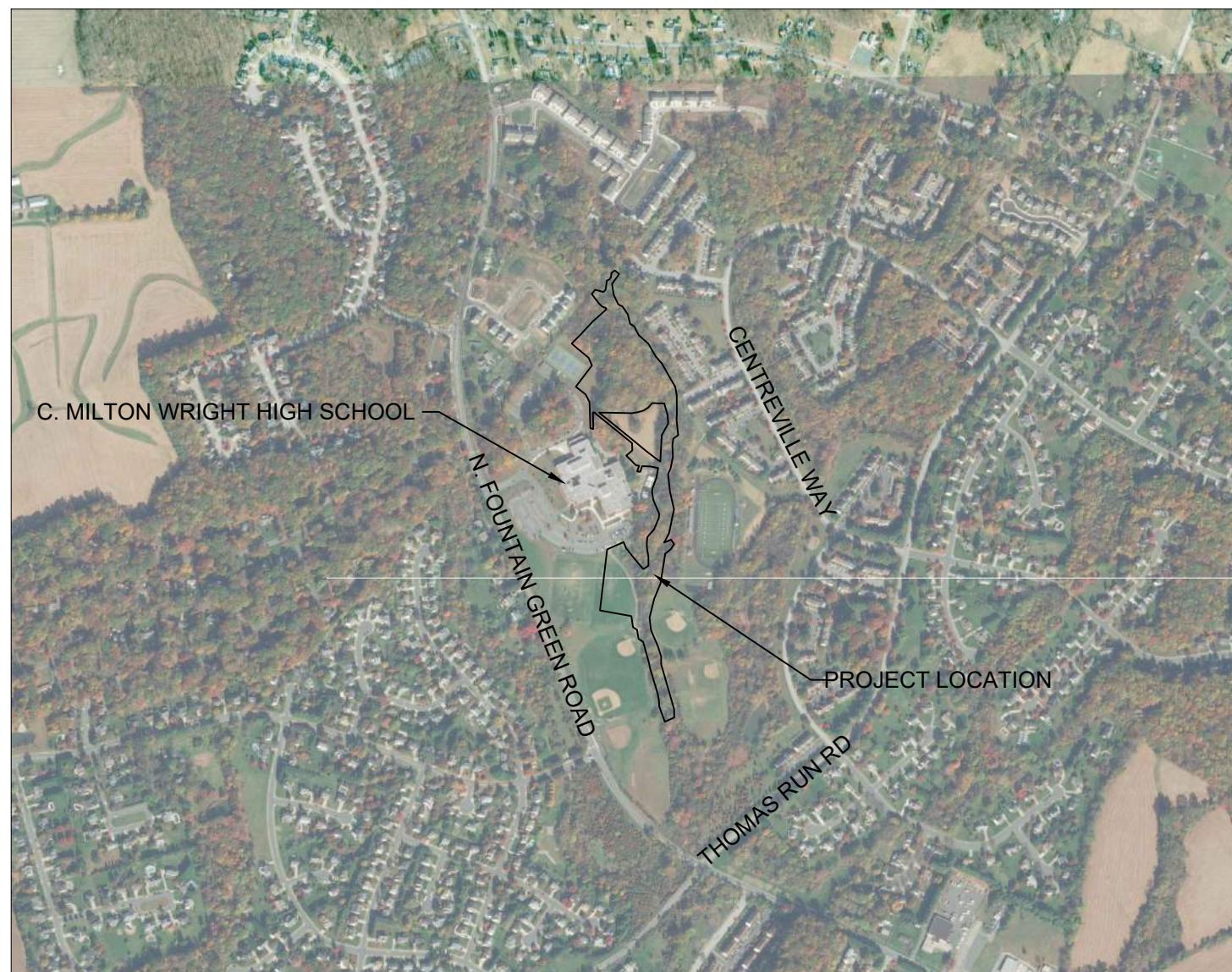


C. MILTON WRIGHT HIGH SCHOOL STREAM RESTORATION

HARFORD COUNTY, MARYLAND



LOCATION MAP
SCALE 1" = 1000'
0 1000 2000

SHEET INDEX

- 1 - COVER SHEET
- 2 - NOTES
- 3 - KEY SHEET
- 4-8 - EXISTING CONDITIONS
- 9 - TREE INDEX TABLE
- 10 - DRAINAGE AREA MAP
- 11-13 - HYDRAULIC ANALYSIS MAP & RESULTS
- 14 - GRADING PLAN AND PROFILE KEY SHEET
- 15-22 - GRADING PLAN AND PROFILE
- 23-24 - CROSS-SECTIONS
- 25-30 - STREAM DETAILS
- 31-38 - PLANTING PLAN
- 39 - PLANTING NOTES / DETAILS
- 40-47 - EROSION AND SEDIMENT CONTROL PLAN
- 48 - EROSION AND SEDIMENT CONTROL NOTES
- 49-50 - EROSION AND SEDIMENT CONTROL DETAILS

SWM SITE ANALYSIS	
TOTAL SITE AREA:	9.17 Ac. [±]
ONSITE DISTURBED AREA:	2.1 Ac. [±]
ONSITE PROP. IMPERVIOUS AREA:	0.00 Ac.
SWM WATERSHED:	BYNUM RUN (02130704) RESERVOIR (#)

TOTAL POLLUTANT LOAD REMOVAL TABLE				
REMOVAL RATE DESIGNATION	TOTAL NITROGEN REMOVED (lbs/yr)	TOTAL PHOSPHOROUS REMOVED (lbs/yr)	TOTAL SUSPENDED SOLIDS REMOVED (TONS/yr)	IMPERVIOUS ACRE CREDIT (Ac.)
STREAM RESTORATION	1,182.0	326.5	56.1	124

ENVIRONMENTAL INFORMATION

THE FOLLOWING ARE NOT ASSOCIATED WITH THIS PROPERTY:

- FEMA 100-YR FLOODPLAIN
- CHESAPEAKE BAY CRITICAL AREA

THIS PROPERTY DOES NOT CONTAIN THE FOLLOWING:

- ENDANGERED SPECIES
- FOREST CONSERVATION EASEMENTS
- EXISTING BMP FACILITIES
- STEEP SLOPES OR ERODIBLE SOILS
- TIDAL / NONTIDAL WETLANDS

PROJECT NARRATIVE

THIS PROJECT WILL RESTORE APPROXIMATELY 3,878 LINEAR FEET OF EXISTING STREAM USING NATURAL CHANNEL DESIGN. THE EXISTING, DEGRADED AND INCISED CHANNEL WILL BE LIFTED AND RECONNECTED WITH ITS FLOODPLAIN.

EROSION AND SEDIMENT CONTROL PLAN #: _____
RECOMMENDED FOR APPROVAL:
HARFORD COUNTY, DPW
TECHNICAL CONCURRANCE:
HARFORD SOIL CONSERVATION DISTRICT
APPROVED:
HARFORD SOIL CONSERVATION DISTRICT

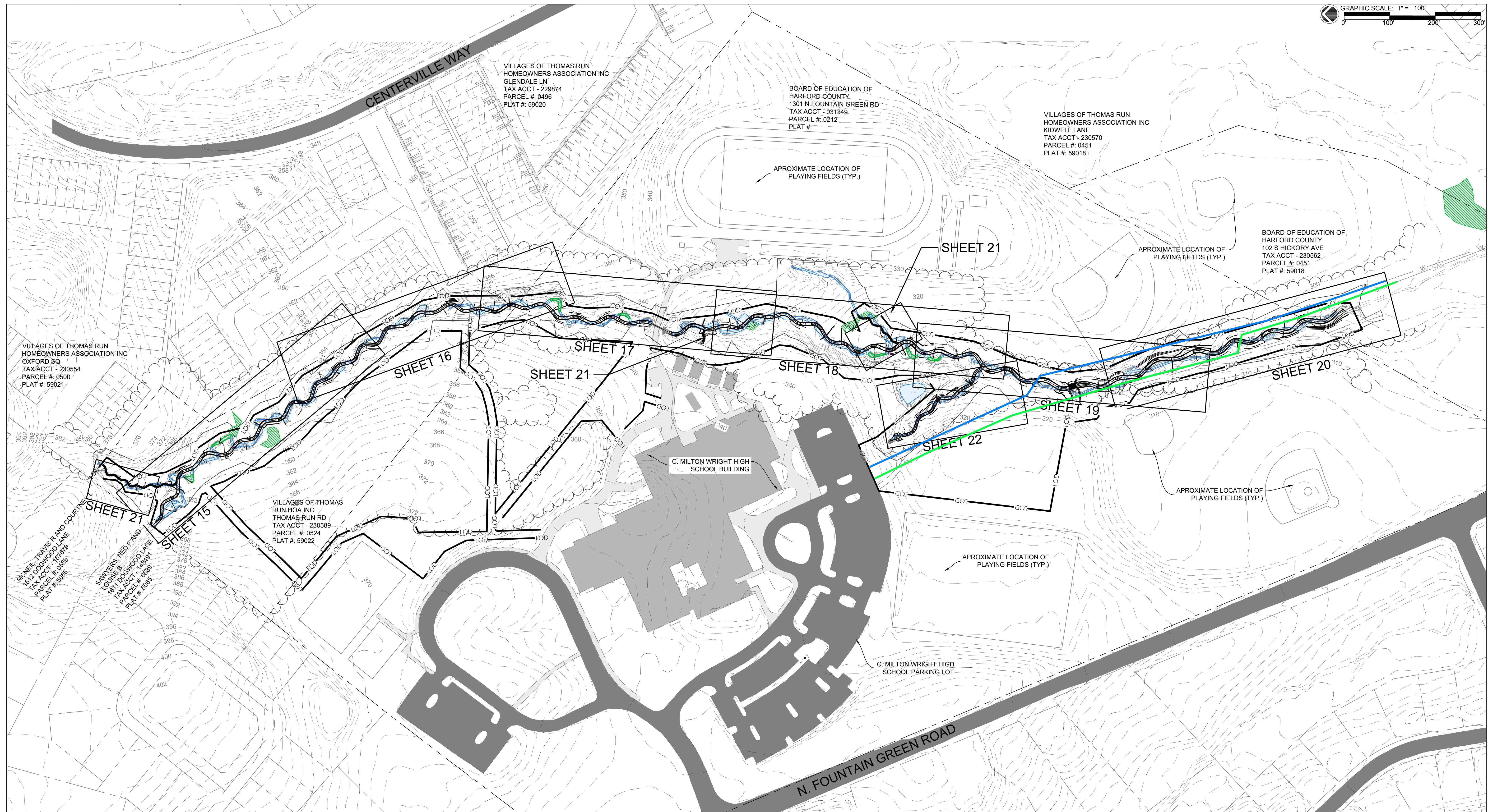
AS-BUILT CERTIFICATION	
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.	
SIGNATURE	DATE
NAME (PRINT)	DATE
PE NO.	EXPIRATION DATE
CERTIFY MEANS TO STATE OR DECLAIM A PROFESSIONAL OPINION BASED UPON ONSITE INSPECTIONS AND MATERIAL TESTS WHICH ARE CONDUCTED DURING CONSTRUCTION. THE ONSITE INSPECTION AND MATERIAL TESTS ARE THOSE INSPECTIONS AND TESTS DEEMED SUFFICIENT AND APPROPRIATE BY COMMONLY ACCEPTED ENGINEERED STANDARDS. CERTIFY DOES NOT MEAN IMPLY A GUARANTEE BY THE ENGINEER NOR DOES AN ENGINEER'S CERTIFICATION RELIEVE ANY OTHER PARTY FROM MEETING REQUIREMENTS IMPOSED BY CONTRACT, EMPLOYMENT, OR OTHER MEANS, INCLUDING MEETING COMMONLY ACCEPTED INDUSTRY PRACTICES.	

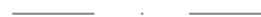


CORPORATE | 5367 TELEPHONE ROAD, WARRENTON, VIRGINIA 20187
P: 703.393.4844 | F: 703.393.2934
WWW.RES.US

NOT FOR
CONSTRUCTION

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the state of Maryland.
License Number: 52852
Expiration Date: 6-14-2022



<u>LEGEND:</u>	
— — — — —	EX. PROPERTY LINE
— — — — —	EX. PROPERTY ADJACENT
— — — — —	EX. MAJOR CONTOUR
— — — — —	EX. MINOR CONTOUR
— — — — —	EX. BUILDING/EDGE OF PAVEMENT
— — — — —	EX. TRAIL
	EX. TREELINE
	EX. CULVERT
— — — — —	EX. STREAM CENTERLINE
	EX. STREAM
	EX. FORESTED WETLAND
SAN — — — —	EX. SANITARY SEWER LINE
W — — — —	EX. WATER LINE
— — — — —	PR. MAJOR CONTOUR
— — — — —	PR. MINOR CONTOUR

- LOD — PR. LIMITS OF DISTURBANCE
- PR. BANKFULL LIMITS
- PR. STREAM CENTERLINE
-  PR. OXBOW PFO WETLAND
- PR. CULVERT

NOTES:

1. SURVEY COMPLETED BY G.W. STEPHENS IN JANUARY 2020.
1' CONTOUR INTERVAL.
2. TOPOGRAPHY AND LINWORK OUTSIDE THE SURVEY LIMITS
IS BASED UPON AVAILABLE GIS DATA. 2' CONTOUR INTERVAL.
3. WETLAND DELINEATION PERFORMED BY RES WITHIN THE
PROJECT AREA IN NOVEMBER, 2019.
4. REFER TO NOTES SHEET 2 FOR COMPLETE NOTES.

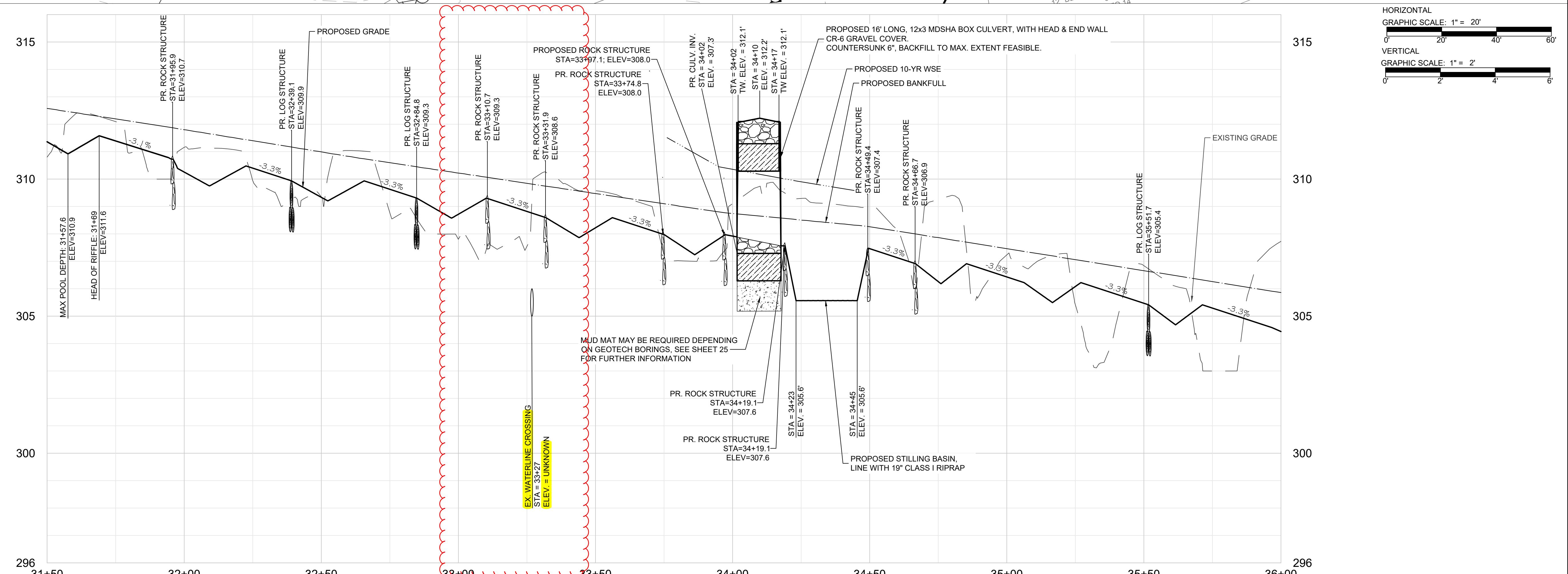
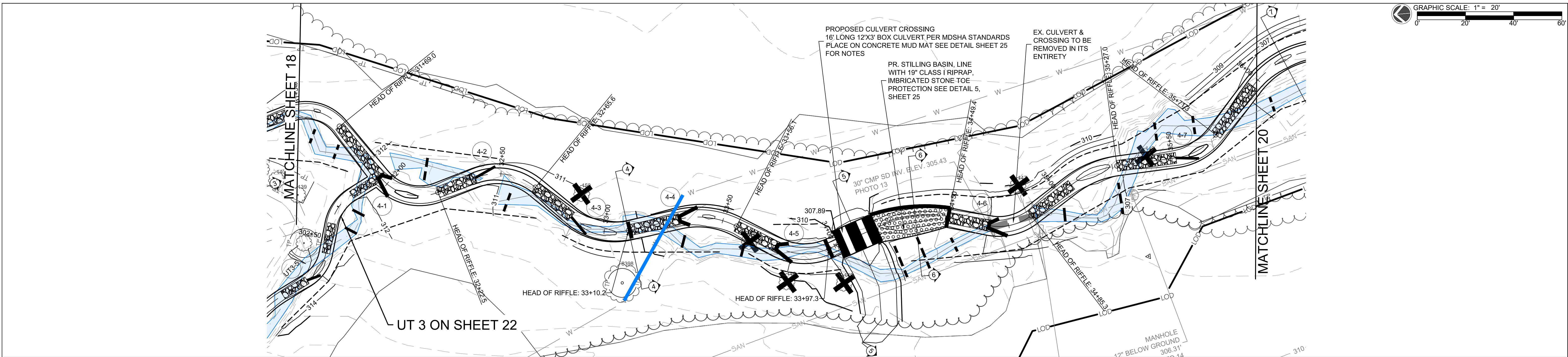


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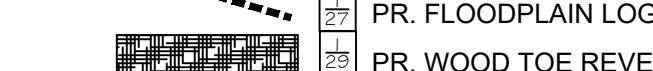
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HARFORD COUNTY, MARYLAND

C. MILTON WRIGHT HIGH SCHOOL
STREAM RESTORATION
GRADING PLAN AND PROFILE KEY SHEET



LEGEND:	
EX. PROPERTY LINE	W EX. WATER LINE
EX. PROPERTY ADJACENT	PR. MAJOR CONTOUR
EX. MAJOR CONTOUR	PR. MINOR CONTOUR
EX. MINOR CONTOUR	TP PR. TREE PROTECTION
EX. BUILDING/EDGE OF PAVEMENT	PR. 100-YR WSE
EX. TRAIL	PR. 100-YR WSE
EX. TREELINE	PR. FLOODPLAIN LOG
EX. CULVERT	PR. WOOD TOE REVETMENT
EX. STREAM CENTERLINE	PR. RIFFLE
EX. LIMITS OF TREE SURVEY	PR. FLOODPLAIN BENCH LIMITS
EX. 100-YR WSE	PR. BANKFULL LIMITS
EX. STREAM	PR. STREAM CENTERLINE
EX. FORESTED WETLAND	PR. OXBOW PFO WETLAND
EX. TREE/TREE TO BE REMOVED	PR. CULVERT
EX. FOREST CONSERVATION EASEMENT	PR. RIPRAP
EX. SANITARY SEWER LINE	PR. ROCK STRUCTURE
	PR. LOG STRUCTURE



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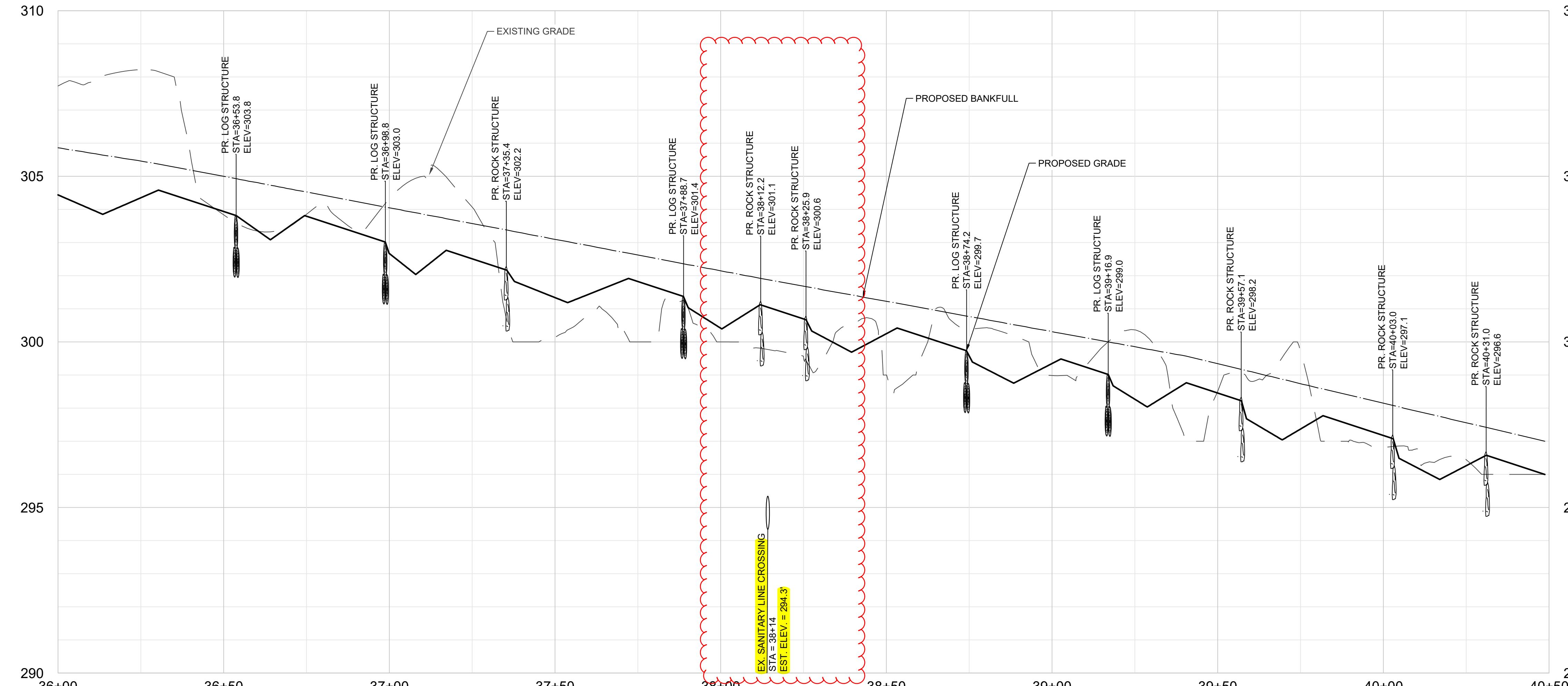
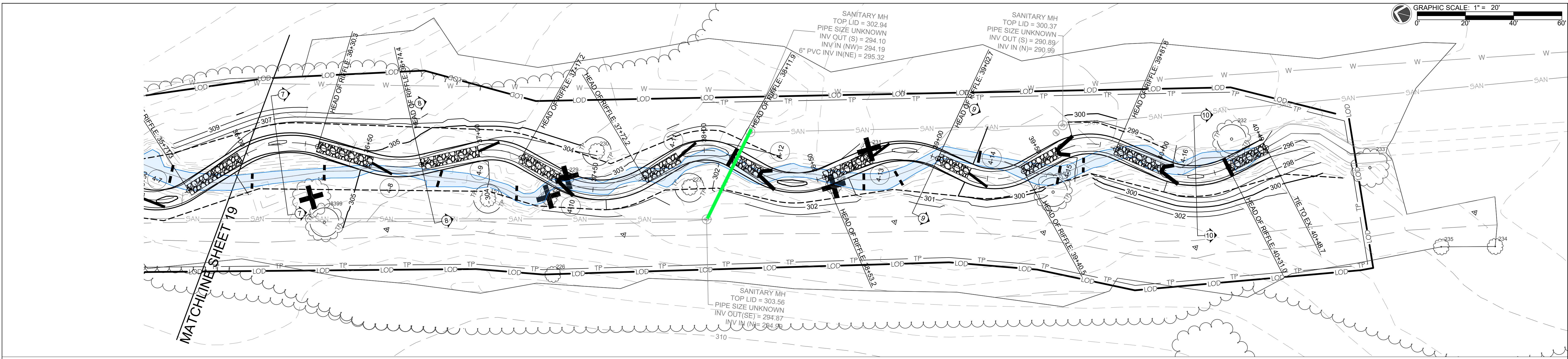
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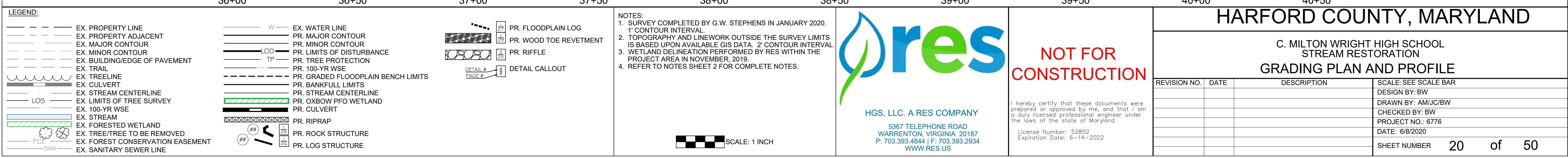
HARFORD COUNTY, MARYLAND

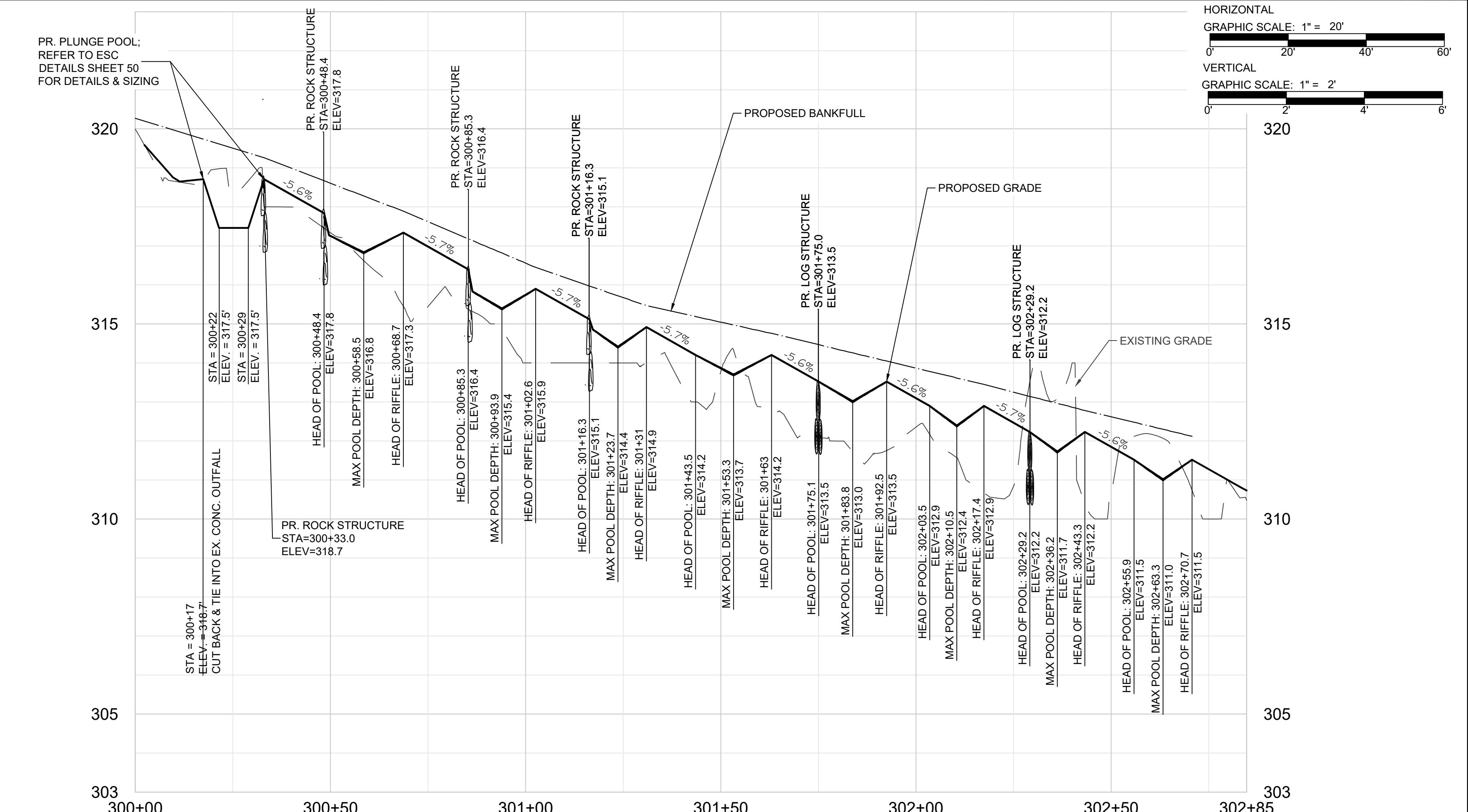
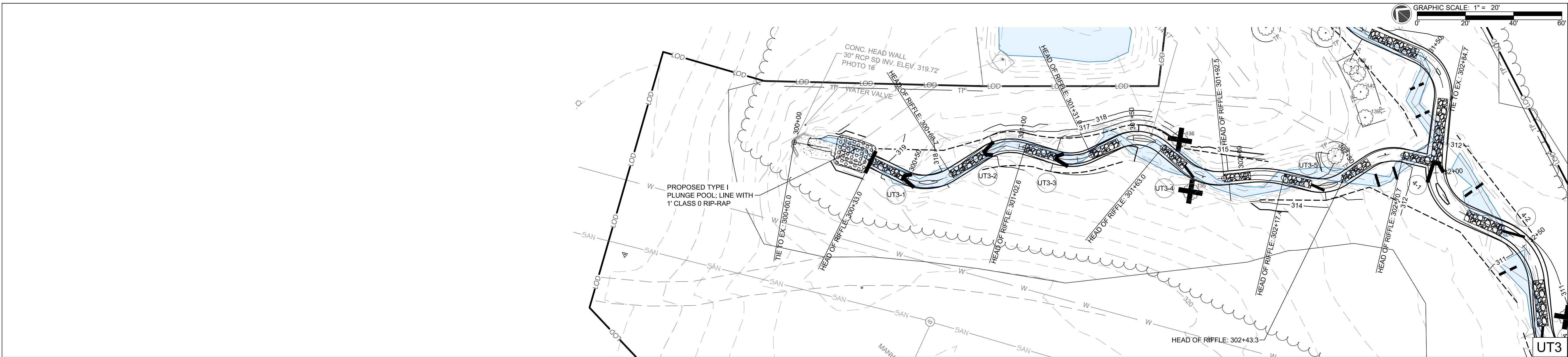
C. MILTON WRIGHT HIGH SCHOOL STREAM RESTORATION GRADING PLAN AND PROFILE

REVISION NO.	DATE	DESCRIPTION	SCALE: SEE SCALE BAR
			DESIGN BY: BW
			DRAWN BY: AM/JC/BW
			CHECKED BY: BW
			PROJECT NO.: 6776
			DATE: 6/8/2020
			SHEET NUMBER 19 of 50



GRAPHIC SCALE: 1" = 20'
0' 20' 40' 60'





LEGEND:	
EX. PROPERTY LINE	EX. WATER LINE
EX. PROPERTY ADJACENT	PR. MAJOR CONTOUR
EX. MAJOR CONTOUR	PR. MINOR CONTOUR
EX. MINOR CONTOUR	TP - PR. TREE PROTECTION
EX. BUILDING/EDGE OF PAVEMENT	PR. 100-YR WSE
EX. TRAIL	PR. GRADED FLOODPLAIN BENCH LIMITS
EX. TREELINE	PR. BANKFULL LIMITS
EX. CULVERT	PR. STREAM CENTERLINE
EX. STREAM CENTERLINE	PR. OXBOW PFO WETLAND
EX. LIMITS OF TREE SURVEY	PR. CULVERT
EX. 100-YR WSE	PR. RIPRAP
EX. STREAM	PR. ROCK STRUCTURE
EX. FORESTED WETLAND	PR. LOG STRUCTURE
EX. TREE/TREE TO BE REMOVED	
EX. FOREST CONSERVATION EASEMENT	
EX. SANITARY SEWER LINE	

W	EX. WATER LINE	PR. FLOODPLAIN LOG
—	EX. PROPERTY LINE	PR. WOOD TOE REVETMENT
—	EX. PROPERTY ADJACENT	PR. MINOR CONTOUR
—	EX. MAJOR CONTOUR	TP - PR. TREE PROTECTION
—	EX. MINOR CONTOUR	PR. 100-YR WSE
—	EX. BUILDING/EDGE OF PAVEMENT	PR. GRADED FLOODPLAIN BENCH LIMITS
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—	EX. SANITARY SEWER LINE	

NOTES:
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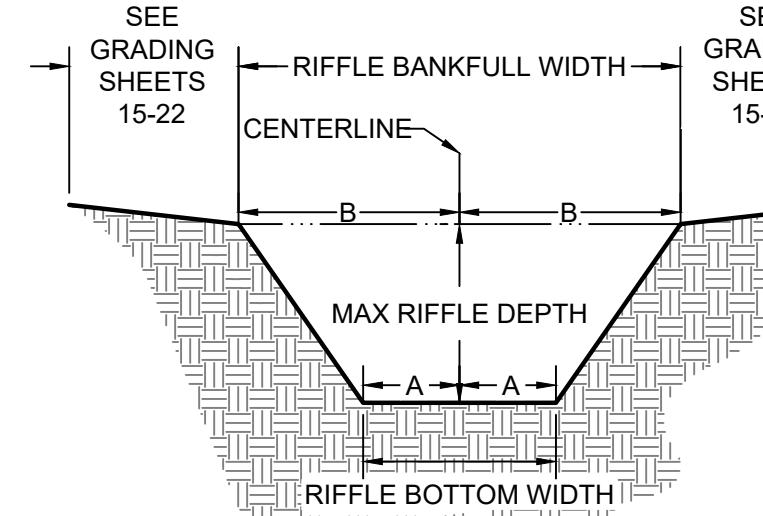
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HARFORD COUNTY, MARYLAND

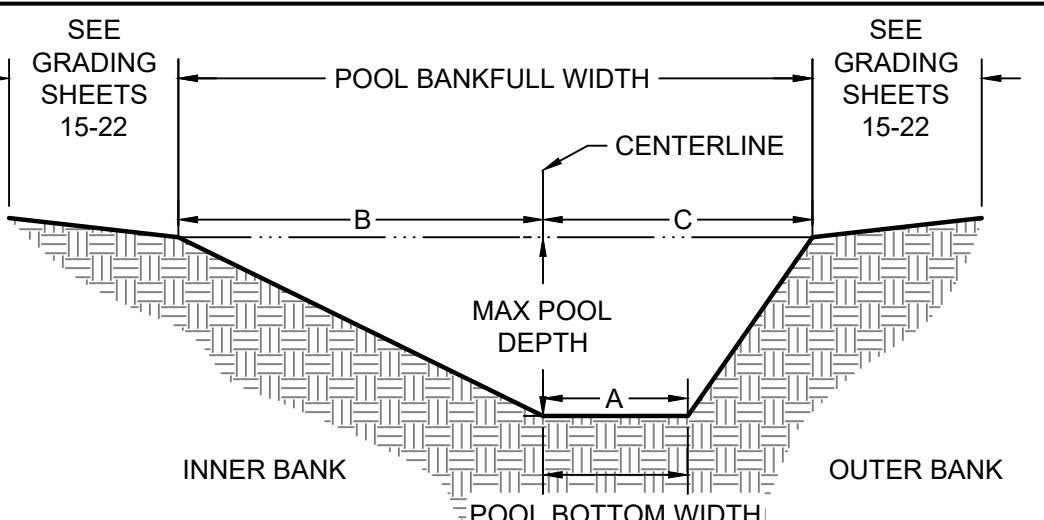
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			CHECKED BY: BW
			PROJECT NO.: 6776
			DATE: 6/8/2020
			SHEET NUMBER 22 of 50



RIFFLE CROSS-SECTION GEOMETRY						
REACH	STATION	A-CENTERLINE OFFSET TO BOTTOM OF BANK (FT)	RIFFLE BOTTOM WIDTH (FT)	MAX RIFFLE DEPTH (FT)	B-CENTERLINE OFFSET TO TOP OF BANK (FT)	RIFFLE BANKFULL WIDTH (FT)
REACH 1	10+00-11+13	1.6	3.2	0.55	2.8	5.6
REACH 2A	11+13-23+73	2.0	4.0	0.6	3.2	6.4
REACH 2B	24+20-29+86	2.0	4.0	0.6	3.2	6.4
REACH 3	29+86-31+96	2.0	4.0	0.7	3.6	7.2
REACH 4	31+96-40+49	2.3	4.5	0.8	4.1	8.2
UT1	100+00-101+98	0.9	1.8	0.25	1.4	2.8
UT2	200+00-201+22	0.9	1.8	0.25	1.4	2.8
UT3	300+00-302+85	1.6	3.2	0.55	2.8	5.6
Outfall Swale	400+00-400+36	0.9	1.8	0.25	1.4	2.8

*REACH PROFILE DATA SHALL BE USED TO DETERMINE DEPTH AT SPECIFIC STATIONS.



POOL CROSS-SECTION GEOMETRY						
REACH	STATION	A-CENTERLINE OFFSET TO OUTER BANK (FT)	POOL BOTTOM WIDTH (FT)	B-CENTERLINE OFFSET TO TOP OF INNER BANK (FT)	MAX POOL DEPTH (FT)	C-CENTERLINE OFFSET TO TOP OUTER BANK (FT)
REACH 1	10+00-11+13	0.6	0.6	4.1	1.1	2.8
REACH 2A	11+13-23+73	0.8	0.8	4.5	1.2	3.2
REACH 2B	24+20-29+86	0.8	0.8	4.5	1.2	3.2
REACH 3	29+86-31+96	0.8	0.8	5.1	1.4	3.6
REACH 4	31+96-40+49	0.9	0.9	5.7	1.5	4.1
UT1	100+00-101+98	0.4	0.4	1.9	0.5	1.4
UT2	200+00-201+22	0.4	0.4	1.9	0.5	1.4
UT3	300+00-302+85	0.6	0.6	4.1	1.1	2.8
Outfall Swale	400+00-400+36	0.4	0.4	1.9	0.5	1.4

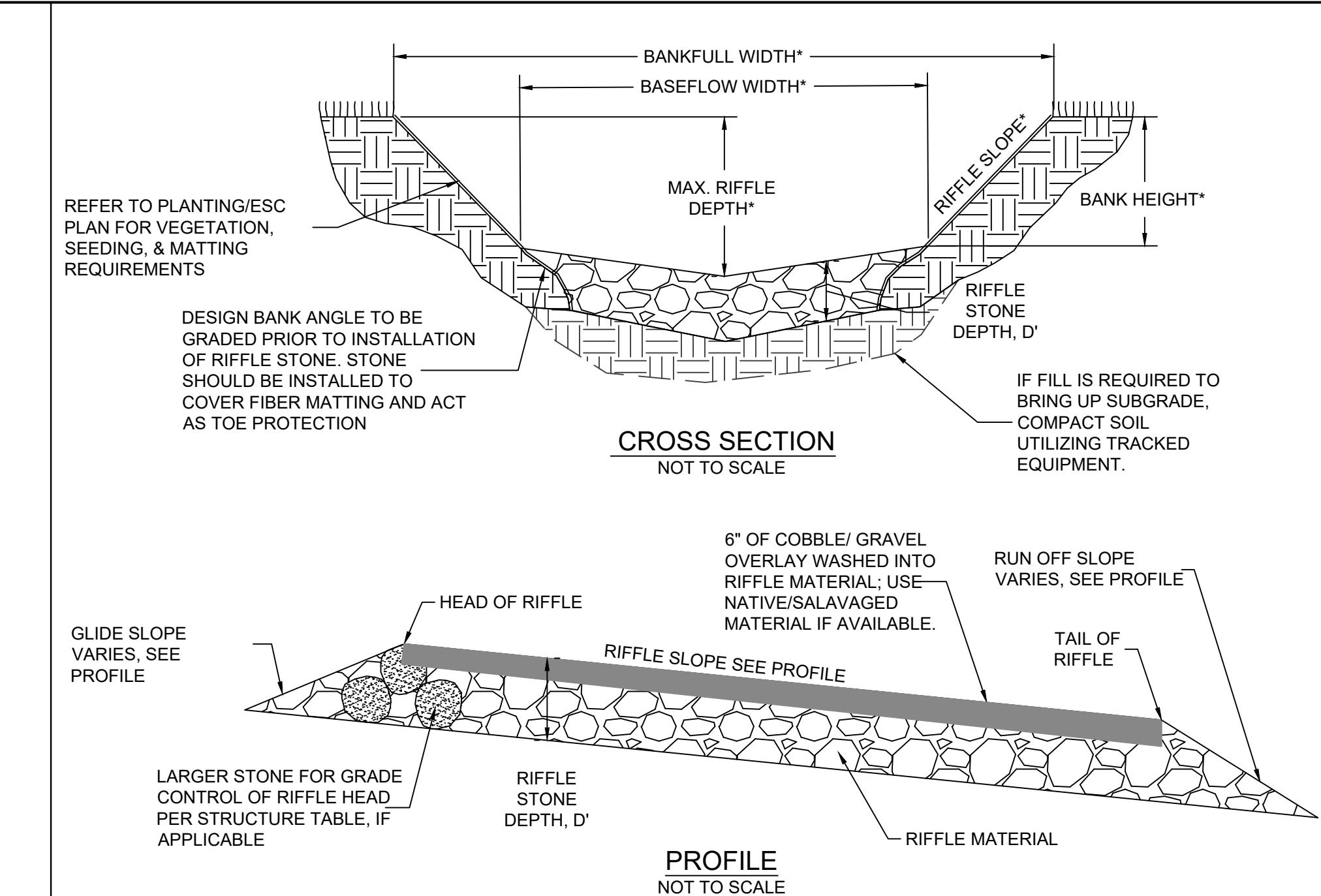
*REACH PROFILE DATA SHALL BE USED TO DETERMINE DEPTH AT SPECIFIC STATIONS.

1 RIFFLE CROSS-SECTION GEOMETRY

NOT TO SCALE

2 POOL CROSS-SECTION GEOMETRY

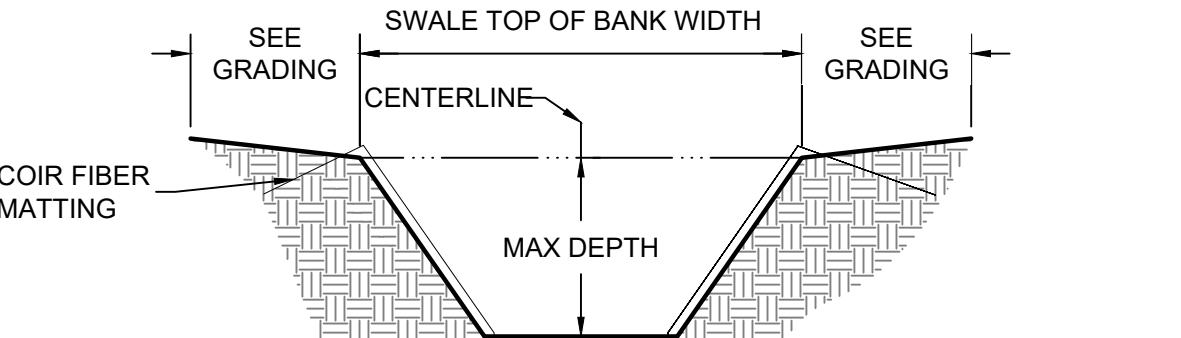
NOT TO SCALE



STRUCTURE TABLE		
	RIFFLE STONE DEPTH, D	MIN. GRADE CONTROL STONE SIZE (L, W, H)
REACH X		
ROCK		
SOIL/SAND		

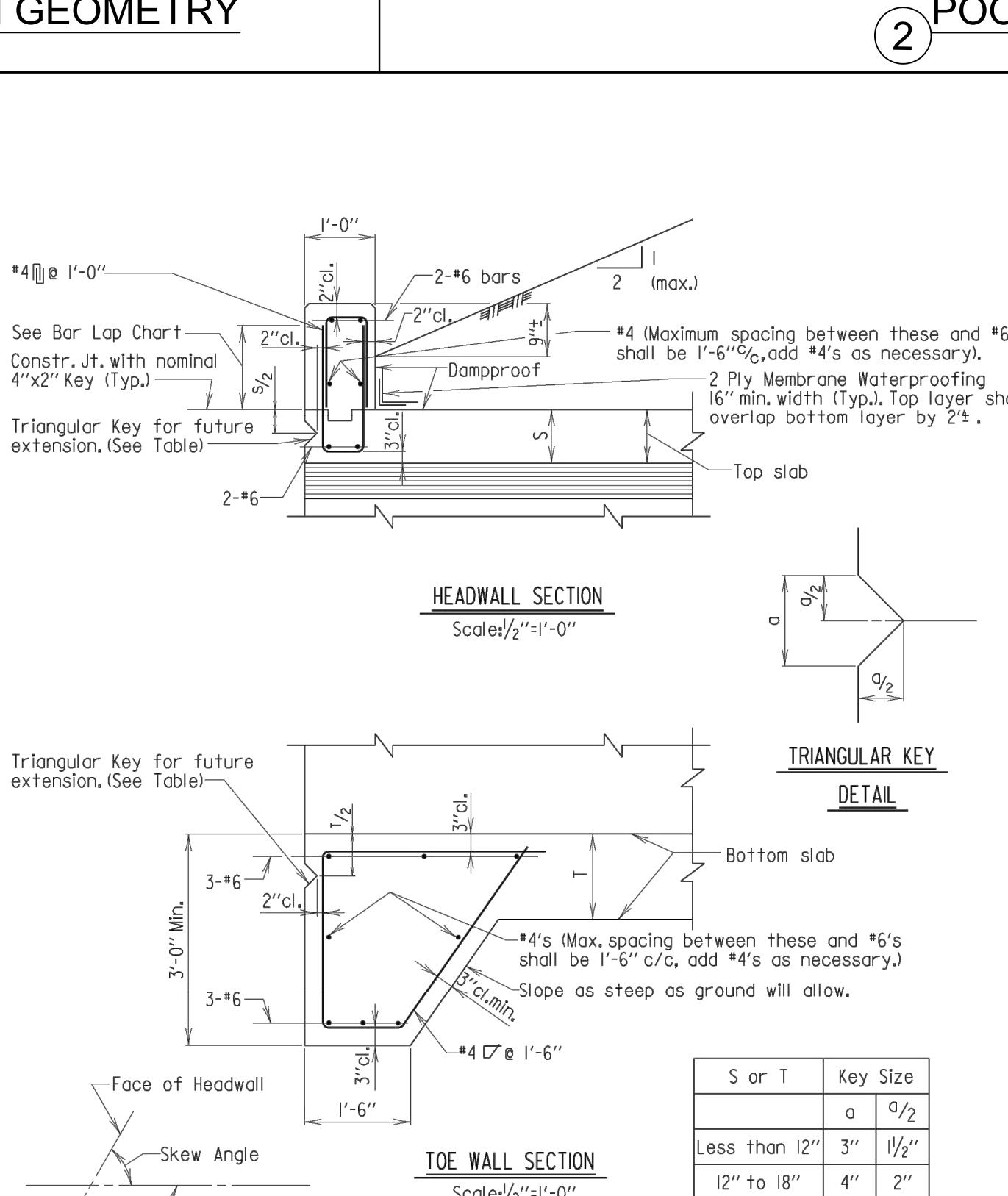
REACH X RIFFLE MATERIAL		
MATERIAL	SIZE (D50)	PERCENT
ROCK		
SOIL/SAND		

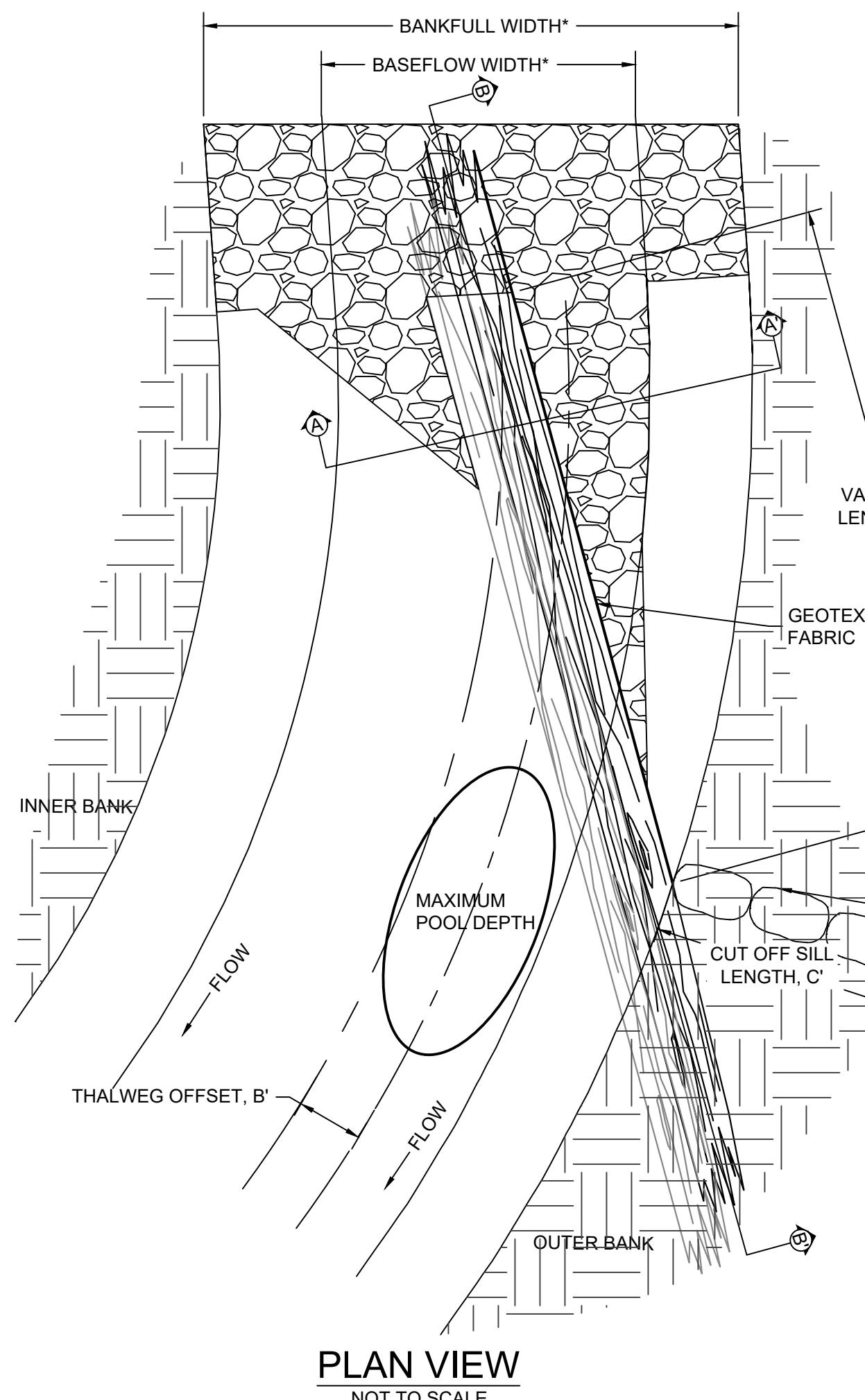
REACH X RIFFLE MATERIAL		
MATERIAL	SIZE (D50)	PERCENT
ROCK		
SOIL/SAND		



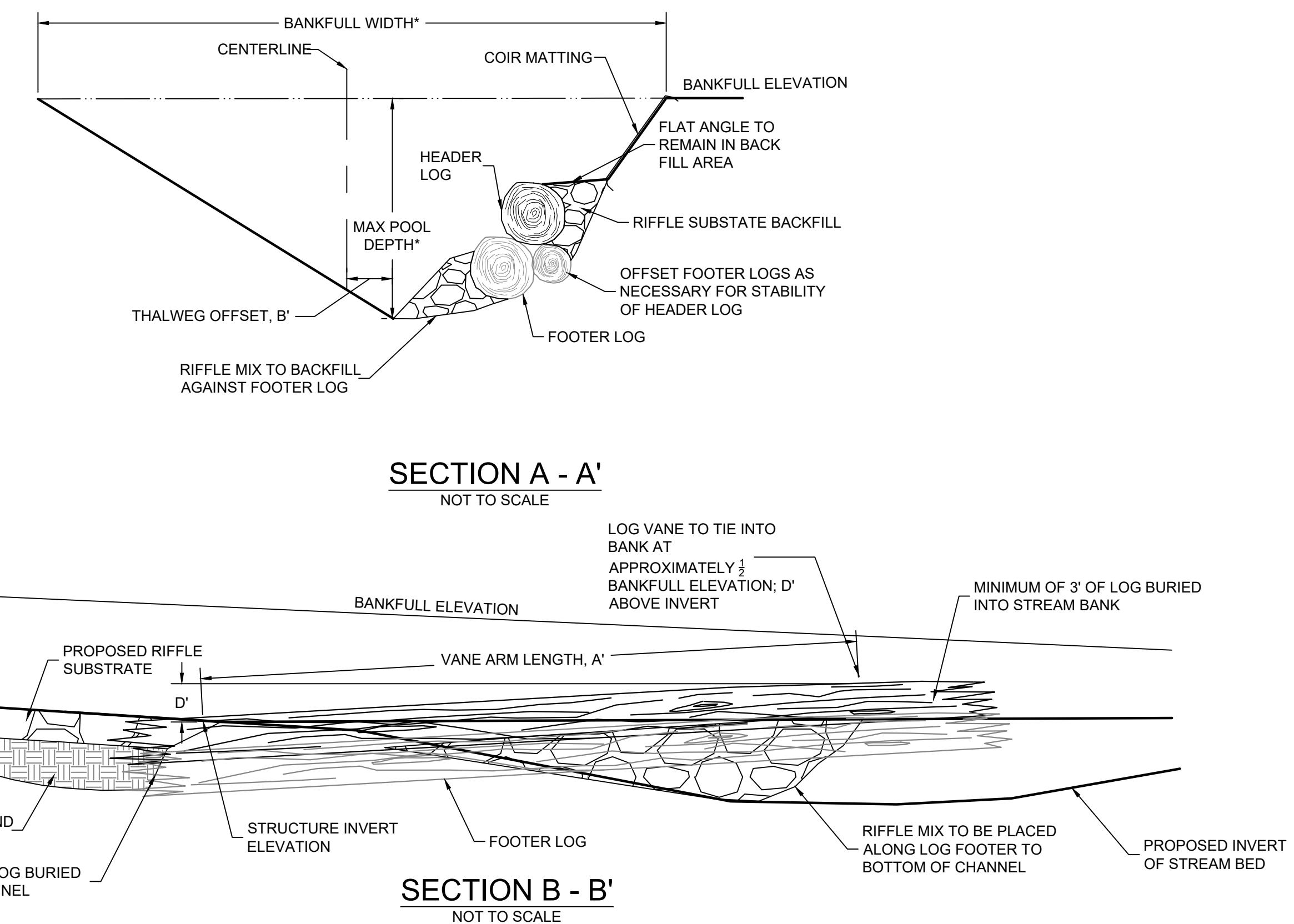
4 DRAINAGE SWALE

NOT TO SCALE





PLAN VIEW
NOT TO SCALE



SECTION A - A'
NOT TO SCALE

SECTION B - B'
NOT TO SCALE

STRUCTURE TABLE												
REACH	STRUCTURE #	STATION	INVERT ELEV.	VANE ARM LENGTH, A'	LOG LENGTH (FT)	THALWEG OFFSET, B''	VANE ARM TIE-IN HEIGHT, D''	CUT OFF SILL LENGTH, C''	MIN. LOG DIAMETER (IN)	CUT OFF SILL STONE HEIGHT (A)	CUT OFF SILL STONE DEPTH (B)	CUT OFF SILL STONE LENGTH (C)
STRUCTURE #												

TO BE COMPLETED WITH FINAL DESIGN

① LOG VANE
NOT TO SCALE

*NOTE: SEE CROSS-SECTION GEOMETRY TABLE FOR CHANNEL DIMENSIONS AND SLOPES.

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4. REFER TO NOTES SHEET 2 FOR COMPLETE NOTES.



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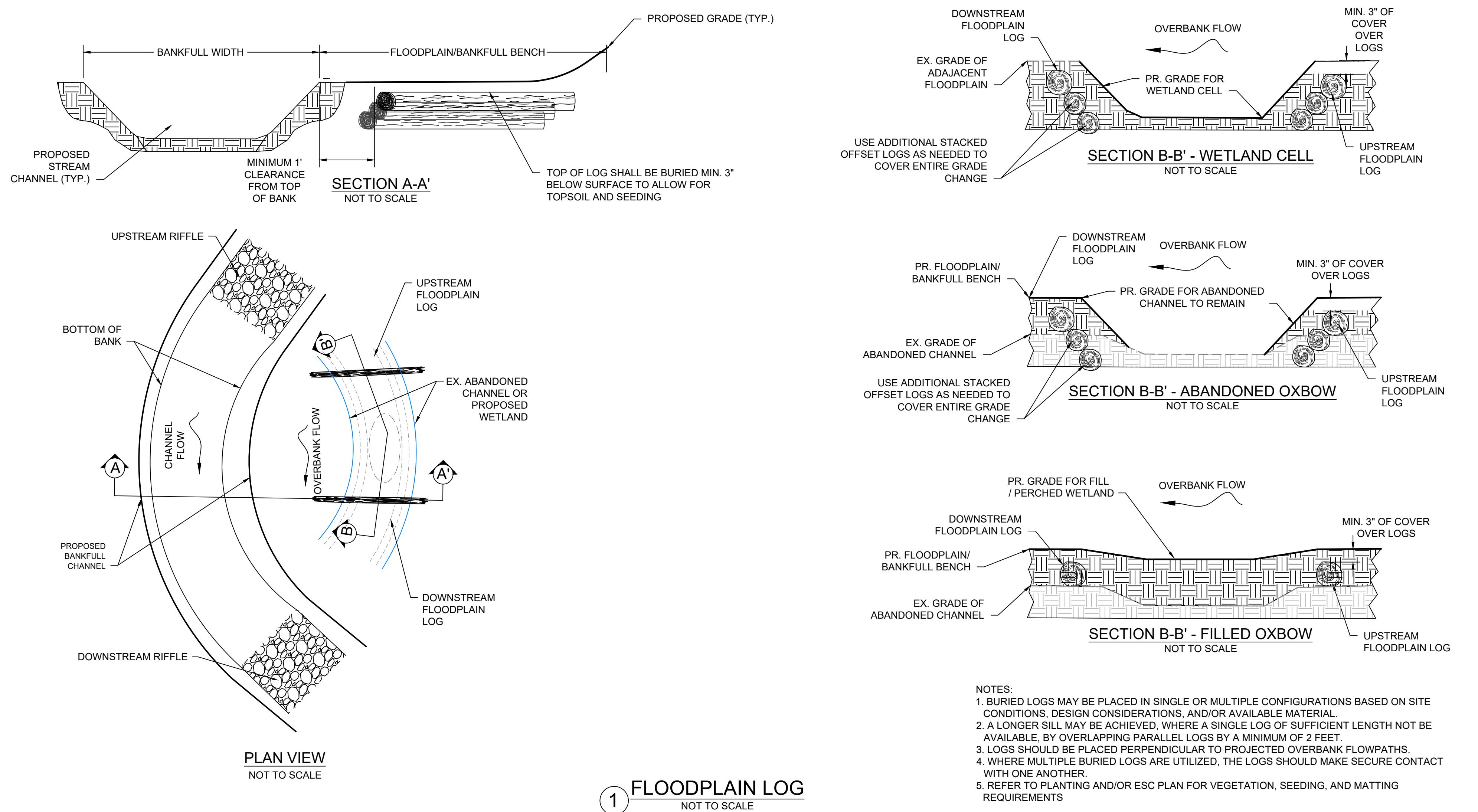
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HARFORD COUNTY, MARYLAND

C. MILTON WRIGHT HIGH SCHOOL
STREAM RESTORATION
STREAM DETAILS

REVISION NO.	DATE	DESCRIPTION	SCALE: SEE SCALE BAR
			DESIGN BY: BW
			DRAWN BY: AMJC/BW
			CHECKED BY: BW
			PROJECT NO.: 6776
			DATE: 6/8/2020
			SHEET NUMBER 26 of 50



NOTES:
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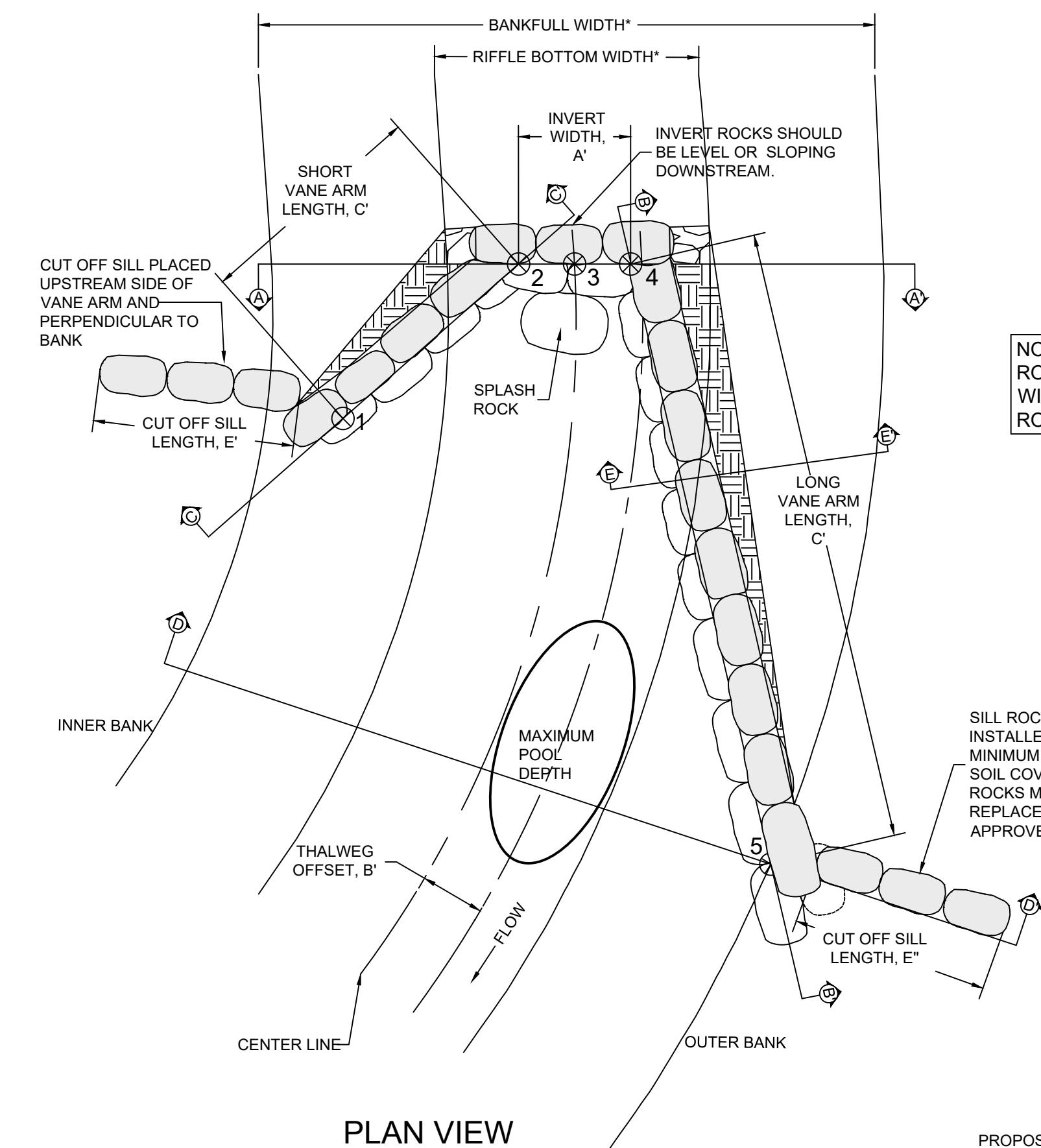
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HARFORD COUNTY, MARYLAND

C. MILTON WRIGHT HIGH SCHOOL STREAM RESTORATION STREAM DETAILS

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		DESIGN BY: BW	
		DRAWN BY: AMJC/BW	
		CHECKED BY: BW	
		PROJECT NO.: 6776	
		DATE: 6/8/2020	
		SHEET NUMBER	27 of 50

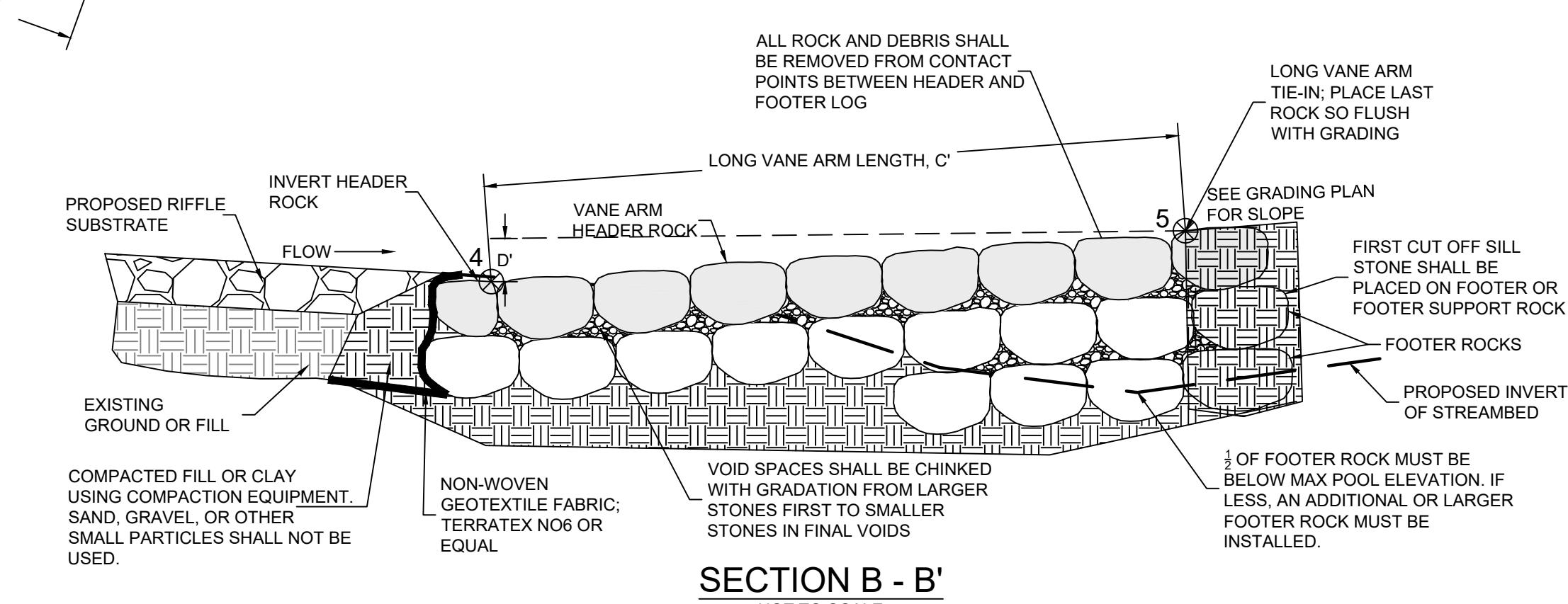
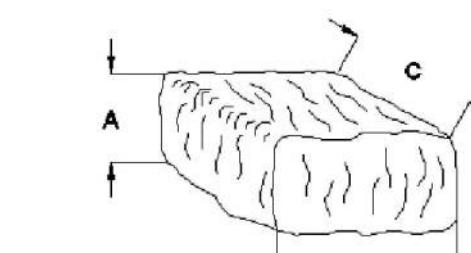


PLAN VIEW
NOT TO SCALE

LEGEND

	STAKEOUT POINT		GEOTEXTILE
	HEADER ROCK		FABRIC CHINKING MATERIAL
	FOOTER ROCK		FOOTER SUPPORT ROCK

*NOTE: SEE CROSS-SECTION GEOMETRY TABLE FOR CHANNEL



SECTION B - B

TO BE COMPLETED WITH FINAL DESIGN



NOTES:

1. SURVEY COMPLETED BY G.W. STEPHENS IN JANUARY 2020. 1' CONTOUR INTERVAL.
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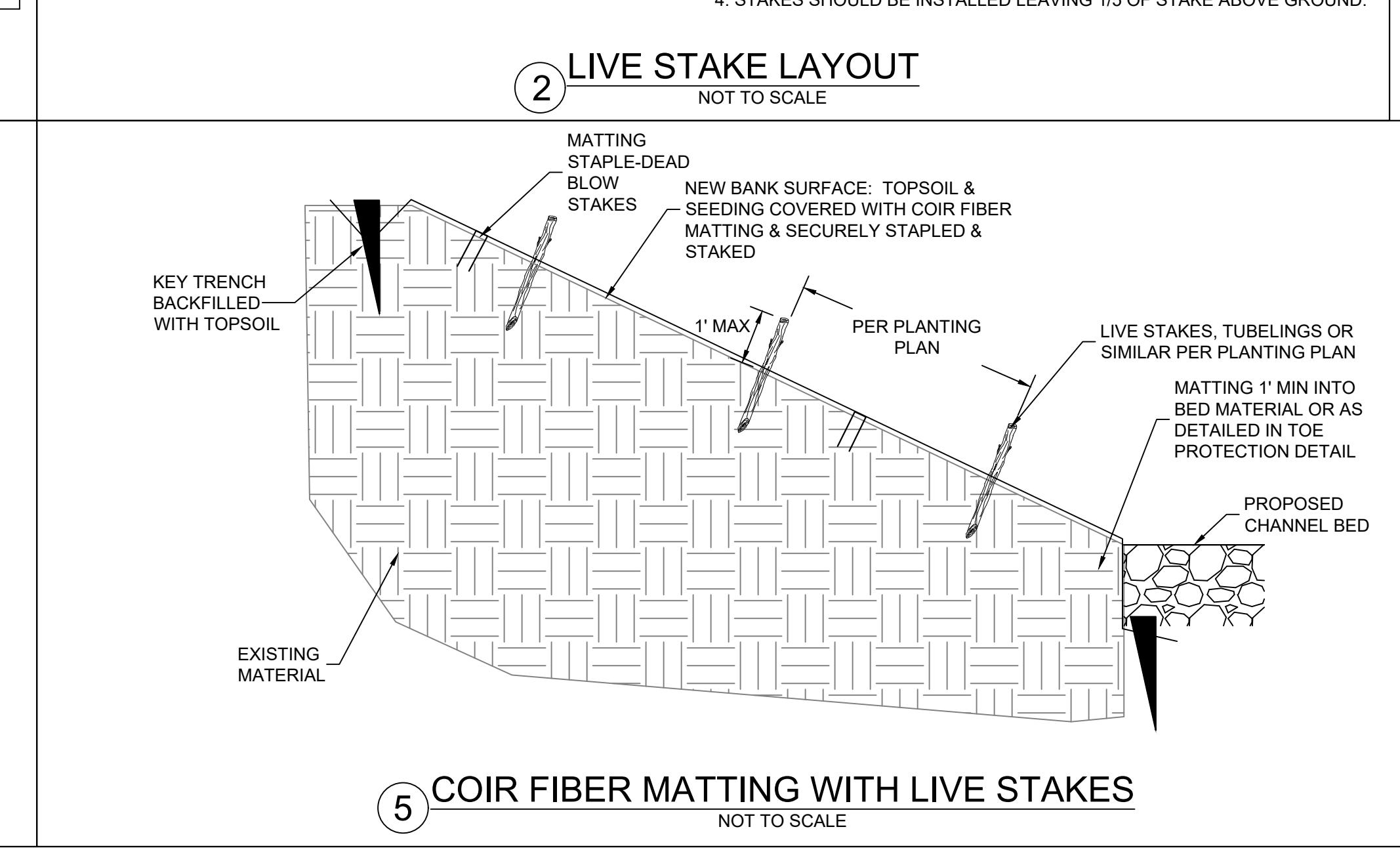
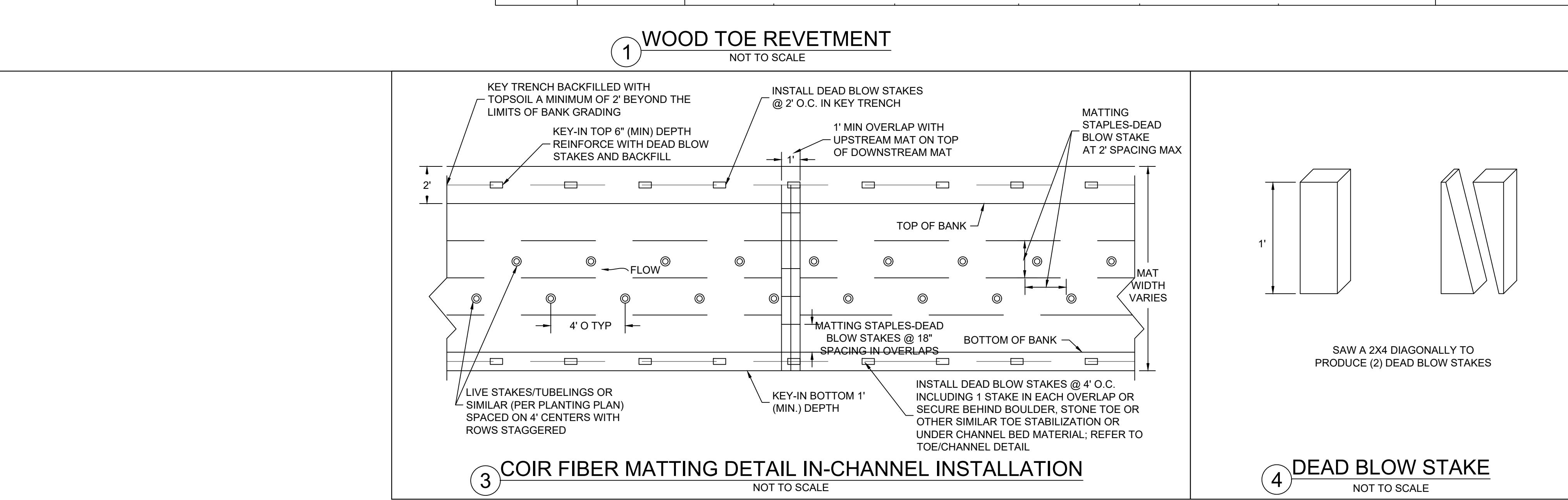
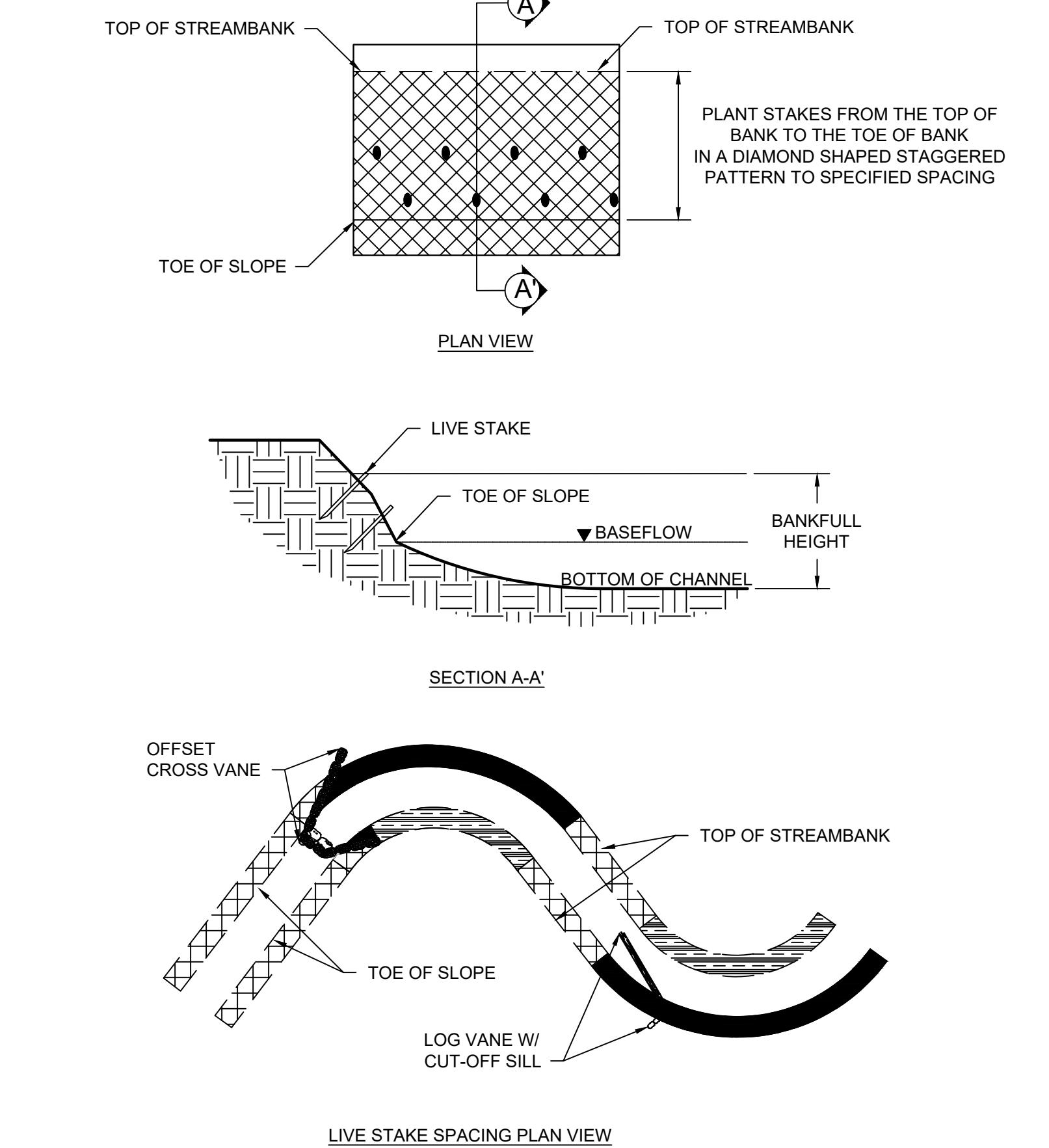
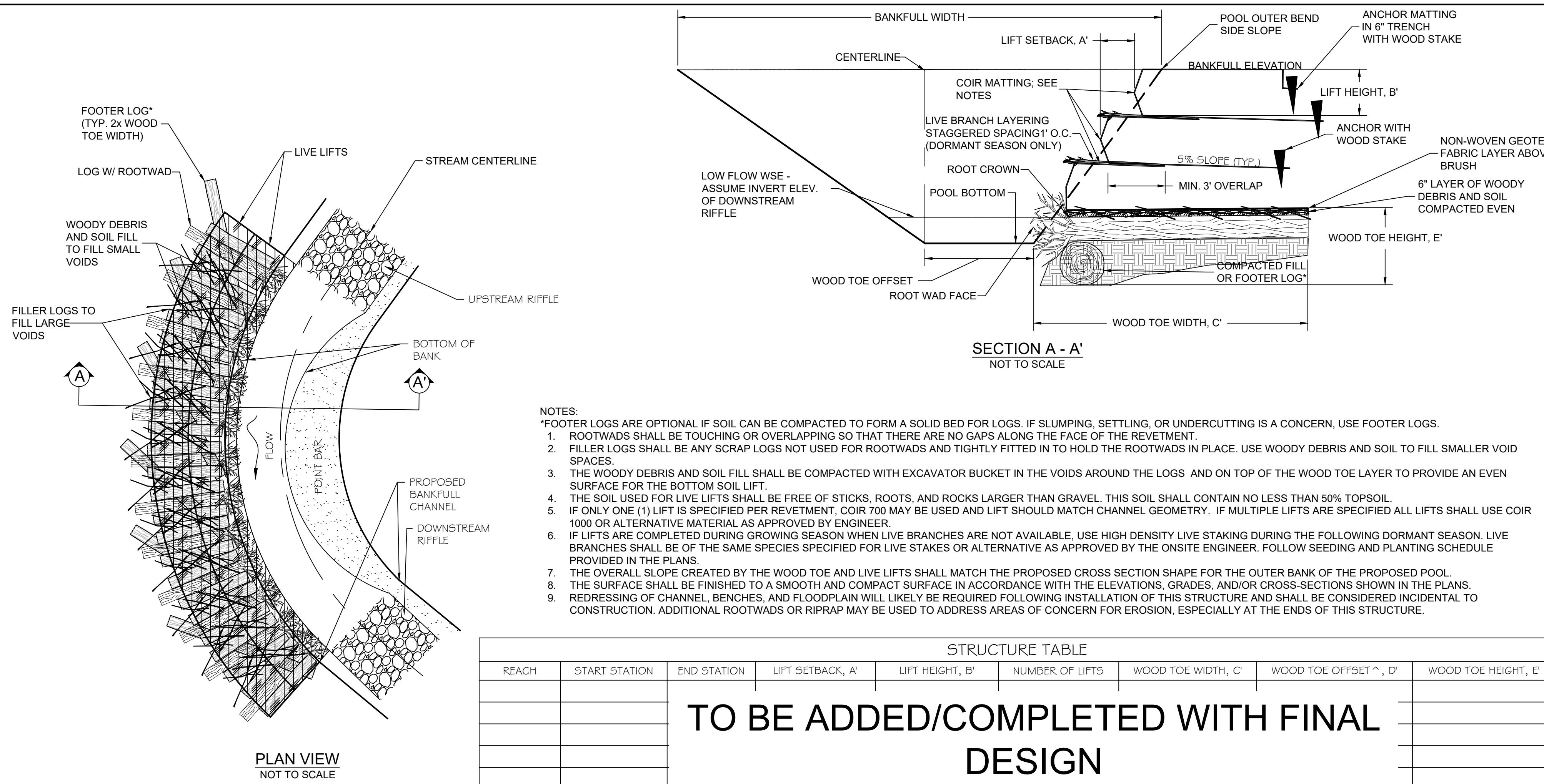


NOT FOR CONSTRUCTION

HARFORD COUNTY, MARYLAND

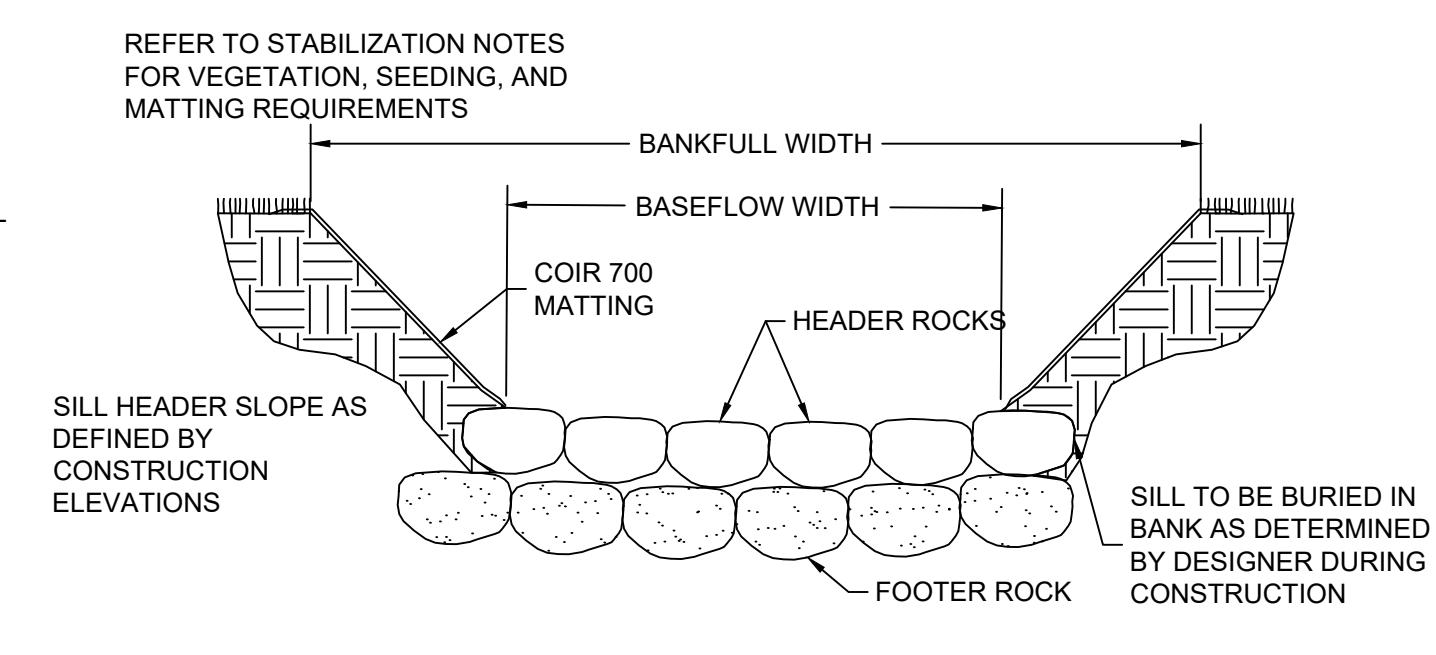
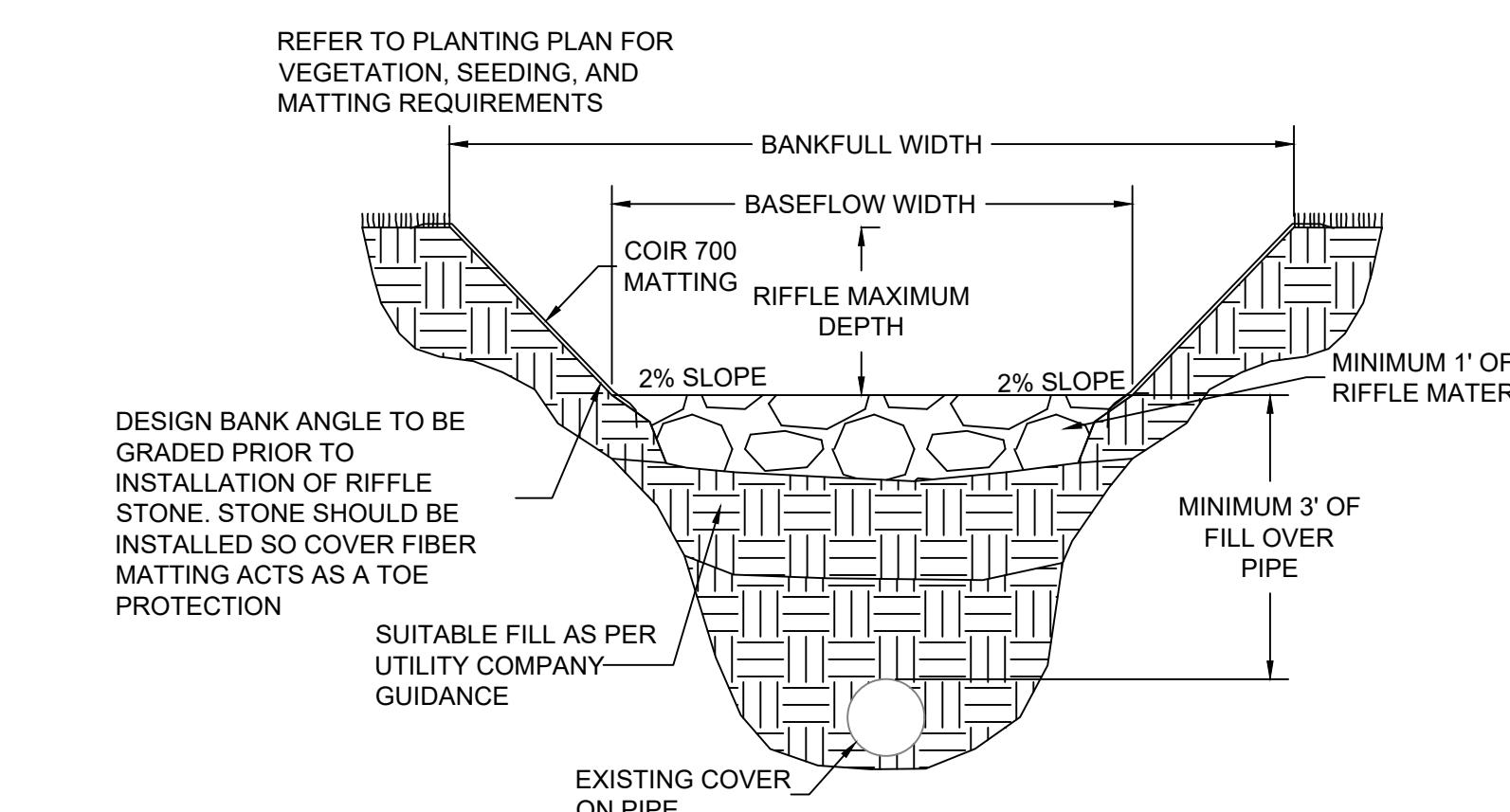
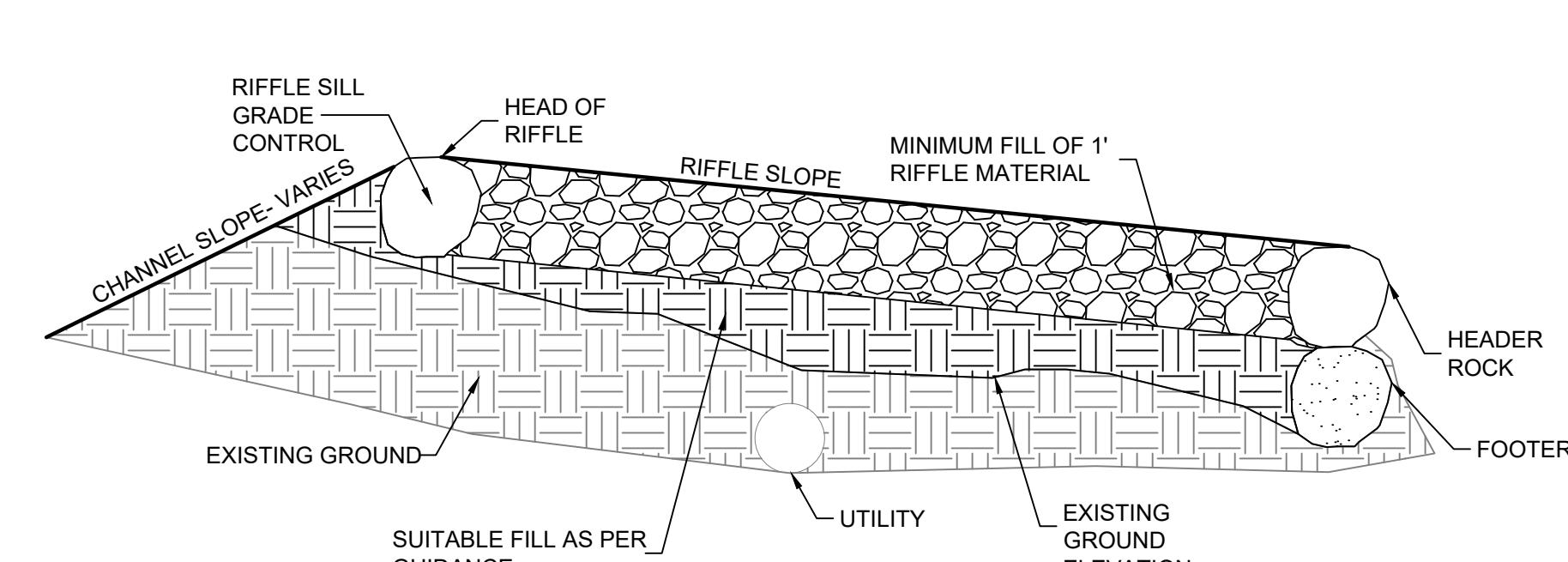
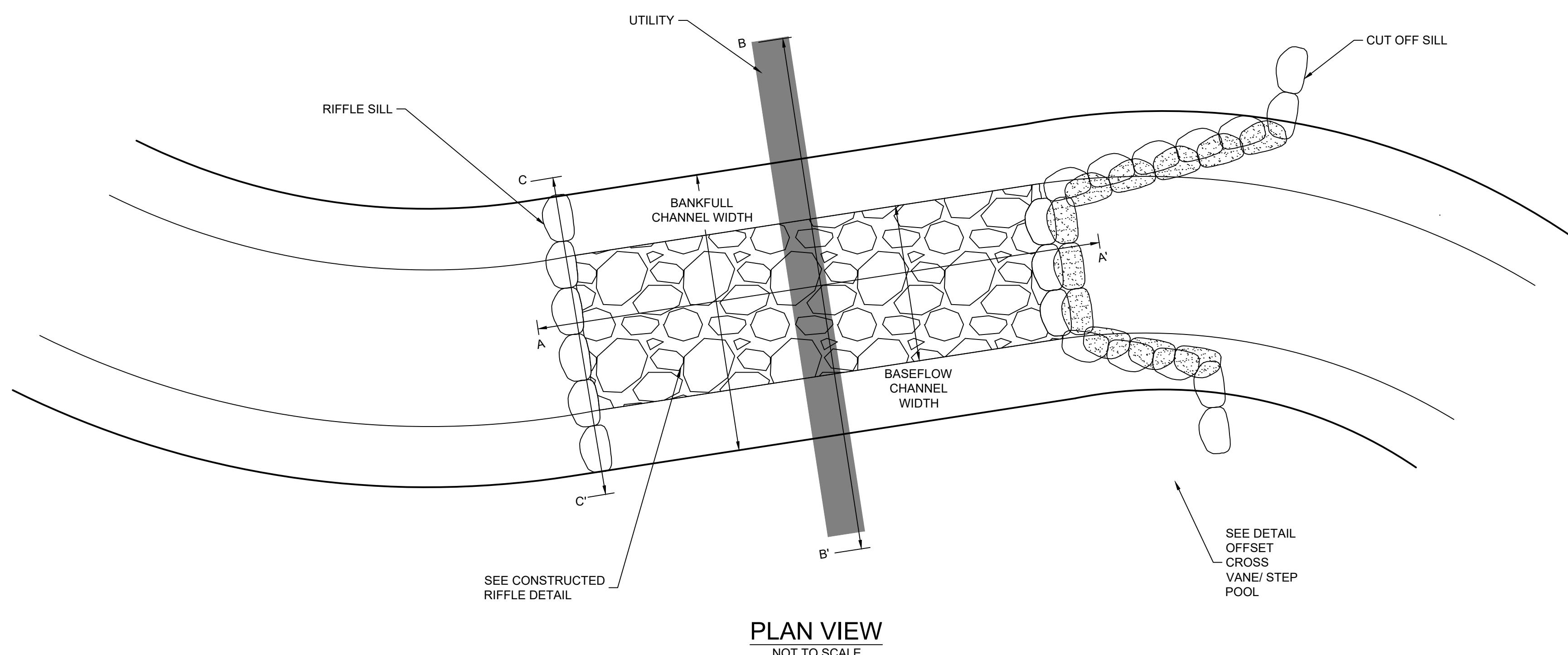
C. MILTON WRIGHT HIGH SCHOOL STREAM RESTORATION STREAM DETAILS

STREAM DETAILS			
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			CHECKED BY: BW
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NOTES:
 1. SURVEY COMPLETED BY G.W. STEPHENS IN JANUARY 2020.
 2. 1' CONTOUR INTERVAL.
 3. TOPOGRAPHY AND LINework OUTSIDE THE SURVEY LIMITS IS BASED UPON AVAILABLE GIS DATA. 2' CONTOUR INTERVAL.
 4. WETLAND DELINEATION PERFORMED BY RES WITHIN THE PROJECT AREA IN NOVEMBER, 2019.
 5. REFER TO NOTES SHEET 2 FOR COMPLETE NOTES.

REVISION NO.	DATE	DESCRIPTION	SCALE: SEE SCALE BAR
		DESIGN BY: BW	
		DRAWN BY: AMJC/BW	
		CHECKED BY: BW	
		PROJECT NO.: 6776	
		DATE: 6/8/2020	
		SHEET NUMBER	29 of 50



1 UTILITY PROTECTION
NOT TO SCALE

NOTES:
 1. SURVEY COMPLETED BY G.W. STEPHENS IN JANUARY 2020.
 1' CONTOUR INTERVAL.
 2. TOPOGRAPHY AND LINWORK OUTSIDE THE SURVEY LIMITS IS BASED UPON AVAILABLE GIS DATA. 2' CONTOUR INTERVAL.
 3. WETLAND DELINEATION PERFORMED BY RES WITHIN THE PROJECT AREA IN NOVEMBER, 2019.
 4. REFER TO NOTES SHEET 2 FOR COMPLETE NOTES.



NOT FOR
CONSTRUCTION

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the state of Maryland.
License Number: 52852
Expiration Date: 6-14-2022

HARFORD COUNTY, MARYLAND

C. MILTON WRIGHT HIGH SCHOOL
STREAM RESTORATION
STREAM DETAILS

REVISION NO.	DATE	DESCRIPTION	SCALE: SEE SCALE BAR
		DESIGN BY: BW	
		DRAWN BY: AMJC/BW	
		CHECKED BY: BW	
		PROJECT NO.: 6776	
		DATE: 6/8/2020	
		SHEET NUMBER 30 of 50	