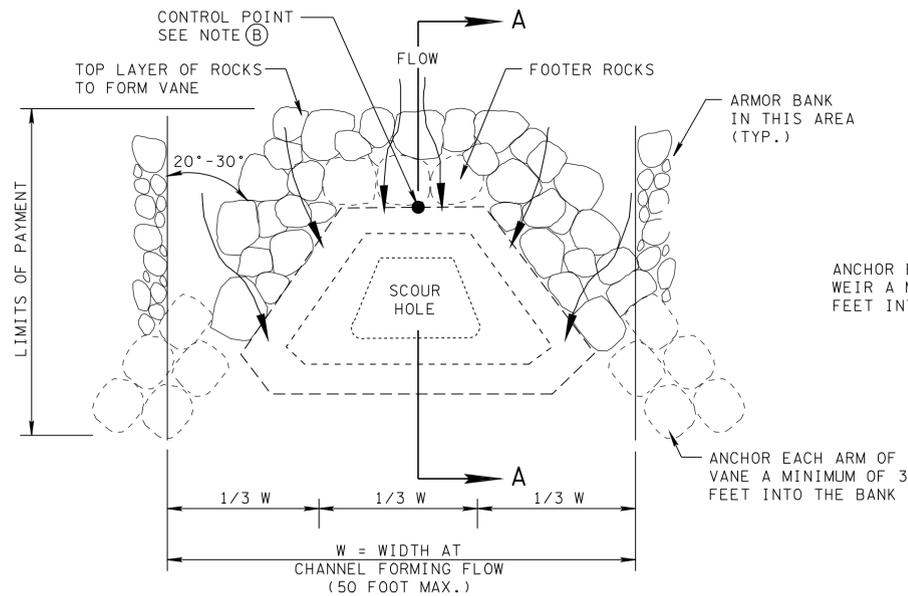
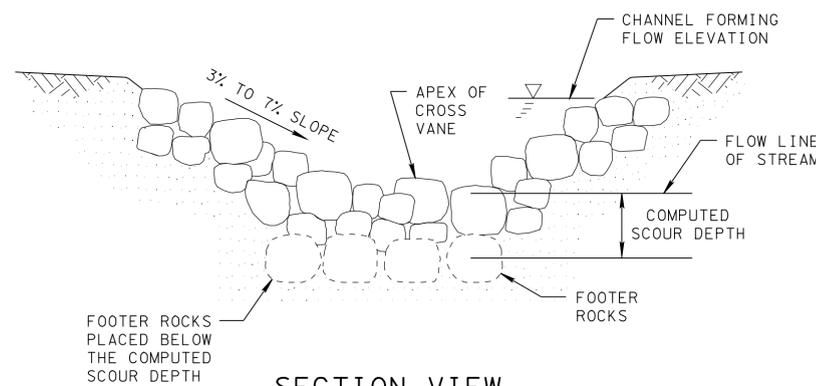


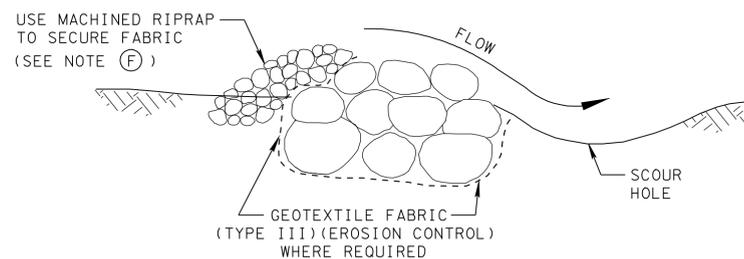
CROSS VANE



PLAN VIEW
CROSS VANE



SECTION VIEW
CROSS VANE



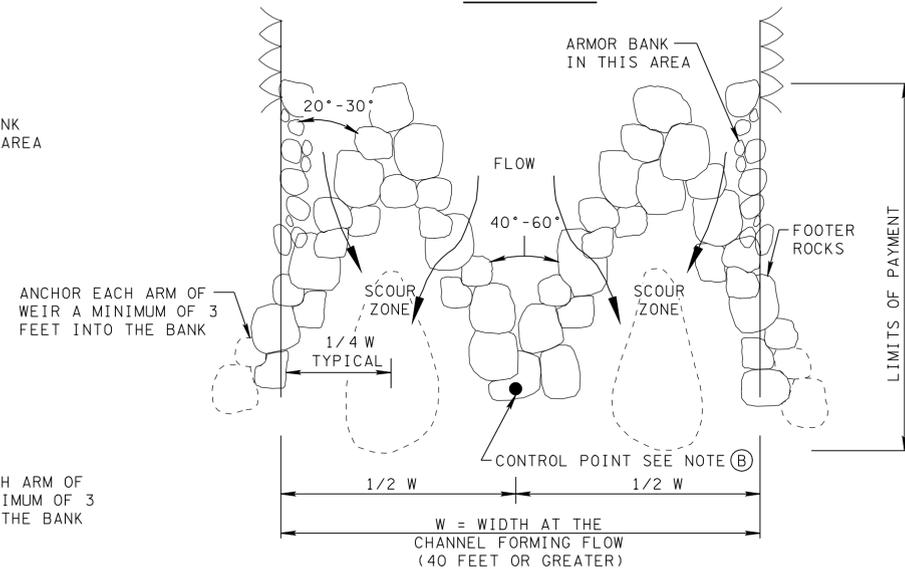
SECTION A-A

STREAM MITIGATION PLAN LEGEND: CROSS VANE

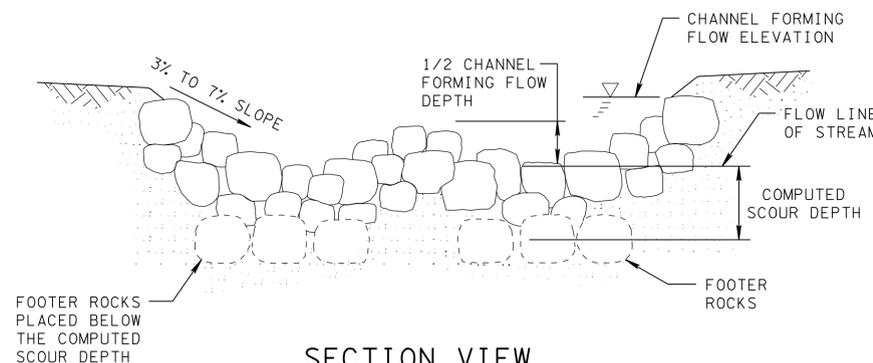
STREAM MITIGATION PLAN LEGEND: W-WEIR

STREAM MITIGATION PLAN LEGEND: J-HOOK

W-WEIR

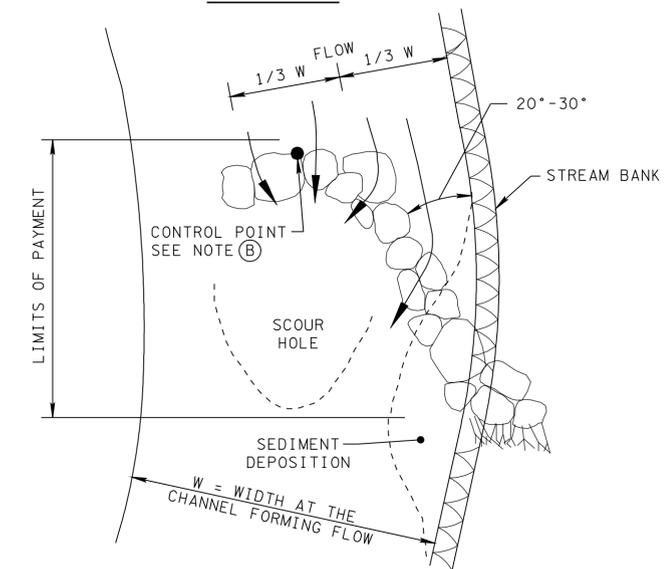


PLAN VIEW
W-WEIR

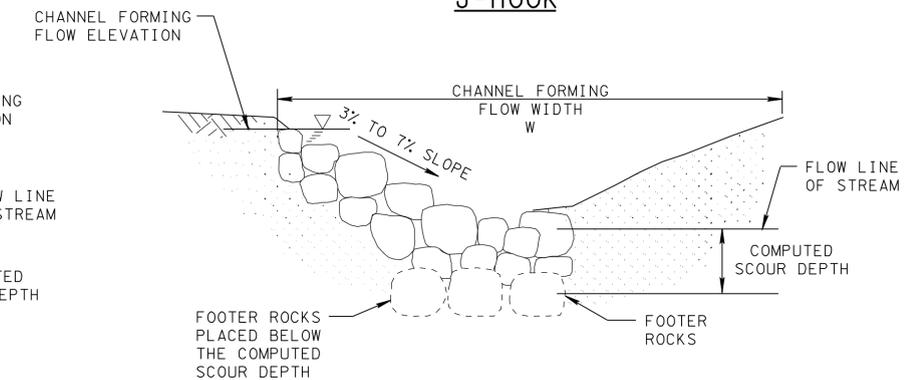


SECTION VIEW
W-WEIR

J-HOOK



PLAN VIEW
J-HOOK



SECTION VIEW
J-HOOK

ROCK VANE GENERAL NOTES

- (A) ROCK VANES ARE HYDRAULIC CONTROL MEASURES THAT MAY BE USED TO DIRECT FLOW AWAY FROM THE CHANNEL BANK, CONCENTRATE FLOWS INTO THE CENTER OF THE CHANNEL AND ENHANCE HABITAT. THEY MAY CONSIST OF STRAIGHT VANES, CROSS VANES, "W" WEIRS OR "J" HOOKS. STRAIGHT VANES ARE EQUIVALENT TO A SINGLE ARM OF A CROSS VANE.
 - (B) CONSTRUCT AT THE ELEVATIONS AND STATIONS INDICATED IN THE STREAM MITIGATION DATA TABLE IN THE PROJECT PLANS OR AS DIRECTED BY THE ENGINEER.
 - (C) ROCK VANES SHOULD BE APPLIED WITH CAUTION IN STREAMS WITH BEDS COMPOSED OF CLAY, SILT OR OTHER SOFT MATERIAL. THE SIZE AND DEPTH OF THE FOOTER ROCKS MUST BE SUFFICIENT TO ENSURE THAT THE STRUCTURE WILL NOT SUBSIDE. ROCK VANES ALSO ARE NOT SUITABLE FOR STREAMS WITH BEDROCK CHANNELS.
 - (D) THE STONES USED TO CONSTRUCT THE VANE SHOULD BE SUFFICIENTLY FLAT AND BLOCKY TO ALLOW STACKING WITH LITTLE TO NO GAP WHEN THE STONES ARE BUTTED AGAINST EACH OTHER. THE STONES SHOULD ALSO BE SIZED TO REMAIN STABLE IN THE 50-YEAR STORM EVENT. THE MINIMUM SIZE OF THE STONES WILL BE PROVIDED IN THE STREAM MITIGATION DATA TABLE. LARGER STONES MAY BE REQUIRED FOR THE FOOTER STONES IN ORDER TO PROVIDE A STABLE BASE FOR THE STRUCTURE.
 - (E) THE LOWEST COURSE OF FOOTER ROCKS SHOULD BE PLACED AT A DEPTH BELOW THE SCOUR HOLE DEPTH INDICATED IN THE STREAM MITIGATION DATA TABLE IN THE PROJECT PLANS.
 - (F) WHERE THE STREAM BED IS COMPOSED OF SAND OR FINER MATERIALS, THE BOTTOM AND UPSTREAM FACE OF THE STRUCTURE SHOULD BE LINED WITH GEOTEXTILE FABRIC (TYPE III) (EROSION CONTROL) TO PREVENT THE PIPING OF FINE MATERIALS THROUGH THE STONES. RIPRAP SHOULD THEN BE PLACED ON THE UPSTREAM FACE OF THE STRUCTURE IN ORDER TO SECURE THE GEOTEXTILE FABRIC. THE REQUIRED CLASS OF MACHINED RIPRAP WILL BE INDICATED IN THE PROJECT PLANS. ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS LIST SHALL BE USED.
 - (G) THE BANK SLOPES UPSTREAM OF THE VANE ARMS SHOULD BE PROTECTED AGAINST EROSION BY THE PLACEMENT OF APPROPRIATE EROSION PREVENTION MEASURES SUCH AS MACHINED RIPRAP, VEGETATED RIPRAP, OR TURF REINFORCEMENT MATS.
 - (H) THE ENDS OF THE VANE ARMS SHOULD BE KEYED INTO THE BANK A MINIMUM DISTANCE OF 3 FEET OR AS DIRECTED BY THE ENGINEER.
 - (I) CROSS VANES AND J-HOOKS MAY BE USED IN COMBINATION WITH STEP POOLS. SEE STANDARD DRAWING D-NSD-4.
 - (J) ROCK VANES AND J-HOOKS SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS:
 - 209-03.37 STREAM MITIGATION - CROSS VANE STRUCTURE PER EACH
 - 209-03.38 STREAM MITIGATION - J-HOOK PER EACH
 - 209-03.39 STREAM MITIGATION - W-WEIR PER EACH
 - 209-03.52 STREAM MITIGATION - J-HOOK WITH STEP PER EACH
 - 209-03.54 STREAM MITIGATION - CROSS VANE STRUCTURE WITH STEP PER EACH
 - 209-03.60 STREAM MITIGATION - ROCK VANE PER EACH
- PAYMENT SHALL INCLUDE ALL MATERIALS AND LABOR NECESSARY FOR CONSTRUCTION OF THE VANE STRUCTURE.