

PHOTO: BOULDER J-HOOK VANE

THIS FIGURE IS ONLY MEANT TO DEFINE THE MINIMUM INFORMATION REQUIRED BY THE CITY OF CHARLOTTE TO BE INCLUDED IN A DETAIL FOR THIS TYPE OF TECHNIQUE.
 THIS FIGURE IS NOT MEANT TO REPRESENT A STANDARD DESIGN METHOD FOR THIS TYPE OF TECHNIQUE AND SHALL NOT BE USED AS SUCH.

NOT TO SCALE

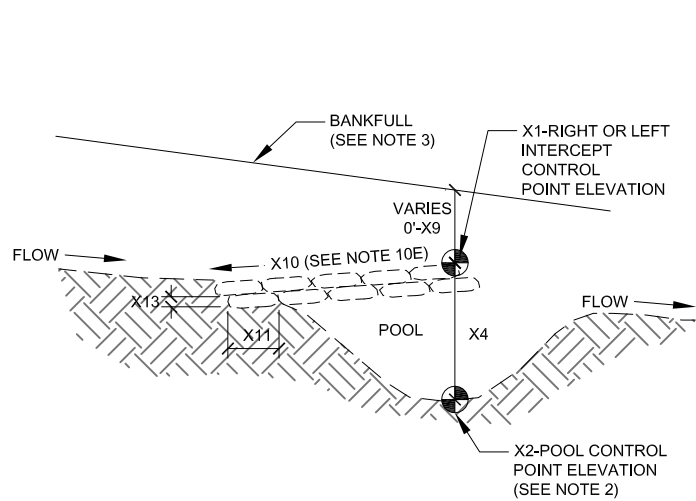


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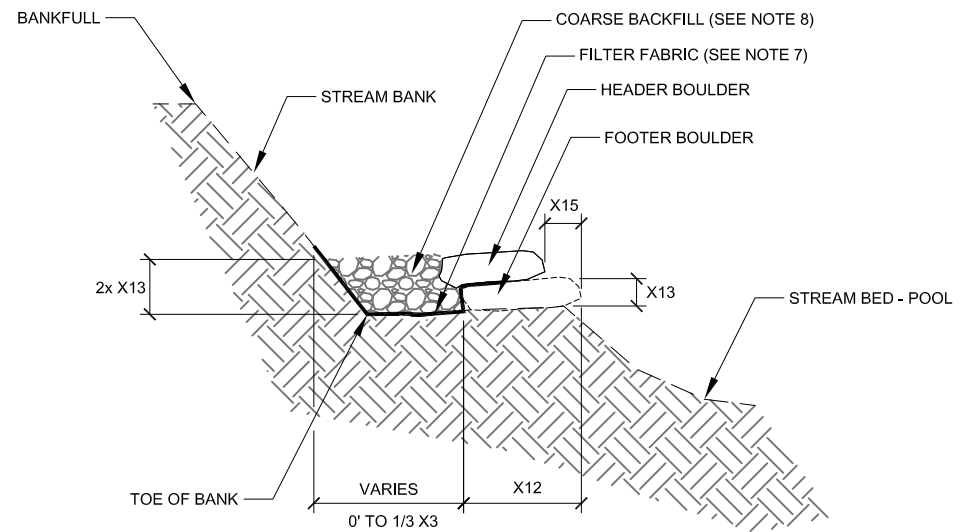
BOULDER J-HOOK VANE

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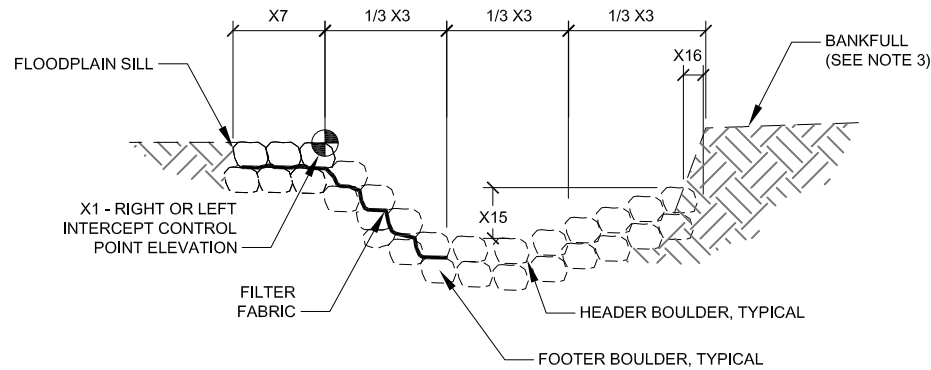
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PROFILE VIEW



VANE ARM SECTION A - A'



CROSS SECTION B-B'

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NOTES:

1. A J-HOOK VANE IS A STREAM BANK PROTECTION, IN-STREAM STRUCTURE THAT DIRECTS STREAM FLOW AWAY FROM THE STREAM BANK ON THE OUTSIDE OF A MEANDER BEND (POOL) AND IN TOWARD THE CENTER OF THE CHANNEL. THE DETAIL SHALL BE "FLIPPED" DEPENDING ON WHICH STREAM BANK (LEFT OR RIGHT) IS ON THE OUTSIDE OF THE MEANDER BEND.
2. A POOL ELEVATION CONTROL POINT OR EXCAVATION TO A SPECIFIED MAXIMUM POOL DEPTH SHALL BE DESIGNATED TO ESTABLISH PART OF THE PROFILE. SURVEY OF CONTROL POINTS SHALL BE REQUIRED TO ESTABLISH ACCURATE J-HOOK INSTALLATION WITHIN THE TOLERANCE SPECIFIED BY THE DESIGNER.
3. THE VANE ARM SHALL INTERCEPT THE STREAM BANK AT A HEIGHT EQUAL TO BETWEEN 1/2 BANKFULL STAGE AND BANKFULL STAGE. ELEVATION CONTROL POINTS MAY BE ESTABLISHED AT THE LEFT OR RIGHT STREAM BANK/VANE ARM INTERCEPT POINTS. THE VANE ARM INTERCEPT LOCATION MAY BE OTHERWISE DESCRIBED BY ITS RELATIONSHIP TO BANKFULL STAGE OR BY THE LENGTH AND SLOPE OF THE VANE ARM. BANKFULL IS NOT NECESSARILY THE TOP OF THE STREAM BANK SLOPE.
4. IF PLANS DESIGNATE THE USE OF MULTIPLE BOULDER J-HOOK VANES A TABLE OF ALL STATION LOCATIONS AND CONTROL POINT ELEVATIONS SHALL BE PROVIDED IN THIS DETAIL OR PROVIDED ELSEWHERE IN THE PLANS AND REFERENCED HEREIN.
5. A TYPICAL POOL CROSS SECTION SHALL BE PROVIDED ELSEWHERE IN THE PLANS TO ESTABLISH THE DIMENSIONS OF THE CHANNEL GRADING INTO WHICH THE BOULDER J-HOOK VANES ARE TO BE INSTALLED.
6. THE J-HOOK VANE SHALL BE CONSTRUCTED WITH FLAT-SIDED BOULDERS OF A SIZE (LENGTH, WIDTH, AND DEPTH) AS SPECIFIED BY THE DESIGNER.
7. FILTER FABRIC OF A TYPE AND SIZE SPECIFIED BY THE DESIGNER SHALL BE USED TO SEAL THE GAPS BETWEEN THE BOULDERS AND UNDER THE COARSE BACKFILL MATERIAL OF THE VANE ARM. THERE SHALL BE NO FILTER FABRIC VISIBLE IN THE FINISHED WORK; EDGES SHALL BE FOLDED, TUCKED, OR TRIMMED AS NEEDED.
8. COARSE BACKFILL OF THE BOULDER J-HOOK VANE ARM SHALL BE OF A TYPE, SIZE, AND GRADATION AS SPECIFIED BY THE DESIGNER. COARSE BACKFILL SHALL BE PLACED TO A THICKNESS EQUAL TO THE DEPTH OF THE HEADER AND FOOTER BOULDERS AND SHALL EXTEND OUT FROM THE VANE ARMS TO THE STREAM BANK.
9. THE VANE ARM OF THE BOULDER J-HOOK SHALL BE CONSTRUCTED FIRST, FOLLOWED BY THE HOOK. THE FLOODPLAIN SILLS SHALL BE CONSTRUCTED LAST.
10. BOULDER J-HOOK VANES SHALL BE BUILT TYPICALLY AS FOLLOWS:
 - A. OVER-EXCAVATE STREAM BED TO A DEPTH EQUAL TO THE TOTAL THICKNESS OF THE HEADER AND FOOTER BOULDERS.
 - B. PLACE FOOTER BOULDERS OF THE VANE ARM AND FLOODPLAIN SILL. THERE SHALL BE NO GAPS BETWEEN BOULDERS.
 - C. INSTALL FILTER FABRIC.
 - D. PLACE COURSE BACKFILL BEHIND THE FOOTER BOULDERS.
 - E. INSTALL HEADER BOULDERS ON THE VANE ARM AND FLOODPLAIN SILL ON TOP OF AND SET SLIGHTLY BACK FROM THE FOOTER BOULDERS (SUCH THAT PART OF THE HEADER BOULDER IS RESTING ON THE COARSE BACKFILL). HEADER BOULDERS SHALL SPAN THE SEAMS OF THE FOOTER BOULDERS. THERE SHALL BE NO GAPS BETWEEN BOULDERS. THE SLOPE OF THE VANE ARM IS MEASURED ALONG THE VANE ARM WHICH IS INSTALLED AT AN ANGLE TO THE STREAM BANK AND PROFILE.
 - F. PLACE COARSE BACKFILL BEHIND HEADER BOULDERS ENSURING THAT ANY VOIDS BETWEEN THE BOULDERS ARE FILLED.
 - G. PLACE EACH BOULDER TO FORM THE HOOK BY INSTALLING A FOOTER BOULDER, THEN A HEADER BOULDER.
 - H. EMBED THE END OF THE HOOK BOULDERS INTO THE OPPOSITE BANK.
11. IF ANY EROSION CONTROL MATTING IS SPECIFIED FOR USE IN THE VICINITY OF THE VANE ARM INTERCEPT POINTS AND FLOODPLAIN SILLS THE MATTING EDGES SHALL BE NEATLY SECURED AROUND THE BOULDERS.

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DIMENSIONS (VALUES TO BE PROVIDED BY DESIGNER)			
VARIABLE	VALUES	TYPICAL UNIT	DESCRIPTION
X1		FT. (NAVD)	LEFT OR RIGHT VANE ARM INTERCEPT CONTROL POINT ELEVATION
X2		FT. (NAVD)	POOL CONTROL POINT ELEVATION
X3		FT.	BANKFULL WIDTH
X4		FT.	MAXIMUM POOL DEPTH FROM VANE ARM INTERCEPT CONTROL POINT ELEVATION
X5		FT.	VANE ARM LENGTH
X6		IN.	D50 OF COARSE BACKFILL
X7		FT.	LENGTH OF FLOODPLAIN SILL
X8		DEGREES	VANE ARM ANGLE WITH STREAM BANK
X9		IN. OR FT.	DIFFERENCE BETWEEN BANKFULL AND VANE ARM INTERCEPT POINT
X10		PERCENT	VANE ARM SLOPE
X11		IN. OR FT.	BOULDER LENGTH
X12		IN. OR FT.	BOULDER WIDTH
X13		IN. OR FT.	BOULDER THICKNESS
X14		IN.	HEADER BOULDER SETBACK
X15		IN.	OPPOSITE BANK TIE IN HEIGHT
X16		IN.	OPPOSITE BANK EMBEDMENT LENGTH



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