

## **SURVEY NOTES:**

1. This limited field survey was prepared for Roanoke County.
2. Field survey is limited to natural features and improvements within the stream restoration corridor.
3. This map has been horizontally referenced to The Virginia Coordinate System of 1983, South Zone, (NAD83) and vertically to the North American Vertical Datum of 1988 (NAVD 88) based on RTN GPS. Horizontal and vertical values are expressed in U.S. Survey Feet. Field locations were completed on July 6, 2023.
4. Contour Interval: 0.5 Foot
5. Water depths within the channel did not exceed depths of 0.25', except in areas denoted as "Ex. Thalweg (Field Located)". Contour data below the water surface may not necessarily conform to national map accuracy standards for providing 0.5' topography.
6. This topography was acquired by sUAS LIDAR - Phoenix LIDAR Ranger-LR (Riegl VUX-1) on a Freefly Alta X in conjunction with established survey-grade ground control and supplemented by conventional methods.
7. Contours for the survey were developed by creation of a triangulated irregular network (TIN), based on the survey data points, using Autodesk AutoCAD Civil 3D 2023.
8. No utilities were surveyed other than those shown hereon. Other utilities may be present within the project area.

Horizontal Datum: VCS NAD 83

Vertical Datum: NAVD 88

## Boundary and Topo Source:

WSSI and Roanoke County Digital Data

Design      Draft      Approved

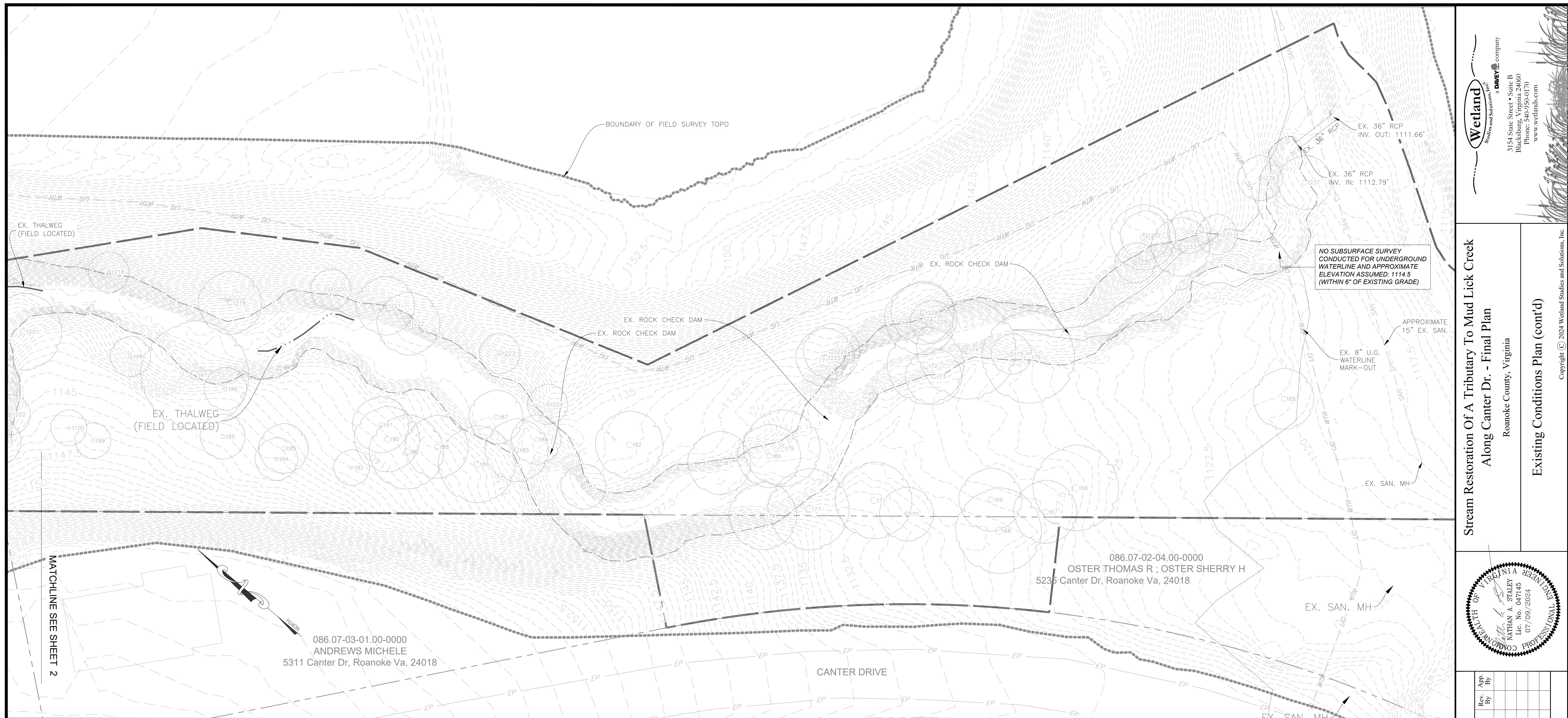
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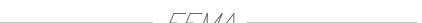
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Sheet #

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THE INFLUENCE OF THE CULTURE OF THE PARENTS ON THE CHILD'S LANGUAGE 11



EXISTING CONDITIONS LEGEND	
750	SURVEYED 0.5' CONTOURS
750	GIS 2.0' CONTOURS
██████████	BOUNDARY SURVEYED TOPO.
— UG — WTR —	UNDERGROUND WATERLINE
— — — — —	COUNTY MAPPED PARCELS
██████████	EASEMENT BOUNDARY
— UG — ELEC —	UNDERGROUND ELECTRIC
██████████	EXISTING PIPE
— OH — UTIL —	OVERHEAD UTILITY
X — — — — —	WOOD BOARD FENCE
— EP — — — —	ESTIMATED EDGE OF PAVEMENT
██████████	EXISTING THALWEG
— — — — — — —	PERENNIAL - (PER TOP OF BANK - NOT SURVEY LOCATED)
— — — — — — —	EPHEMERAL (PER TOP OF BANK - NOT SURVEY LOCATED)
	
	
	
	
	



Horizontal Datum: VCS NAD 83

Vertical Datum: NAVD 88

### Boundary and Topo Source:

WSSI and Roanoke County Digital Data

Design      Draft      Approved

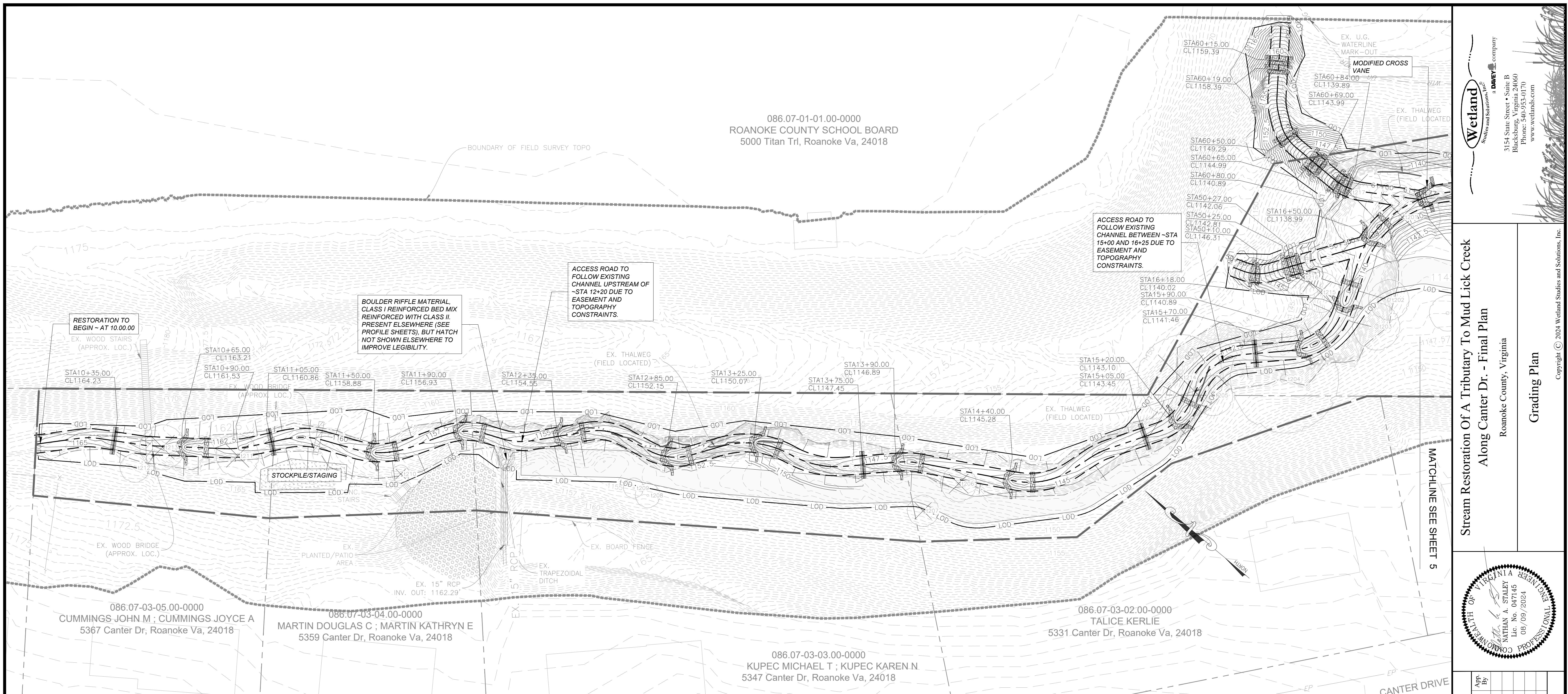
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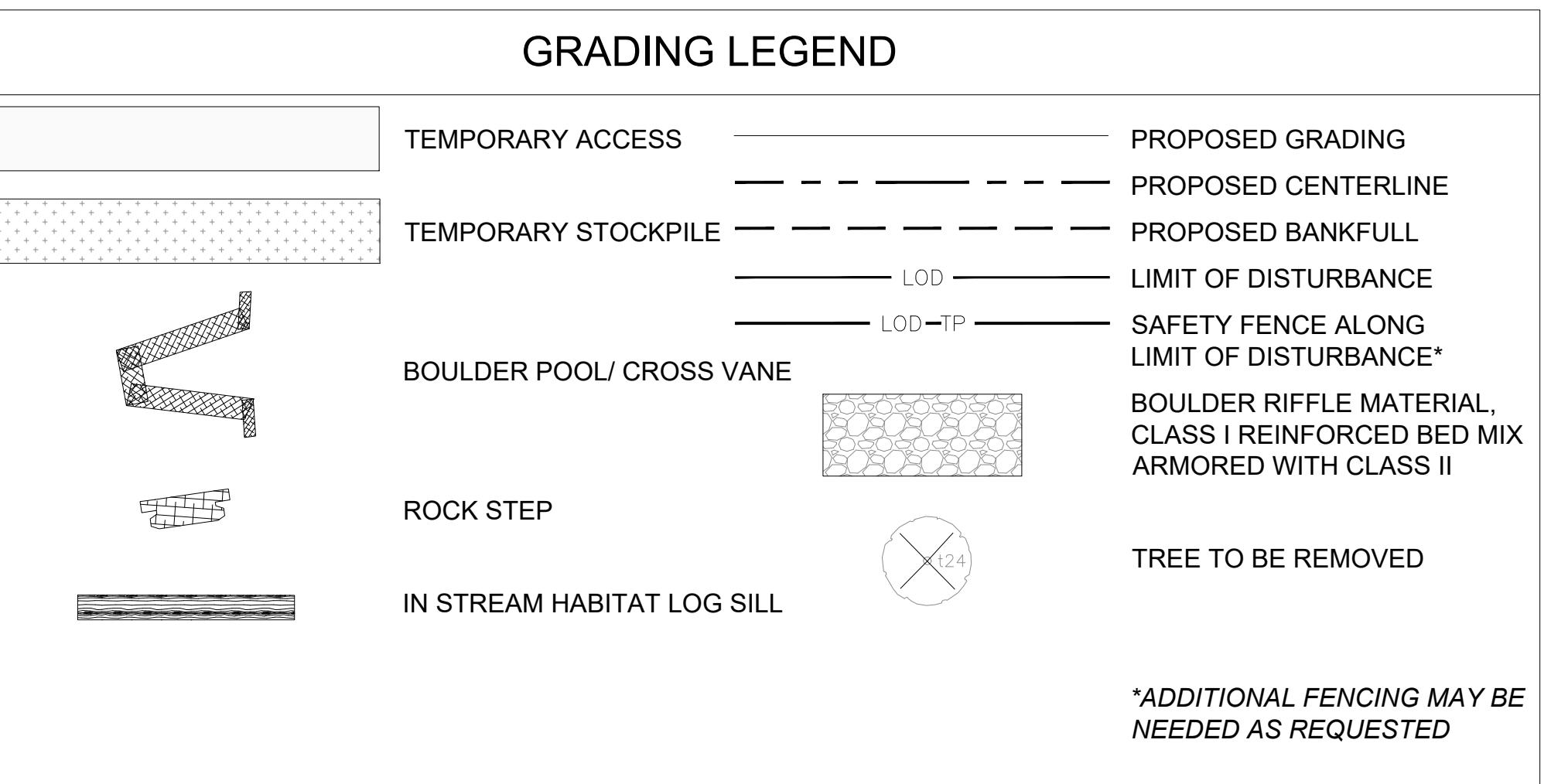
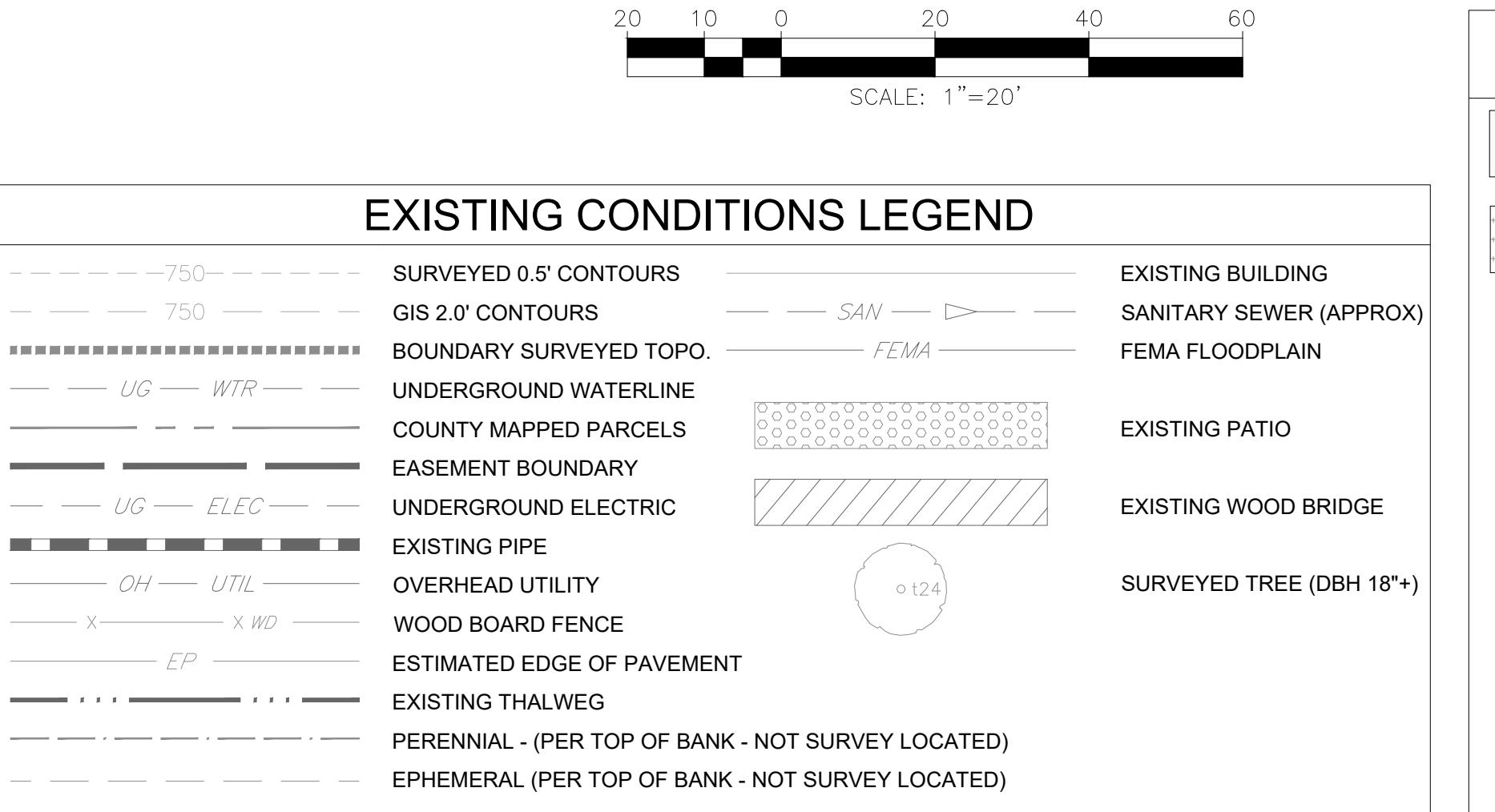
Category: File: N

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EXISTING CONDITIONS PLAN.dwg



Tree Schedule						
Tree #	DBH	Common Name	Dead (Y/N)	Priority (1-4)	* TBR	Tree #
65	27	tuliptree	NO	2		20
66	38	oak, northern red	NO	3		20
67	28	oak, northern red	NO	2		20
68	38	oak, northern red	NO	2		20
69	16,16,16	oak, northern red	NO	3		20
70	24	oak, northern red	NO	2		20
71	34	oak, northern red	NO	3		20
72	34	oak, northern red	YES	4	X	20
73	25	oak, northern red	NO	3		20
74	34,28	oak, northern red	NO	3	X	21
75	18	oak, northern red	NO	3	X	21
76	26,26,18	tuliptree	NO	3	X	21
77	36	oak, northern red	NO	2		21
78	30	oak, northern red	NO	3		21
79	34	oak, northern red	YES	4	X	21
80	28	oak, northern red	YES	4	X	21
81	28	oak, northern red	NO	2	X	21
82	18,18,16	maple, red	NO	4	X	21
83	20	tuliptree	NO	3		21
84	22	sycamore, American	YES	4	X	22
85	28	tuliptree	NO	2	X	22
86	34	tuliptree	NO	2	X	22
87	24	sycamore, American	NO	3	X	22
88	28	tuliptree	NO	2		22
89	33	tuliptree	NO	2		22
90	29	tuliptree	NO	2		22
91	25	tuliptree	NO	2		22
92	16	oak, northern red	NO	2	X	22
93	22	oak, northern red	NO	2		22
94	19	tuliptree	NO	2		23
95	20	tuliptree	NO	2		23
96	19	pine, eastern white	NO	3		23
97	48	tuliptree	NO	3		23
98	18	blackgum	NO	2		23
99	16	tuliptree	NO	2		23
100	16	tuliptree	NO	2		23

Tree #	DBH	Common Name	Dead (Y/N)	Priority (1-4)	*TBR
201	34	beech, American	NO	2	X
202	18	tuliptree	NO	3	
203	21	tuliptree	NO	3	
204	48	oak, northern red	NO	2	
205	18	tuliptree	NO	3	
206	16	tuliptree	NO	3	X
207	14	cherry, black	NO	2	X
208	11	tuliptree	NO	2	
209	9	tuliptree	NO	2	
210	8	cherry, black	NO	2	X
211	19	tuliptree	NO	3	X
212	10,8	maple, silver	NO	2	
213	17,10	tuliptree	NO	4	X
214	38	tuliptree	NO	2	X
215	18	tuliptree	NO	2	X
216	18	tuliptree	NO	2	X
217	30	oak, white	NO	3	X
218	18	tuliptree	NO	4	
219	28	maple, red	NO	3	
220	18	tuliptree	NO	2	
221	26	oak, white	NO	2	
222	28	oak, northern red	YES	4	
223	18	tuliptree	NO	2	
224	18	tuliptree	NO	4	
225	26	tuliptree	NO	3	
226	25	tuliptree	YES	4	
227	32	tuliptree	NO	3	
228	28	oak, northern red	NO	3	
229	19	tuliptree	YES	4	
230	18	ash, green	YES	0	
231	29	oak, white	NO	2	
232	22	tuliptree	NO	2	
233	26	oak, northern red	NO	2	
234	19	ash, green	NO	4	
235	18	tuliptree	NO	3	
236	20	oak, white	NO	2	X
237	18,16	oak, white	NO	2	X



\*TBR - TO BE REMOVED













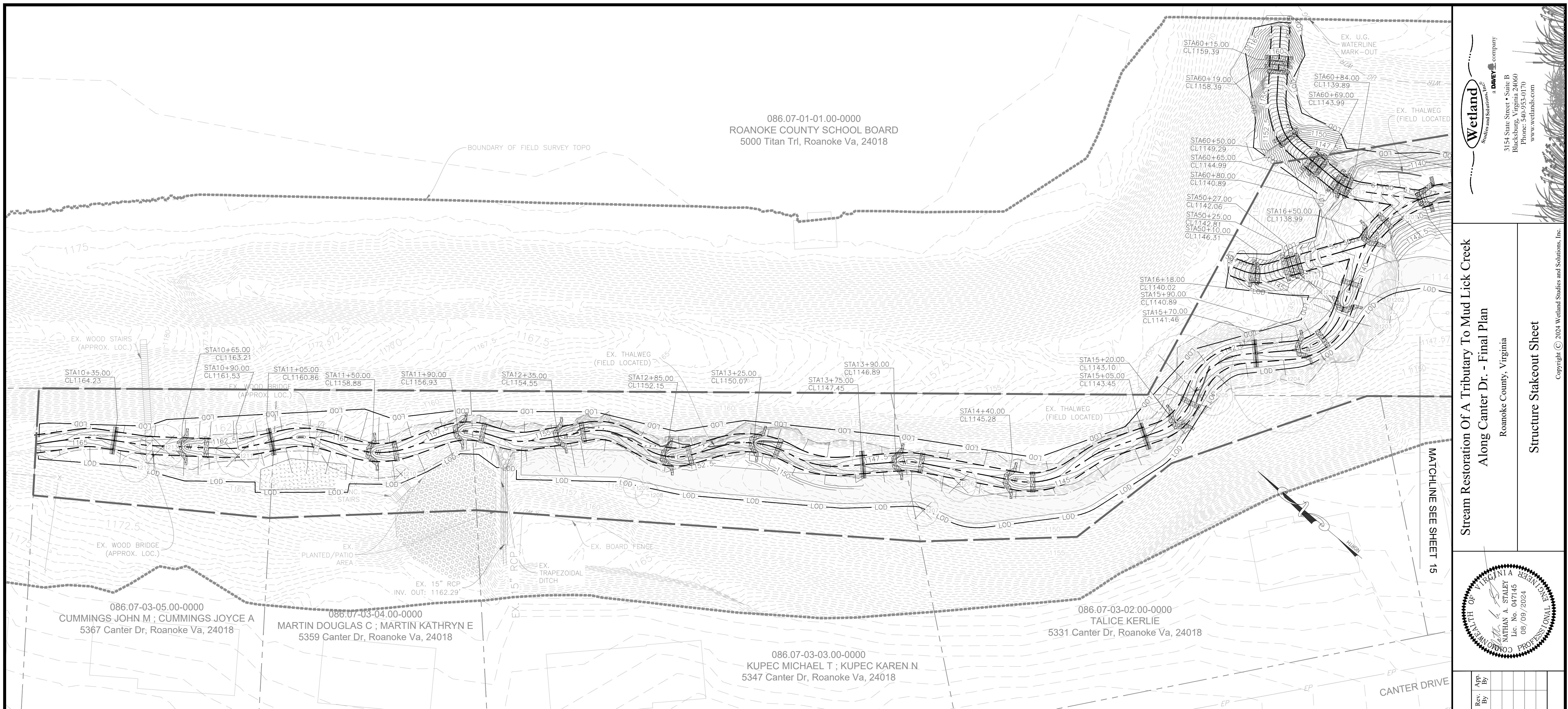




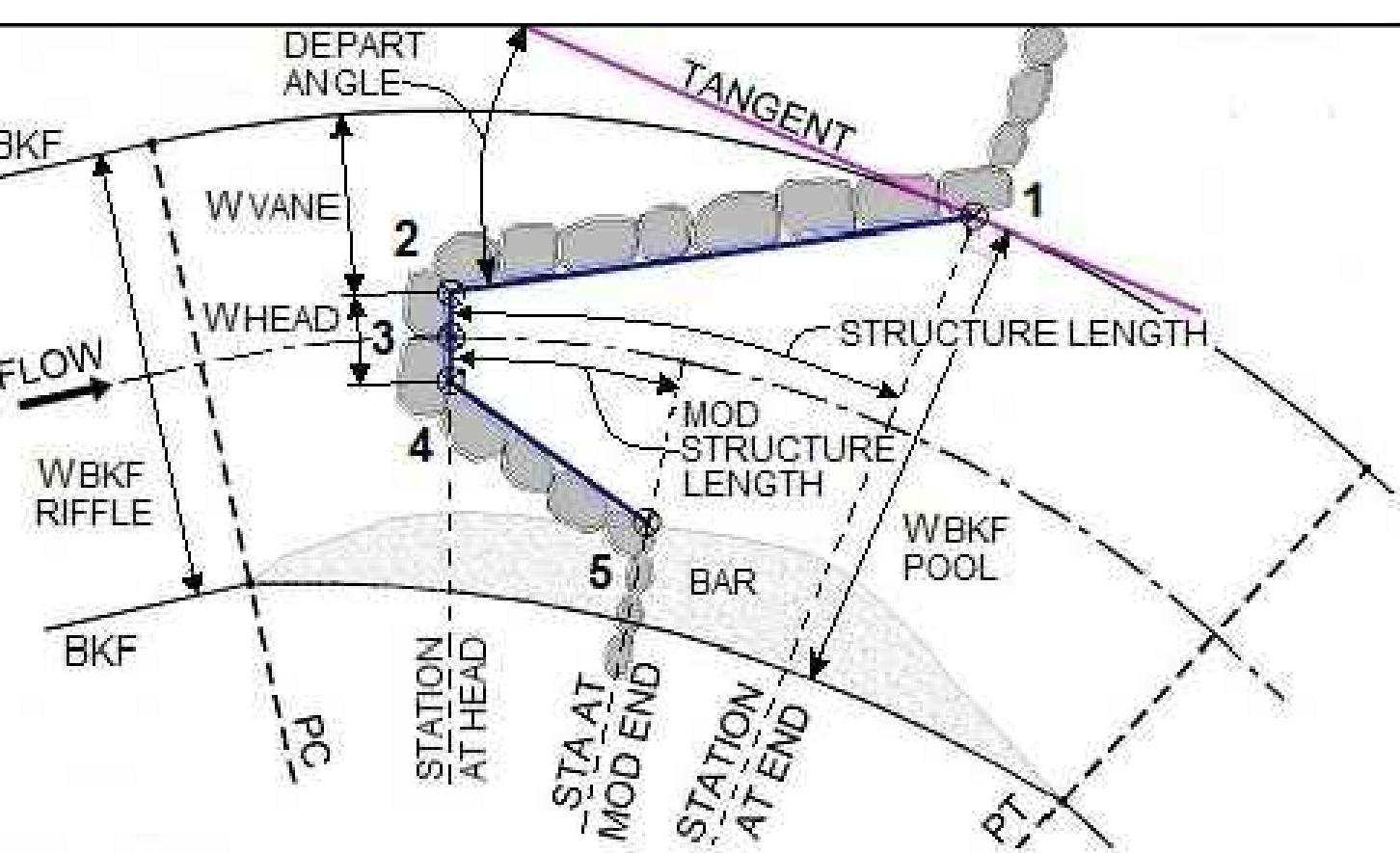
GEOMETRY TABLE								
NO.	Reach ID	LENGTH	RADIUS	BEARING/DELTA	TANGENT	CHORD BEARING	CHORD	
L1	REACH00	19.64'	--	S47°39'49"E	--	--	--	
C1	REACH00	8.50'	30.00'	16°14'17"E	4.28'	N39°32'41"W	8.47'	
L2	REACH00	18.52'	--	S31°25'32"E	--	--	--	
C2	REACH00	4.95'	45.00'	06°18'21"	2.48'	S34°34'42"E	4.95'	
L3	REACH00	32.42'	--	S37°43'53"E	--	--	--	
C3	REACH00	11.09'	45.00'	14°07'32"E	5.58'	S44°47'39"E	11.07'	
L4	REACH00	16.34'	--	S51°51'25"E	--	--	--	
C4	REACH00	17.06'	35.00'	27°55'14"E	8.70'	N37°53'48"W	16.89'	
L5	REACH00	14.09'	--	S23°56'11"E	--	--	--	
C5	REACH00	25.01'	40.00'	35°49'20"	12.93'	S41°50'51"E	24.60'	
L6	REACH00	15.97'	--	S59°45'31"E	--	--	--	
C6	REACH00	19.27'	30.00'	36°48'38"	9.98'	N41°21'12"W	18.94'	
L7	REACH00	6.69'	--	S22°56'53"E	--	--	--	
C7	REACH00	13.87'	30.00'	26°29'34"E	7.06'	S36°11'40"E	13.75'	
L8	REACH00	25.20'	--	S49°26'27"E	--	--	--	
C8	REACH00	16.61'	25.00'	38°04'10"E	8.63'	N30°24'22"W	16.31'	
L9	REACH00	11.89'	--	S11°22'17"E	--	--	--	
C9	REACH00	19.60'	25.00'	44°55'20"	10.34'	S33°49'57"E	19.10'	
L10	REACH00	13.36'	--	S56°17'37"E	--	--	--	
C10	REACH00	30.89'	40.00'	44°14'34"E	16.26'	N34°10'20"W	30.13'	
L11	REACH00	2.52'	--	S12°03'03"E	--	--	--	
C11	REACH00	22.60'	40.00'	32°22'30"E	11.61'	S28°14'18"E	22.30'	
L12	REACH00	24.60'	--	S44°25'33"E	--	--	--	
C12	REACH00	10.57'	40.00'	15°08'17"E	5.32'	N36°51'24"W	10.54'	
L13	REACH00	41.69'	--	S29°17'16"E	--	--	--	
C13	REACH00	27.11'	35.00'	44°22'31"E	14.27'	S51°28'32"E	26.43'	
L14	REACH00	8.96'	--	S73°39'47"E	--	--	--	
C14	REACH00	9.21'	35.00'	15°04'31"E	4.63'	N66°07'32"W	9.18'	
L15	REACH00	22.59'	--	S58°35'16"E	--	--	--	
C15	REACH00	20.53'	25.00'	47°03'19"E	10.88'	S82°06'56"E	19.96'	
L16	REACH00	7.07'	--	N74°21'25"E	--	--	--	
C16	REACH00	26.59'	25.00'	60°55'43"	14.71'	N75°10'43"W	25.35'	
L17	REACH00	21.58'	--	S44°42'52"E	--	--	--	
C17	REACH00	28.21'	25.00'	64°39'08"	15.82'	S77°02'26"E	26.74'	
L18	REACH00	3.27'	--	N70°38'00"E	--	--	--	
C18	REACH00	1.25'	25.00'	02°52'19"	0.63'	N69°11'50"E	1.25'	
L19	REACH00	21.96'	--	N67°45'41"E	--	--	--	
C19	REACH00	7.36'	25.00'	16°52'17"E	3.71'	S76°11'49"W	7.33'	
L20	REACH00	0.97'	--	N84°37'58"E	--	--	--	
C20	REACH00	53.41'	50.00'	61°11'57"	29.57'	N64°46'04"W	50.90'	
L21	REACH00	15.04'	--	S34°10'05"E	--	--	--	
C21	REACH00	13.09'	40.00'	18°45'05"	6.60'	N24°47'33"W	13.03'	
L22	REACH00	30.64'	--	S15°25'00"E	--	--	--	
C22	REACH00	24.75'	30.00'	47°15'41"	13.13'	S39°02'50"E	24.05'	
L23	REACH00	9.05'	--	S62°40'41"E	--	--	--	
C23	REACH00	29.29'	45.00'	37°17'36"	15.18'	N44°01'53"W	28.78'	
L24	REACH00	25.31'	--	S25°23'05"E	--	--	--	
C24	REACH00	24.09'	45.00'	30°40'37"	12.34'	N10°02'46"W	23.81'	
L25	REACH00	34.88'	--	S05°17'32"W	--	--	--	
C25	REACH00	24.88'	30.00'	47°30'48"	13.20'	S18°27'52"E	24.17'	
L26	REACH00	15.40'	--	S42°13'16"E	--	--	--	
C26	REACH00	20.89'	45.00'	26°35'52"	10.64'	N28°55'20"W	20.70'	
L27	REACH00	22.36'	--	S15°37'24"E	--	--	--	
C27	REACH00	34.16'	35.00'	55°54'48"	18.58'	S43°34'48"E	32.82'	
L28	REACH00	16.64'	--	S71°32'12"E	--	--	--	
C28	REACH00	22.30'	45.00'	28°23'25"	11.38'	S85°43'55"E	22.07'	
L29	REACH00	15.37'	--	N80°04'23"E	--	--	--	
C29	REACH00	37.86'	45.00'	48°12'36"	20.13'	N75°49'19"W	36.76'	
L30	REACH00	17.39'	--	S51°43'01"E	--	--	--	
C30	REACH00	11.39'	35.00'	18°38'33"	5.74'	N42°23'44"W	11.34'	
L31	REACH00	22.06'	--	S33°04'28"E	--	--	--	
C31	REACH00	18.97'	40.00'	27°10'07"	9.67'	S46°39'32"E	18.79'	
L32	REACH00	31.67'	--	S60°14'35"E	--	--	--	
C32	REACH00	10.38'	35.00'	16°59'15"	5.23'	N51°44'58"W	10.34'	
L33	REACH00	20.64'	--	S43°15'20"E	--	--	--	
C33	REACH00	19.78'	25.00'	45°20'18"	10.44'	S65°55'29"E	19.27'	
L34	REACH00	7.42'	--	S88°35'38"E	--	--	--	
C34	REACH00	20.32'	25.00'	46°34'07"	10.76'	N68°07'19"E	19.76'	
L35	REACH00	11.83'	--	N44°50'15"E	--	--	--	
C35	REACH00	17.80'	25.00'	40°48'20"	9.30'	S65°14'25"W	17.43'	
L36	REACH00	9.93'	--	N85°38'35"E	--	--	--	

GEOMETRY TABLE								
NO.	Reach ID	LENGTH	RADIUS	BEARING/DELTA	TANGENT	CHORD BEARING	CHORD	
L37	REACH01 - TRIB 1	4.28'	--	S19°00'06"E	--	--	--	
C36	REACH01 - TRIB 1	12.92'	20.00'	37°01'16"E	6.70'	S37°30'44"E	12.70'	
L38	REACH01 - TRIB 1	43.17'	--	S56°01'22"E	--	--	--	
L39	REACH02 - TRIB 2	31.18'	--	S53°10'31"W	--	--	--	
C37	REACH02 - TRIB 2	7.37'	25.00'	16°53'08"	3.71'	S44°43'58"W	7.34'	
L40	REACH02 - TRIB 2	4.39'	--	S36°17'25"W	--	--	--	
C38	REACH02 - TRIB 2	12.70'	20.00'	36°22'31"	6.57'	S18°06'10"W	12.49'	
L41	REACH02 - TRIB 2	21.83'	--	S00°05'06"E	--	--	--	
C39	REACH02 - TRIB 2	13.99'	25.00'	32°03'24"	7.18'	S16°06'48"E	13.81'	
L42	REACH02 - TRIB 2	25.32'	--	S32°08'30"E	--	--	--	

RADIUS POINT LOCATION TABLE				
NO.	Reach ID	Northing	Easting	
R1	REACH00	3608289.7000	11038506.0539	
R2	REACH00	3608313.0004	11038579.7092	
R3	REACH00	3608287.3614	11038599.5477	
R4	REACH00	3608214.3493	11038562.9914	
R5	REACH00	3608231.9026	11038637.2567	
R6	REACH00	3608165.3851	11038615.7993	
R7	REACH00	3608180.6206	11038673.6582	
R8	REACH00	3608122.4513	11038657.0384	
R9				



		MODIFIED CROSS VANE – RIGHT MEANDER				PC	PT	RC
16+80.00	WBKF-POOL	8	DBKF	0.9	16+49.63	17+03.03	50	
WHEAD	WVANE	WBANK	STRUC LENGTH	MOD LENGTH	SLOPE BKF	STEP	LPOOL	
3.0	2.5	2.4	7.0	4.0	0.028	0.5	18.0	
Δ Y-HEAD	DEPART ANGLE	WRAMP	LVANE-OUT	LVANES-MOD	SLOPE VANE		Mod % WIDTH	
0.1	22.7	0.1	7.8	4.1	0.078		100	
POINT #	STATION	BL DIST TO PREVIOUS POINT	OFFSET FROM BL TO POINT	ELEVATION AT POINT	DISTANCE TO PREVIOUS POINT	BANKFULL ELEVATION	SLOPE TO PREVIOUS POINT	
1	16+87.00	0.0	4.0	1138.70	0.0	1138.70	---	
2	16+80.00	7.0	1.5	1138.09	7.8	1138.89	0.078	
3	16+80.00	0.0	---	1137.99	1.5	1138.89	0.067	
4	16+80.00	0.0	1.5	1138.09	1.5	1138.89	0.067	
5	16+84.00	4.0	3.1	1138.44	4.1	1138.78	0.086	



SEE EXISTING CONDITIONS PLAN  
FOR EXISTING LEGEND,  
GRADING PLAN FOR PROPOSED  
LEGEND (SHEETS 2 AND 4).

BOULDER POOL STAKEOUT TABLE						
REACH ID	STARTING STATION	*POINT	NORTHING (ft)	EASTING (ft)	ELEVATION (ft)	DROP OVER STRUCTURE (ft)
Canter Drive	10+65.00	W	3608274.8804	11038552.3070	1163.21	1.10
	11+50.00	W	3608209.2416	11038604.2949	1158.875	1.00
	11+90.00	W	3608185.5154	11038636.0539	1156.925	1.10
	12+35.00	W	3608150.3068	11038662.9397	1154.548	
	12+85.00	W	3608108.3774	11038686.6223	1152.15	1.00
	13+25.00	W	3608082.0749	11038716.2360	1150.073	1.10
	13+90.00	W	3608028.3372	11038750.3710	1146.893	0.5
	14+40.00	W	3607985.6264	11038776.1310	1145.278	
	15+20.00	W	3607945.3072	11038843.0511	1143.1	
	15+90.00	W	3607923.6663	11038903.3552	1140.893	
	16+18.00	W	3607920.9715	11038929.8714	1140.015	0.55
	16+50.00	W	3607931.6286	11038959.9074	1138.99	
	17+60.00	W	3607857.8197	11039027.1577	1135.965	0.65
	18+15.00	W	3607820.9587	11039065.6459	1134.24	0.55
	19+10.00	W	3607730.6938	11039082.5431	1131.425	
	19+60.00	W	3607688.6207	11039106.7324	1129.972	0.50
	20+00.00	W	3607650.7595	11039119.3354	1128.797	
	20+85.00	W	3607630.0092	11039196.0163	1126.14	0.75
	21+40.00	W	3607607.3664	11039244.1927	1123.507	0.85
	21+78.00	W	3607576.5474	11039266.2813	1121.532	1.00
	22+43.00	W	3607539.0231	11039318.7655	1118.192	0.80
	22+70.00	W	3607525.0247	11039340.8982	1116.762	0.90

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AKEOUT SHEET.dwg

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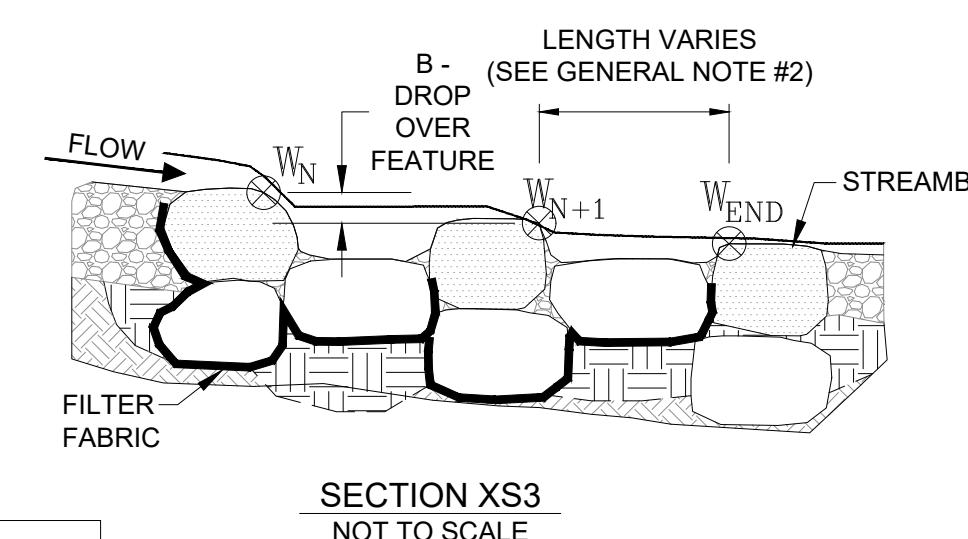
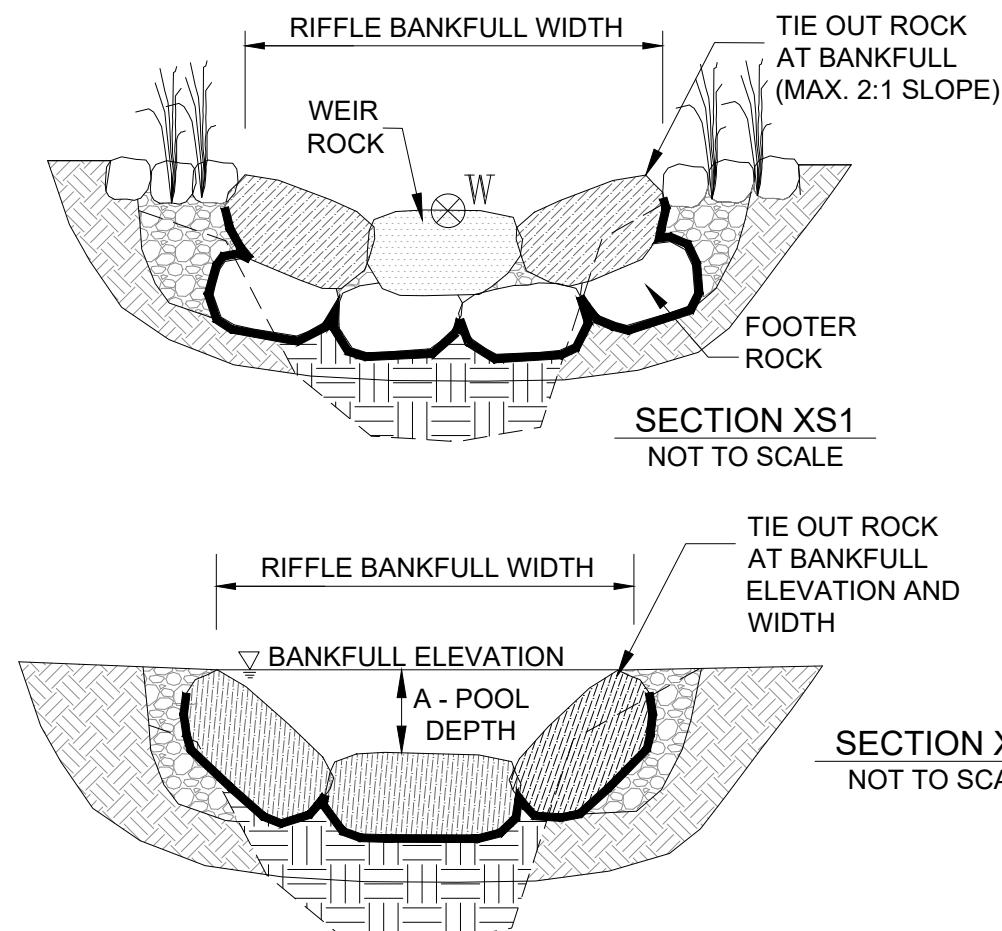
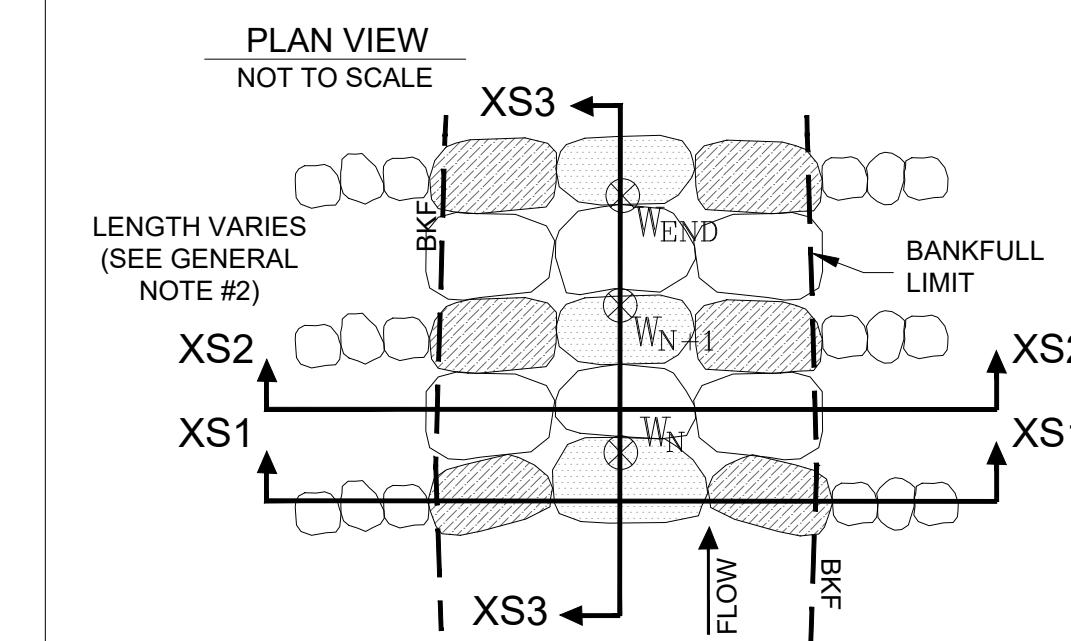
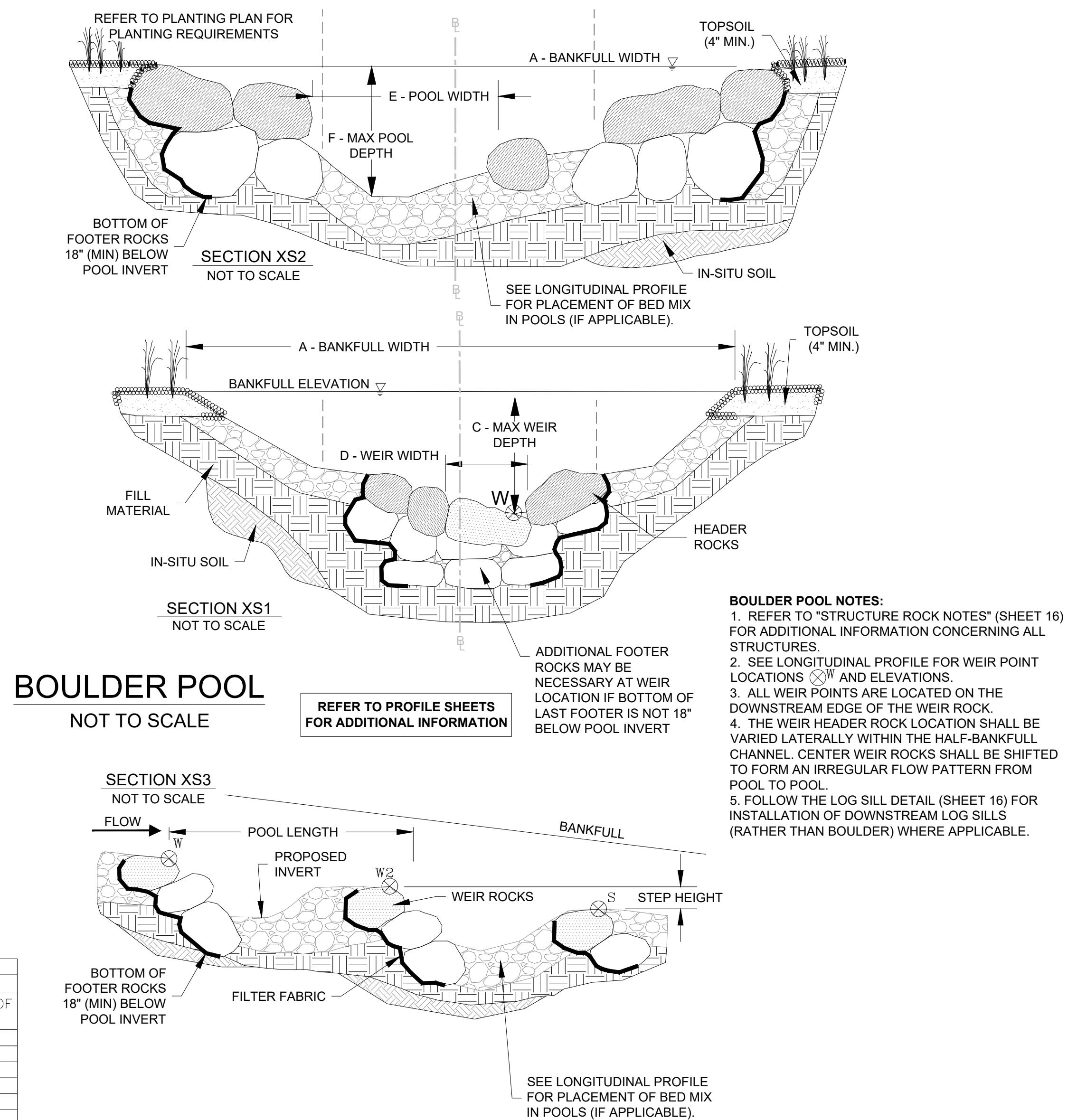
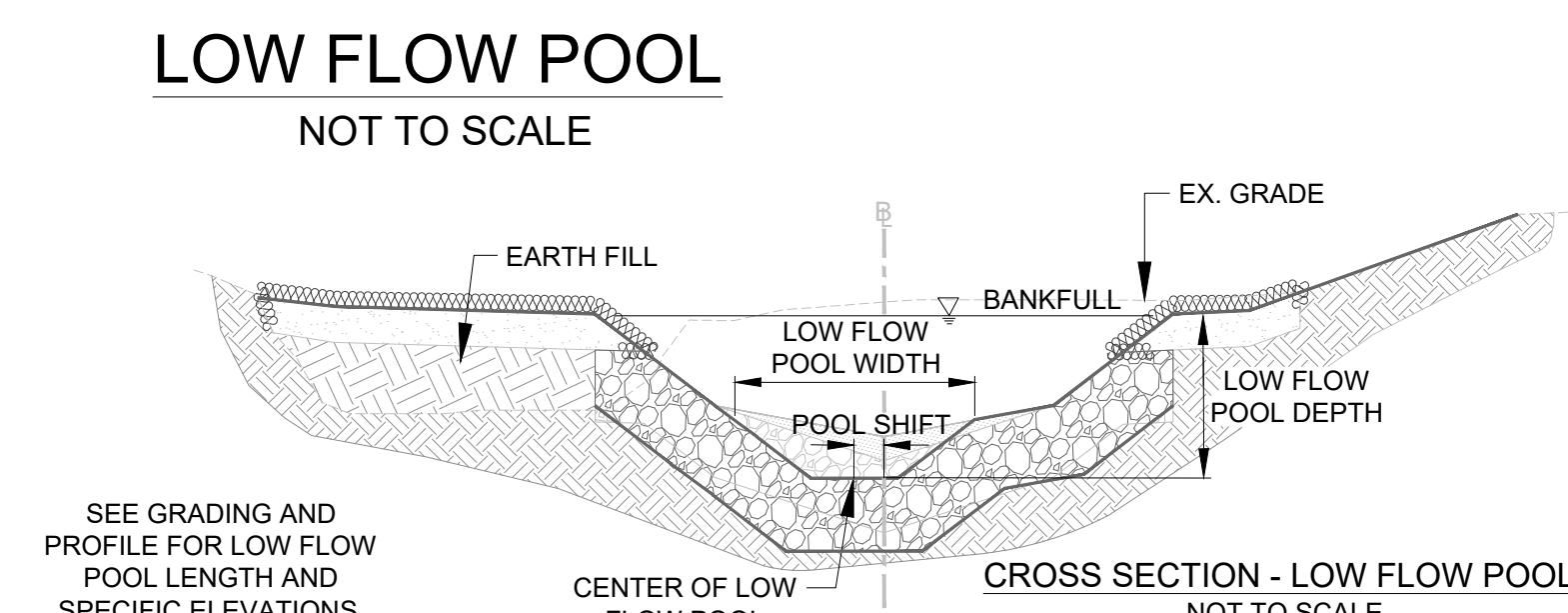
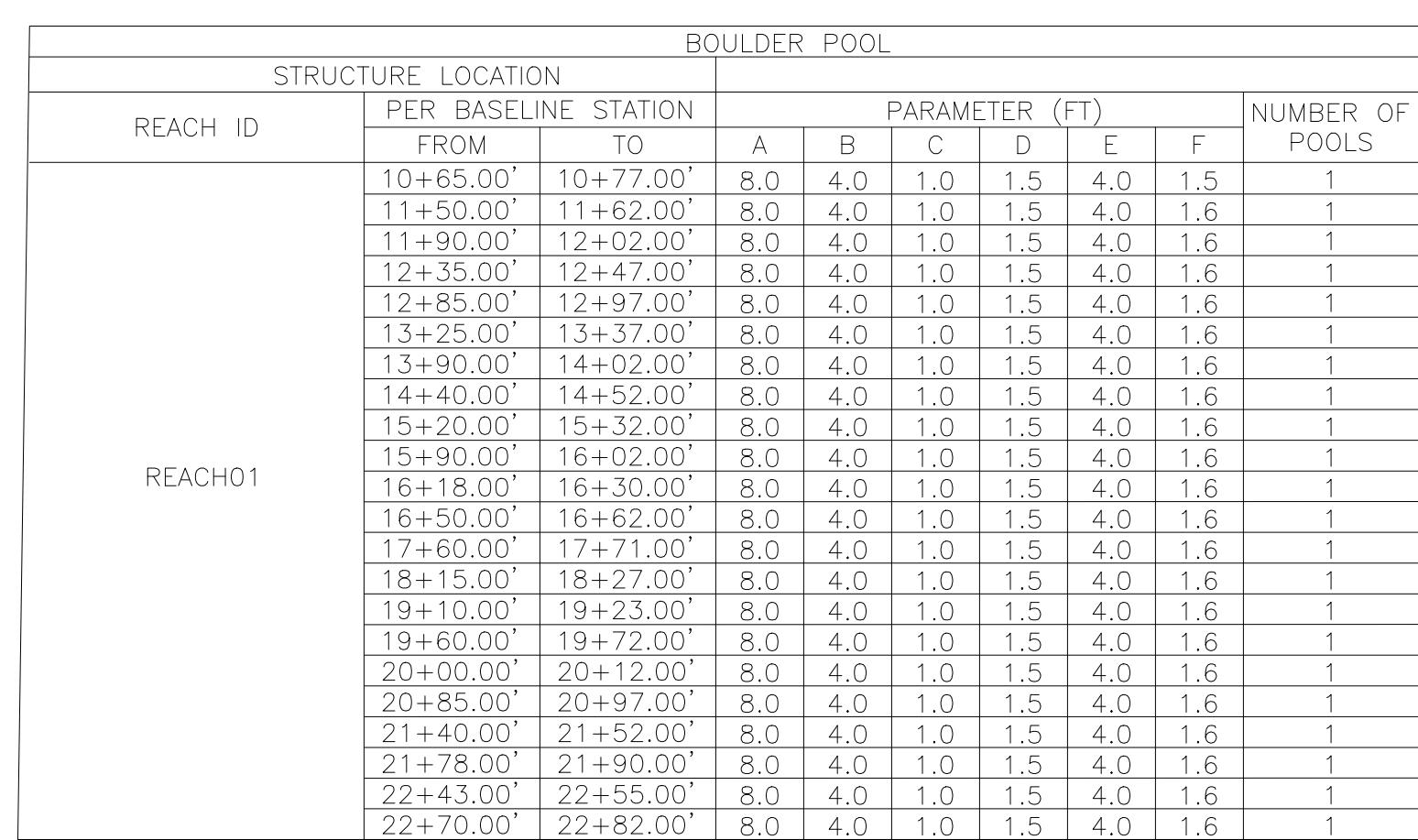
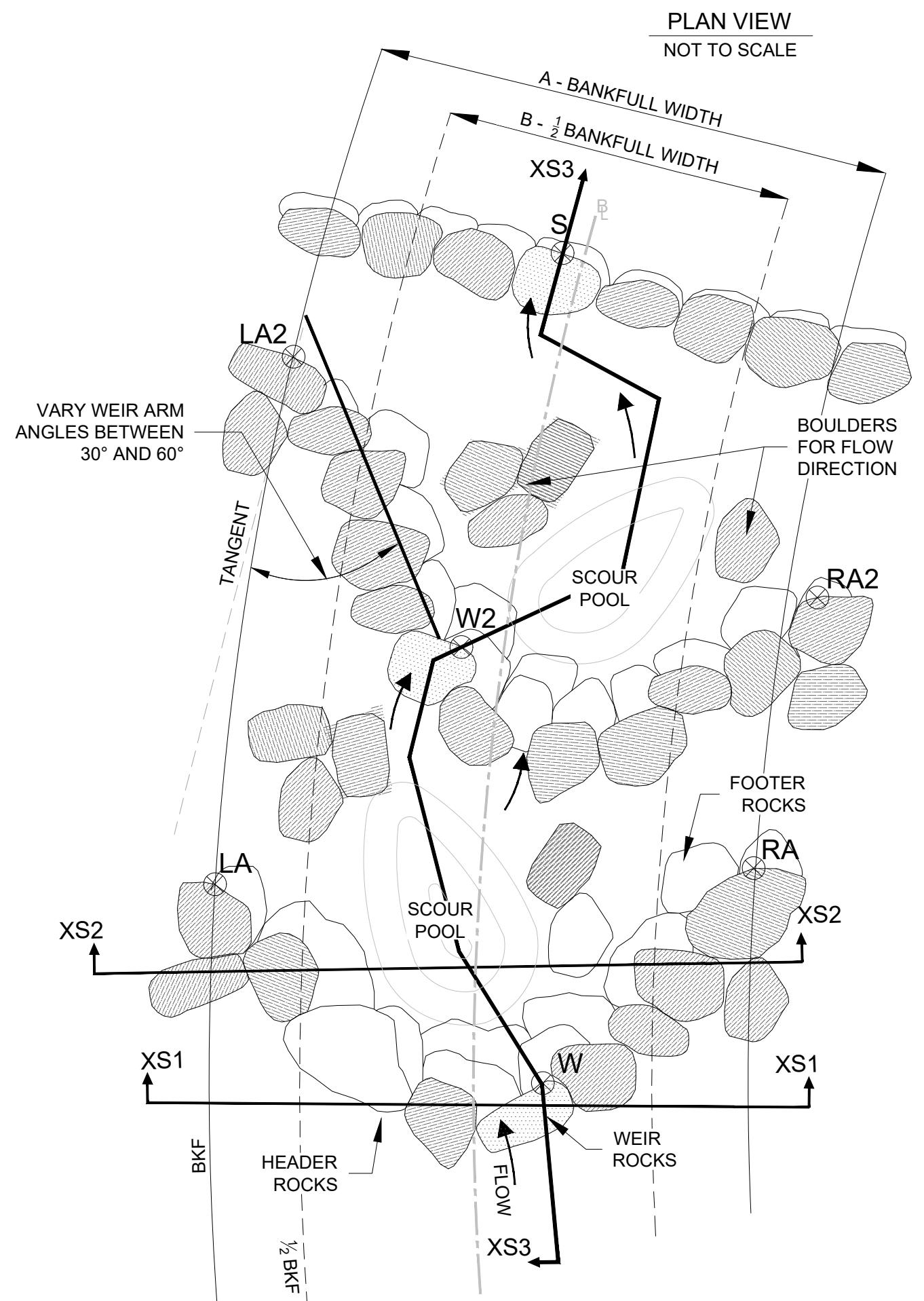
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DATE: AUG 2024      SCALE: 1" = 20'

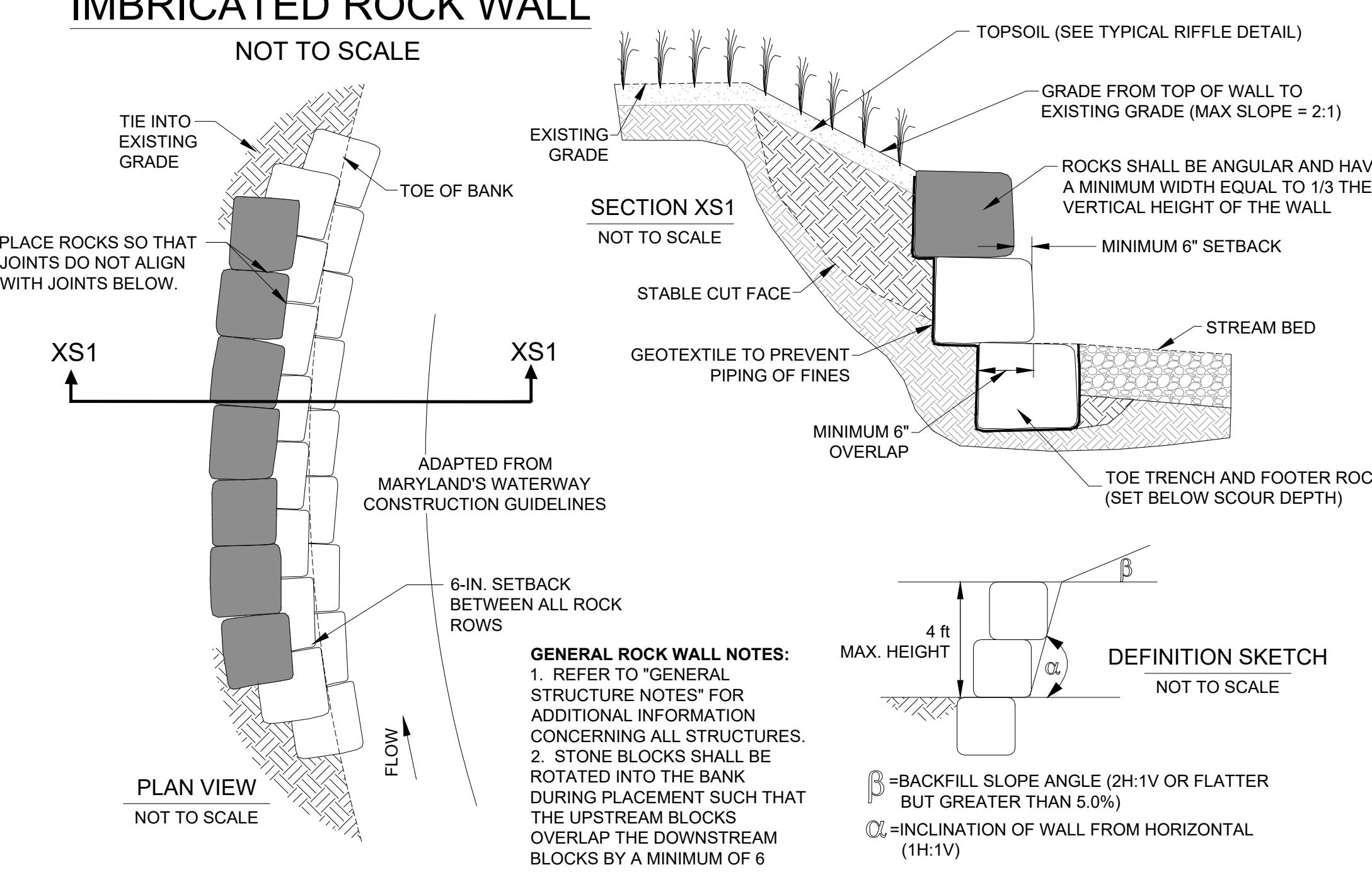
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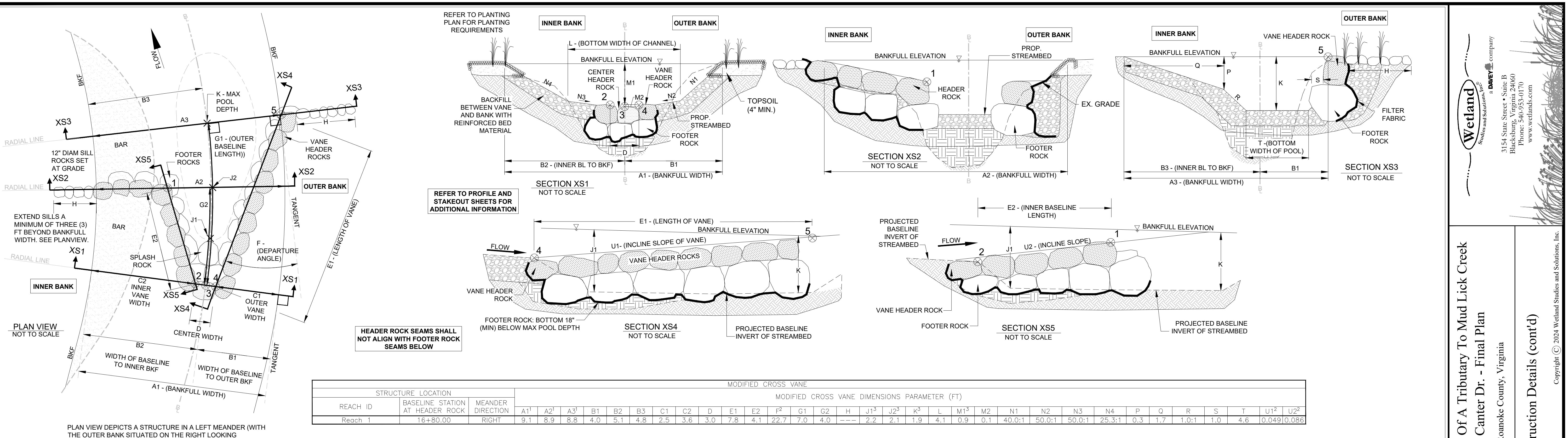




ROCK STEP DIMENSIONS					
REACH ID	WEIR STATION	WEIR POINT #	WEIR ELEVATION	PARAMETER (FT)	
				A	B
CANTER DRIVE	23+18.0	1	1114.67	----	----
	23+22.0	2	1113.92	0.5	0.75
	23+24.0	END	1113.17	0.5	0.75
TRIB 1	50+10.0	1	1146.31	----	----
	50+12.0	END	1145.56	0.5	0.75
	50+25.0	1	1142.81	----	----
	50+29.0	2	1142.06	0.5	0.75
	50+31.0	END	1141.31	0.5	0.75
TRIB 2	60+15.0	1	1159.39	----	----
	60+19.0	2	1158.39	0.5	1.00
	60+21.0	END	1157.39	0.5	1.00
	60+50.0	1	1149.29	----	----
	60+52.0	END	1148.29	0.5	1.00
	60+65.0	1	1144.99	----	----
	60+69.0	2	1143.99	0.5	1.00
	60+71.0	END	1142.99	0.5	1.00
	60+80.0	1	1140.89	----	----
	60+84.0	2	1139.89	0.5	1.00
	60+86.0	END	1138.89	0.5	1.00



Computer File Name:  
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INSTRUCTION DETAILS.dwg



PLAN VIEW DEPICTS A STRUCTURE IN A LEFT MEANDER (WITH THE OUTER BANK SITUATED ON THE RIGHT LOOKING DOWNSTREAM) FOR A RIGHT MEANDER STRUCTURE (WITH THE OUTER BANK ON THE LEFT). THE PLAN VIEW IS A MIRROR IMAGE OF WHAT SHOULD BE CONSTRUCTED. \*\*THE LONG VANE IS ALWAYS SITUATED ON THE OUTER BANK.

MODIFIED CROSS VANE NOTES:

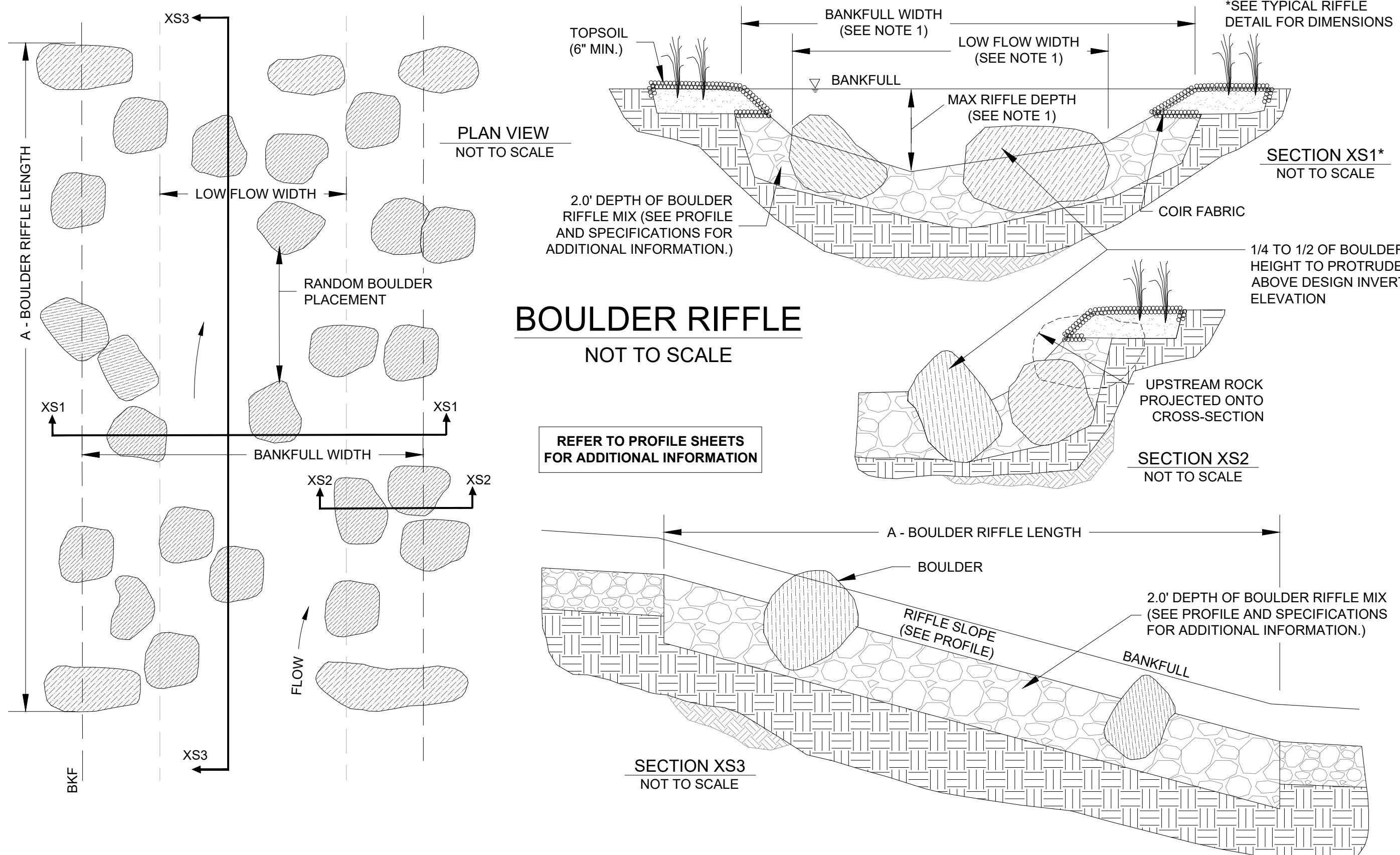
<sup>1</sup> VARIABLE "A1" IS THE BANKFULL WIDTH AT SECTION XS1, VARIABLE "A2" IS THE BANKFULL WIDTH AT SECTION XS2, AND "A3" IS BANKFULL WIDTH AT XS3. THE BANKFULL WIDTH CHANGES CONTINUOUSLY THROUGHOUT THE STRUCTURE BASED ON GRADING OF THE BAR.

<sup>2</sup> VARIABLE "F" IS IN UNITS OF DEGREES AND VARIABLES "U1" AND "U2" ARE SLOPES EXPRESSED AS VERTICAL: HORIZONTAL (V:H) AND IN UNITS OF FT/FT.

<sup>3</sup> VARIABLES "J1", "J2", "K", "M1", & "M2" ARE DEPTHS RELATIVE TO BANKFULL.

<sup>4</sup> SEE PLAN VIEW FOR VARIABLE "H" (SILL LENGTH AND PLACEMENT).

<sup>5</sup> VARIABLES "N" AND "R" ARE SLOPES EXPRESSED AS HORIZONTAL: VERTICAL (H:V).



BOULDER RIFFLE NOTES:

1. REFER TO TYPICAL RIFFLE SECTION FOR CROSS SECTION DIMENSIONS.

2. WEIR ELEVATIONS AND LOCATIONS SHALL ADHERE TO PLAN SPECIFICATIONS. BETWEEN THESE POINTS INVERT LOCATION IS EXPECTED TO VARY WIDELY THROUGH THE FULL WIDTH OF THE LOW FLOW CHANNEL. SEE TYPICAL RIFFLE DETAIL FOR ADDITIONAL INFORMATION.

3. 40% OF RIFFLE AREA SHALL CONSIST OF PROTRUDING RANDOM BOULDERS (STRUCTURE ROCK). BOULDERS SHALL BE PLACED SO AS TO MAXIMIZE CHANNEL ROUGHNESS (NOT FLAT), LEAVING LOCALIZED SCOUR HOLES BETWEEN PROTRUDING BOULDERS. BOULDERS SHALL BE PLACED WITH 1/4 TO 1/2 OF THE ROCK HEIGHT BURIED BELOW THE INVERT AND THE REMAINDER PROTRUDING FROM THE SURROUNDING BED. PROTRUSION HEIGHTS SHALL VARY.

4. SPECIFIC LOCATIONS FOR RANDOM BOULDER PLACEMENT SHALL BE MARKED AND REVIEWED BY DESIGN ENGINEER OR ENGINEER'S REPRESENTATIVE PRIOR TO PLACEMENT.

5. RANDOM BOULDERS SHOULD BE PLACED AT THE DESIGNATED LOCATIONS AND THE FEATURE BACKFILLED WITH MATERIAL AS SPECIFIED IN THE PROFILE AND BOULDER RIFFLE MIXTURE SPECIFICATIONS.

Stream Restoration Of A Tributary To Mud Lick Creek  
Along Carter Dr. - Final Plan

Roanoke County, Virginia

Construction Details (cont'd)

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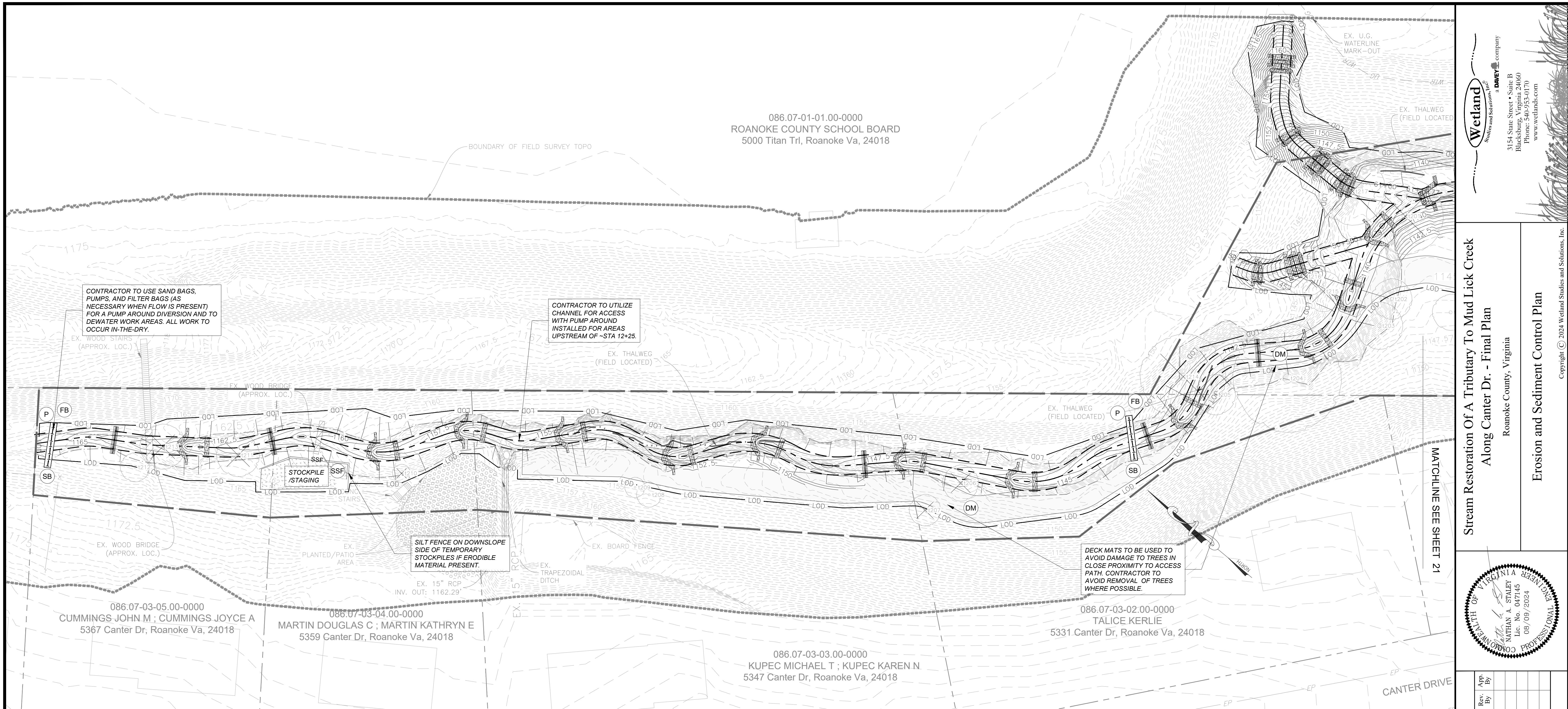
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**THIS SHEET TO BE USED FOR  
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SEE PLANTING PLAN AND  
VEGETATION SCHEDULE  
SHEETS FOR VEGETATIVE  
STABILIZATION MEASURES.

SEE EXISTING CONDITIONS PLAN  
FOR EXISTING LEGEND,  
GRADING PLAN FOR PROPOSED  
LEGEND (SHEETS 2 AND 4).

## GENERAL NOTES:

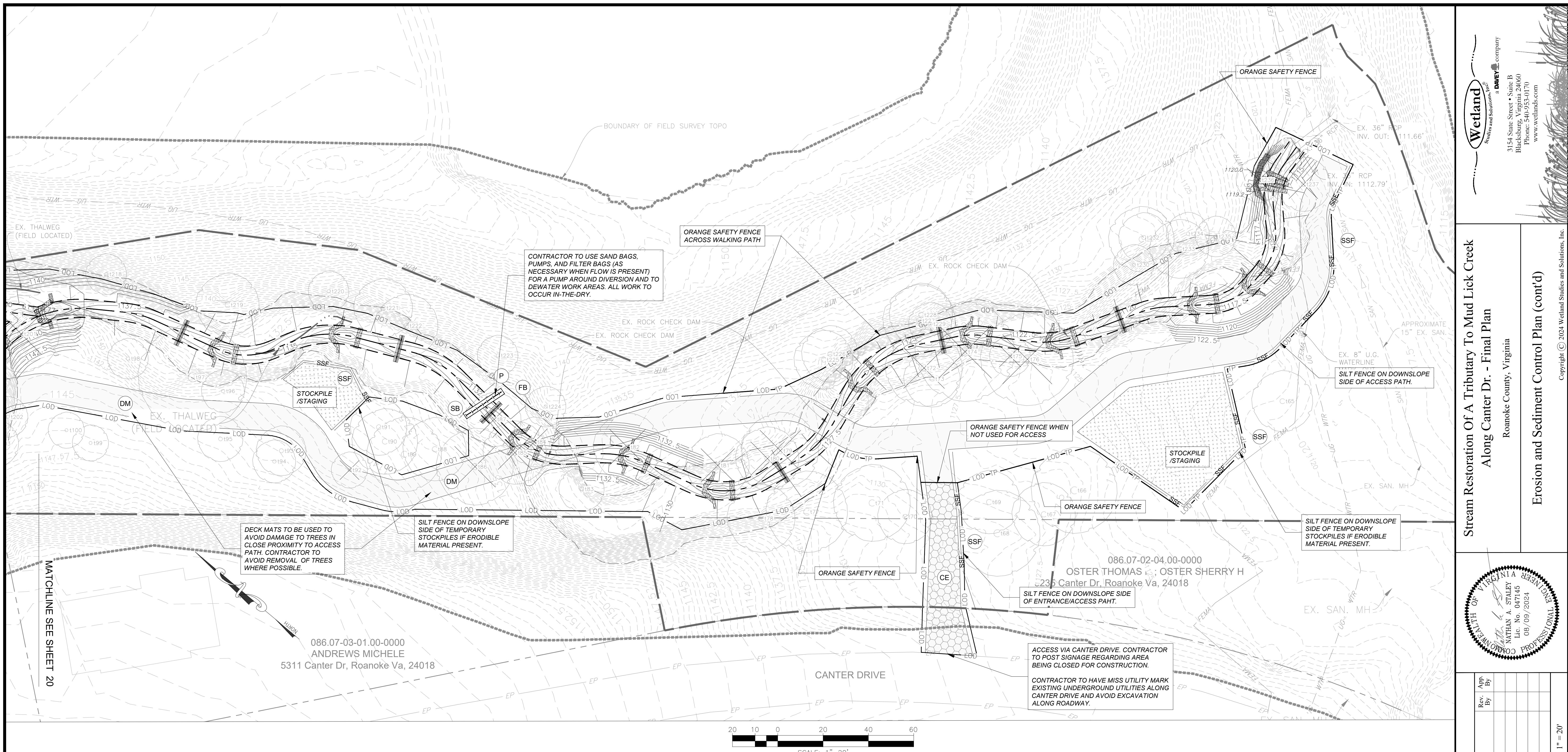
1. CONTRACTOR SHALL ADHERE TO OSHA REQUIREMENTS FOR DURATION OF CONSTRUCTION.
2. SEE THE EROSION AND SEDIMENT CONTROL NARRATIVE FOR MORE INFORMATION. **THIS SHEET SHALL BE USED FOR EROSION AND SEDIMENT CONTROL PURPOSES ONLY.**
3. MAIN STOCKPILE STAGING AREAS TO BE AS SHOWN IN PLAN. OTHER AREAS MAY BE USED TEMPORARILY.
4. CONTRACTOR SHALL NOT GRUB AREAS UNTIL NECESSITATED BY GRADING ACTIVITIES, DISTURBED AREAS SHALL BE STABILIZED AT THE END OF EACH DAY OR UPON THREAT OF RAIN.
5. NATURAL FIBER MATTING (CM-700 OR APPROVED EQUAL) TO BE USED ON ALL STREAM BANK AREAS, ACROSS BANKFULL BENCH, ON SLOPES 3:1 OR STEEPER, AND AS OTHERWISE NOTED IN PLANS/ DETAILS. ALL OTHER AREAS TO BE SEEDED PER THE PLANTING PLAN AND MULCHED WITH STRAW AT 2 TONS/AC (MIN.).
6. DECK MATS SHALL BE USED ALONG ACCESS PATH AREAS WHERE BOUNDED BY MATURE TREES WHICH WILL BE LEFT UNDISTURBED.
7. TREE PROTECTION FENCE AND HIGH VISIBILITY SAFETY FENCE SHALL BE INSTALLED UPON REQUEST OF ENGINEER OR COUNTY STAFF.
8. ***EXCAVATORS USED FOR IN STREAM WORK SHALL DEMONSTRATE (THROUGH SUBMITTAL IMMEDIATELY UPON MOBILIZATION) THAT AN ORGANIC HYDRAULIC FLUID SUBSTITUTE IS BEING UTILIZED (BIODEGRADABILITY PER EPA 560/6-82-003, NON-TOXIC PER OECD 203, OR EQUIVALENT).***

EROSION/SEDIMENT CONTROL LEGEND					
NO.	TITLE	KEY	SYMBOL	UNITS	QUANTITY
GWC 1.2	PUMP AROUND DIVERSION*	P	(P)	EA	1
IGWC 1.2	SANDBAG DIKE	SB	(SB) [→→→→→]	EA	2
3.01; IPFM ATE 6-12	WELDED WIRE TREE PROTECTION FENCE	TP	LOD-TP	LF	AS NEEDED
3.02	WASH RACK	WR	(WR)	EA	AS NEEDED
	TEMP. STONE		(TS)		

Horizontal Datum: VCS NAD 83

Vertical Datum: NAVD 88		
Boundary and Topo Source: WSSI and Roanoke County Digital Data		
Design	Draft	Approved
JAB	JAB	NAS
Sheet #		
20 of 28		
Computer File Name:		

PUMP AROUND SHALL MOVE AS CONTRACTOR STARTS NEW AREA



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SEE PLANTING PLAN AND  
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SHEETS FOR VEGETATIVE  
STABILIZATION MEASURES.

**SEE EXISTING CONDITIONS PLAN  
FOR EXISTING LEGEND,  
GRADING PLAN FOR PROPOSED  
LEGEND (SHEETS 2 AND 4).**

## GENERAL NOTES:

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8. ***EXCAVATORS USED FOR IN STREAM WORK SHALL DEMONSTRATE (THROUGH SUBMITTAL IMMEDIATELY UPON MOBILIZATION) THAT AN ORGANIC HYDRAULIC FLUID SUBSTITUTE IS BEING UTILIZED (BIODEGRADABILITY PER EPA 560/6-82-003, NON-TOXIC PER OECD 203, OR EQUIVALENT).***

EROSION/SEDIMENT CONTROL LEGEND					
NO.	TITLE	KEY	SYMBOL	UNITS	QUANTITY
GWC 1.2	PUMP AROUND DIVERSION*	P	(P)	EA	1
IGWC 1.2	SANDBAG DIKE	SB	(SB) [—>>>—]	EA	2
3.01; PFP ATE 6-12	WELDED WIRE TREE PROTECTION FENCE	TP	—LOD-TP—	LF	AS NEEDED
3.02	WASH RACK	WR	[—>>>—]	EA	AS NEEDED
3.02	TEMP. STONE CONSTRUCTION ENTRANCE	CE	[—>>>—]	EA	1
3.05	SILT FENCE	SF	—SF—	LF	AS NEEDED
05 B	SILT FENCE WITH WIRE SUPPORT (SUPER SILT FENCE)	SSF	—SSF—	LF	430
N/A	FILTER BAG	FB	(FB)	EA	1
N/A	TEMPORARY DECK MATS	DM	(DM)	LF	AS NEEDED

Horizontal Datum: VCS NAD 83

Vertical Datum: NAVD 88

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VSSI and Roanoke County Digital Data

Design      Draft      Approved

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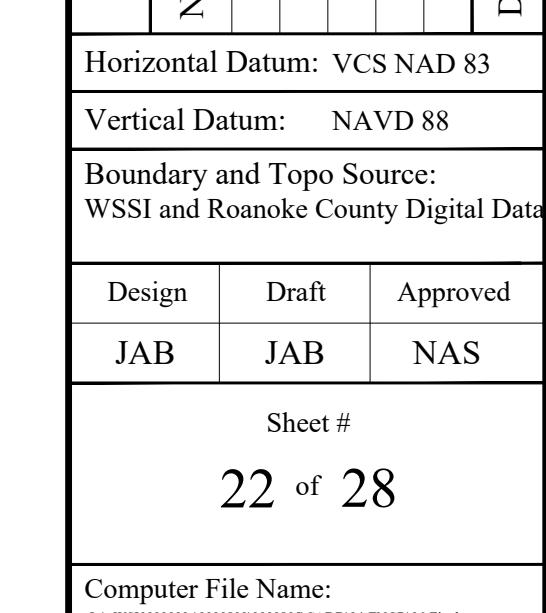
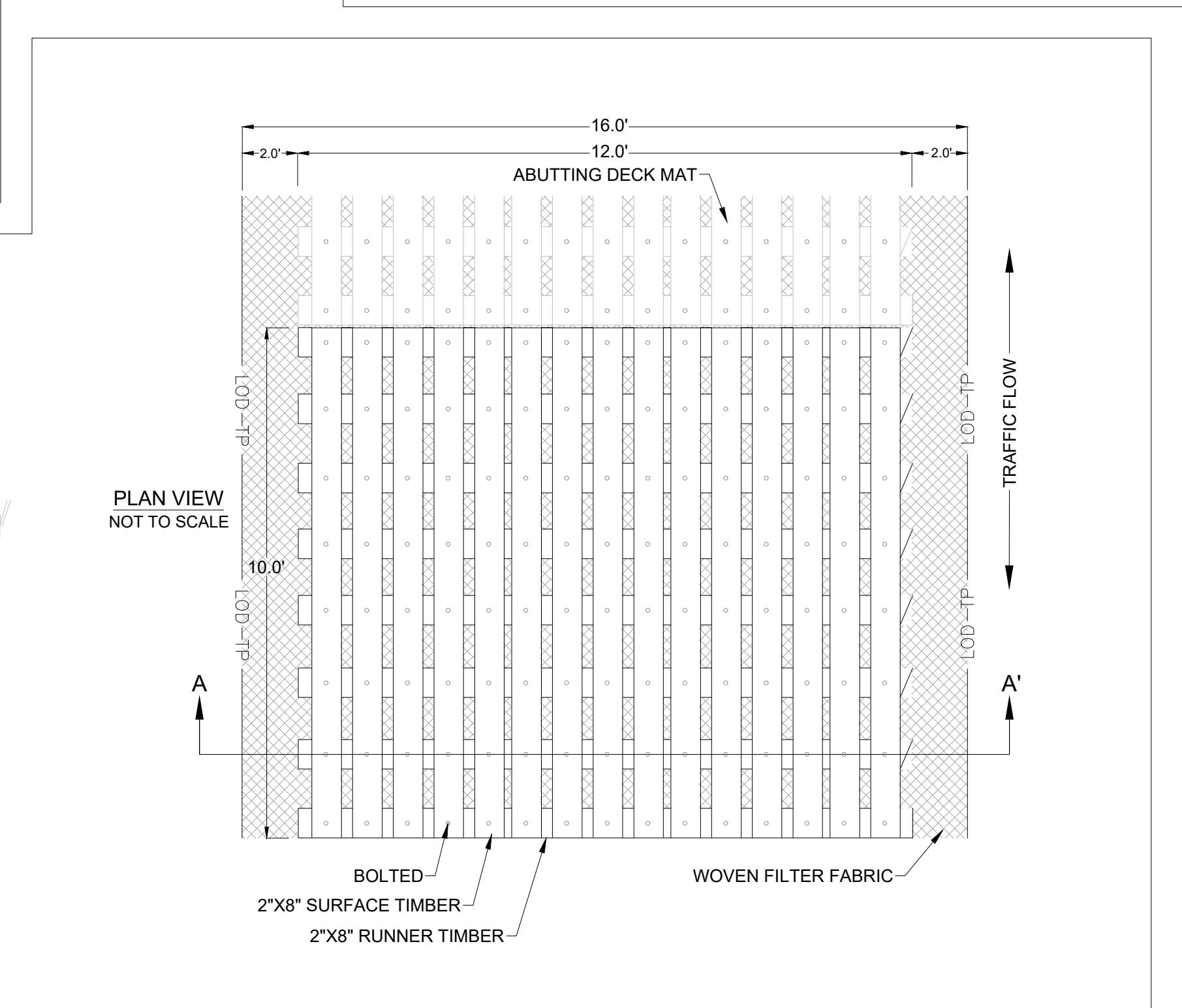
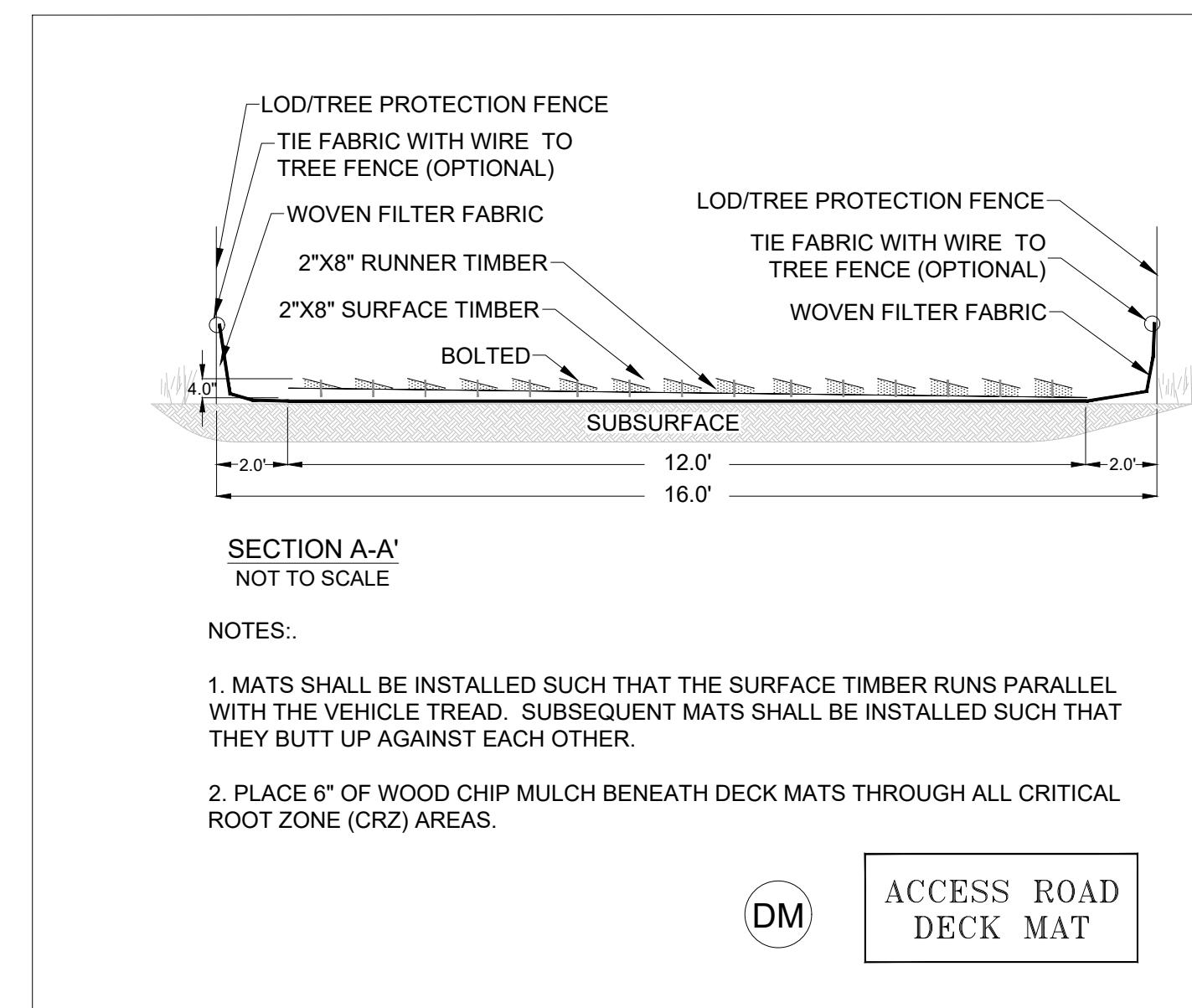
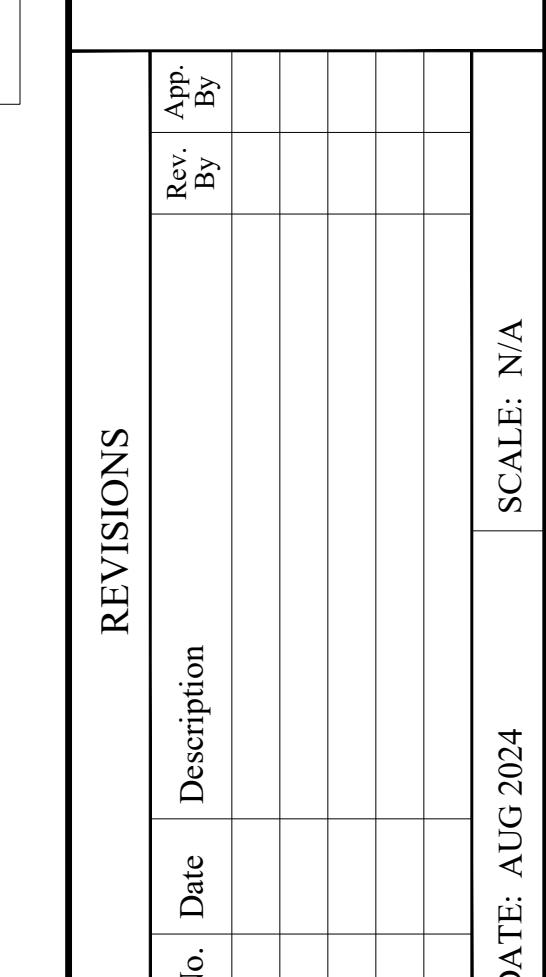
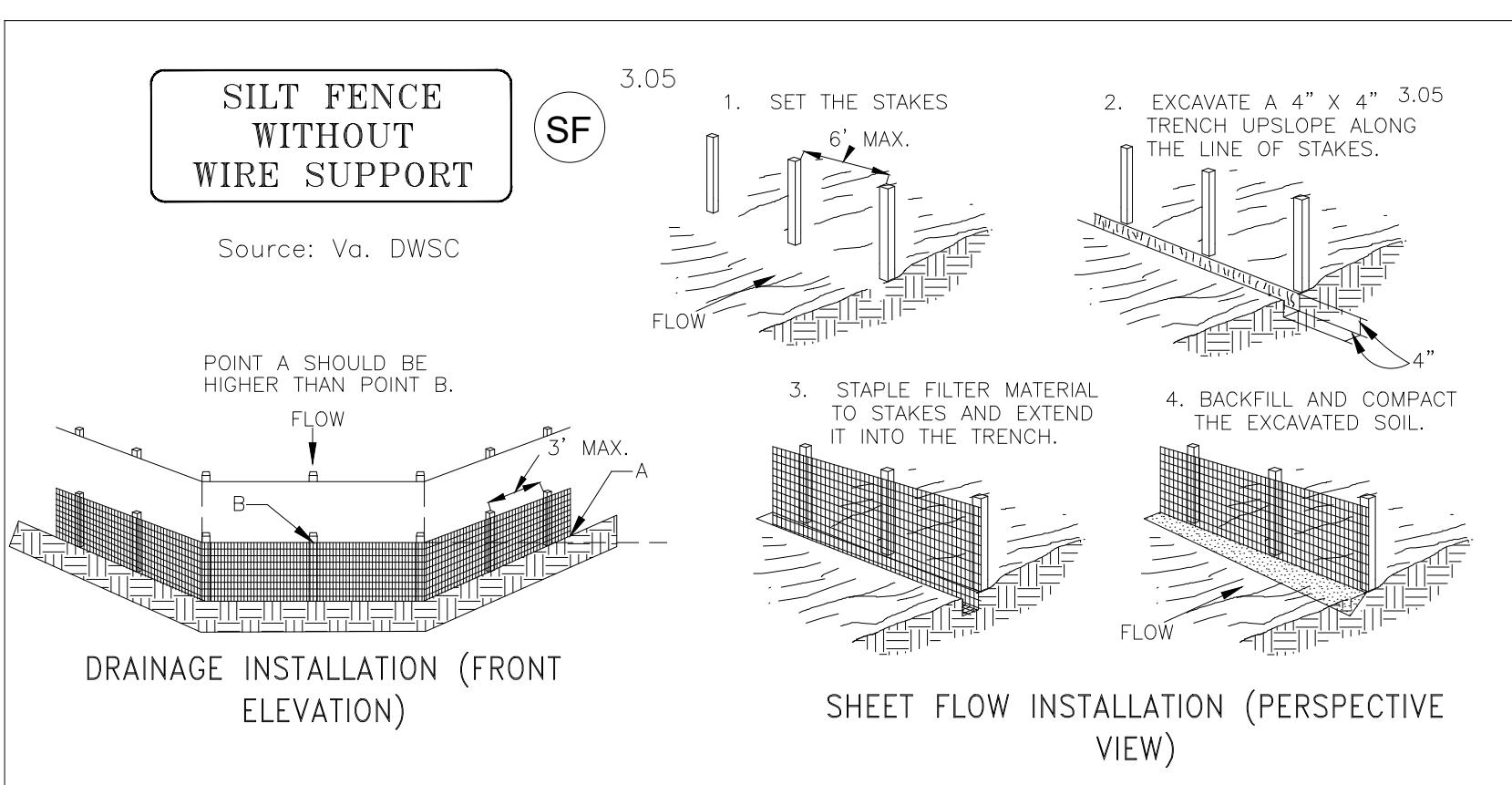
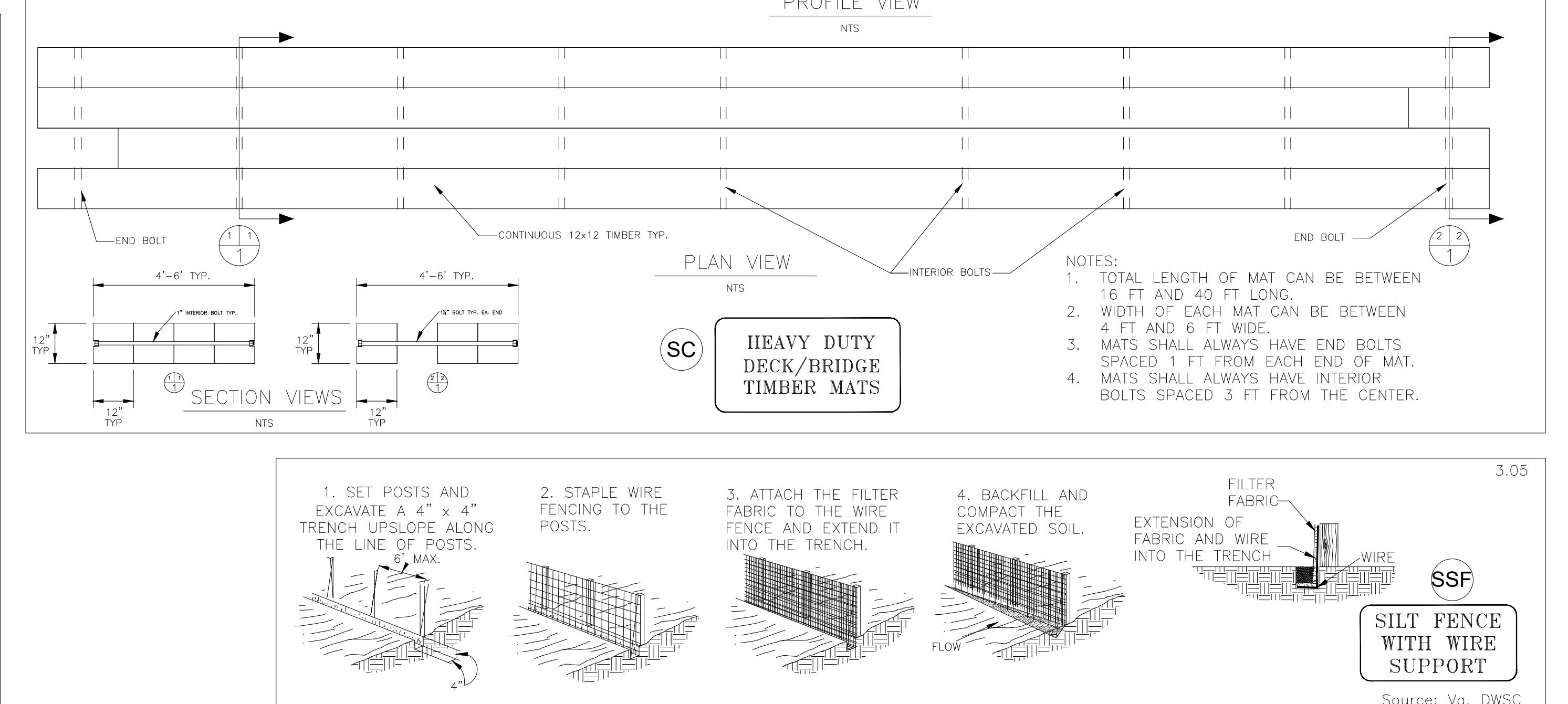
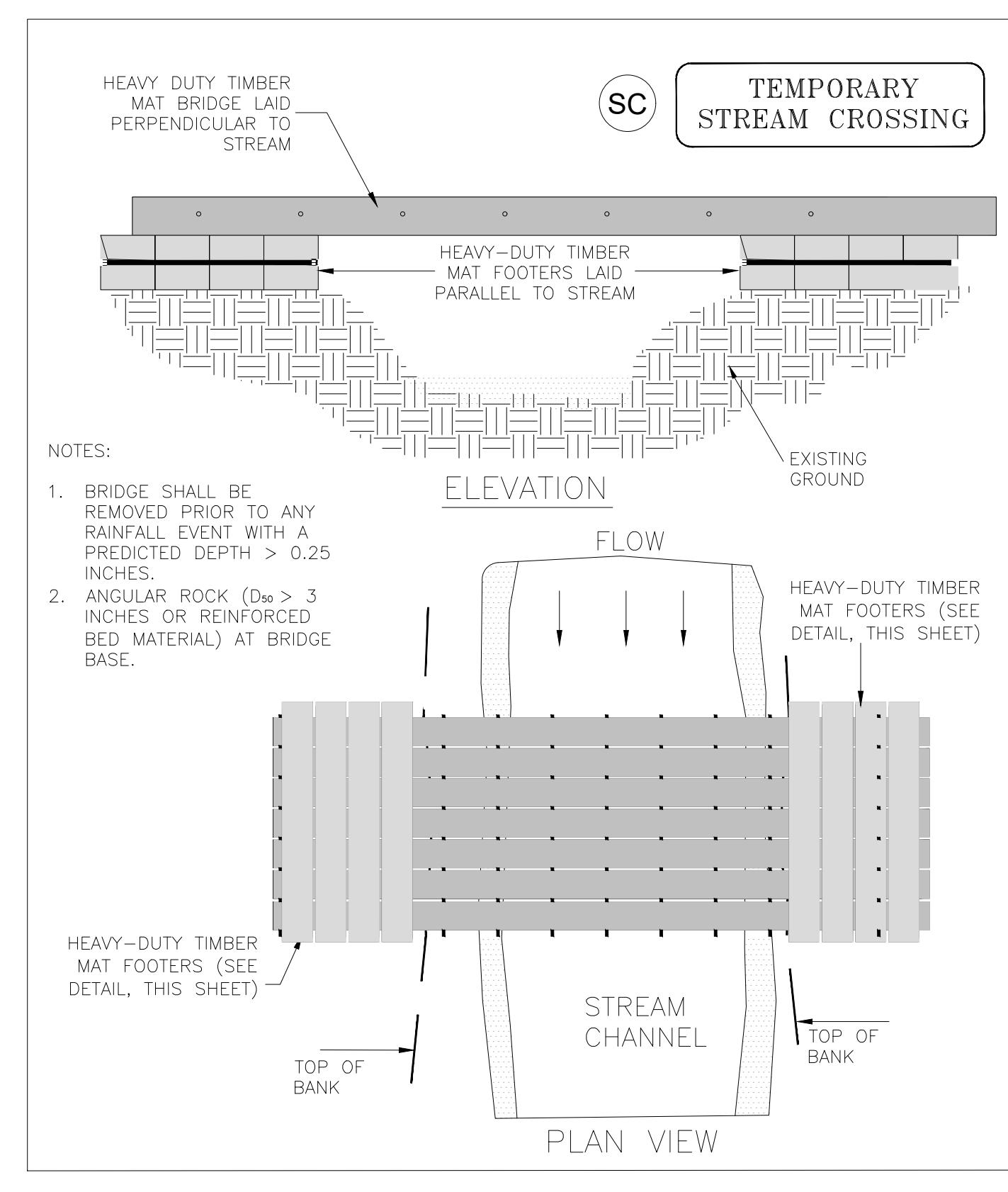
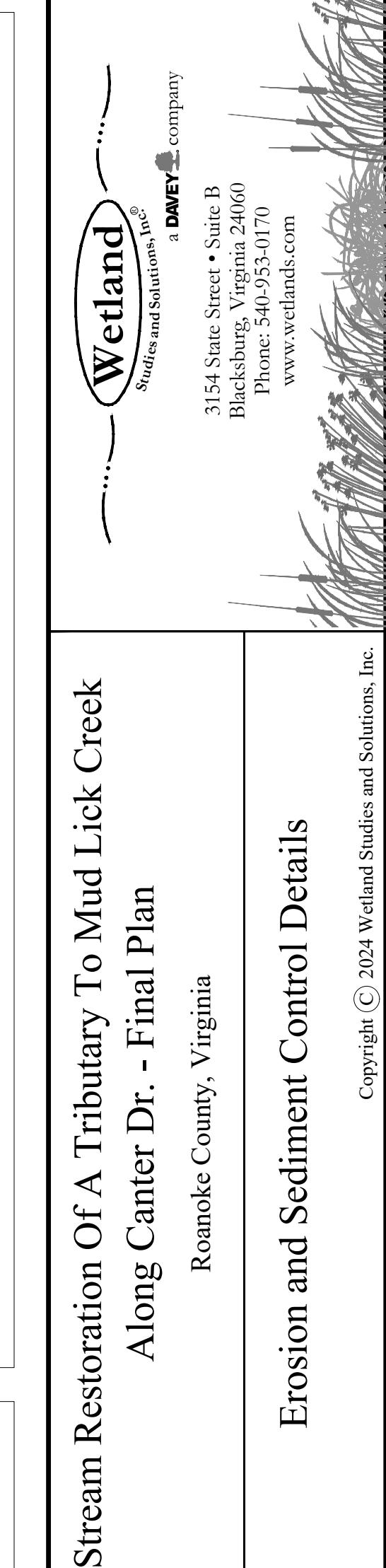
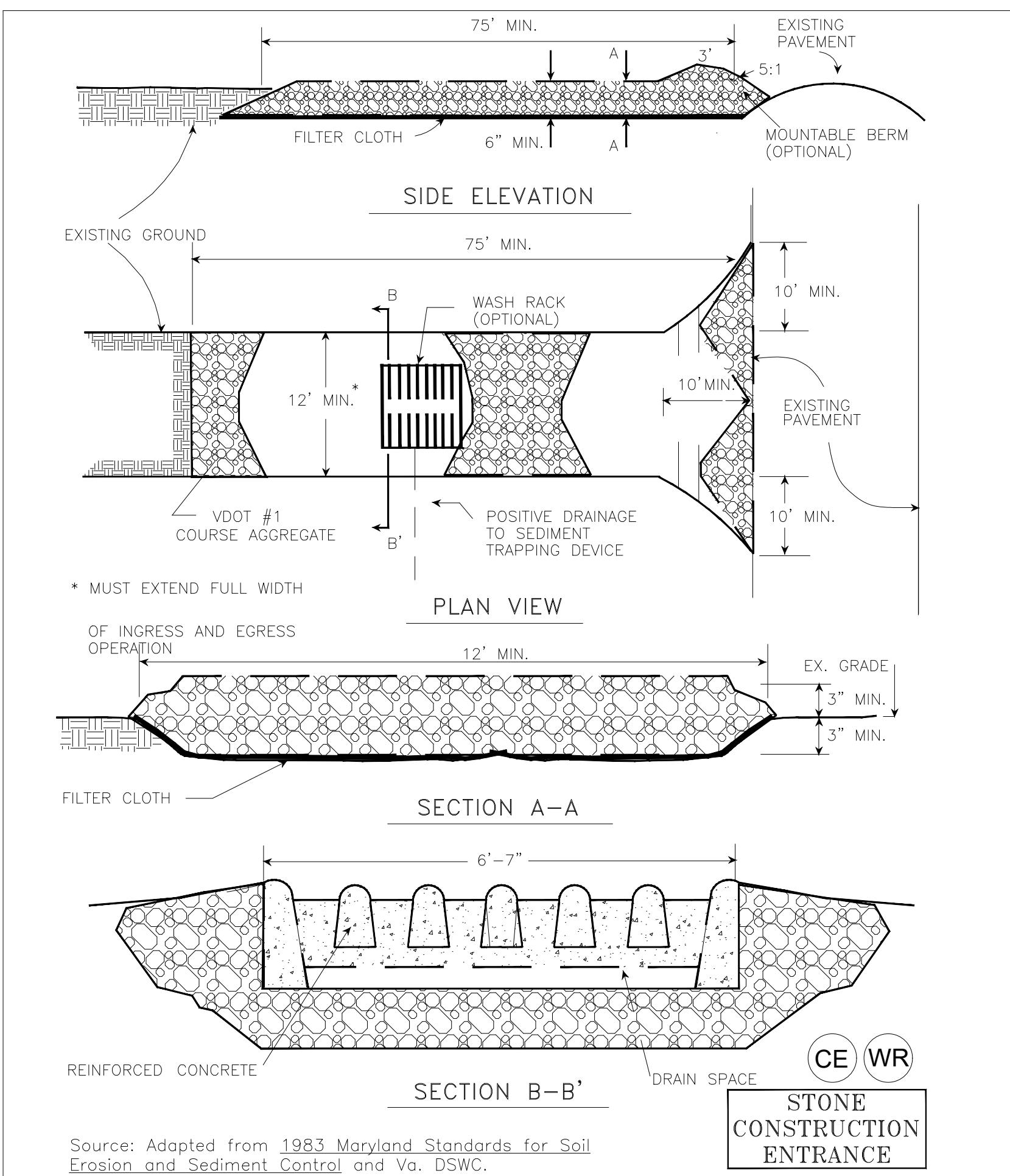
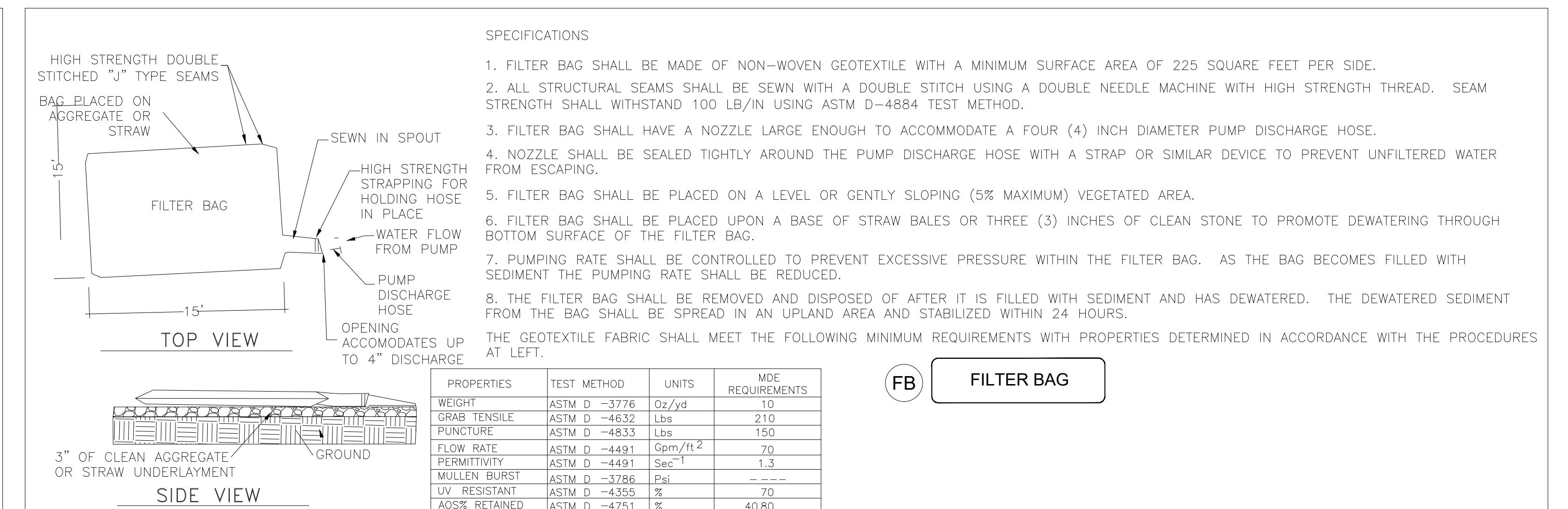
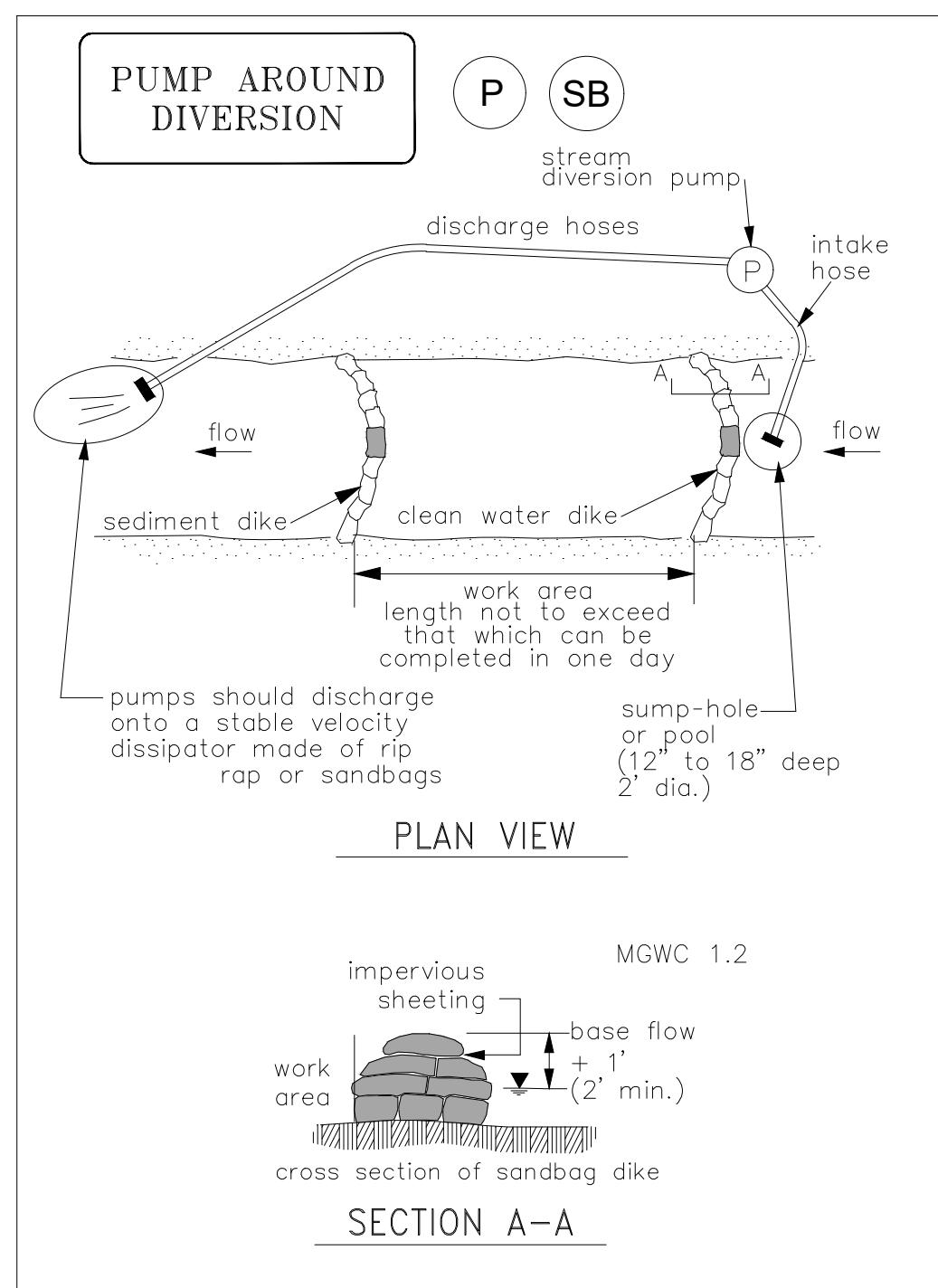
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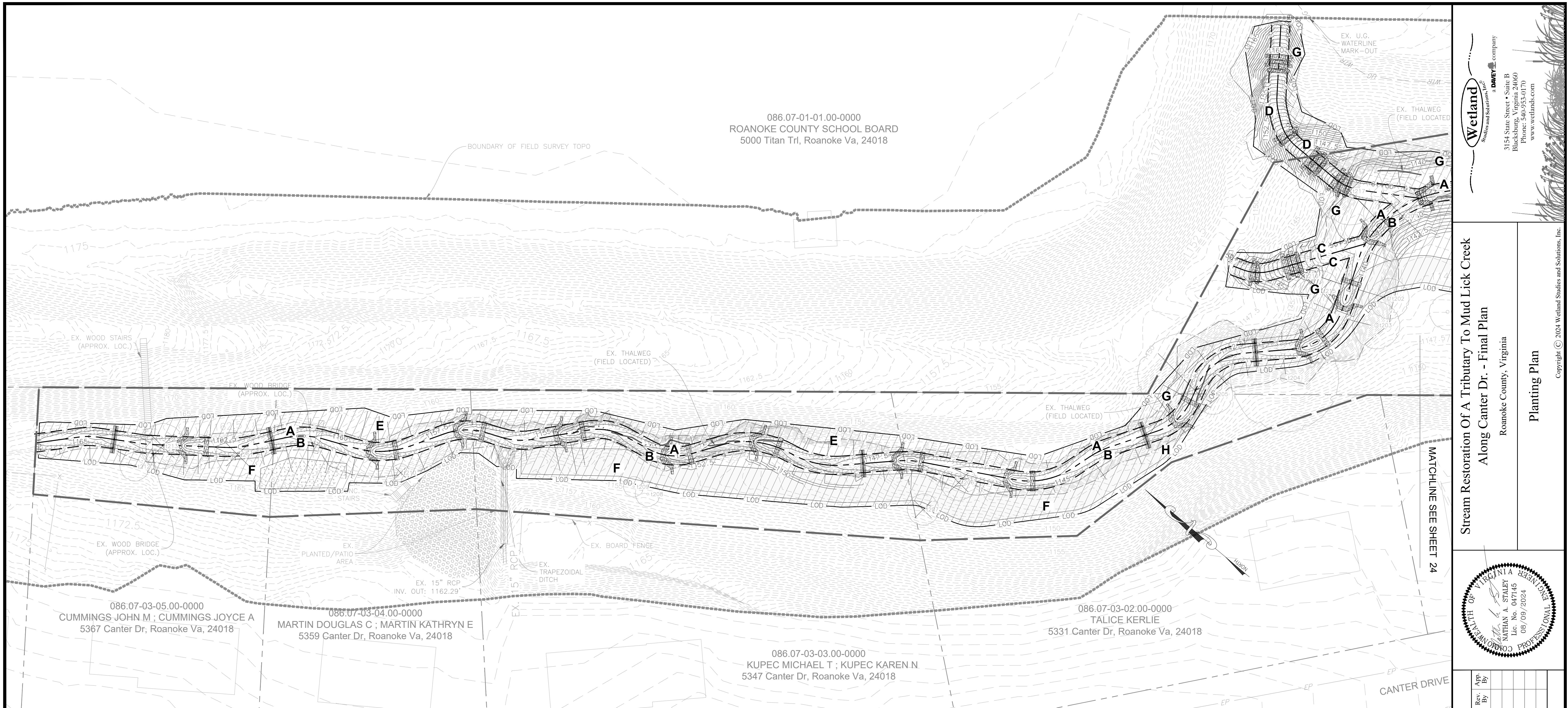
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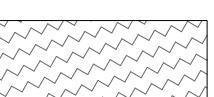




**SEE PLANTING DETAILS, SHEET 25.**

**SEE EXISTING CONDITIONS PLAN FOR EXISTING  
LEGEND, GRADING PLAN FOR PROPOSED  
LEGEND (SHEETS 2 AND 4).**

**THIS SHEET TO BE USED FOR  
PLANTING PURPOSES ONLY**

PLANTING AREAS	SYMBOL
	<b>STREAMSIDE*</b> STREAM BANK - 6,000 SF = 0.14 AC STREAM EDGE - 2,999 LF
	<b>RIPARIAN FOREST SEED AND PLANTING*</b> 46,384 SF = 1.06 AC
	<b>TURF SEED*</b> 778 SF = 0.02 AC

\*SEED MIX SHALL BE DISTRIBUTED EVENLY THROUGHOUT ALL DISTURBED AREAS IN THE AMOUNT SPECIFIED ON THE SEEDING SCHEDULE SHEET.

Horizontal Datum: VCS NAD 83

Vertical Datum: NAVD 88

## Boundary and Topo Source:

VSSI and Roanoke County Digital Data

Design	Draft	Approved
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Design	Draw	Approved
JAB	JAB	NAS

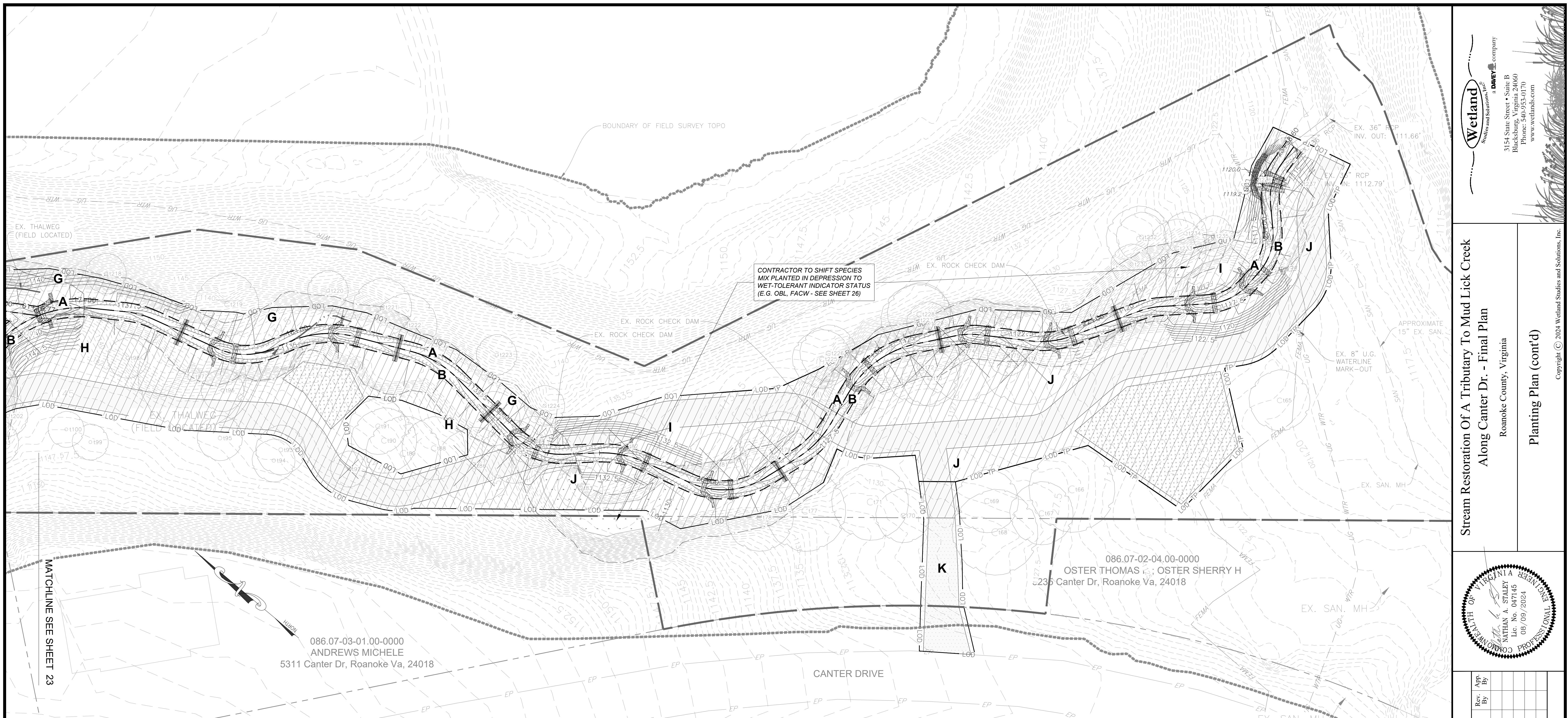
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23 of 28

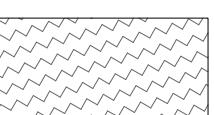
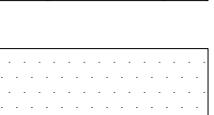
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**SEE EXISTING CONDITIONS PLAN FOR EXISTING  
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LEGEND (SHEETS 2 AND 4)**

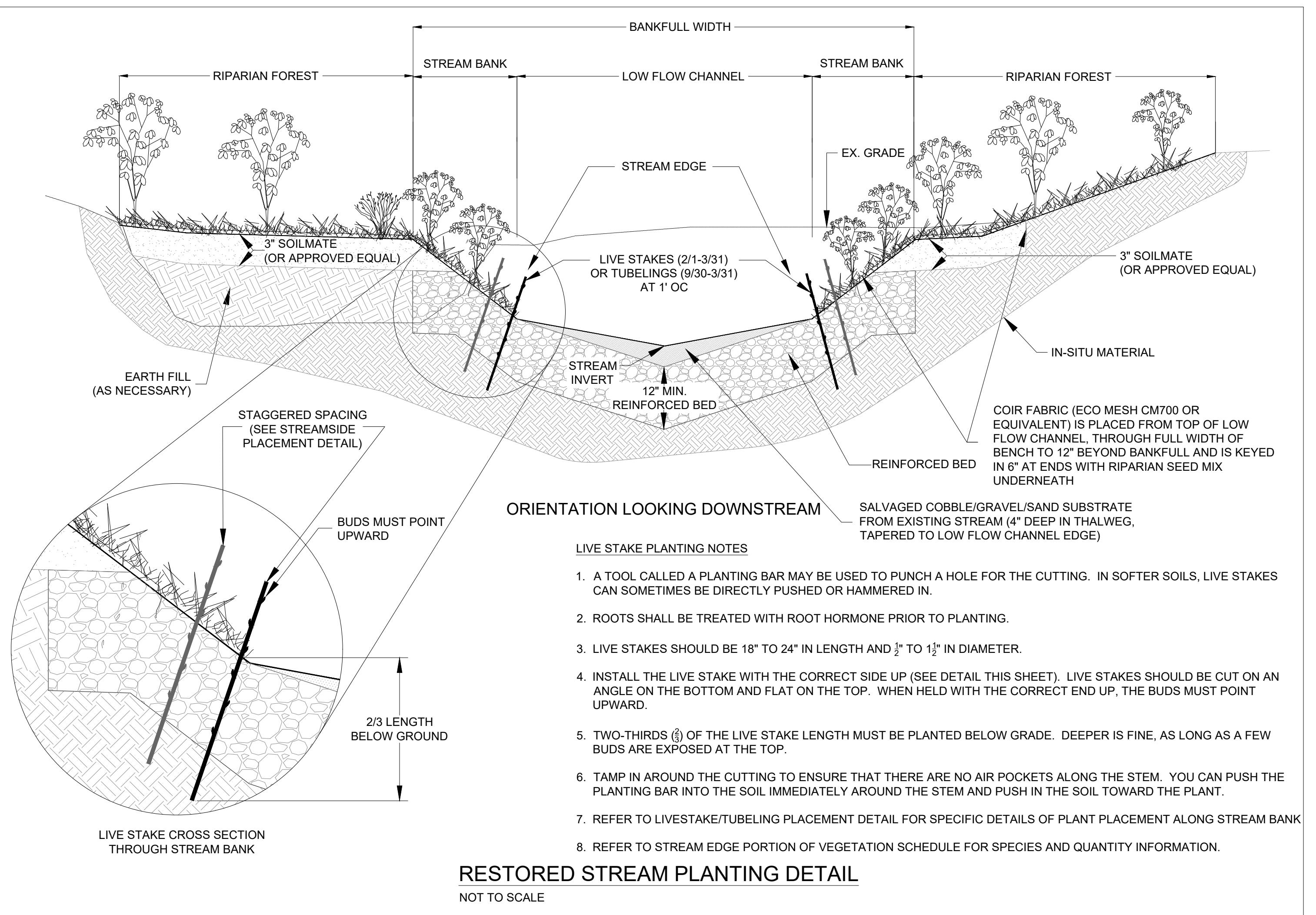
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	PLANTING AREAS	SYMBOL
UPLAND ZONE	 <b>STREAMSIDE*</b> STREAM BANK - 6,000 SF = 0.14 AC STREAM EDGE - 2,999 LF	<b>A, B, C, D</b>
	 <b>RIPARIAN FOREST SEED AND PLANTING*</b> 46,384 SF = 1.06 AC	<b>E, F, G, H, I, J</b>
	 <b>TURF SEED*</b> 778 SF = 0.02 AC	<b>K</b>

\*SEED MIX SHALL BE DISTRIBUTED EVENLY THROUGHOUT ALL DISTURBED AREAS IN THE AMOUNT SPECIFIED ON THE SEEDING SCHEDULE SHEET.

le Name:

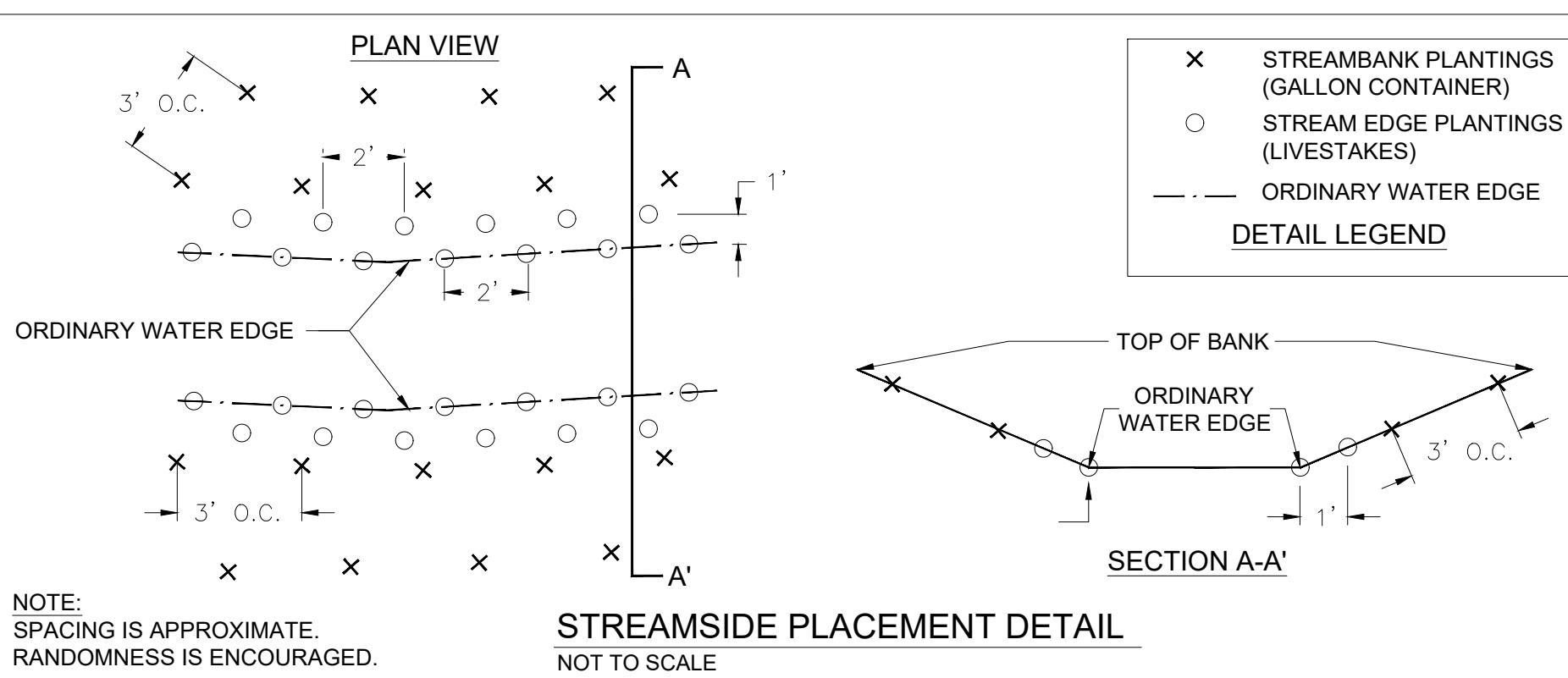
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### RESTORED STREAM PLANTING DETAIL

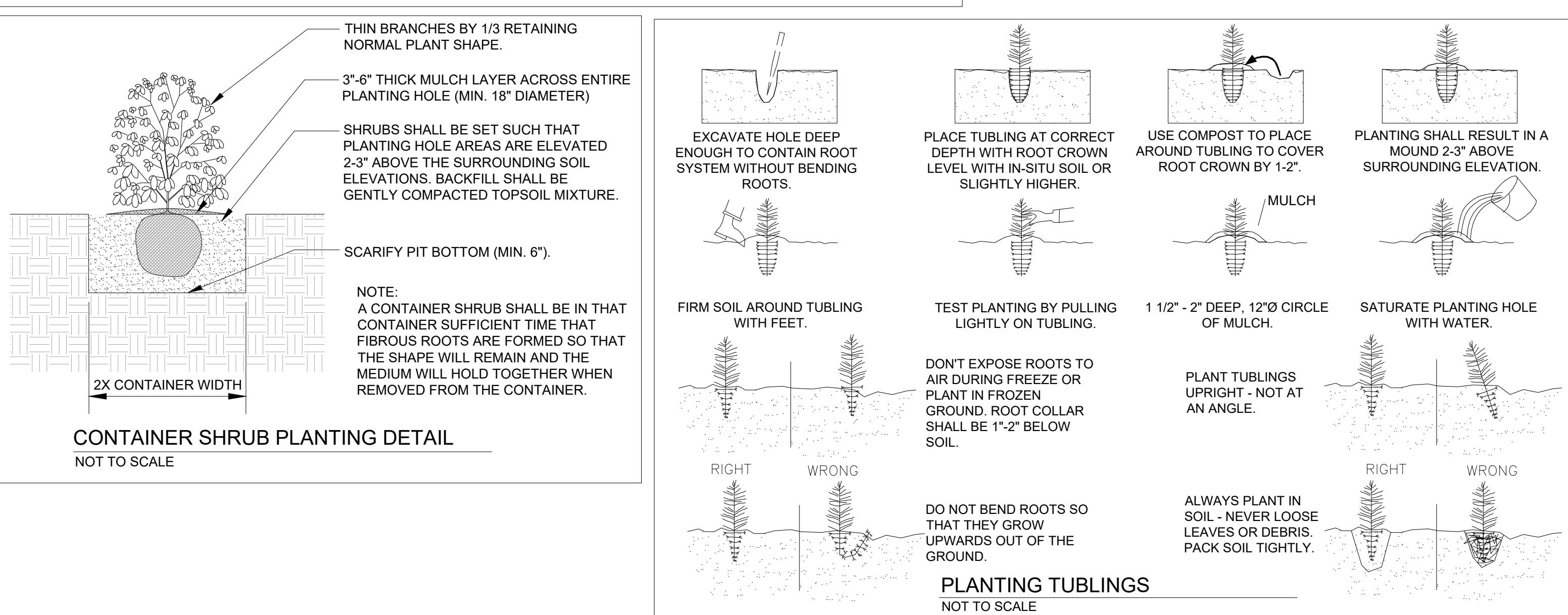
NOT TO SCALE

PLAN VIEW  
 X STREAMBANK PLANTINGS (GALLON CONTAINER)  
 O STREAM EDGE PLANTINGS (LIVESTAKES)  
 - - - ORDINARY WATER EDGE  
 DETAIL LEGEND



### STREAMSIDE PLACEMENT DETAIL

NOT TO SCALE



### PLANTING SPECIFICATIONS

1. CONTRACTOR TO REFER TO PLAN DETAILS FOR ADDITIONAL INFORMATION.
2. THE SUPPLIER OF ALL SEEDS AND/OR VEGETATION SHALL CERTIFY THAT THE ORIGIN OF THE SEEDS FROM WHICH THE PLANTS OR SEEDS WERE PRODUCED IS FROM HARDINESS ZONES 6 AND 7, FROM THE EASTERN OR CENTRAL PORTIONS OF THE U.S. PRIOR TO PLANTING.
3. PLUG PLANTINGS SHALL BE SOURCED FROM A REGIONAL PLANT SUPPLIER USING NATIVE MATERIAL.
4. ANY NURSERY SUPPLYING THE STOCK SHALL PROVIDE A CURRENT NURSERY INSPECTION CERTIFICATE FROM THE STATE DEPARTMENT OF AGRICULTURE, OR PROVIDE AT LEAST THIRTY DAYS ADVANCE NOTICE FOR OWNER TO INSPECT THE PLANT SOURCE AREAS AT OWNER'S DISCRETION. ANY SUCH INSPECTION IS NOT DEEMED APPROVAL OF THE PLANT MATERIALS.
5. ALL PLANTS SHALL BE SET STRAIGHT, OR PLUMB.
6. PLANTING SHALL ONLY BE PERMITTED BETWEEN SEPTEMBER 30 THROUGH MARCH 31. LIVESTAKES SHALL ONLY BE PLANTED BETWEEN FEBRUARY 1 THROUGH MARCH 31. NO PLANTING SHALL OCCUR WHEN THE SOIL IS FROZEN. THESE TIME LIMITS MAY NOT BE MODIFIED UNLESS APPROVED BY OWNER, IN ADVANCE WITH THE RISK OF SURVIVAL BORNE SOLELY BY THE CONTRACTOR.
7. PLANTING HOLES FOR CONTAINER GROWN PLANTS SHALL BE ONE FOOT (1') DEEP PLUS THE CONTAINER DEPTH IN WHICH THE PLANT HAS BEEN GROWN AND TWO FEET (2') WIDER THAN CONTAINER.
8. BACKFILL THE PLANTING HOLES WITH THE IN-SITU SOIL MATERIALS REMOVED FOR PLANTING AFTER REMOVING ALL STONES, ROOTS, AND OTHER DEBRIS GREATER THAN 1-1/2" IN DIAMETER.
9. FOLLOWING THE BACKFILLING, WATER TO THE POINT OF SOIL SATURATION (IF NOT PLANTED IN THE "WET") AND TAMP TO COMPACT THE BACKFILL MIXTURE. ADD EXISTING SOIL TO BRING THE FINAL GRADE IN THE PLANTING HOLE TO THE SURROUNDING SOIL SURFACE. RAKE THE UNUSED EXISTING SOIL OUTSIDE THE PLANTING HOLES, TAKING CARE NOT TO MOUND THE SOIL OR TO SIGNIFICANTLY ALTER THE EXISTING GRADES AND THEN PLACE MULCH (MIN. 2" THICK) ATOP ENTIRE PLANTING HOLE (EXCEPT THAT NO MULCH IS REQUIRED FOR EMERGENT PLANTINGS). SAID AREAS SHALL BE SLIGHTLY RAISED (2-3"). RELATIVE TO THE SOIL SURFACE. WHEN PLANTED THROUGH MATTING (COIR OR OTHERWISE) PLANTING CONTRACTOR TO RESTAKE MATTING AROUND PLANTING HOLES.
10. THE SHRUBS THAT ARE SPECIFIED AS CONTAINER GROWN SPECIMENS SHALL BE AT LEAST 18" IN HEIGHT. THEY SHALL BE HEALTHY, VIGOROUS, WELL ROOTED AND ESTABLISHED IN THE PLANTING CONTAINER IN WHICH THEY ARE GROWING. A CONTAINER SHRUB SHALL BE IN THAT CONTAINER A SUFFICIENT TIME SUCH THAT FIBROUS ROOTS ARE FORMED SO THE SHAPE WILL REMAIN AND THE MEDIUM WILL HOLD TOGETHER WHEN REMOVED FROM THE CONTAINER (REFER TO AMERICAN STANDARD FOR NURSERY STOCK).
11. DO NOT REMOVE PLANTS FROM CONTAINERS UNTIL IMMEDIATELY BEFORE PLANTING. EXAMINE THE ROOTS TO SEE IF THEY ARE POT BOUND. CAREFULLY SEPARATE ANY POT BOUND OR CRAMPED ROOTS AND SPREAD THEM OUT WHEN PLACING THE PLANT SO THAT THE ROOTS CAN GROW WITHOUT FURTHER CONSTRICTION OF THE ROOT BALL.
12. FERTILIZE EACH TUBING PLANT WITH A 5 GRAM TABLET OF CONTROLLED RELEASE FERTILIZER. USE A 20 GRAM TABLET OF FERTILIZER WITH EACH 1 GALLON CONTAINER. GENERALLY, FOR EACH 12 TO 18 INCHES OF PLANT HEIGHT OR FOR EACH 1/2" OF TREE DIAMETER AT THE BASE, USE 20 GRAMS FOR SLOW GROWING PLANTS OR 40 GRAMS FOR FAST GROWING PLANTS OR POOR SOIL SITUATIONS. SAID FERTILIZER TABLETS SHALL BE AGRIFORM 20-10-5 OR APPROVED EQUIVALENT, APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
13. LOCAL CONDITIONS MAY NECESSITATE POST-INSTALLATION WATERING. SEE THE PROJECT SPECIFICATIONS DOCUMENT FOR ADDITIONAL INFORMATION REGARDING WATERING ACTIVITIES.
14. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING NON-SURVIVING TREES AND SHRUBS DURING THE CARE AND REPLACEMENT PERIOD (12 MONTHS TO INCLUDE ONE FULL GROWING SEASON, UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS) OR UNTIL FINAL ACCEPTANCE, WHICHEVER IS THE SHORTEST, AS REQUIRED BY THE TERMS OF THE SURVIVAL WARRANTY SPECIFIED HEREIN AND/OR IN CONTRACT DOCUMENTS. THE SPECIFICATIONS FOR THE REPLACED PLANTS SHALL BE THOSE PROVIDED IN THE PLANT LIST.
15. REFER TO APPLICABLE SKETCHES WITHIN THIS PLAN SET FOR ADDITIONAL GUIDANCE ON PLANTING REQUIREMENTS.
16. INVASIVE AND NOXIOUS WEEDS SHALL BE REMOVED BY HAND WITH LOCALIZED APPLICATIONS OF RODEO, BY A LICENSED PROFESSIONAL, WHERE NECESSARY.

### SEEDING SPECIFICATIONS

1. SEED SHALL HAVE BEEN COLLECTED THE SAME YEAR OF SEEDING. A SEED GERMINATION AND PURITY RATE OF 75% IS REQUIRED. EVIDENCE OF SUCH SHALL BE PROVIDED TO OWNER PRIOR TO PLANTING.
2. THE LANDSCAPE CONTRACTOR SHALL INSPECT THE AREAS AND CONDITIONS UNDER WHICH THE SEEDING WORK IS TO BE PERFORMED PRIOR TO COMMENCING WORK. IF CONDITIONS ARE DETERIMENTAL TO THE PROPER AND TIMELY COMPLETION OF THE WORK, HE/SHE SHALL NOTIFY THE OWNER VERBALLY AND IN WRITING AND POSTPONE COMMENCING WORK UNTIL THE UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
3. PRIOR TO SEEDING, THE TOP SOIL SHALL BE RAKED SMOOTH AND CLEARED OF ALL STONES LARGER THAN 5" AND TRASH, DEBRIS, BRANCHES AND OTHER MATTER DETERIMENTAL TO THE SUCCESS OF SEEDING.
4. SEEDING SHALL BE COMPLETED IMMEDIATELY AFTER FINE GRADING OF AN AREA.
5. MULCH SHALL BE STRAW IF APPLIED AT A RATE SPECIFIED BY THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, 3RD EDITION, 1992.
6. CARE SHOULD BE EXERCISED TO INSURE UNIFORM SEED COVERAGE IS OBTAINED. SEED SHALL BE APPLIED AT THE RATE SPECIFIED ON THE PLANTING SCHEDULE.
7. THE SPECIFIED SEED SHALL BE BROADCAST IN AREAS SPECIFIED ON THE PLANTING PLAN. FOLLOWING SEEDING, MECHANICALLY SOW SEED TO A DEPTH OF 1/8 OF AN INCH BY THE USE OF A CULTIPACTOR, YORK RAKE, OR HAND RAKE.

### PLANTING AND SEEDING SURVIVAL WARRANTY

1. CONTRACTOR SHALL GUARANTEE A MINIMUM SURVIVAL RATE OF EACH VEGETATION SPECIES AFTER 12 MONTHS OF 85% FOR B&B, CONTAINER GROWN, AND TUBLINGS, AND 60% FOR BARE ROOT, TUBER STOCK, AND LIVESTAKES.
2. IF SURVIVAL RATES ARE LESS THAN THE ABOVE WARRANTY RATES, THEN CONTRACTOR SHALL REPLACE THE QUANTITY OF DEAD PLANTS WITHIN THE NEXT PLANTING WINDOW FOLLOWING THE END OF THE APPLICABLE WARRANTY PERIOD.

### PRODUCT HANDLING, STORAGE, AND DELIVERY

1. HANDLE PLANTS AT ALL TIMES SO THAT ROOTS OR BALLS ARE ADEQUATELY PROTECTED FROM BREAKAGE OF BALLS, FROM SUN AND DRYING WINDS. PLANTS WITH DRIED OUT TOPS OR ROOTS SHALL BE REJECTED.
2. ALL PLANT MATERIALS SHALL BE STORED AND DELIVERED IN SUCH A FASHION AND FOR TIME INTERVALS CONSISTENT WITH SOUND SILVICULTURAL PRACTICES.
3. PLANT MATERIAL WILL BE TRANSPORTED FROM THE NURSERY TO THE PLANTING AREAS BY SUCH MEANS AS TO AVOID WIND DAMAGE, OVER-CROWDING, OR OTHER MECHANISMS BY WHICH PHYSICAL DAMAGE MAY RESULT TO THE PLANTS.
4. PLANT MATERIAL MAY BE RANDOMLY INSPECTED BY THE OWNER UPON ARRIVAL AT EACH PLANTING AREA AND DURING PLANTING ACTIVITIES. MATERIAL FOUND TO BE UNACCEPTABLE WILL BE REJECTED AND THE CONTRACTOR WILL BE REQUIRED TO SUPPLY REPLACEMENT MATERIAL WITHIN A REASONABLE TIME FRAME (I.E. 1-WEEK). UNACCEPTABLE MATERIAL IS TO BE DEFINED AS THE FOLLOWING:
  - (A) PLANTS WITH BENT TRUNKS OR MULTIPLE LEADERS, UNLESS CHARACTERISTIC FOR THE SPECIES;
  - (B) PLANTS WITH DISEASED TRUNKS, STEMS, OR LEAVES;
  - (C) PLANTS WITH PEST-INFESTED TRUNKS, STEMS, OR LEAVES;
  - (D) PLANTS OF INSUFFICIENT SIZE (LESS THAN A SPECIFIED HEIGHT OR CALIPER);
  - (E) PLANTS OF THE WRONG SPECIES/SUB-SPECIES;
  - (F) PLANTS HAVING ROOT GIRDLING IN THE CONTAINER;
 UNLESS OTHERWISE APPROVED BY THE OWNER, JUSTIFICATION FOR USE OF TENTATIVELY REJECTED MATERIAL MAY BE PRESENTED TO THE OWNER.

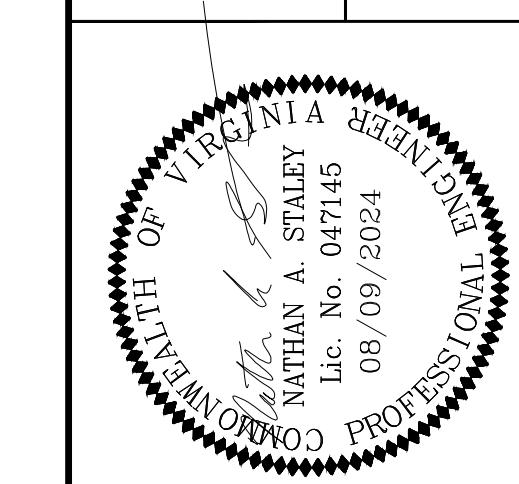
**THIS PLAN IS FOR PLANTING PURPOSES ONLY**

**PLEASE REFER TO PLANTING PLAN SHEETS FOR LEGEND**

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Roanoke County, Virginia  
Stream Restoration Of A Tributary To Mud Lick Creek  
Along Carter Dr. - Final Plan

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REVISIONS	Rev. By	App. By
No. Date	Description	
DATE: AUG 2024	SCALE: N/A	
Horizontal Datum: VCS NAD 83		
Vertical Datum: NAVD 88		
Boundary and Topo Source: WSSI and Roanoke County Digital Data		
Design Draft Approved	JAB	JAB NAS
Sheet #		
Computer File Name: U:\\S:\\00000000\\00000000\\00000000\\CAD\\04-ENGR-06-Final PLANTING PLAN.dwg		

# RIPARIAN FOREST VEGETATION SCHEDULE FOR SHADY & VARIABLE HYDROLOGY CONDITIONS

PLANTING SCHEDULE														PLANTING QUANTITIES (BASED ON ONE-GALLON SIZE) <sup>4</sup>												
CONTAINER PLANTING ZONE	SPECIES GROUP <sup>1,2</sup>	SPECIES <sup>2</sup>	INDICATOR STATUS (AGCP)	INDICATOR STATUS (EMP)	WILDLIFE VALUE				PLANT SPACING <sup>3</sup>	CONTAINER SIZE, RATE, AND QUANTITY <sup>4</sup>		AREA (SF): AREA (AC): LENGTH (LF):	A	B	C	D	E	F	G	H	I	J	K			
					FUNCTIONS	PRIMARY SPECIES	PLANT PART	SEASON		PLANTS PER ACRE	# OF PLANTS		2,769 0.06 1,319	2,833 0.07 1,349	133 0.003 111	265 0.01 221	3,439 0.08 -	6,710 6,710 0.15 -	5,843 0.13 -	9,918 0.23 -	5,748 0.13 -	14,726 0.34 -				
RIPARIAN FOREST (VARIABLE, SHADY)	OVERSTORY LAYER	1	QUERCUS FALCATA (SOUTHERN RED OAK)	FACU	FACU	Food	Woodpeckers, turkey, deer, squirrels, raccoons, other small mammals	Nuts, trees	All	12' O.C. <sup>3</sup>	300 ONE GALLON - or - 600 TUBELINGS - or - MIX AT 1:2 RATIO <sup>4</sup>	318 (BASED ON ONE-GALLON)		0	0	0	0	24	45	39	69	39	102			
			QUERCUS ALBA (WHITE OAK)	FACU	FACW	Food	Woodpeckers, turkey, deer, squirrels, raccoons, other small mammals	Nuts, trees	All					0	0	0	0	8	15	13	23	13	34			
			QUERCUS PALUSTRIS (PIN OAK)	FACW	FACW	Food	Woodpeckers, turkey, deer, squirrels, raccoons, other small mammals	Nuts, trees	All					0	0	0	0	16	30	26	46	26	68			
			QUERCUS PHELLOS (WILLOW OAK)	FACW	FAC	Food	Woodpeckers, turkey, deer, squirrels, raccoons, other small mammals	Nuts, trees	All					0	0	0	0	16	30	26	46	26	68			
			QUERCUS RUBRA (NORTHERN RED OAK)	FACU	FACU	Food	Woodpeckers, turkey, deer, squirrels, raccoons, other small mammals	Nuts, trees	All					0	0	0	0	16	30	26	46	26	68			
	UNDERSTORY LAYER	2	ACER NEGUNDO (BOX ELDER) <sup>8</sup>	FAC	FAC	Food	Finches, chickadees, squirrels, robins, goldfinches, other birds	Seeds, buds, flowers, tree	Spring, summer	21' O.C. <sup>3</sup>	100 ONE-GALLON - or - 400 TUBELINGS - or - MIX AT 1:2 RATIO <sup>4</sup>	106 (BASED ON ONE-GALLON)		0	0	0	0	8	15	13	23	13	34			
			CARYA CORDIFORMIS (BITTERNUT HICKORY)	FAC	FACU	Food	Squirrels, small mammals	Seed, tree	Spring, summer, fall					0	0	0	0	8	15	13	23	13	34			
			DIOSPYROS VIRGINIANA (COMMON PERSIMMON)	FAC	FAC	Food	Bees, large and small mammals, song birds including cedar waxwing, game birds	Fruits, flowers, leaves, twigs	All					0	0	0	0	8	15	13	23	13	34			
	SHRUB LAYER	3	LIQUIDAMBAR STYRACIFLU (SWEET GUM)	FAC	FAC	Food	Finches, cardinals, chickadees, sparrows, squirrels	Seed	Summer, fall, winter	15' O.C. <sup>3</sup>	200 ONE-GALLON - or - 400 TUBELINGS - or - MIX AT 1:2 RATIO <sup>4</sup>	212 (BASED ON ONE-GALLON)		0	0	0	0	16	30	26	46	26	68			
			NYSSA SYLVATICA (BLACK GUM)	FAC	FACW	Food, cover	Song birds, waterfowl, small mammals	Fruit, tree	All					0	0	0	0	16	30	26	46	26	68			
			PLATANUS OCCIDENTALIS (AMERICAN Sycamore)	FACW	FACW	Food	Raccoons, opossum, wood duck, pileated and other woodpeckers	Hollow trunks	All					0	0	0	0	16	30	26	46	26	68			
RIPARIAN FOREST QUANTITY SUBTOTALS														800	848	-	-	-	-	64	120	104	184	104	272	
STREAMSIDE PLANTING ZONES	STREAM BANK	5	ALNUS SERRULATA (BROOKSIDE ALDER)	FACW	OBL	Food, reproductive areas	Finches, sparrows, doves, yellow warbler, song sparrow, other songbirds	Seeds, buds, stems	Summer, fall, winter	3' O.C. <sup>6</sup>	4800 ONE-GALLON - or - 9600 TUBELINGS - or - MIX AT 1:2 RATIO <sup>4</sup>	887 (BASED ON ONE-GALLON)		288	336	15	48	0	0	0	0	0	0	0	0	
			ARONIA ARBUTIFOLIA (RED CHokeBERRY)	FACW	FACW	Food, cover, reproductive areas	Finches, sparrows, doves, yellow warbler, song sparrow, other songbirds	Flower, fruit	Summer, fall, winter					288	336	15	48	-	-	-	-	-	-	-		
			CEPHALANTHUS OCCIDENTALIS (BUTTONBUSH)	OBL	OBL	Food, cover, reproductive areas	Catbird, thrasher, thrushes, cedar waxwings, rabbits	Flower, fruit	Summer, fall, winter					1319	1349	111	221	0	0	0	0	0	0	0		
			ILEX VERTICILLATA (COMMON WINTERBERRY)	FACW	FACW	Food, cover, reproductive areas	Bluebird, catbird, brown thrasher, robin, yellow bellied sapsucker, mockingbird	Flower, seed, leaves	All					1319	1349	111	221	0	0	0	0	0	0	0		
			VIBURNUM DENTATUM (SOUTHERN ARROWWOOD)	FACU	FAC	Food, cover, reproductive areas	Purple finch, goldfinch, robin, junco, bluebird, hermit thrush	Flower, fruit	Spring, summer, fall					1319	1349	111	221	-	-	-	-	-	-	-		
STREAM BANK QUANTITY SUBTOTALS														4800	687	288	336	15	48	-	-	-	-	-	-	
STREAM EDGE	SHRUB LAYER	6	ALNUS SERRULATA (SMOOTH ALDER)	FACW	OBL	Food, reproductive areas	Finches, sparrows, doves, yellow warbler, song sparrow, other songbirds	Seeds, buds, stems	Summer, fall, winter	1 PER L.F., STAGGERED <sup>6</sup>	N/A	2,999 (TUBELINGS OR LIVESTAKES ONLY)		1319	1349	111	221	0	0	0	0	0	0	0		
			CEPHALANTHUS OCCIDENTALIS (BUTTONBUSH)	OBL	OBL	Food, cover, reproductive areas	Catbird, thrasher, thrushes, cedar waxwings, rabbits	Flower, fruit	Summer, fall, winter					1319	1349	111	221	0	0	0	0	0	0	0		
			CORNUS AMOMUM (SILKY DOGWOOD)	FACW	FACW	Food, cover, reproductive areas	Catbird, thrasher, thrushes, cedar waxwings, rabbits	Flower, fruit	Summer, fall, winter					1319	1349	111	221	0	0	0	0	0	0	0		
STREAM EDGE QUANTITY SUBTOTALS														---	2,999	1,319	1,349	111	221	-	-	-	-	-	-	
LIVE STAKE		7	SALIX NIGRA (BLACK WILLOW)	OBL	OBL	Food, cover, reproductive areas	Beaver, porcupine, deer, muskrat, ducks, fish	Buds, foliage, bark	All	1 PER L.F., STAGGERED <sup>6</sup>	N/A	2,999 LIVE STAKES		1319	1349	111	221	0	0	0	0	0	0	0		
LIVE STAKE QUANTITY SUBTOTALS		7	SALIX NIGRA (BLACK WILLOW)	OBL	OBL	Food, cover, reproductive areas	Beaver, porcupine, deer, muskrat, ducks, fish	Buds, foliage, bark	All					---	2,999	1,319	1,349	111	221	-	-	-	-	-	-	

## PLANTING AND SEEDING NOTES:

1. It is expected and preferred that all species in each of the Species Groups are planted. The tolerances listed in this note are intended to incorporate flexibility according to species availability. At a minimum, Contractor to provide at least:
  - a) 4 of the 5 species in Group 1,
  - b) 5 of the 6 species in Group 2,
  - c) 5 of the 6 species in Group 3,
  - d) 3 of the 4 species in Group 4,
  - e) 4 of the 5 species in Group 5,
  - f) 3 of the 4 species in Group 6,
  - g) all of the species in Group 7,
  - h) all of the species in Group 8,
  - i) all of the species in Group 9,
  - j) 3 of the 4 species in Group 10,
  - k) 3 of the 4 species in Group 11,
  - l) 5 of the 6 species in Group 12,
  - m) 5 of the 7 species in Group 13,
  - n) 4 of the 5 species in Group 14, and
  - o) 5 of the 6 species in Group 15.
2. Substitutions for selected species based upon availability shall be requested in writing to engineer, documenting the lack of availability, if the flexibility inherent in the above schedule is still not sufficient. Engineer is under no obligation to approve substitutions.
- 3.

SEEDING SCHEDULE													SEEDING QUANTITIES										
SEED PLANTING ZONE	SPECIES GROUP <sup>1,2</sup>	SPECIES <sup>2</sup>	INDICATOR STATUS (AGCP)	INDICATOR STATUS (EMP)	WILDLIFE VALUE					SEEDING RATE <sup>7</sup> (LBS/AC)	AREA PER PLANT (AC)	QUANTITY (LBS)	AREA (SF): AREA (AC):	A	B	C	D	E	F	G	H	I	J
					FUNCTIONS		PRIMARY SPECIES							2,769 0.06	2,833 0.07	133 0.003	265 0.01	3,439 0.08	6,710 0.15	5,843 0.13	9,918 0.23	5,748 0.13	14,726 0.34
RIPARIAN FOREST (VARIABLE, SHADY) SEED MIX	9	LOLIUM PERENNE spp. MULTIFLORUM (ANNUAL RYEGRASS)	FACU	FACU	Erosion control, food	Sparrows, finches, small mammals.	Seeds	Summer, fall	45.00	2.40	54.14	2.70 2.70 0.60 0.60 0.60 0.01 0.01 0.01 0.01 0.01	2.70 2.70 0.70 0.70 0.70 0.01 0.01 0.01 0.01 0.01	3.15 3.15 0.03 0.03 0.03 0.00 0.00 0.00 0.00 0.00	0.14 0.14 0.10 0.10 0.10 0.00 0.00 0.00 0.00 0.00	0.45 0.45 0.80 0.80 0.80 0.02 0.02 0.02 0.02 0.02	3.60 3.60 1.50 1.50 1.50 0.03 0.03 0.03 0.03 0.03	6.75 6.75 1.50 1.50 1.50 0.05 0.05 0.05 0.05 0.05	5.85 5.85 1.30 1.30 1.30 0.03 0.03 0.03 0.03 0.03	10.35 10.35 2.30 2.30 2.30 0.01 0.01 0.01 0.01 0.01	5.85 5.85 1.30 1.30 1.30 0.03 0.03 0.03 0.03 0.03	15.30 15.30 3.40 3.40 3.40 0.03 0.03 0.03 0.03 0.03	
		SETARIA ITALICA (FOXTAIL MILLET/ITALIAN BRISTLE GRASS)	FACU	UPL	Erosion control, food	Sparrows, finches, small mammals.	Seeds	Fall, winter	45.00	2.40	54.14												
	10	ELYMUS RIPARIUS (RIVERBANK WILD RYE)	FACW	FACW	Food	Song birds, small mammals	Seeds, leaves	All	10.00	2.40	12.03												
		ELYMUS VIRGINICUS (VIRGINIA WILD RYE)	FAC	FACW	Food	Deer, sparrows, small mammals	Seeds, leaves	All	10.00	2.40	12.03												
		DICHANTHELIUM CLANDESTINUM (DEER TONGUE GRASS)	FACW	FAC	Food	Song birds, waterfowl, small mammals	Seeds	Summer, fall	10.00	2.40	12.03												
		SENNA HEBECAarpa (WILD SENNA)	FAC	FAC	Food	Pollinators, birds	Flower, seeds	Summer, Fall	10.00	2.40	12.03												
	11	AGRIMONIA PARVIFLORA (HARVESTLICE)	FAC	FACW	Food	Pollinators, butterflies, beneficial insects	Flowers	Summer	0.20	2.40	0.25												
		CAREX SQUARROSA (SQUARROSE SEDGE)	FACW	FACW	Food	Song birds, waterfowl	Seeds	Summer, fall	0.20	2.40	0.25												
		PARTHENOCISSUS QUINQUEFOLIA (VIRGINIA CREEPER)	FACU	FACU	Food	Song birds	Fruit	Summer	0.20	2.40	0.25												
		JUNCUS TENUIS (PATH RUSH)	FAC	FAC	Food	Songbirds, small mammals	Seeds	Summer, fall	0.20	2.40	0.25												
	12	ANEMONE VIRGINIANA (THIMBLEWEED)	FACU	FACU	Food	Pollinators, butterflies, beneficial insects	Flowers	Spring, summer	0.10	2.40	0.12												
		EUPATORIUM PERfoliatum (COMMON BONESET)	FACW	FACW	Food	Caterpillars, pollinators	Flowers, leaves	Spring, summer	0.10	2.40	0.12												
		SYMPHOTRICHUM PILosum (WHITE OLDFIELD AMERICAN-ASTER)	FACW	FAC	Food	Butterflies	Flowers	Summer, fall	0.10	2.40	0.12												
		RHUS GLABRA (SMOOTH SUMAC)	UPL	UPL	Food	Beneficial insects, song birds, game birds, mammals	Flowers, fruit, leaves	Spring, summer, fall	0.10	2.40	0.12												
		SOLIDAGO SPECIOSA (SHOWY GOLDENROD)	NI	NI	Food	Butterflies, song birds, small mammals	Flowers	Summer, fall	0.10	2.40	0.12												
		VERNONIA NOVEBORACENSIS (NEW YORK IRONWEED)	FACW	FACW	Food	Butterflies	Flowers	Fall	0.10	2.40	0.12												
	13	BIDENS FRONDOSA (BEGGAR TICKS)	FACW	FACW	Food	Pollinators, butterflies, beneficial insects	Seeds	Summer, fall, winter	0.20	2.40	0.25												
		GEUM CANADENSE (WHITE AVENS)	FAC	FACU	Food	Pollinators, butterflies, beneficial insects	Flowers	Summer	0.20	2.40	0.25												
		CHAMAECRISTA NICITANS (SENSITIVE PARTRIDGE PEA)	FACU	FACU	Food	Pollinators, caterpillars, mammals	Flowers, seeds, leaves	Spring, summer, fall	0.20	2.40	0.25												
		DESMODIUM GLABELLUM (DILLENIUS' TICK-TREFOIL)	UPL	UPL	Food	Pollinators, small mammals	Seeds, plant	Summer, fall	0.20	2.40	0.25												
		PENSTEMON DIGITALIS (PENSTEMON)	FAC	FAC	Food	Pollinators, butterflies, beneficial insects	Leaves, seeds	All	0.20	2.40	0.25												
		CLEMATIS VIRGINIANA (VIRGIN'S BOWER)	FAC	FAC	Food, cover	Pollinators, birds	Flowers, plant	Spring, summer, fall	0.20	2.40	0.25												
	14	VERBESINA ALTERNIFOLIA (WINGSTEM)	FAC	FAC	Food	Butterflies, other insects	Flowers	Summer, fall	0.20	2.40	0.25												
		HAMAMELIS VIRGINIANA (WITCH HAZEL)	FACU	FACU	Food, cover, reproductive areas	Ruffed grouse, wild turkey, rabbit, deer, beaver	Flowers, fruit	Spring, fall, winter	0.20	2.40	0.25												
		ILEX VERTICILLATA (WINTERBERRY)	FACW	FACW	Food, cover, reproductive areas	Song birds, upland game birds	Flower, seed, leaves	All	0.20	2.40	0.25												
		LINDERA BENZONIA (NORTHERN SPICEBUSH)	FACW	FAC	Food	Thrushes vireos, catbird, bluebird, butterfly caterpillars	Fruit, leaves	Spring, summer, fall	0.20	2.40	0.25												
		VIBURNUM DENTATUM (SOUTHERN ARROW WOOD)	FAC	FAC	Food	Robins, bluebirds, other thrushes, thrashers, catbirds, vireos	Fruit	Fall</td															

