPECIFIED SELECT MATERIAL. SOIL SHALL BE COMPACTED WELL AROUND BURIED PORTIONS OF THE STRUCTURE, WHILE CREATING A SMALL ALLUVIAL BAR BETWEEN THE LOG VANE AND THE OUTSIDE BANK. TRIM ANY EXPOSED NON-WOVEN GEOTEXTILE FABRIC (TYPE III).
  - (6) ONCE THE STRUCTURE IS INSTALLED, EXCAVATE THE DOWNSTREAM SCOUR POOL AND PLACE SELECT MATERIAL AS REQUIRED.
  - (7) A MIXTURE OF SELECT MATERIALS, AS SPECIFIED ON THE STREAM MITIGATION PLAN SHEETS, SHOULD BE USED FOR SUBSTRATE RESTORATION IN RIFFLE AND RUN HABITATS AND TO FILL GAPS IN THE VANE LOGS AND J-HOOK BOULDERS. COARSE ALLUVIUM EXCAVATED FROM THE EXISTING STREAM BED, WHICH MEETS THE SPECIFIED SIZE CLASSIFICATION, IS THE PREFERRED MATERIAL TO USE FOR SUBSTRATE RESTORATION. REFER TO D-NSD-30 AND D-NSD-37 FOR ADDITIONAL SUBSTRATE RESTORATION INFORMATION.
- (J) RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- (K) THE SURFACE OF LOG VANES, ROOT WADS, AND J-HOOKS SHALL BE FINISHED TO A NEAT AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE PLANS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.10 FOOT OF THE GRADES AND ELEVATIONS INDICATED, OR AS DIRECTED BY THE ENGINEER. ALL GAPS OR VOIDS SHALL BE PLUGGED WITH SELECT MATERIAL TO FORM A TIGHT-FITTING SEAL.
- (L) ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ON-SITE CONSTRUCTION OBSERVER.
- (M) LOG VANES, ROOT WADS AND BOULDER J-HOOK SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBER:
  - 209-03.34 STREAM MITIGATION - LOG VANE PER LINEAR FOOT
  - 209-03.38 STREAM MITIGATION - J-HOOK PER EACH
  - 209-03.62 STREAM MITIGATION - ROOT WAD PER EACH
 PAYMENT SHALL INCLUDE ALL MATERIALS, EQUIPMENT, AND LABOR TO CONSTRUCT THE LOG VANES, ROOT WADS AND BOULDER J-HOOK.

MATERIAL SHOWN ARE ONLY A GRAPHICAL REPRESENTATION AND DO NOT DEPICT THE ACTUAL DEPTH OR QUANTITY OF MATERIALS TO APPROPRIATELY CONSTRUCT OR STABILIZE THE CHANNEL.

NOT TO SCALE

STATE OF TENNESSEE  
DEPARTMENT OF  
TRANSPORTATION

LOG VANES,  
ROOT WADS,  
AND BOULDER  
J-HOOK

11-01-16 D-NSD-26