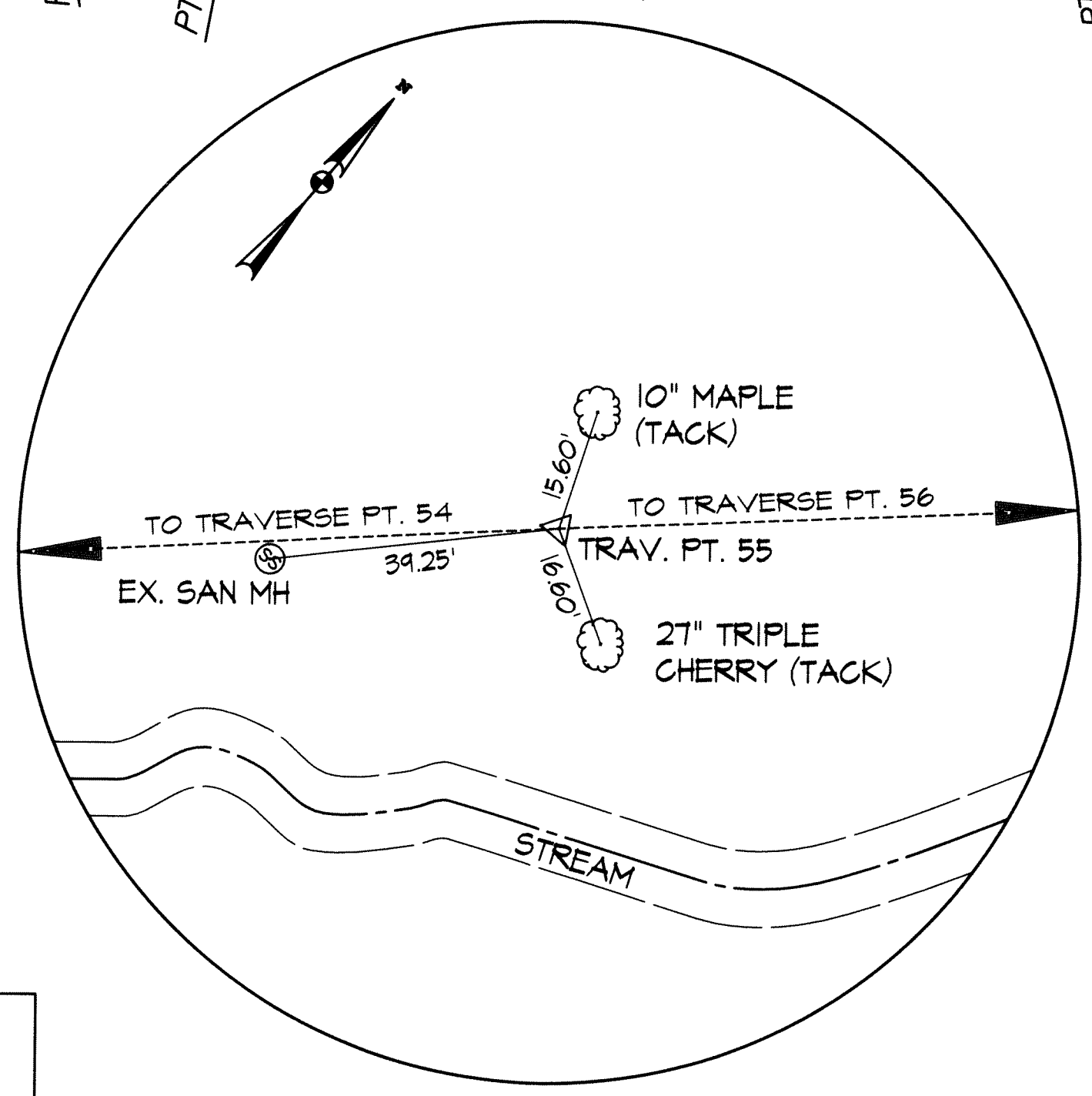
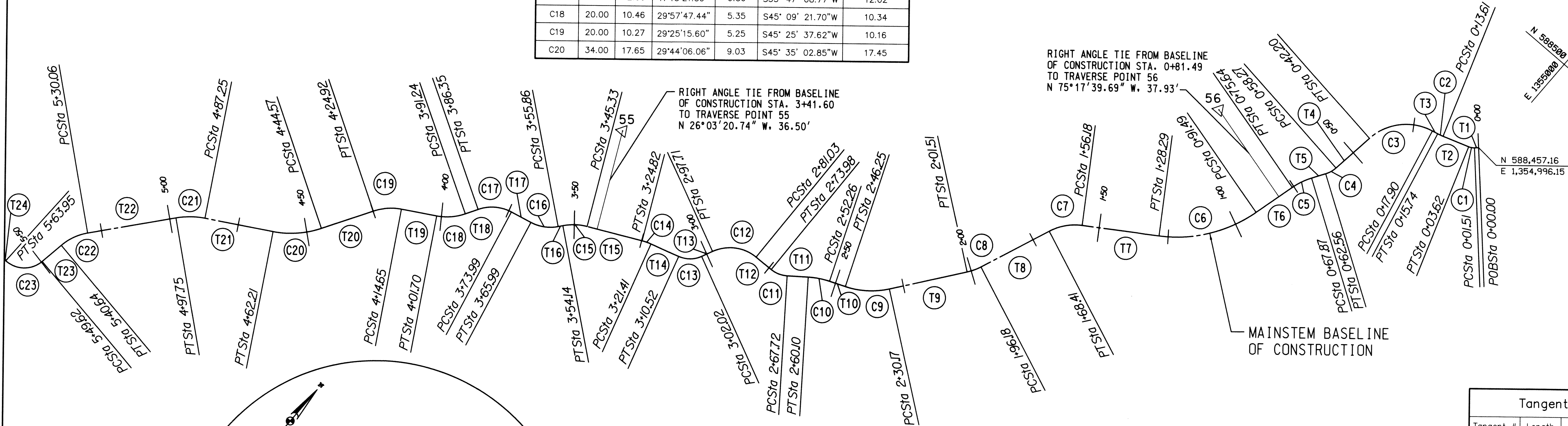


Curve Data						
Curve #	Radius	Length	Delta	Tangent	Chord Direction	Chord Length
C1	5.00	2.12	24°15'48.88"	1.07	S59° 17' 11.33"W	2.10
C2	20.00	2.13	6°06'35.61"	1.07	S74° 28' 23.57"W	2.13
C3	20.00	24.30	69°36'58.63"	13.90	S42° 43' 12.07"W	22.83
C4	10.00	4.30	24°36'48.06"	2.18	S20° 13' 06.78"W	4.26
C5	25.00	7.78	17°49'10.50"	3.92	S23° 36' 55.56"W	7.74
C6	50.00	36.80	42°10'13.04"	19.28	S35° 47' 26.83"W	35.98
C7	20.00	12.23	35°02'41.77"	6.31	S39° 21' 12.47"W	12.04
C8	20.00	5.33	15°15'30.92"	2.68	S29° 27' 37.04"W	5.31
C9	30.00	16.08	30°43'03.24"	8.24	S52° 26' 54.12"W	15.89
C10	30.00	7.83	14°57'46.64"	3.94	S60° 19' 32.42"W	7.81
C11	10.00	6.26	35°52'53.30"	3.24	S70° 47' 05.75"W	6.16
C12	15.00	16.68	63°42'43.56"	9.32	S56° 52' 10.62"W	15.83
C13	10.00	8.50	48°41'48.94"	4.53	S49° 21' 43.31"W	8.25
C14	20.00	3.41	9°45'58.51"	1.71	S68° 49' 38.52"W	3.40
C15	20.00	8.82	25°15'52.19"	4.48	S51° 18' 43.17"W	8.75
C16	15.00	10.14	38°43'02.49"	5.27	S58° 02' 18.32"W	9.94
C17	15.00	12.36	47°13'21.59"	6.56	S53° 47' 08.77"W	12.02
C18	20.00	10.46	29°57'47.44"	5.35	S45° 09' 21.70"W	10.34
C19	20.00	10.27	29°25'15.60"	5.25	S45° 25' 37.62"W	10.16
C20	34.00	17.65	29°44'06.06"	9.03	S45° 35' 02.85"W	17.45

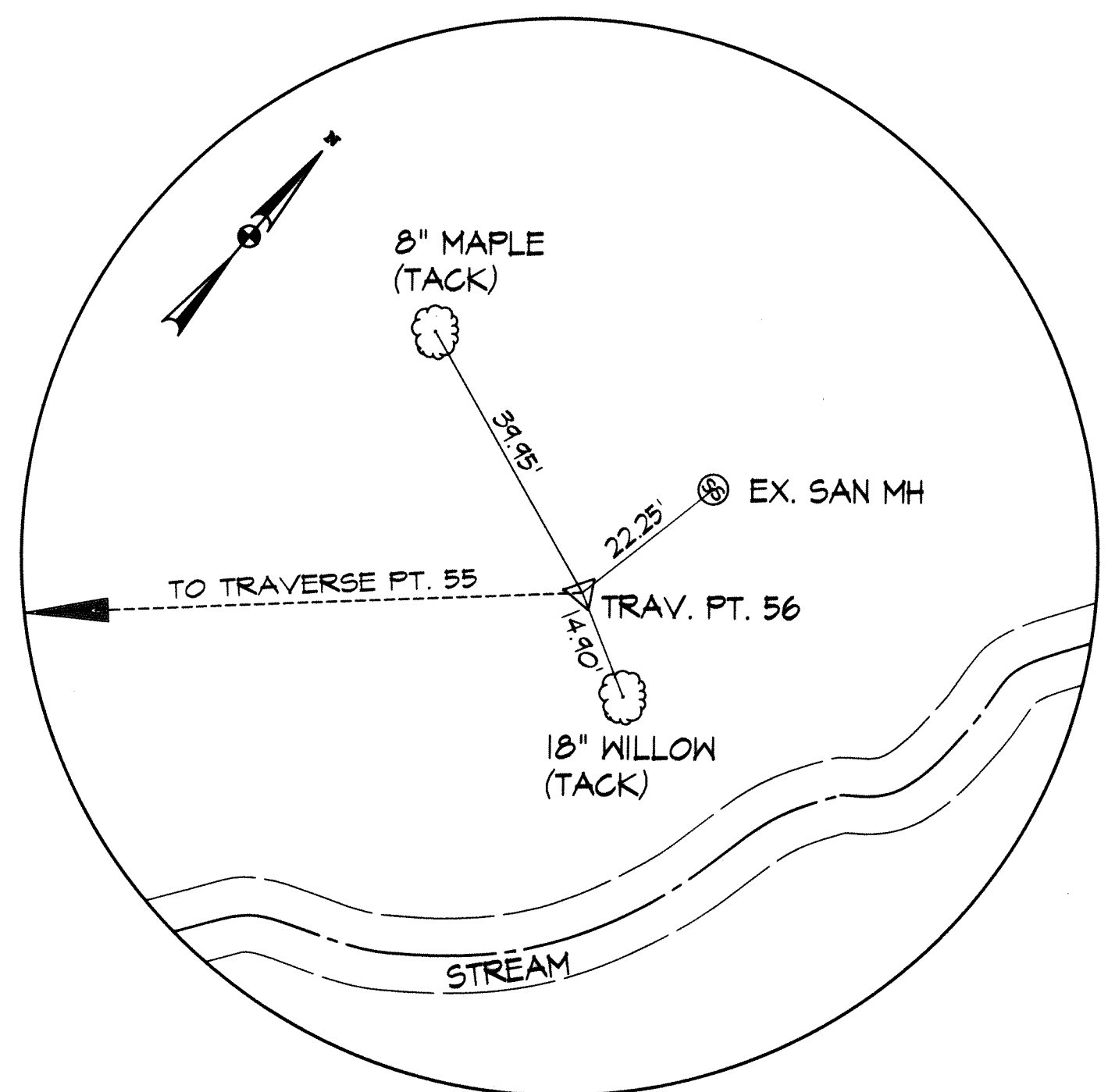
Curve Data						
Curve #	Radius	Length	Delta	Tangent	Chord Direction	Chord Length
C21	29.00	10.50	20°44'36.18"	5.31	S50° 04' 47.79"W	10.44
C22	20.00	10.58	30°18'34.36"	5.42	S24° 33' 12.52"W	10.46
C23	10.00	14.33	82°06'24.28"	8.71	S50° 27' 07.48"W	13.14

Traverse Coordinate Table			
Traverse #	Northing	Easting	Elevation
55	588260.858	1354758.241	359.860
56	588406.560	1354916.307	362.590

MATCH LINE A-A



TRAVERSE POINT 55  
REBAR AND CAP  
NOT TO SCALE



TRAVERSE POINT 56  
REBAR AND CAP  
NOT TO SCALE

Tangent Data		
Tangent #	Length	Direction
T1	1.51	S47° 09' 16.89"W
T2	9.98	S71° 25' 05.77"W
T3	2.16	S77° 31' 41.38"W
T4	16.07	S7° 54' 42.75"W
T5	5.31	S32° 31' 30.81"W
T6	15.85	S14° 42' 20.31"W
T7	27.89	S56° 52' 33.35"W
T8	27.77	S21° 49' 51.58"W
T9	28.66	S37° 05' 22.50"W
T10	6.01	S67° 48' 25.74"W
T11	7.62	S52° 50' 39.09"W
T12	7.05	S88° 43' 32.40"W
T13	4.32	S25° 00' 48.84"W
T14	10.89	S73° 42' 37.78"W
T15	20.50	S63° 56' 39.26"W
T16	1.71	S38° 40' 47.08"W
T17	7.99	S77° 23' 49.57"W
T18	4.89	S30° 10' 27.98"W
T19	12.95	S60° 08' 15.42"W
T20	19.65	S30° 42' 59.82"W
T21	25.03	S60° 27' 05.88"W
T22	32.31	S39° 42' 29.70"W
T23	8.98	S9° 23' 55.34"W
T24	1.28	N88° 29' 40.38"W

STATE OF MARYLAND  
PROFESSIONAL ENGINEER  
No. 38311  
1/27/12

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
9/27/12

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
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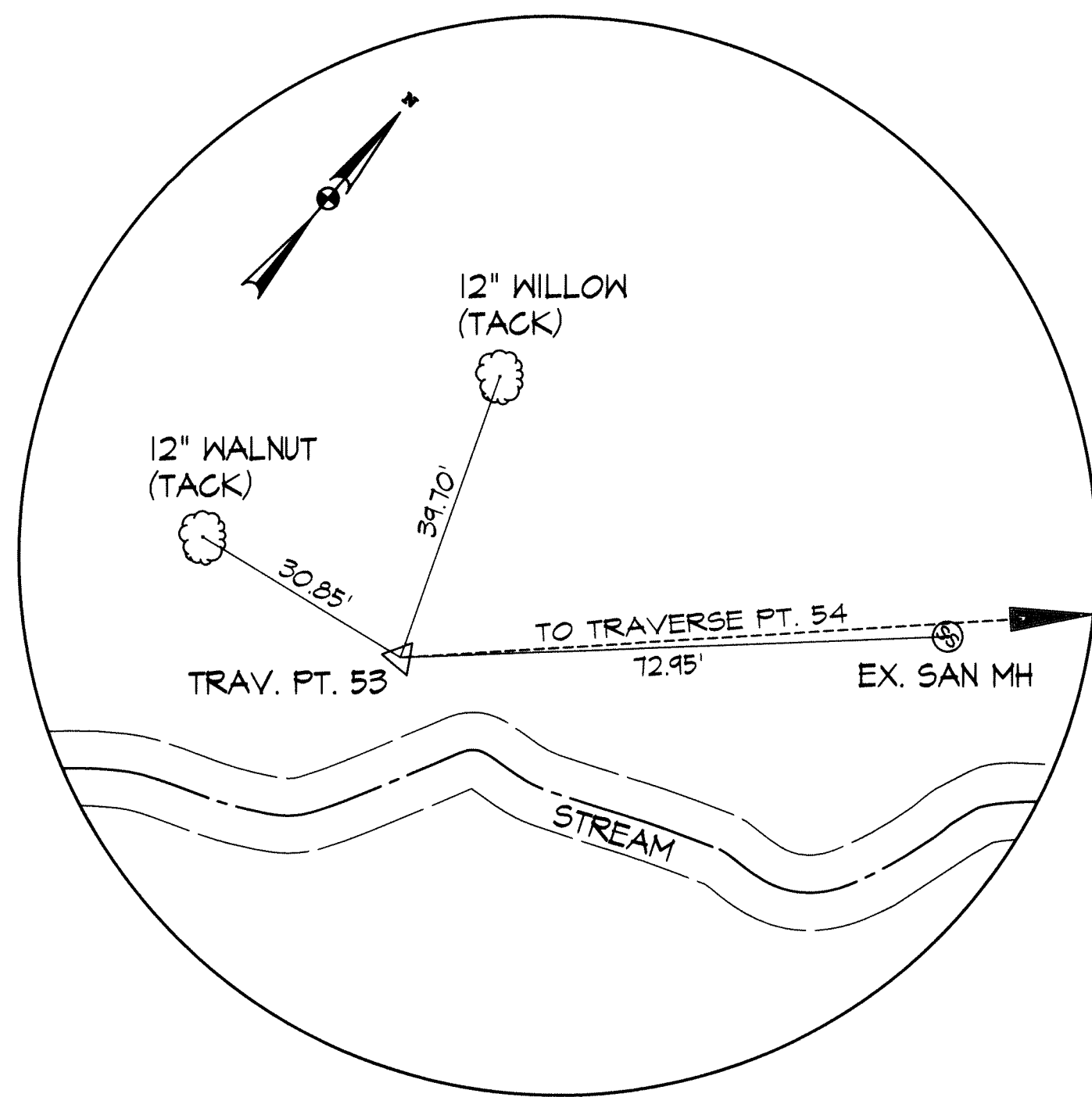
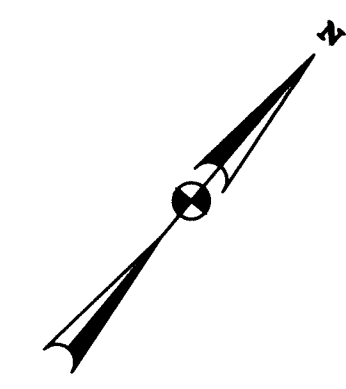
KCI TECHNOLOGIES

ELMEDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STREAM RESTORATION DIVISION  
COLUMBIA, MD 21046

GEOMETRY SHEET

SCALE: 1" = 20'  
DATE: SEPTEMBER 2012  
KCI JOB NO.: 01-081795.60  
CAPITAL PROJECT NO.: D-1158  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

SHEET NO.: 2 OF 18

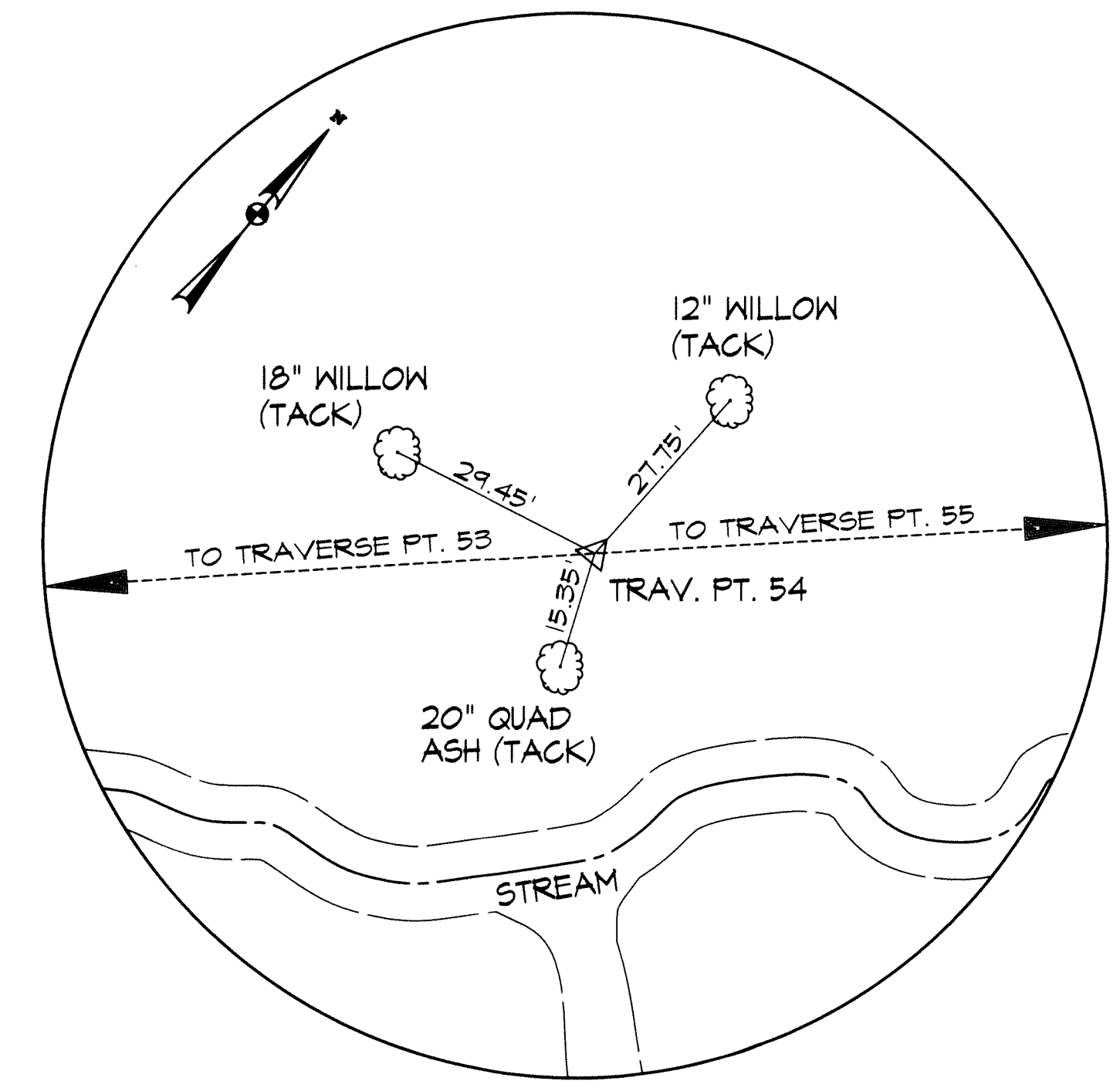
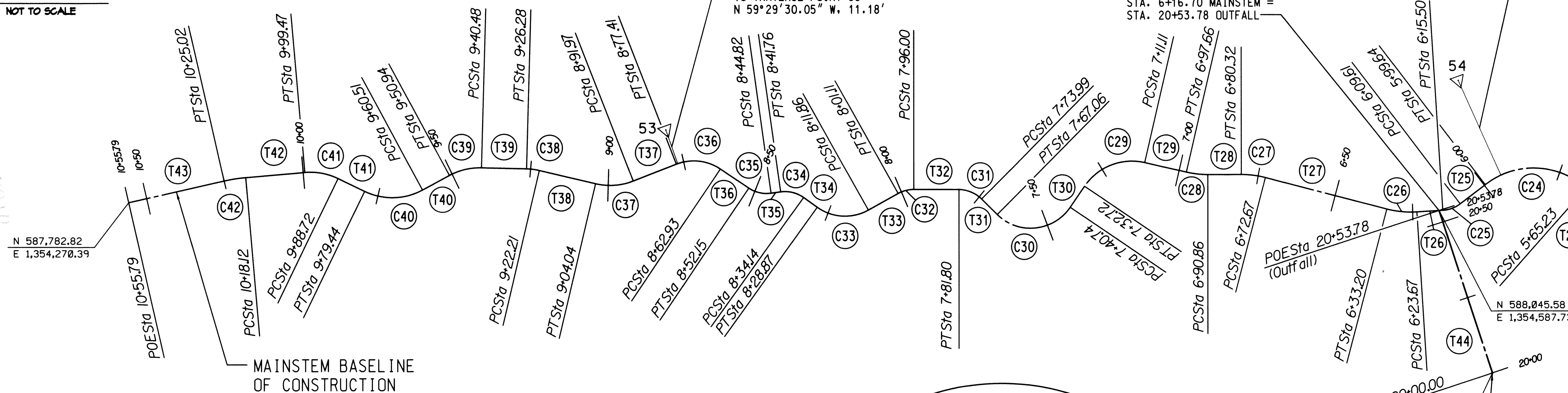


**TRAVERSE POINT 53  
REBAR AND CAP  
NOT TO SCALE**

Curve Data						
Curve #	Radius	Length	Delta	Tangent	Chord Direction	Chord Length
C24	25.00	34.41	78°52'03.62"	20.56	S52° 04' 17.81"W	31.76
C25	10.00	5.89	33°45'23.82"	3.03	S29° 30' 57.91"W	5.81
C26	30.00	9.54	18°13'02.66"	4.81	S55° 30' 11.15"W	9.50
C27	30.00	7.65	14°36'42.47"	3.85	S57° 18' 21.24"W	7.63
C28	30.00	6.80	12°59'40.62"	3.42	S56° 29' 50.31"W	6.79
C29	18.00	21.61	68°46'57.87"	12.32	S28° 36' 11.69"W	20.33
C30	15.00	26.32	100°31'52.30"	18.05	S44° 28' 38.90"W	23.07
C31	10.00	7.81	44°44'35.05"	4.12	S72° 22' 17.53"W	7.61
C32	10.00	5.11	29°17'03.05"	2.61	S35° 21' 28.48"W	5.06
C33	15.00	17.01	64°57'38.12"	9.55	S53° 11' 46.01"W	16.11
C34	10.00	7.62	43°39'16.32"	4.01	S63° 50' 56.91"W	7.44
C35	10.00	7.33	41°58'45.81"	3.84	S63° 00' 41.66"W	7.16
C36	15.00	14.48	55°18'36.62"	7.86	S56° 20' 46.25"W	13.92
C37	20.00	12.06	34°33'38.38"	6.22	S45° 58' 17.13"W	11.88
C38	20.00	4.07	11°39'48.56"	2.04	S57° 25' 12.04"W	4.06
C39	20.00	10.47	29°59'17.52"	5.36	S36° 35' 39.00"W	10.35
C40	20.00	18.93	54°13'58.11"	10.24	S48° 42' 59.30"W	18.23
C41	20.00	10.75	30°48'09.42"	5.51	S60° 25' 53.64"W	10.62
C42	50.00	6.90	7°54'09.70"	3.45	S41° 04' 44.08"W	6.89

Tangent Data		
Tangent #	Length	Direction
T24	1.28	N88° 29' 40.38"W
T25	9.97	S12° 38' 16.00"W
T26	8.17	S46° 23' 39.82"W
T27	39.46	S64° 36' 42.47"W
T28	10.54	S50° 00' 00.00"W
T29	13.45	S62° 59' 40.62"W
T30	8.02	S5° 47' 17.25"E
T31	6.93	N85° 15' 24.95"W
T32	14.20	S50° 00' 00.00"W
T33	10.75	S20° 42' 56.95"W
T34	5.27	S85° 40' 35.07"W
T35	3.06	S42° 01' 18.75"W
T36	10.78	S84° 00' 04.56"W
T37	14.57	S28° 41' 27.94"W
T38	18.17	S63° 15' 06.32"W
T39	14.20	S51° 35' 17.76"W
T40	9.56	S21° 36' 00.24"W
T41	9.28	S75° 49' 58.36"W
T42	18.65	S45° 01' 48.93"W
T43	30.77	S37° 07' 39.23"W
T44	53.78	N58° 11' 13.86"W

Traverse Coordinate Table			
Traverse #	Northing	Easting	Elevation
53	587908.790	1354385.234	351.380
54	588080.780	1354566.062	355.040



**TRAVERSE POINT 54  
REBAR AND CAP  
NOT TO SCALE**

E 1354108  
N 587758

N 588158  
E 1354158

N 587758  
E 1354158

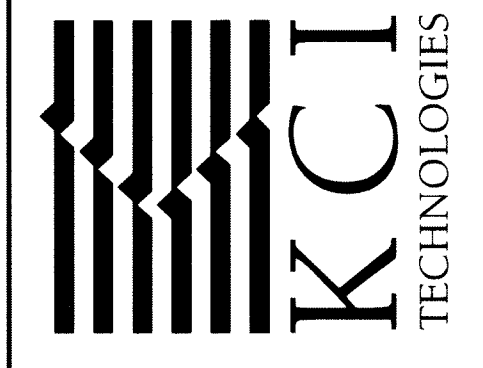
RIGHT ANGLE TIE FROM BASELINE  
OF CONSTRUCTION STA. 5+93.92  
TO TRAVERSE POINT 54  
N 64°15'16.58" W, 32.70'

STA. 6+16.70 MAINSTEM =  
STA. 20+53.78 OUTFALL

MATCH LINE A-A

NO.	REVISIONS DESCRIPTION	DATE

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SPARKS, MARYLAND 21152  
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ELMMEDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
5701 COLUMBIA CATALINA DRIVE  
COLUMBIA, MD 21046

### GEOMETRY SHEET

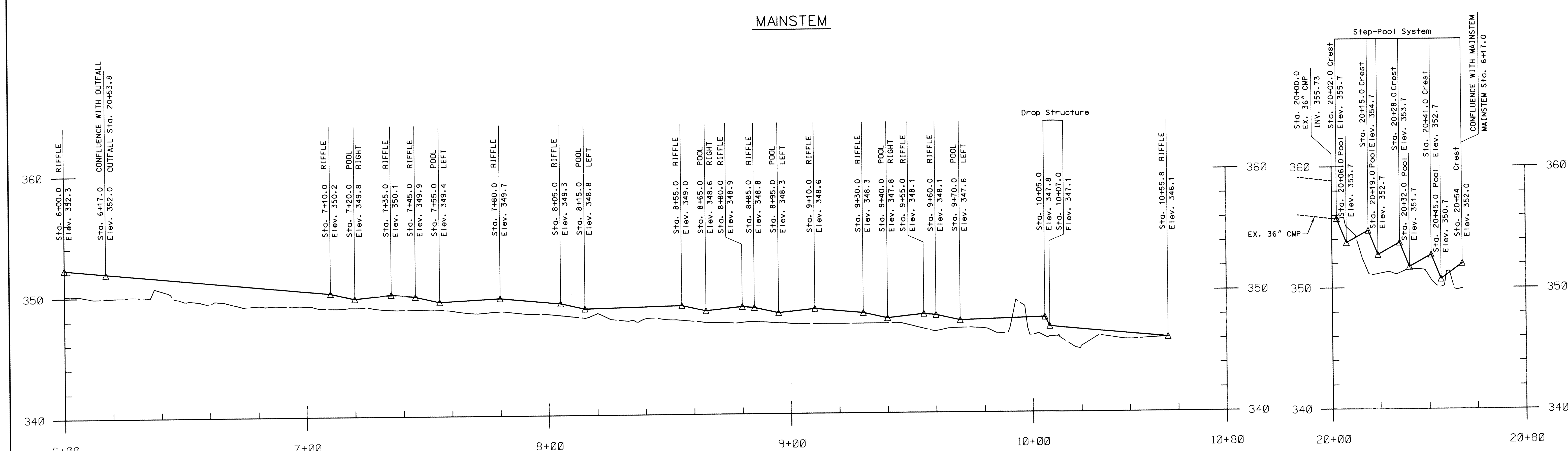
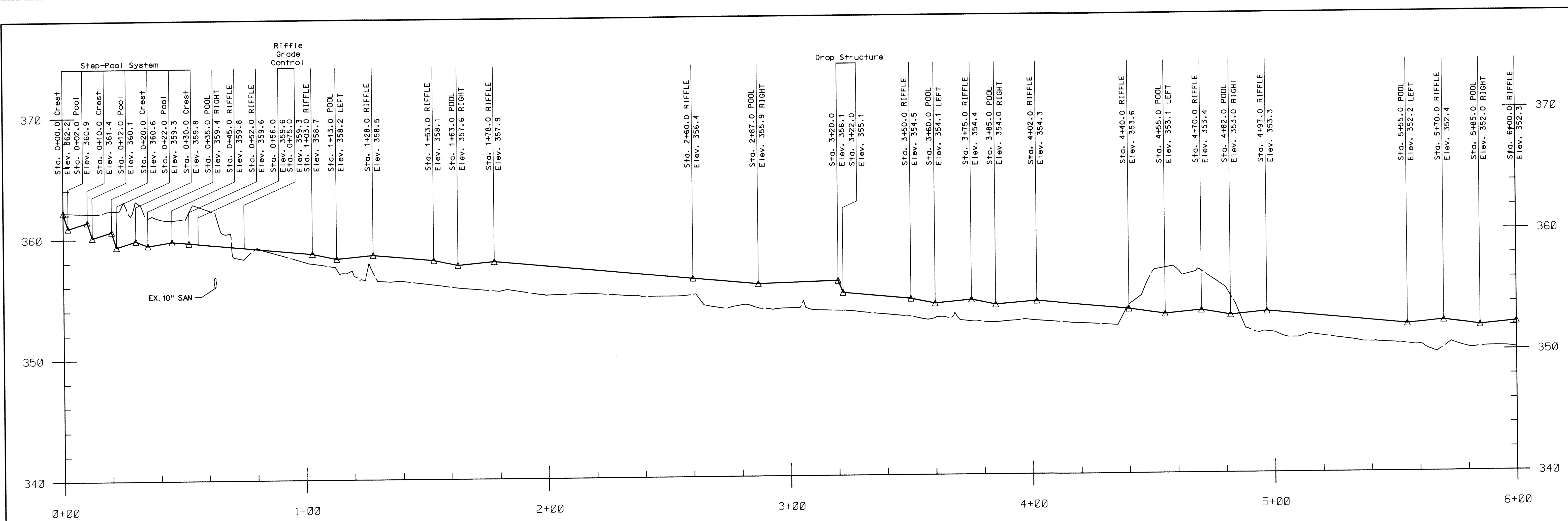
SCALE:	1" = 20'
DATE:	SEPTEMBER 2012
KCIJOB NO.:	01-081795.60
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

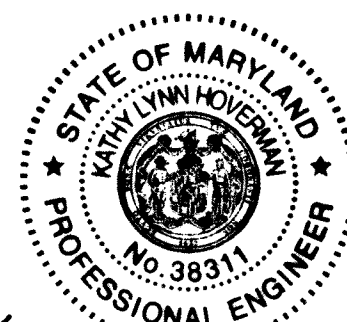


PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311. EXPIRATION DATE: JANUARY 6, 2014.

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
*Wahid R. Khan*  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 DATE: 9/27/12





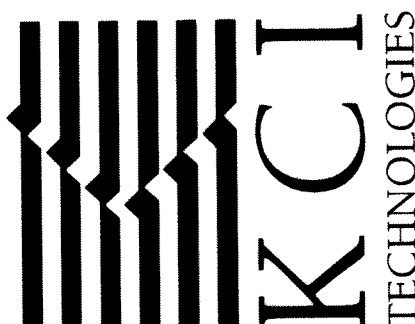

  
 ANTHONY J. KOCI
   
 PROFESSIONAL ENGINEER
   
 LICENSE NO. 38311
   
 9/27/12
   
 DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD
   
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES
   
 9/27/12
   
 DATE

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 9/27/12  
 DATE

**LEGEND**  
 EXISTING GROUND \_\_\_\_\_  
 PROPOSED GRADE \_\_\_\_\_

NO.	REVISIONS DESCRIPTION	DATE

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**KCI**  
 TECHNOLOGIES

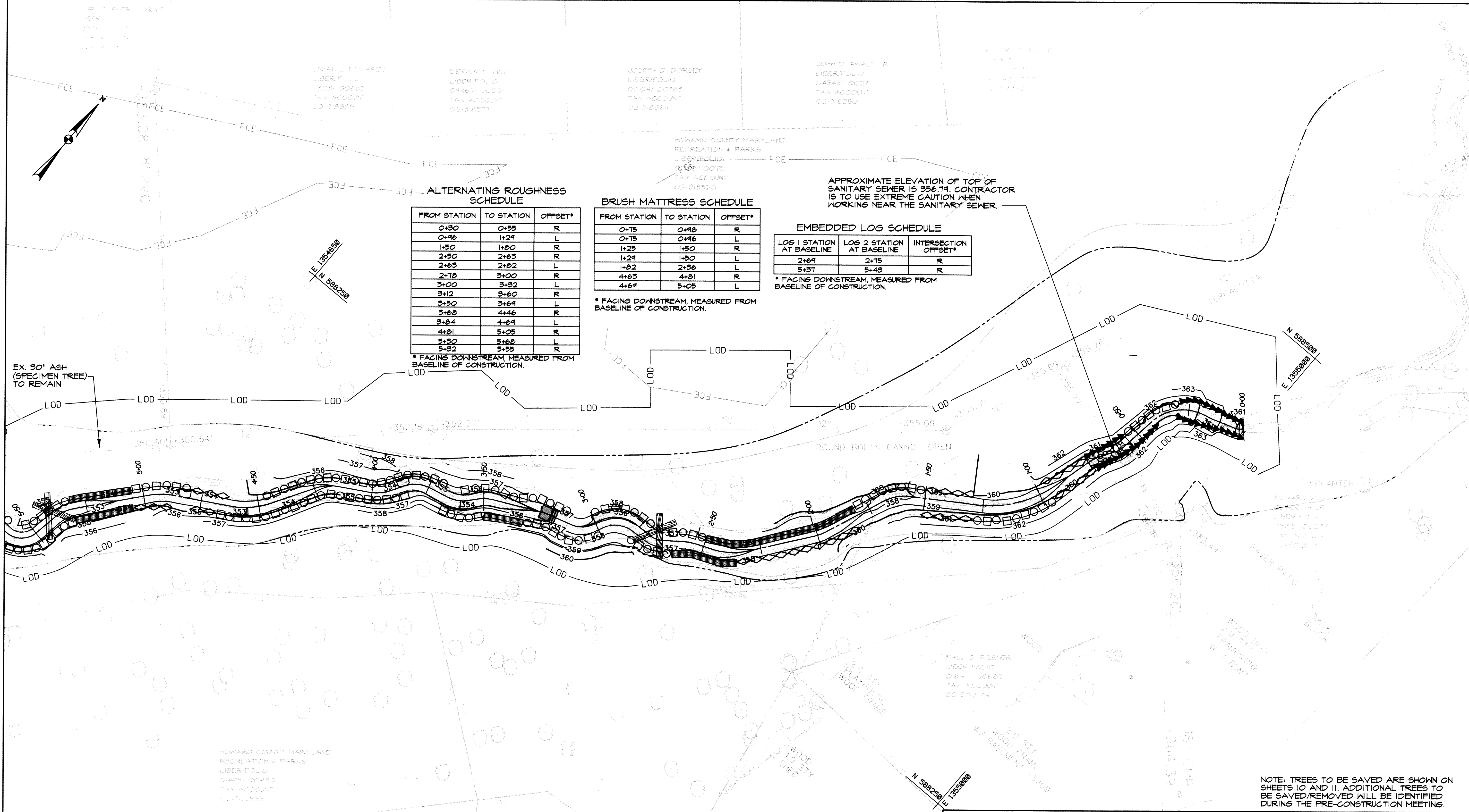
ELMMEDE ROAD  
 STREAM RESTORATION PROJECT  
 CAPITAL PROJECT D-1158  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STREAMWATER MANAGEMENT DIVISION  
 670 COLUMBIA, MD 21046

**PROFILE**

SCALE: HOR. 1" = 20'  
 VERT. 1" = 4'  
 DATE: SEPTEMBER 2012  
 KCI JOB NO.: 01-081795.60  
 CAPITAL PROJECT NO.: D-1158  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:

SHEET NO.: 4 OF 18

MATCH LINE A-A



**ALTERNATING ROUGHNESS SCHEDULE**

FROM STATION	TO STATION	OFFSET*
0+30	0+55	R
0+46	1+24	L
1+50	1+80	R
2+50	2+63	R
2+63	2+82	L
2+78	3+00	R
3+00	3+32	L
3+12	3+60	R
3+50	3+61	L
3+68	4+46	R
3+84	4+61	L
4+81	5+05	R
5+30	5+68	L
5+32	5+55	R

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**BRUSH MATTRESS SCHEDULE**

FROM STATION	TO STATION	OFFSET*
0+75	0+98	R
0+75	0+96	L
1+23	1+30	R
1+24	1+30	L
1+82	2+36	L
4+63	4+81	R
4+64	5+05	L

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**EMBEDDED LOG SCHEDULE**

LOG 1 STATION AT BASELINE	LOG 2 STATION AT BASELINE	INTERSECTION OFFSET*
2+64	2+75	R
5+37	5+43	R

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**STONE TOE PROTECTION SCHEDULE**

FROM STATION	TO STATION	OFFSET*
0+00	0+30	R
0+00	0+30	L
0+40	0+75	L
0+55	0+75	R

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**COIR LOG SCHEDULE**

FROM STATION	TO STATION	OFFSET*
1+80	2+50	R
2+36	2+63	L
3+32	3+50	L
5+05	5+32	R
5+05	5+30	L

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**RIFFLE GRADE CONTROL SCHEDULE**

FROM STATION	TO STATION
0+55	0+75

**DROP SCHEDULE**

FROM STATION	TO STATION
3+20	3+25

**MAINSTEM STEP-POOL SCHEDULE**

STATION	FEATURE
0+00	CREST
0+02	POOL
0+10	CREST
0+12	POOL
0+20	CREST
0+22	POOL
0+30	CREST

**LEGEND**

LIMIT OF DISTURBANCE — LOD —  
 EXISTING CONTOUR — 360 —  
 PROPOSED CONTOUR — 360 —  
 EXISTING PROPERTY LINE — —  
 EXISTING SANITARY SEWER LINE — —  
 EXISTING SANITARY MANHOLE — —  
 EXISTING STORM DRAIN — —  
 EXISTING STORM DRAIN MANHOLE — —  
 EASEMENT LINE — —  
 WATERS OF THE US — WUS —  
 WETLAND LINE — —  
 EXISTING 100-YR FLOODPLAIN — —  
 PROPOSED 100-YR FLOODPLAIN — —

EXISTING TREE LINE  
 EXISTING TREE  
 DROP STRUCTURE  
 RIFFLE GRADE CONTROL  
 EMBEDDED LOG  
 STONE TOE PROTECTION  
 ALTERNATING ROUGHNESS  
 BRUSH MATTRESS WITH COIR LOG  
 COIR LOG  
 FOREST CONSERVATION EASEMENT

ROUND BOLTS CANNOT OPEN

WOOD DECK 10'x10' FRAMEWORK W/ 6x8 SILL

WOOD SHED

WOOD 20'x20' PLATFMD W/ WOOD FRAME

WOOD 20'x20' PLATFMD W/ BASEMENT 13209

WOOD 18'x18' CABIN

WOOD 18'x18' CABIN

WOOD 18'x18' CABIN

WOOD 18'x18' CABIN

WOOD 18'x18' CABIN

WOOD 18'x18' CABIN

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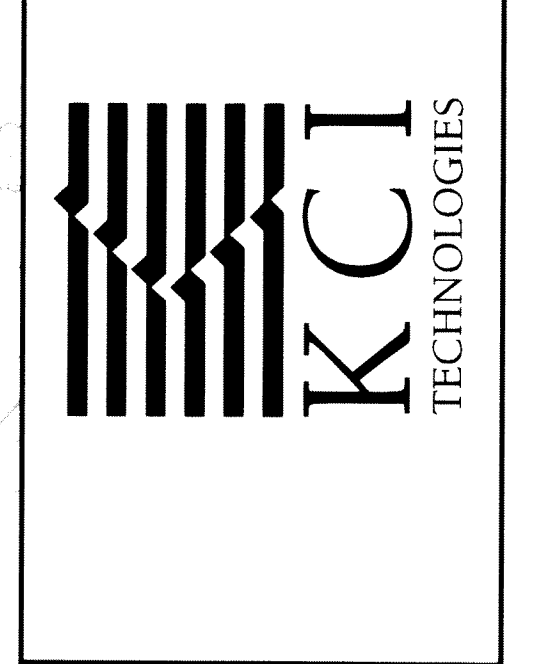
WOOD 18'x18' CABIN

WOOD 18'x18' CABIN

NOTE: TREES TO BE SAVED ARE SHOWN ON SHEETS 10 AND 11. ADDITIONAL TREES TO BE SAVED/REMOVED WILL BE IDENTIFIED DURING THE PRE-CONSTRUCTION MEETING.

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
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ELMMEDE ROAD  
 STREAM RESTORATION PROJECT  
 CAPITAL PROJECT D-1158  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STREAMWATER MANAGEMENT DIVISION  
 6701 COLUMBIA RD. SUITE 200  
 COLUMBIA, MD 21046

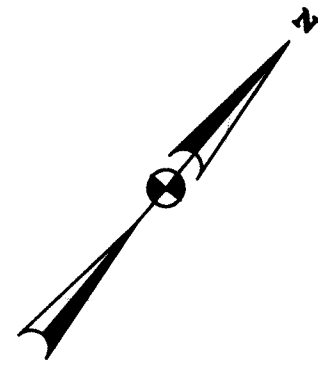
**GRADING PLAN**

SCALE: 1" = 20'  
 DATE: SEPTEMBER 2012  
 JOB NO.: 01-081795.60  
 CAPITAL PROJECT NO.: D-1158  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:

STATE OF MARYLAND  
 PROFESSIONAL ENGINEER  
 LICENSE NO. 38311  
 EXPIRATION DATE: JANUARY 6, 2014  
 9/27/12

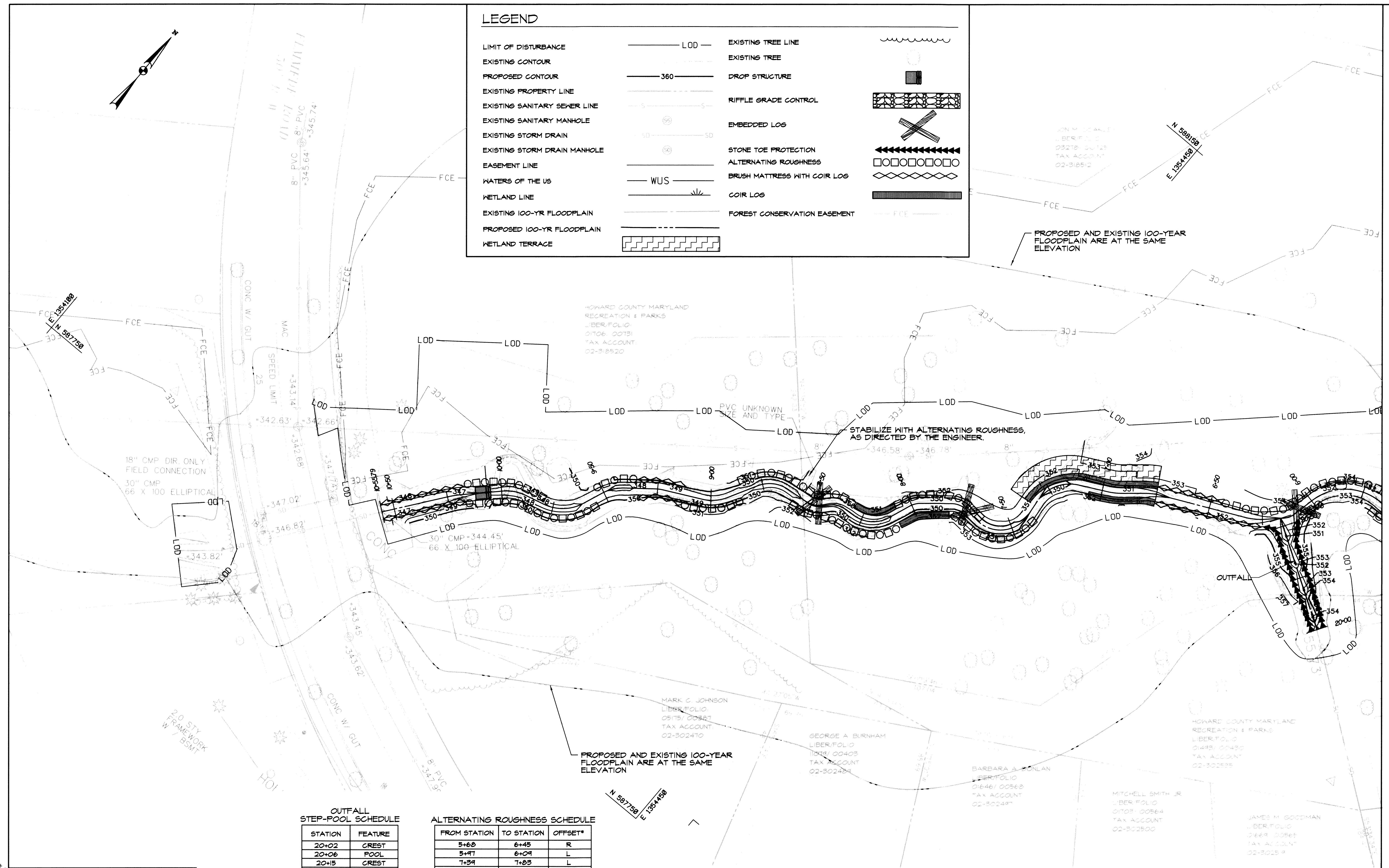
DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 DATE: 9/27/12





**LEGEND**

LIMIT OF DISTURBANCE	LOD	EXISTING TREE LINE	
EXISTING CONTOUR		EXISTING TREE	
PROPOSED CONTOUR	360	DROP STRUCTURE	
EXISTING PROPERTY LINE		RIFFLE GRADE CONTROL	
EXISTING SANITARY SEWER LINE		EMBEDDED LOG	
EXISTING SANITARY MANHOLE		STONE TOE PROTECTION	
EXISTING STORM DRAIN		ALTERNATING ROUGHNESS	
EXISTING STORM DRAIN MANHOLE		BRUSH MATTRESS WITH COIR LOG	
EASEMENT LINE		COIR LOG	
WATERS OF THE US	WUS	FOREST CONSERVATION EASEMENT	
WETLAND LINE			
EXISTING 100-YR FLOODPLAIN			
PROPOSED 100-YR FLOODPLAIN			
WETLAND TERRACE			



MATCH LINE A-A

**OUTFALL STEP-POOL SCHEDULE**

STATION	FEATURE
20+02	CREST
20+06	POOL
20+15	CREST
20+19	POOL
20+28	CREST
20+32	POOL
20+41	CREST
20+45	POOL
20+54	CREST

**ALTERNATING ROUGHNESS SCHEDULE**

FROM STATION	TO STATION	OFFSET*
5+60	6+45	R
5+47	6+09	L
7+34	7+83	L
7+65	8+06	R
8+08	8+60	L
8+31	8+85	R
8+85	9+13	L
9+34	9+53	R
9+55	10+15	L
9+80	10+15	R

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**EMBEDDED LOG SCHEDULE**

LOG 1 STATION AT BASELINE	LOG 2 STATION AT BASELINE	INTERSECTION OFFSET*
6+06	6+09	R
7+72	7+75	L
8+46	8+51	R

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**COIR LOGS SCHEDULE**

FROM STATION	TO STATION	OFFSET*
6+75	7+32	R
6+75	7+06	L
7+83	8+08	L
8+06	8+31	R

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**BRUSH MATTRESS SCHEDULE**

FROM STATION	TO STATION	OFFSET*
6+25	6+75	L
6+45	6+75	R
9+13	9+34	R
9+13	9+34	L
10+15	10+56	R
10+15	10+56	L

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**STONE TOE PROTECTION SCHEDULE**

FROM STATION	TO STATION	OFFSET*
20+00	20+40	R
20+00	20+40	L

\* FACING DOWNSTREAM, MEASURED FROM BASELINE OF CONSTRUCTION.

**DROP SCHEDULE**

FROM STATION	TO STATION
10+05	10+10

STATE OF MARYLAND  
MARTIN W. JOHNSON  
PROFESSIONAL ENGINEER  
NO. 38311

9/27/12

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 DATE: 9/27/12

NOTE: TREES TO BE SAVED ARE SHOWN ON SHEETS 10 AND 11. ADDITIONAL TREES TO BE SAVED/REMOVED WILL BE IDENTIFIED DURING THE PRE-CONSTRUCTION MEETING.

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
 SPARKS, MARYLAND 21152  
 TELEPHONE: (410) 316-7800  
 FAX: (410) 316-7818  
 www.kci.com

**KCI**  
 TECHNOLOGIES

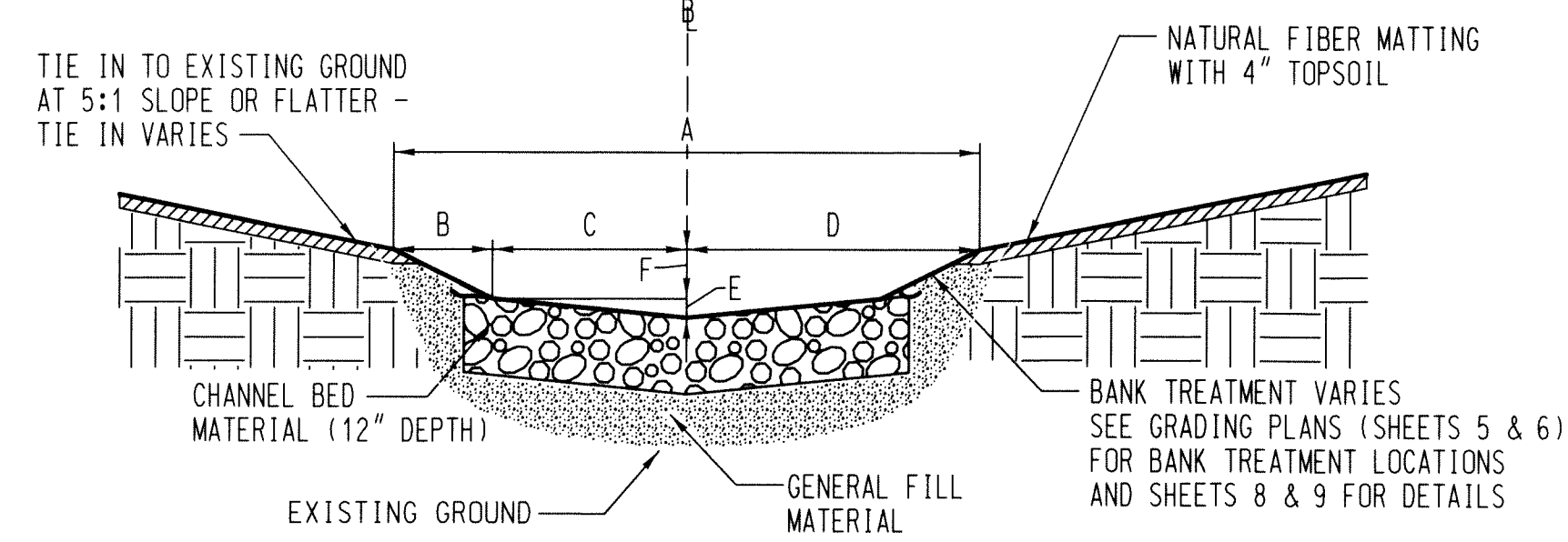
ELMDEE ROAD  
 STREAM RESTORATION PROJECT  
 CAPITAL PROJECT D-1158

HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 ENVIRONMENTAL MANAGEMENT DIVISION  
 675 COLUMBIA, MD 21046

**GRADING PLAN**

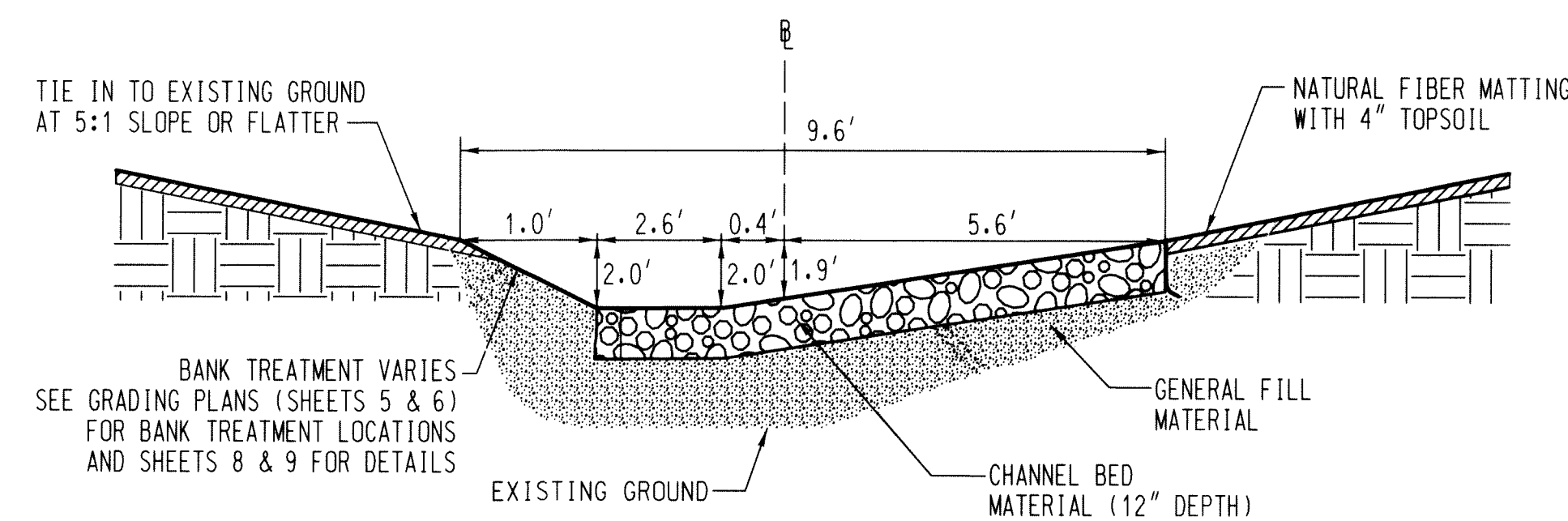
SCALE: 1" = 20'  
 DATE: SEPTEMBER 2012  
 KCIJOB NO.: 01-081795.60  
 CAPITAL PROJECT NO.: D-1158  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:

SHEET NO.: 6 OF 18



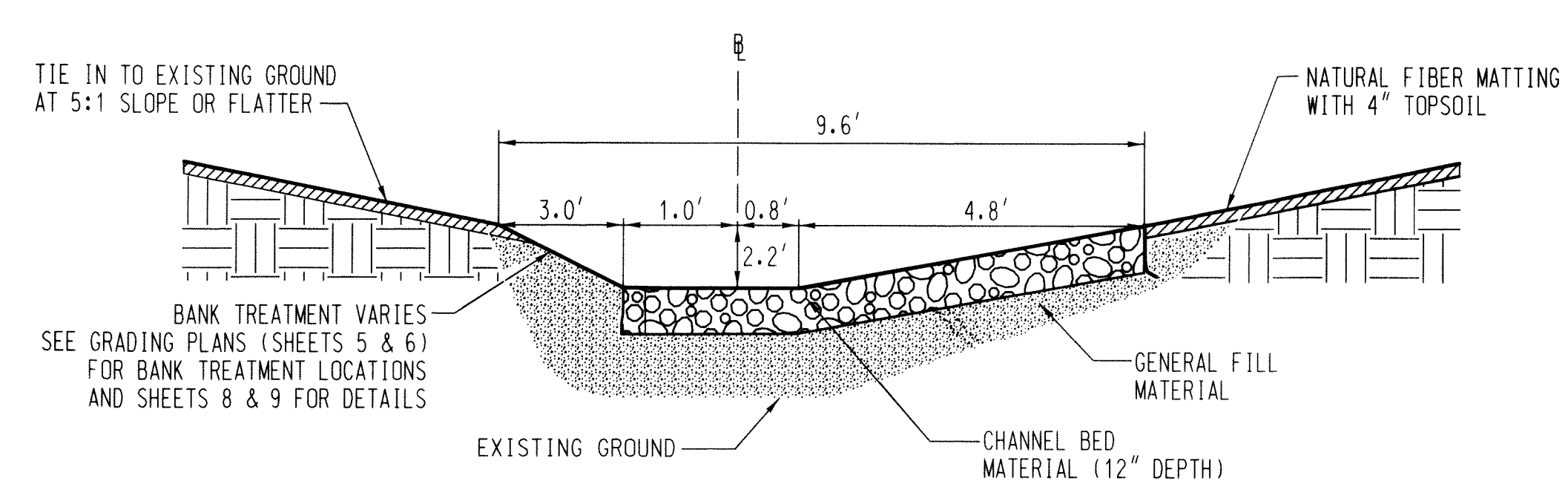
FROM STATION	TO STATION	A	B	C	D	E	F
0+45	5+70	8.0'	1.2'	2.8'	4.0'	0.3'	1.2'
6+00	10+55.8	8.0'	1.5'	2.5'	4.0'	0.3'	1.5'

TYPICAL SECTION - RIFFLE  
NOT TO SCALE



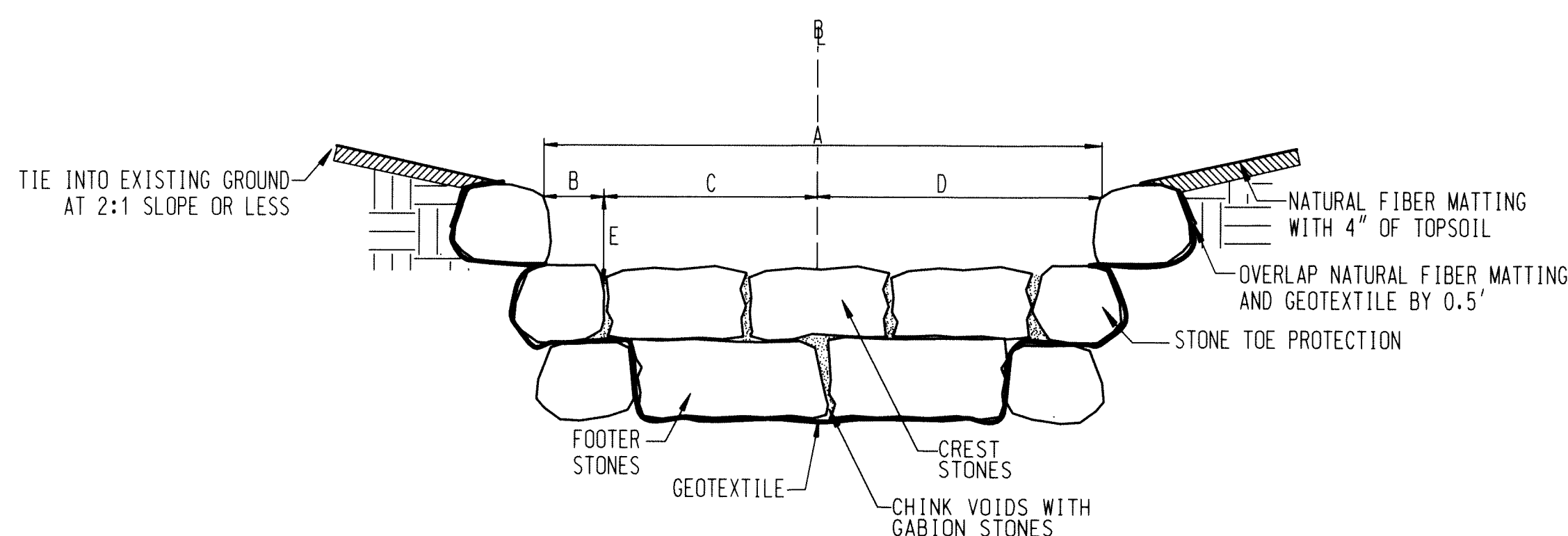
NOTE: POOL RIGHT IS A MIRROR IMAGE OF POOL LEFT.

TYPICAL SECTION - POOL LEFT (STATIONS 0+00 TO 5+85)  
NOT TO SCALE



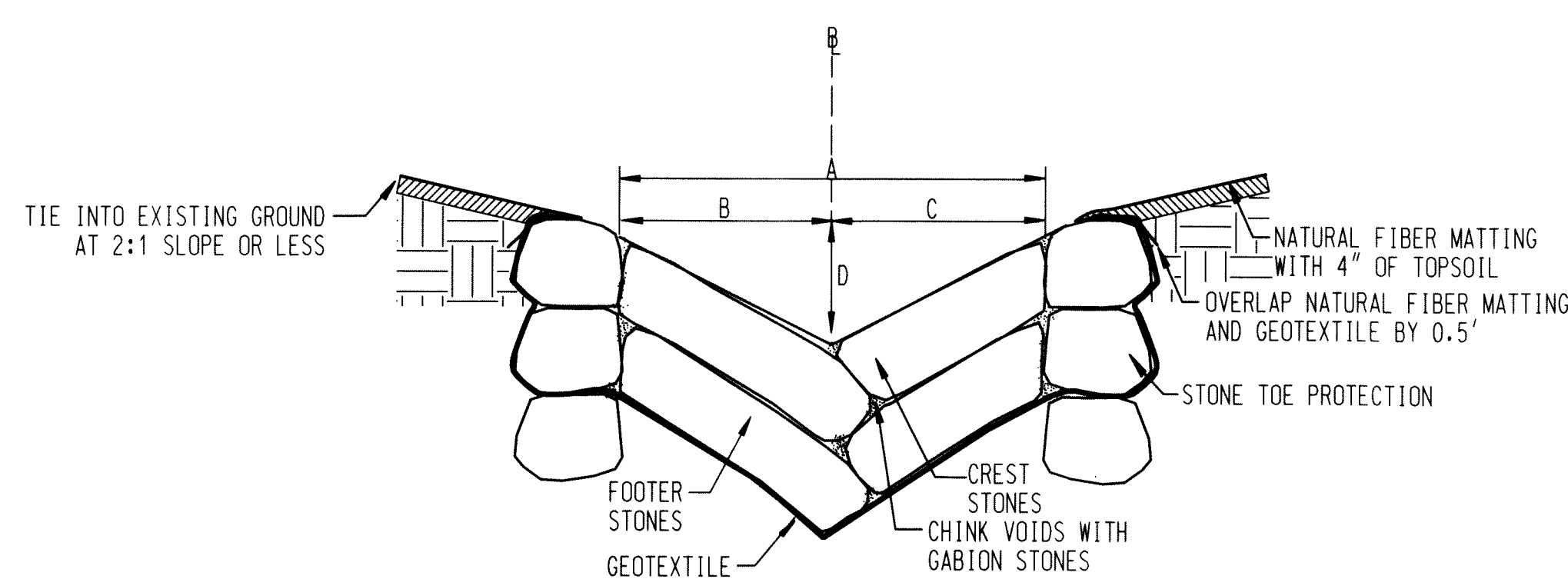
NOTE: POOL RIGHT IS A MIRROR IMAGE OF POOL LEFT.

TYPICAL SECTION - POOL LEFT (STATIONS 6+00 TO 10+56)  
NOT TO SCALE



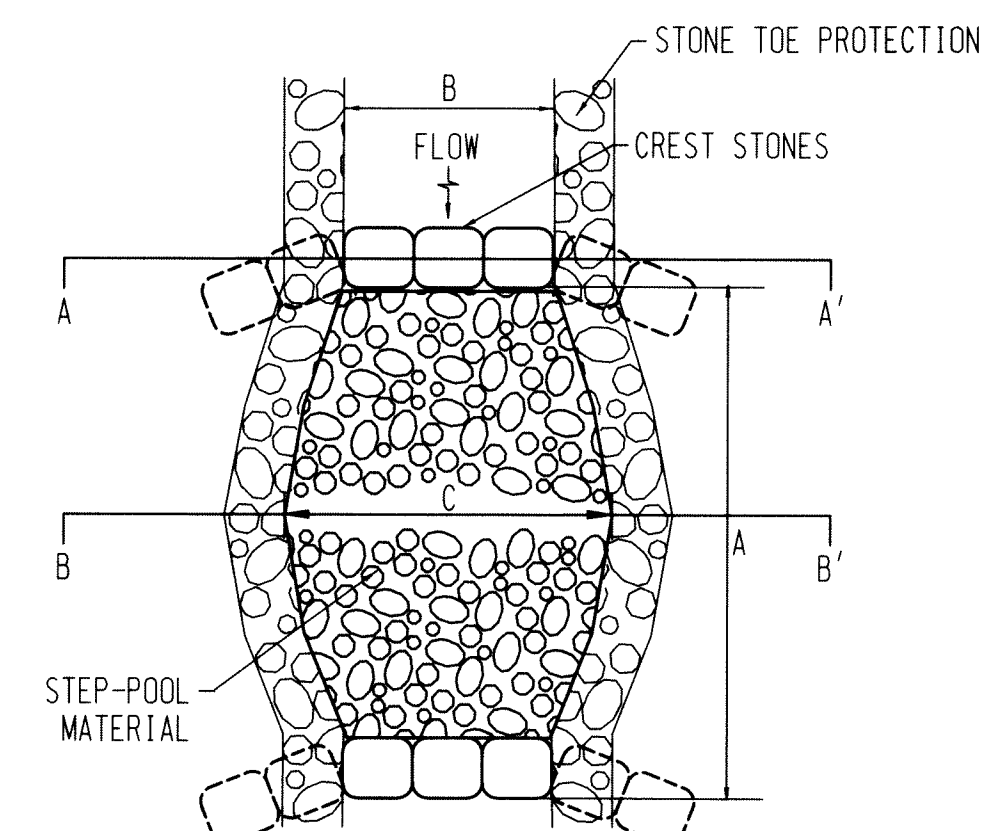
STATION	A	B	C	D	E
0+00	5.0'	1.5'	1.0'	2.5'	1.5'
0+10					
0+20	8.0'	1.2'	2.8'	4.0'	1.5'
0+30					

STEP-POOL CREST (MAINSTEM CHANNEL) A-A'  
NOT TO SCALE



STATION	A	B	C	D
20+02				
20+15				
20+28	4.0'	2.0'	2.0'	0.7'
20+41				
20+56				

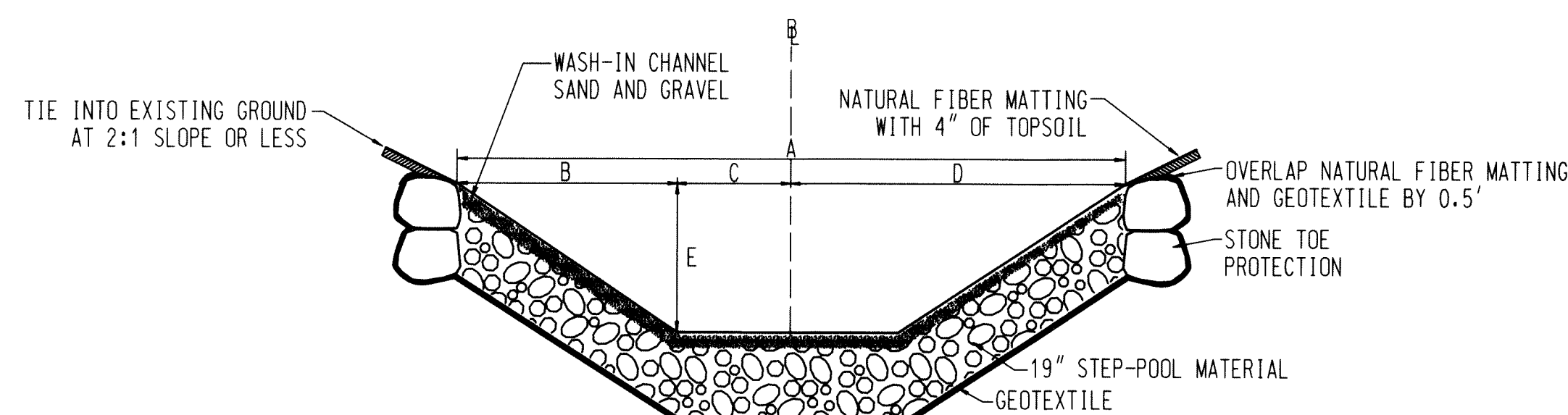
STEP-POOL CREST (OUTFALL CHANNEL) A-A'  
NOT TO SCALE



NOTE: WASH IN CHANNEL SAND & GRAVEL TO FILL VOID SPACE OF POOL PAVEMENT

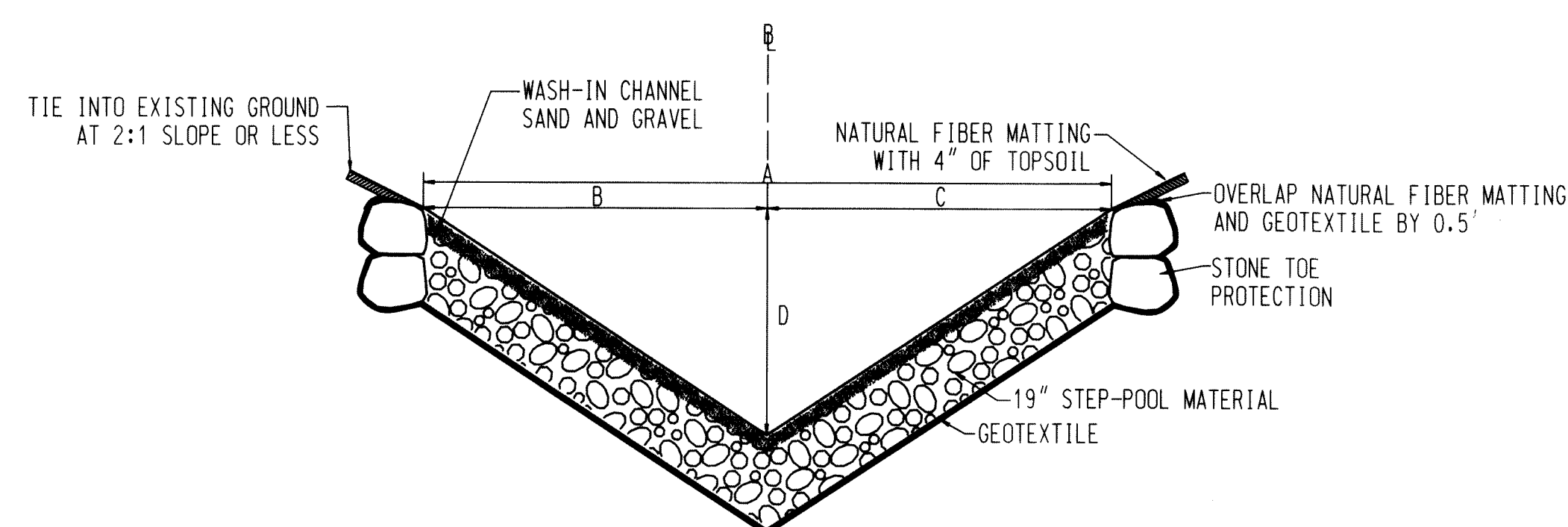
LOCATION	FROM STATION	TO STATION	A	B	C
MAINSTEM	0+00	0+09	10.0'	2.0'	4.0'
MAINSTEM	0+10	0+30	10.0'	5.6'	7.0'
OUTFALL	20+02	20+54	10.5'	4.0'	7.0'

TYPICAL PLAN VIEW OF STEP-POOL  
NOT TO SCALE



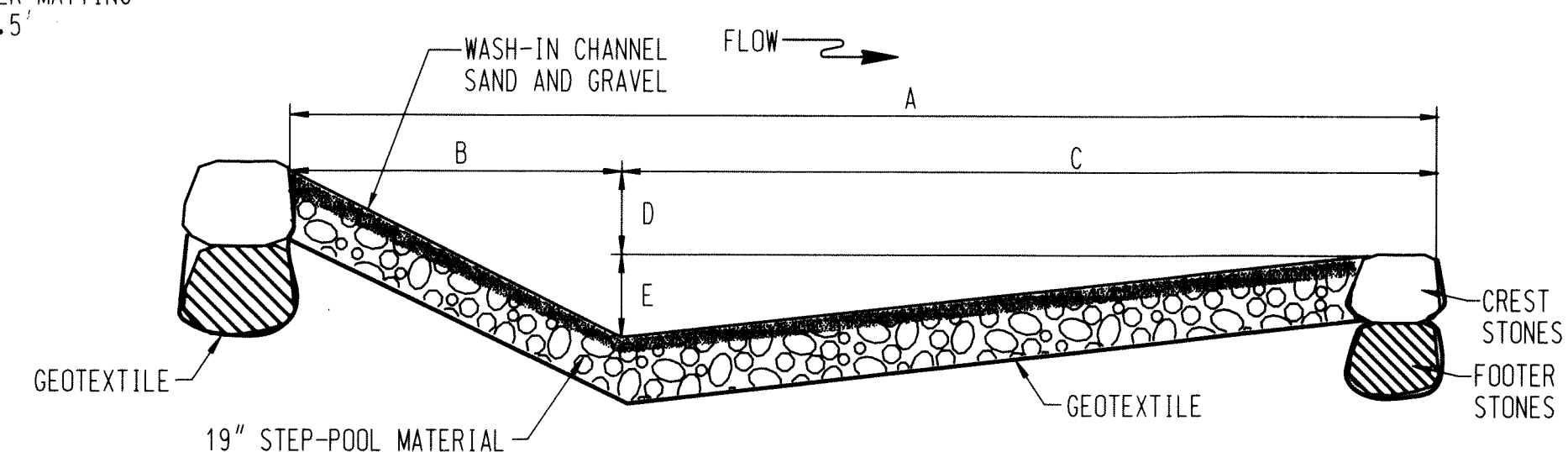
STATION	A	B	C	D	E
0+02	9.2'	2.6'	2.0'	4.6'	2.6'
0+12					
0+22	12.2'	2.6'	3.5'	6.1'	2.6'

STEP-POOL (MAINSTEM CHANNEL) B-B'  
NOT TO SCALE



STATION	A	B	C	D
20+06				
20+19				
20+45	7.0'	3.5'	3.5'	2.3'
20+52				

STEP-POOL (OUTFALL CHANNEL) B-B'  
NOT TO SCALE

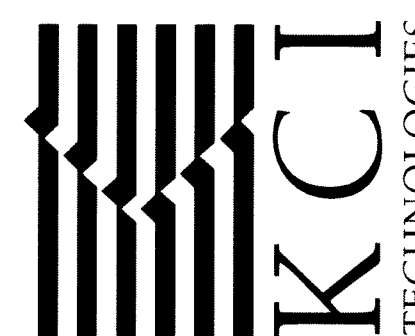


LOCATION	FROM STATION	TO STATION	A	B	C	D	E
MAINSTEM	0+00	0+30	10.0'	2.0'	8.0'	0.8'	0.5'
OUTFALL	20+02	20+54	10.5'	4.0'	6.5'	1.0'	1.0'

TYPICAL PROFILE THROUGH STEP-POOL  
NOT TO SCALE

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
www.kci.com



ELMDEE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158

STREAM  
DETAILS

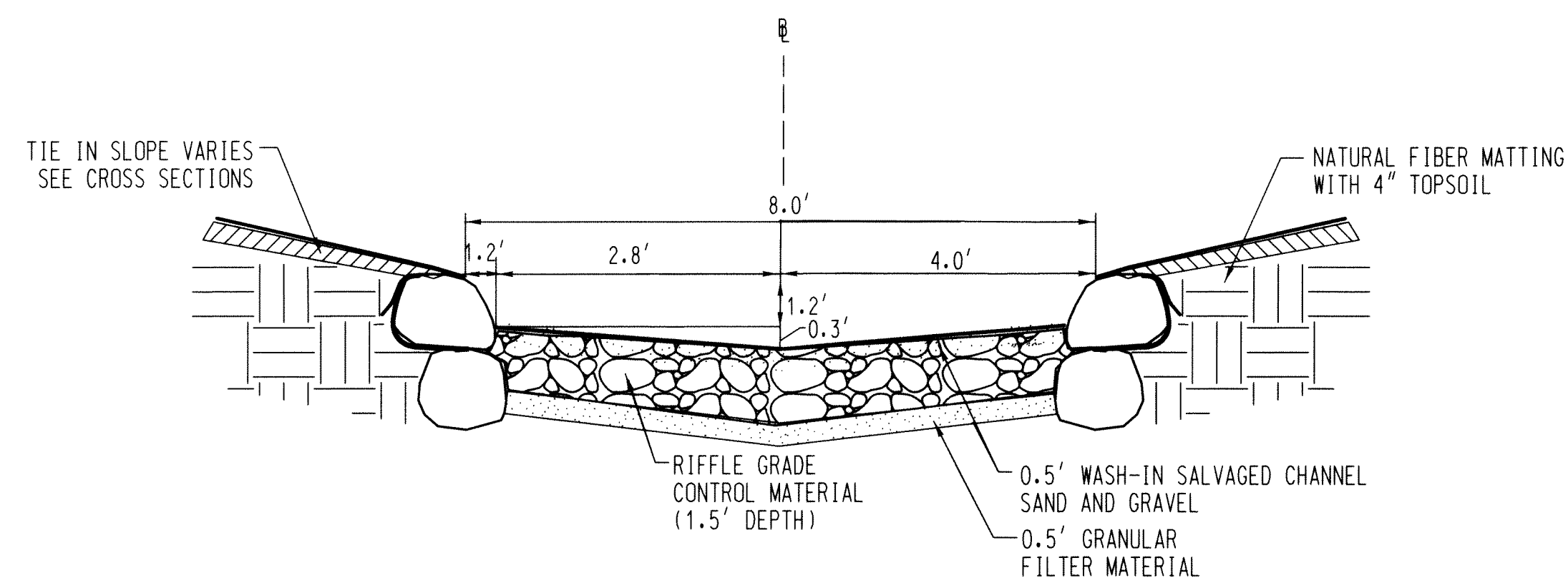
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DATE:	SEPTEMBER 2012
KCI JOB NO.:	01-081795.60
CAPITAL PROJECT NO.:	D-1158
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	

BY: Elizabeth Spencer, Division P050, Natural Resources Emp. FILE: M32008\01081795.60.dwg, 11/27/12, 10:41 AM

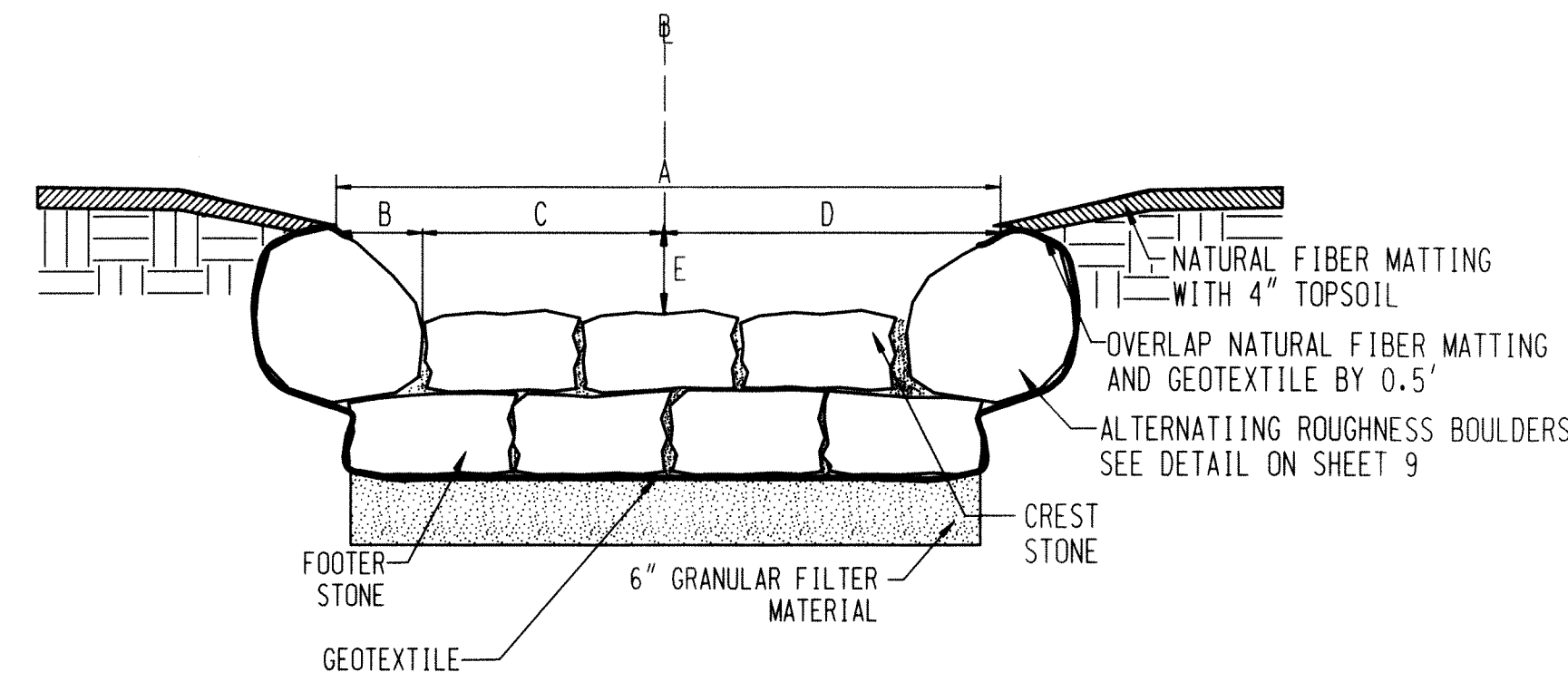
PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311. EXPIRATION DATE: JANUARY 6, 2014

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
DATE: 9/27/12



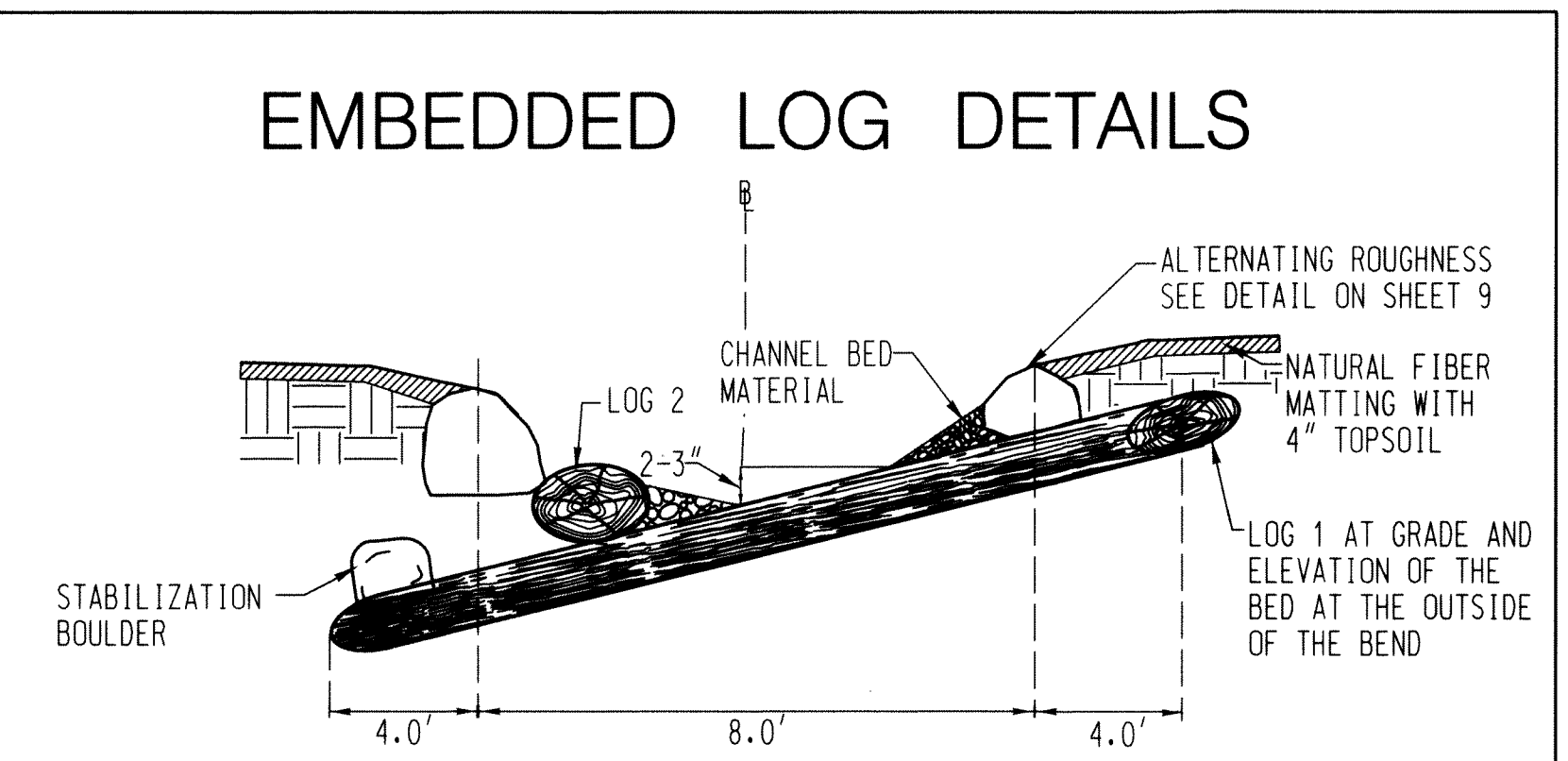


**RIFFLE GRADE CONTROL CROSS SECTION**  
NOT TO SCALE

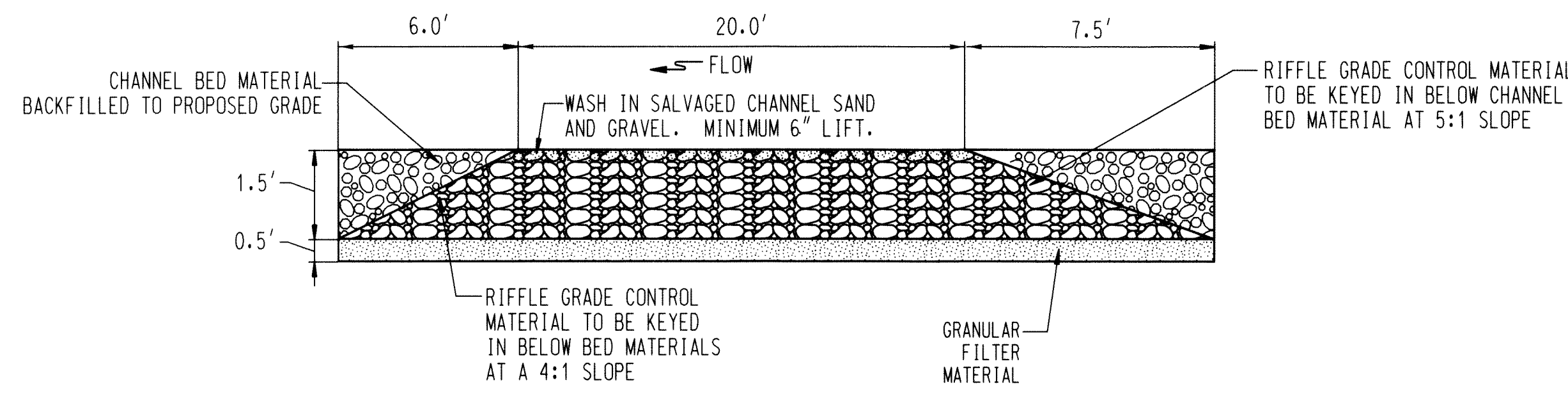


STATION	A	B	C	D	E
3+20	8.0'	1.2'	2.8'	4.0'	1.5'
10+05	8.0'	1.5'	2.5'	4.0'	1.8'

**DROP STRUCTURE CROSS SECTION**  
NOT TO SCALE

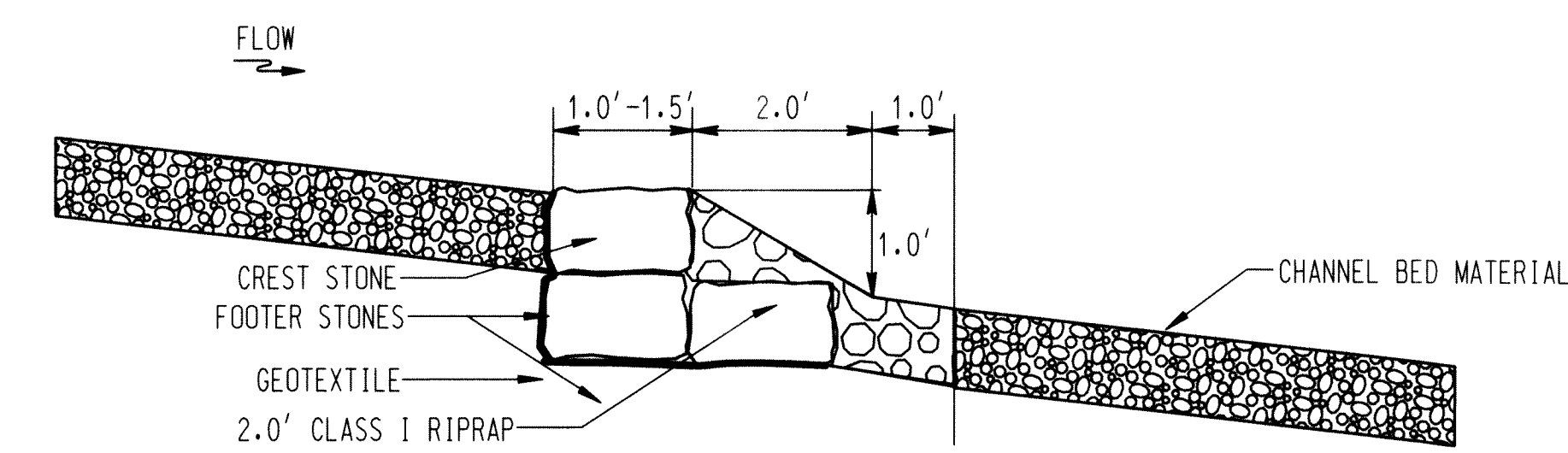


**CROSS SECTION VIEW A-A'**  
NOT TO SCALE

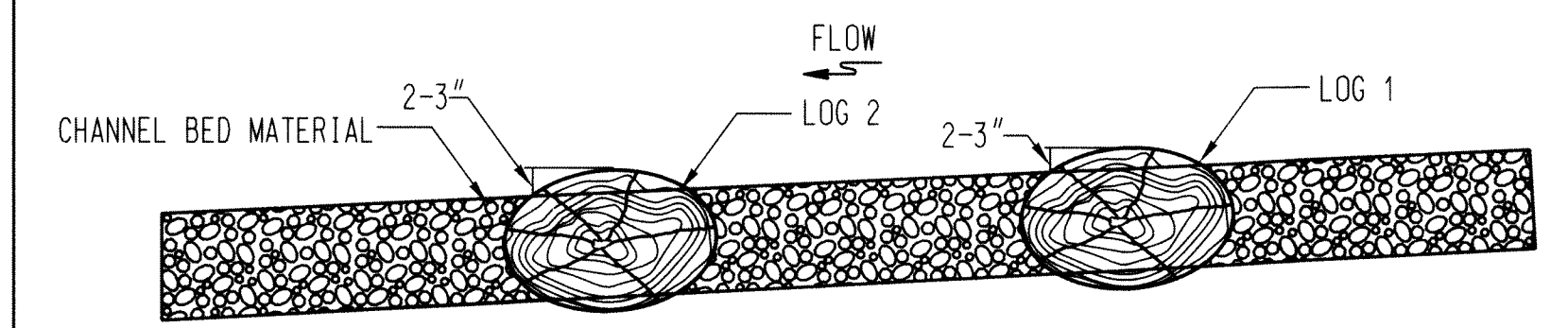


NOTES: 1. ALL RIFFLE GRADE CONTROL STRUCTURES SHALL BE CONSTRUCTED FROM DOWNSTREAM TO UPSTREAM  
2. THE RIFFLE GRADE CONTROL MATERIAL SHALL BE PLACED TO ITS FULL DEPTH MOVING FROM ONE BANK TO THE OPPOSING BANK.

**TYPICAL RIFFLE GRADE CONTROL PROFILE**  
NOT TO SCALE



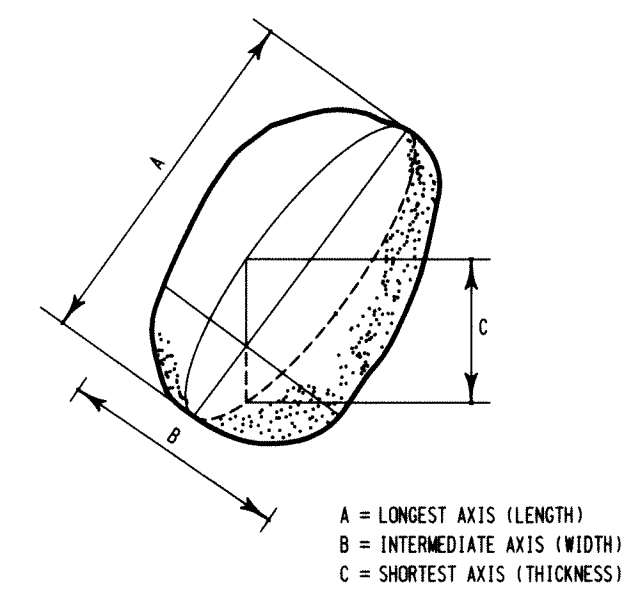
**DROP STRUCTURE PROFILE**  
NOT TO SCALE



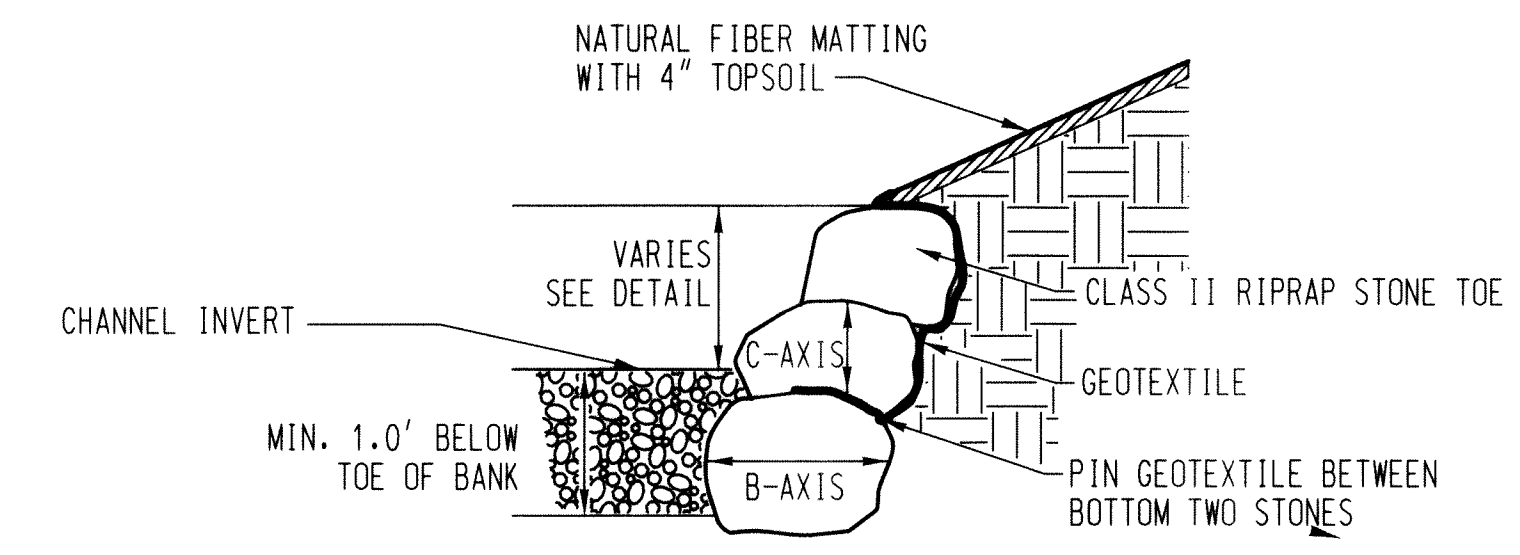
**PROFILE VIEW B-B'**  
NOT TO SCALE

SIZES FOR STONE TYPES			
AXIS	A (LONGEST)	B (INTERMEDIATE)	C (SHORTEST)
STONE TYPE	MAX.	RANGE	MIN.
STABILIZATION BOULDER	3.0'	2.0'	2.0'
CREST AND FOOTER STONES*	3.8'	1.0' - 1.5'	0.7'
ROUGHNESS STONE	3.0'	2.0'	2.0'
STONE TOE PROTECTION	CLASS II RIPRAP		
STEP-POOL MATERIAL (FOR OUTFALL)	MIX OF 30% GABION STONE AND 70% CLASS I		
STEP-POOL MATERIAL (FOR MAINSTEM)	RIFFLE GRADE CONTROL MATERIAL		

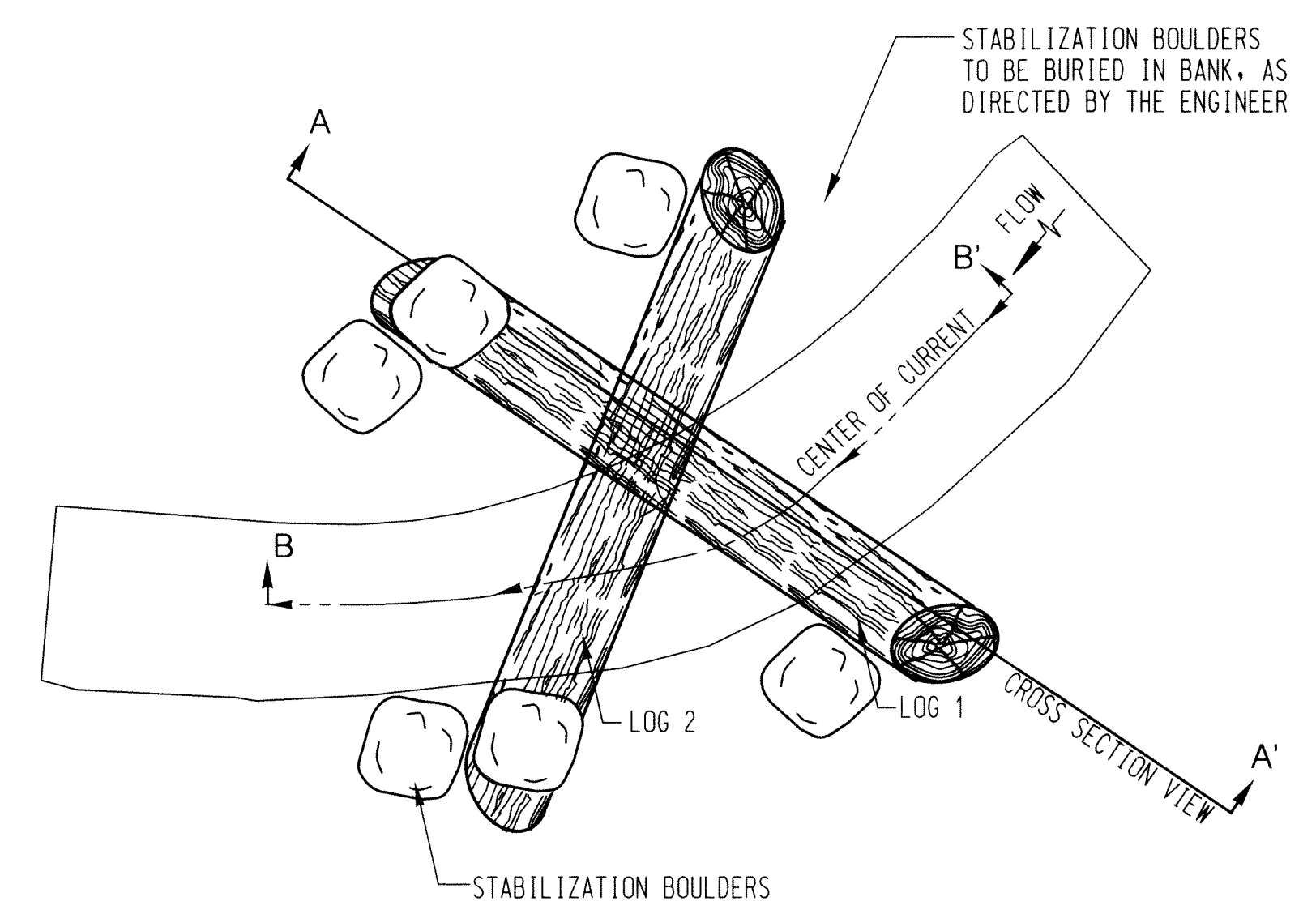
\*CREST AND FOOTER STONES SHALL BE BLOCKY IN SHAPE AND GREY OR BROWN IN COLOR.



**ROCK AXIS DEFINITION**  
NOT TO SCALE



**TYPICAL STONE TOE PROTECTION DETAIL**  
NOT TO SCALE



NOTE: PLACE ALTERNATING ROUGHNESS, AS SPECIFIED ON DETAIL ON SHEET 9 AT LOCATIONS SPECIFIED ON SHEETS 5 - 6. EMBEDDED LOGS SHALL CONSIST OF SALVAGED MATERIAL FROM CLEARING ACTIVITIES AND SHALL BE APPROVED BY THE ENGINEER. THE ENGINEER SHALL BE PRESENT FOR THE CONSTRUCTION AND PLACEMENT OF THE EMBEDDED LOGS.

**LOG DETAIL PLAN VIEW**  
NOT TO SCALE

RIFFLE GRADE CONTROL MATERIAL	
% LESS THAN	US STD SIEVE
100	9.4 in
84	7.2 in
60	5.6 in
50	4.7 in
30	3.1 in
10	0.9 in

NOTE: RIFFLE GRADE CONTROL MATERIAL SHALL NOT BE COMPRISED OF RIPRAP BUT OF A NATURAL STREAM MATERIAL.

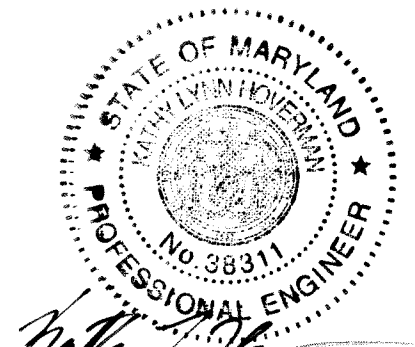
CHANNEL SAND & GRAVEL & GRANULAR FILTER MATERIAL	
% LESS THAN	US STD SIEVE
100	2.5 in
85-100	1.0 in
60-100	0.5 in
35-70	No. 10
20-50	No. 40
3-20	No. 200

NOTE: WASH IN CHANNEL SAND AND GRAVEL, AS SPECIFIED BY THE ENGINEER, WHEN PLACING CHANNEL BED MATERIAL.

CHANNEL BED MATERIAL	
% LESS THAN	US STD SIEVE
100	5.6 in
84	4.7 in
60	3.2 in
50	2.8 in
30	2.0 in
10	0.6 in

NOTE: CHANNEL BED MATERIAL SHALL BE SALVAGED WHEN POSSIBLE. ONLY FURNISH CHANNEL BED MATERIAL WHEN SALVAGED MATERIAL IS NOT AVAILABLE. MATERIAL SHALL NOT BE COMPRISED OF RIPRAP BUT OF A NATURAL STREAM MATERIAL.

PROFESSIONAL CERTIFICATION. 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 NO. 38311, EXPIRATION DATE: JANUARY 6, 2014



DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 Elizabeth Spencer  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 9/27/12  
 DATE

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
 SPARKS, MARYLAND 21152  
 TELEPHONE: (410) 316-7800  
 FAX: (410) 316-7818  
 www.kci.com

**KCI**  
 TECHNOLOGIES

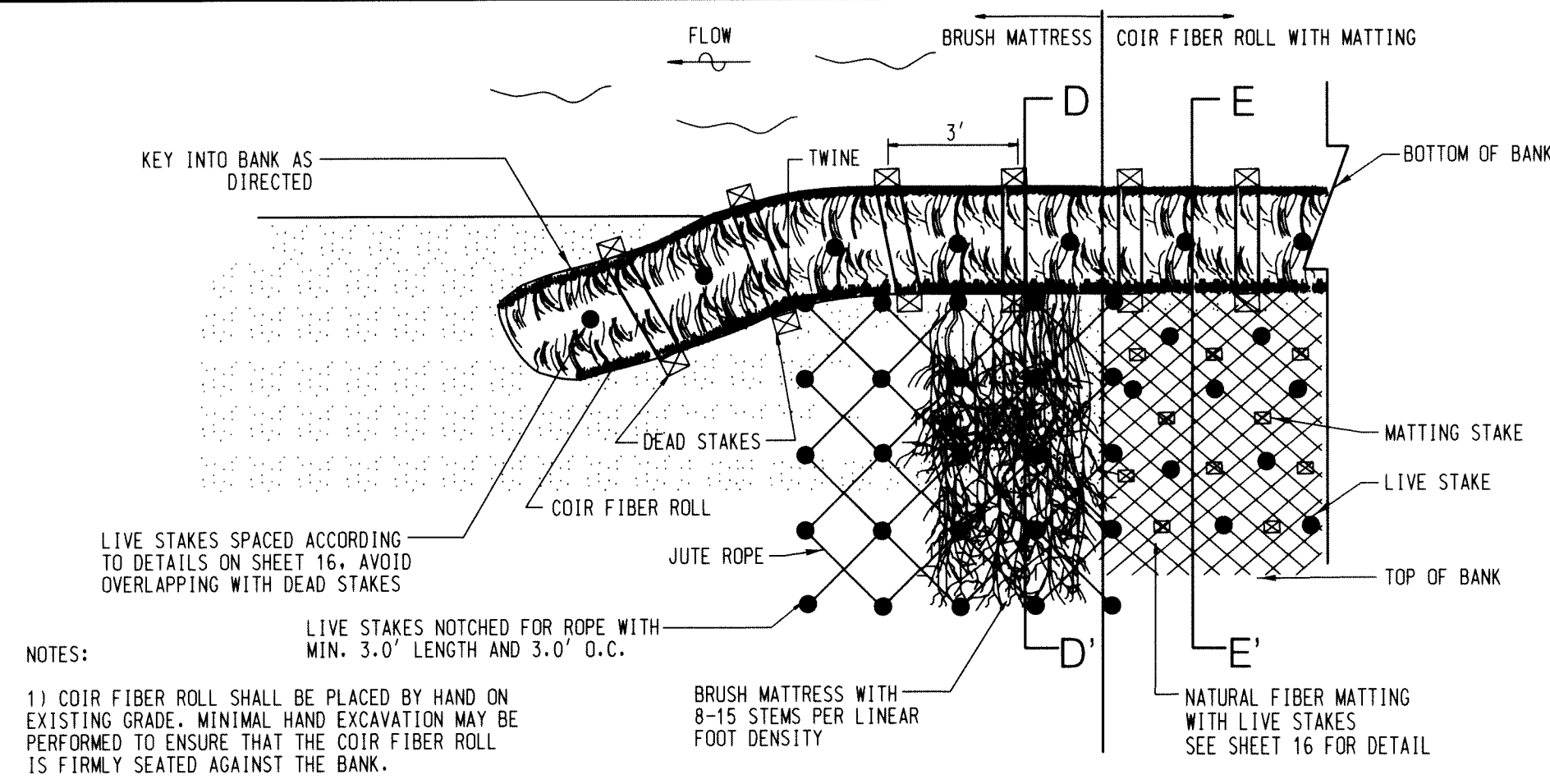
ELMDEE ROAD  
 STREAM RESTORATION PROJECT  
 CAPITAL PROJECT D-1158  
 HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 STORMWATER MANAGEMENT DIVISION  
 8150 COLUMBIA PIKE  
 COLUMBIA, MD 21046

**STREAM DETAILS**

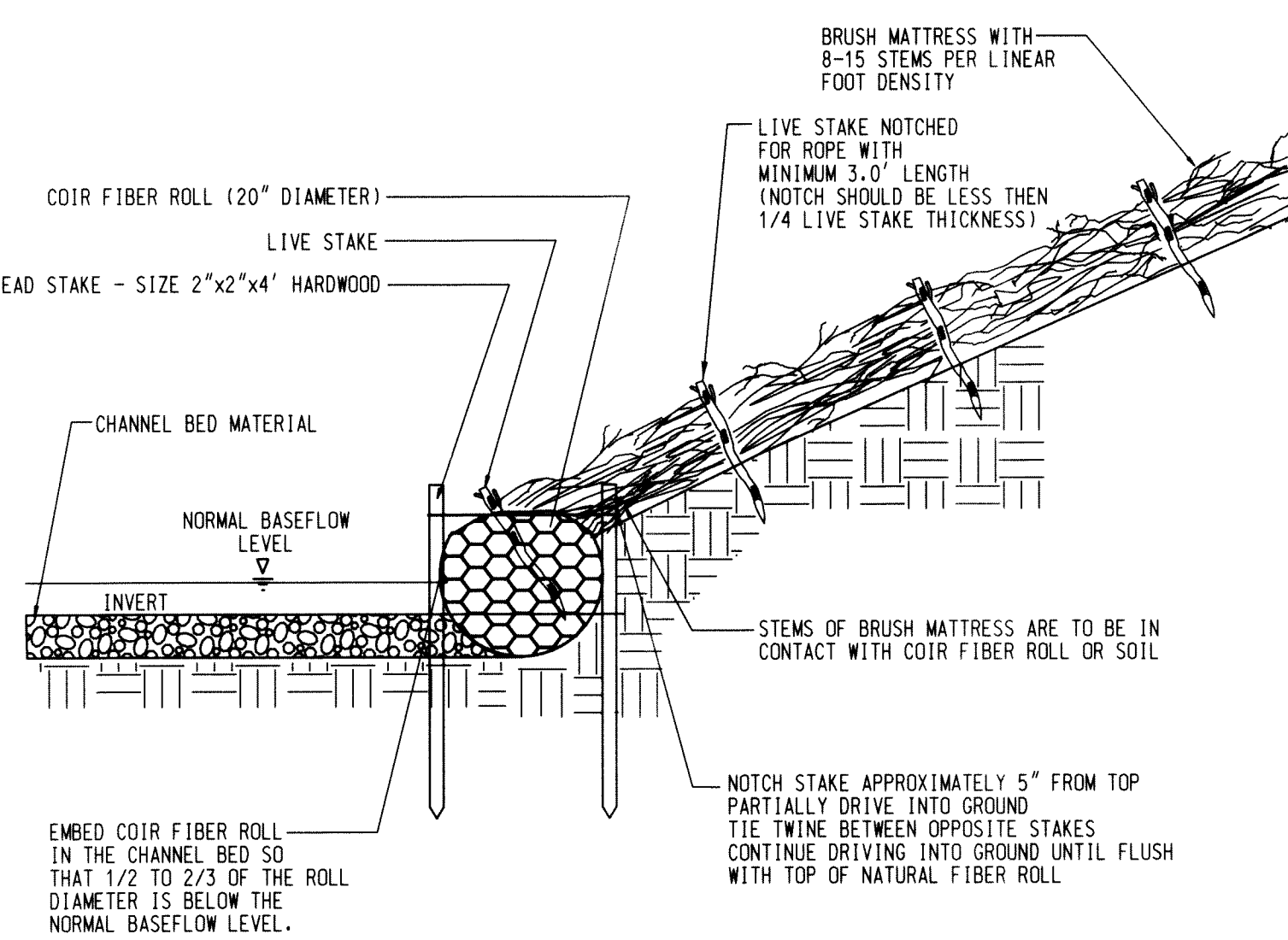
SCALE: NTS  
 DATE: SEPTEMBER 2012  
 KCI JOB NO.: 01-081795.60  
 CAPITAL PROJECT NO.: D-1158  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:

SHEET NO.: 8 OF 18

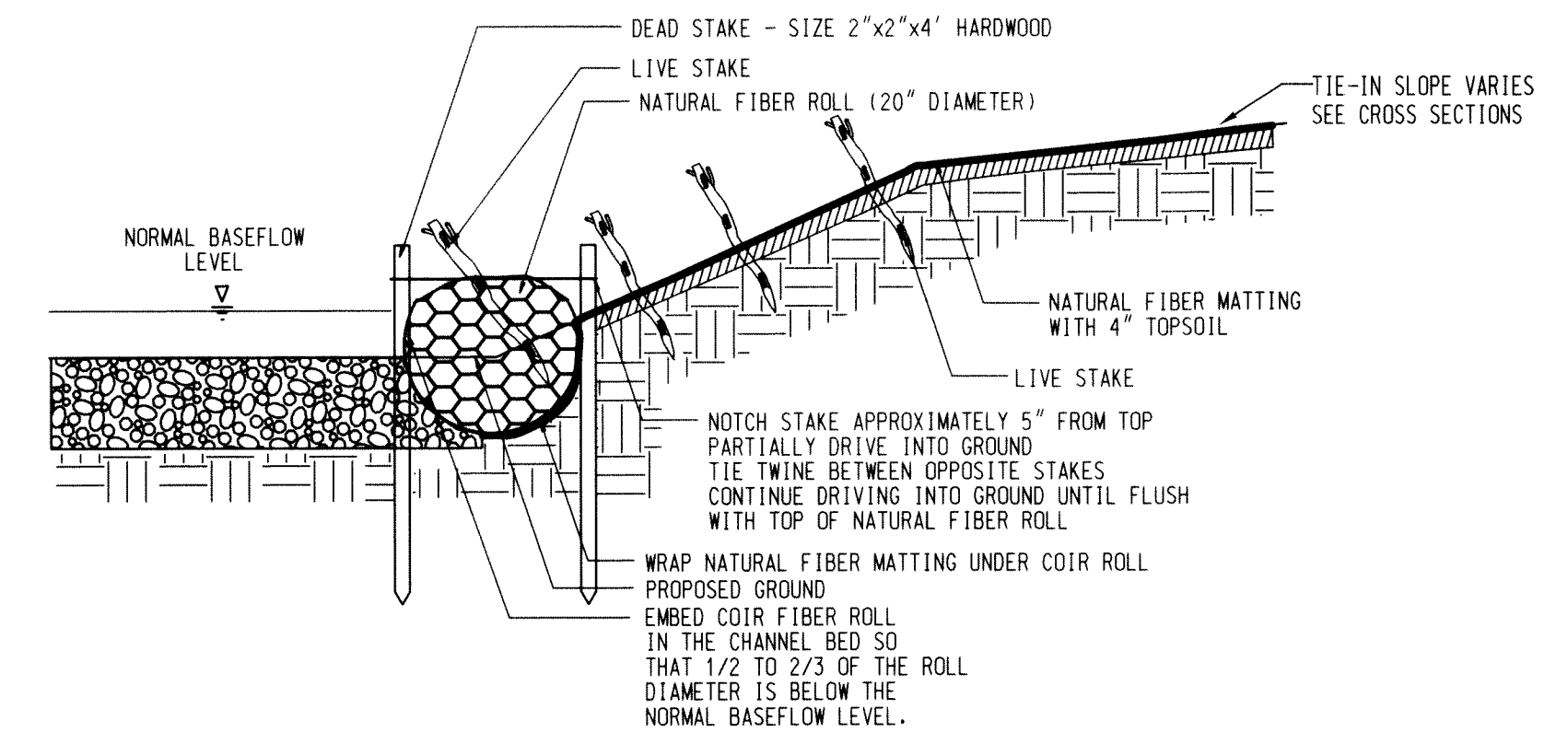




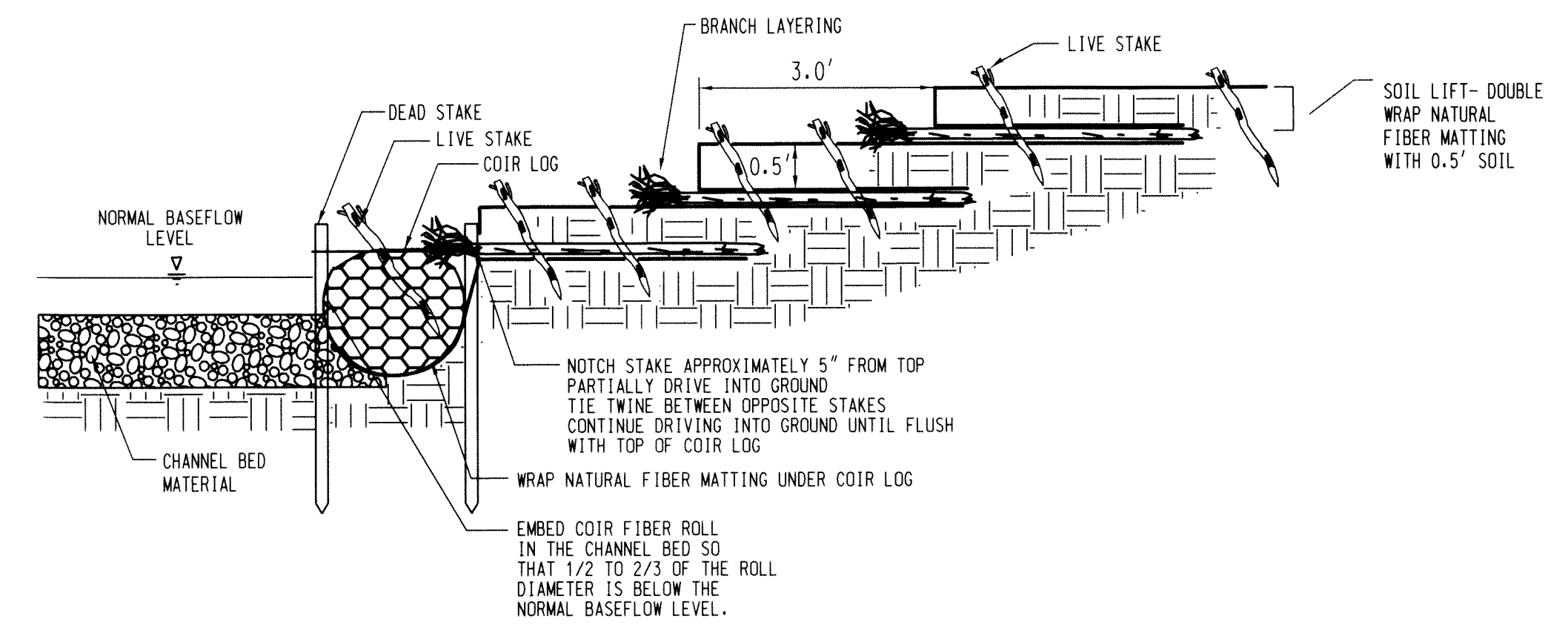
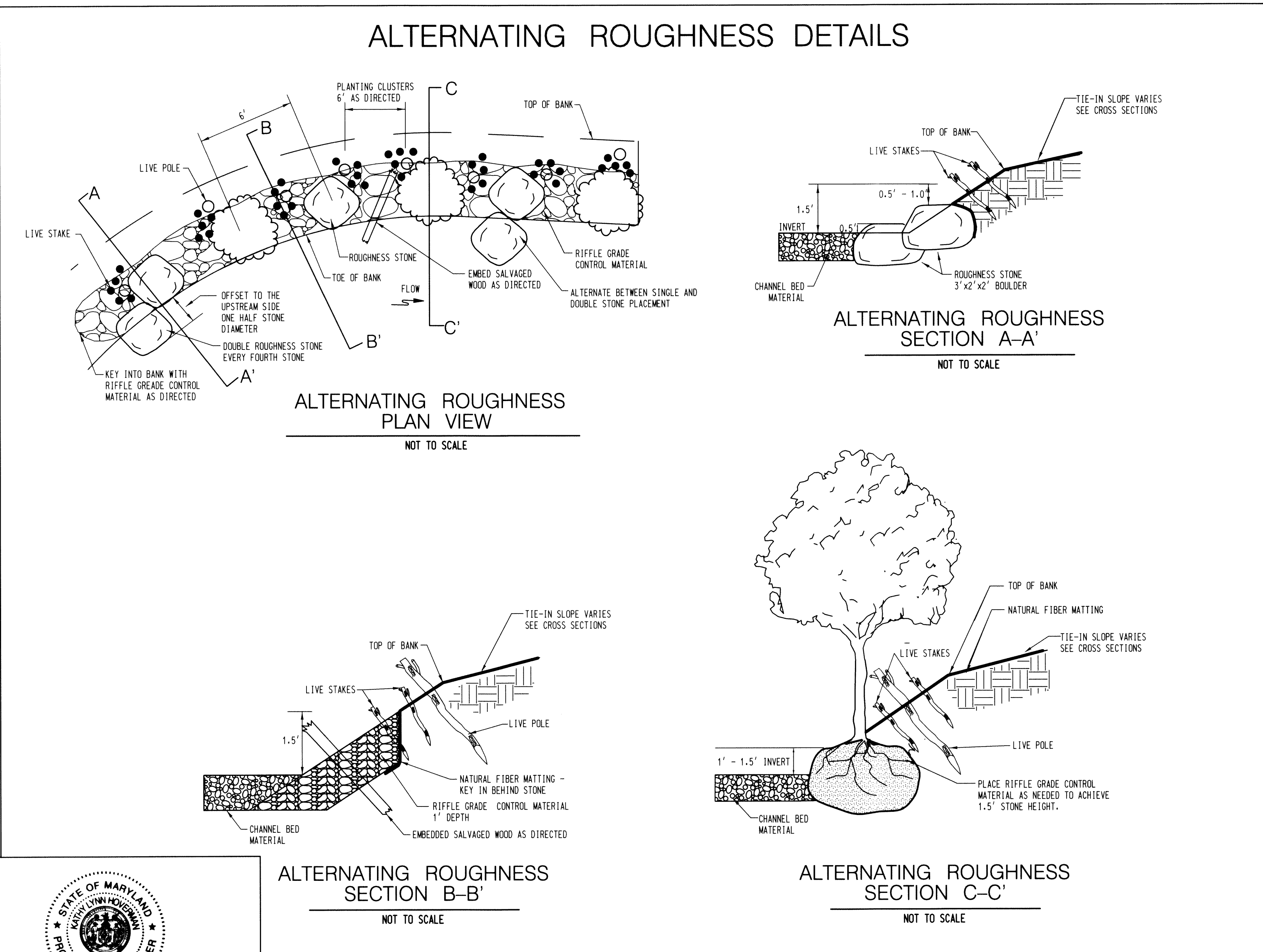
BRUSH MATTRESS AND COIR FIBER ROLL WITH MATTING  
PLAN VIEW DETAIL  
NOT TO SCALE



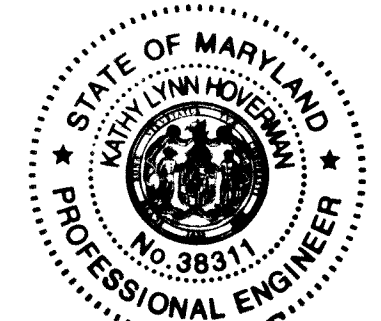
BRUSH MATTRESS WITH COIR FIBER ROLL  
SECTION D-D'  
NOT TO SCALE



COIR FIBER ROLL WITH MATTING  
SECTION E-E'  
NOT TO SCALE



WETLAND TERRACE CROSS SECTION DETAIL  
NOT TO SCALE



PROFESSIONAL CERTIFICATION. 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 NO. 38311, EXPIRATION DATE: JANUARY 6, 2014.

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
Chief, Bureau of Environmental Services  
9/27/12  
DATE

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
www.kci.com



ELIMMEDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
1000 COLUMBIA NATIONAL DRIVE  
COLUMBIA, MD 21046

STREAM  
DETAILS

SCALE: NTS  
DATE: SEPTEMBER 2012  
KCI JOB NO.: 01-081795.60  
CAPITAL PROJECT NO.: D-1158  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

CHRISTOPHER E. WOLF  
LIBER/FOLIO:  
0315/0045  
TAX ACCOUNT:  
02-318337

BRIAN L. EDWARDS I  
LIBER/FOLIO:  
1303/00623  
TAX ACCOUNT:  
02-318365

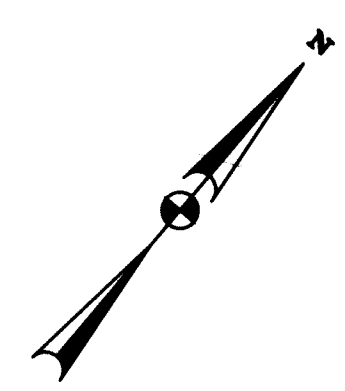
DERICK C. WOLF  
LIBER/FOLIO:  
09467/0022  
TAX ACCOUNT:  
02-318377

JOSEPH D. DORSEY  
LIBER/FOLIO:  
01904/00563  
TAX ACCOUNT:  
02-318364

JOHN D. ANALT JR.  
LIBER/FOLIO:  
04348/0029  
TAX ACCOUNT:  
02-318350

ROBERT E. FAZEL  
LIBER/FOLIO:  
01707/0077  
TAX ACCOUNT:  
02-318342

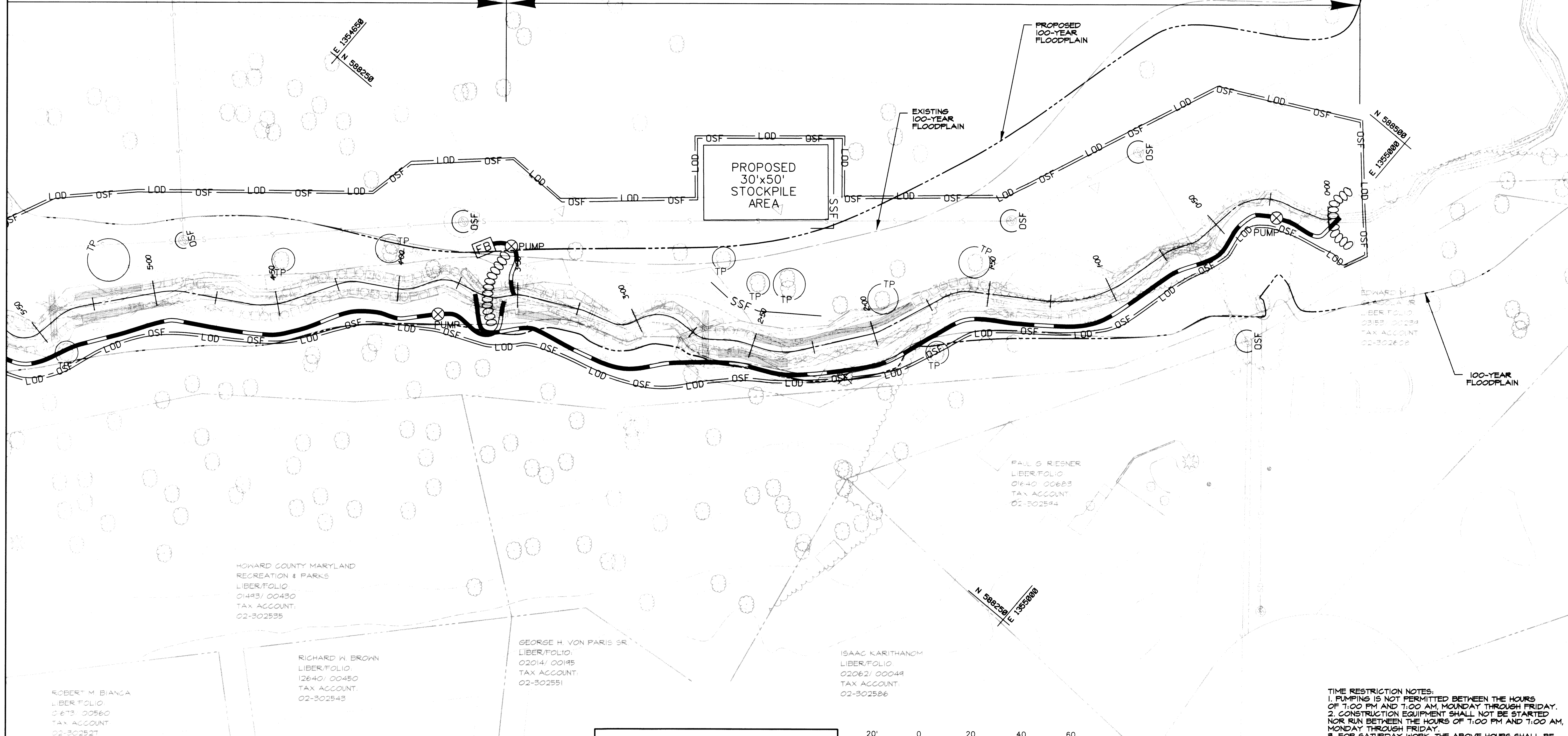
HOWARD COUNTY MARYLAND  
RECREATION & PARKS  
LIBER/FOLIO:  
0106/00731  
TAX ACCOUNT:  
02-318520



WORK AREA 2

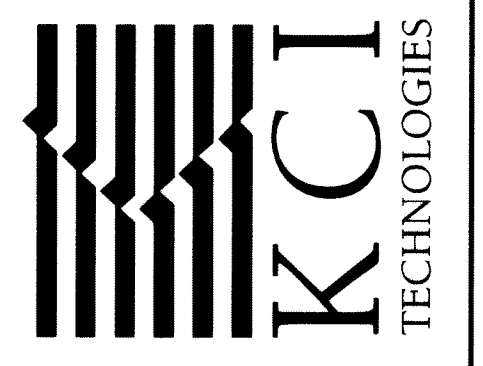
WORK AREA 1

MATCH LINE A-A



NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
www.kci.com



ELMMEDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-118  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
610 COLUMBIA, MD 21046

EROSION AND SEDIMENT CONTROL PLAN

BY: Elizabeth Spencer, Division: PG50, Natural Res. Emp.  
FILE: M:\2008\01081795.60\Drawings\est01a1.mxd

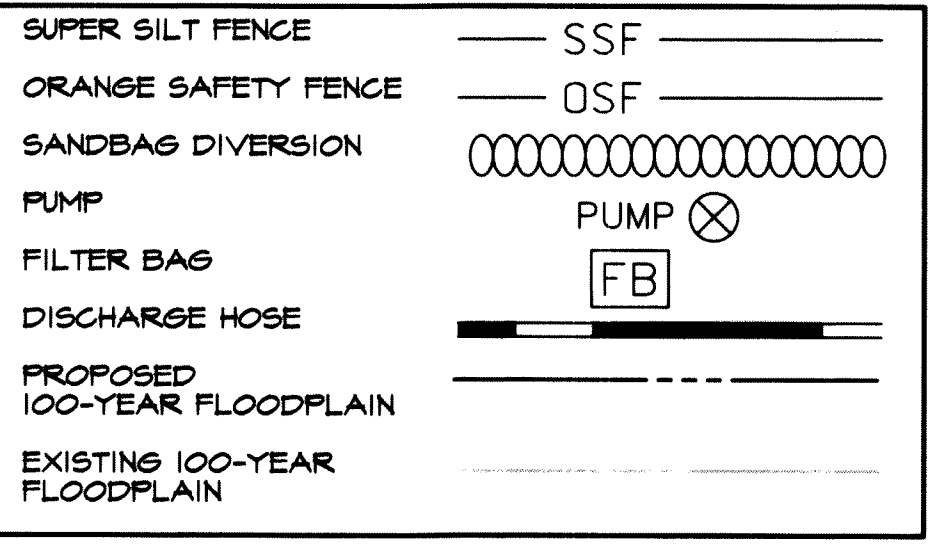
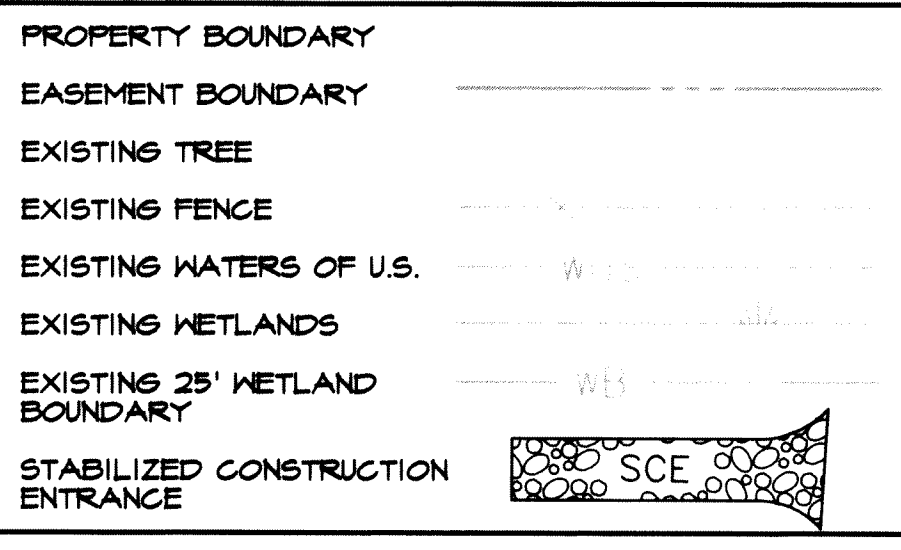
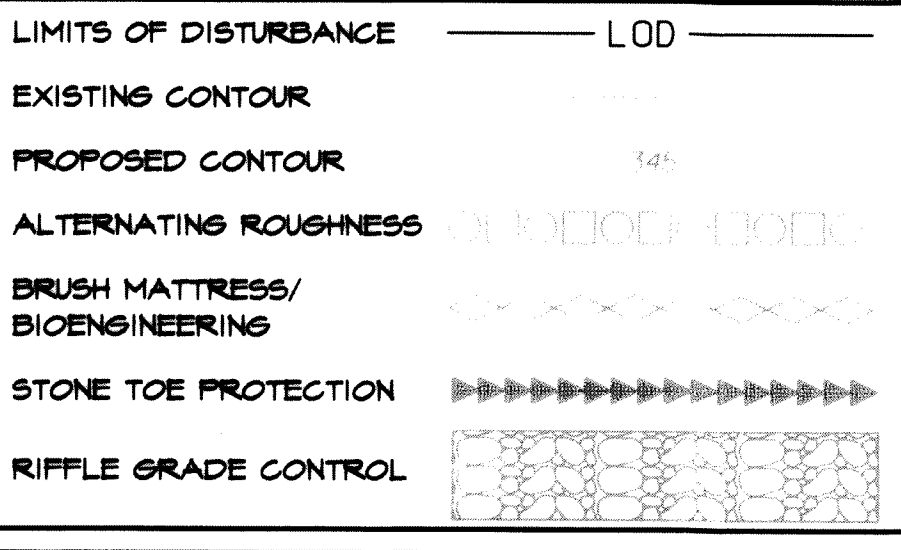
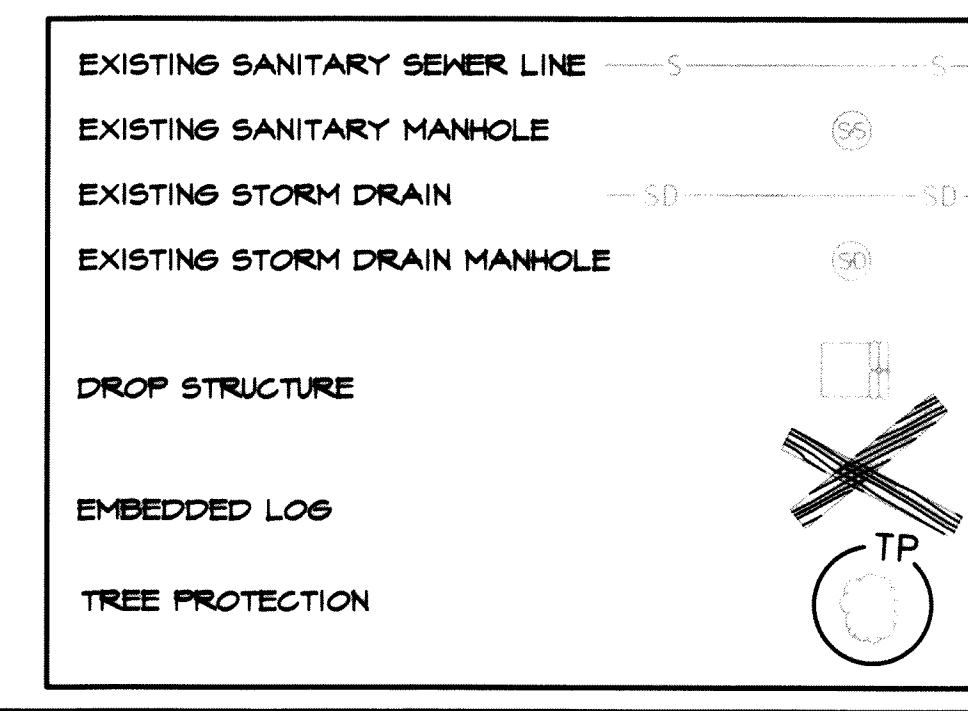
STATE OF MARYLAND  
DIVISION OF PROFESSIONAL ENGINEERS  
No. 38311  
PROFESSIONAL ENGINEER

*John E. Blitzer*  
10/1/2012  
DATE

*Mark D. Lewis*  
9/27/12  
DATE

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

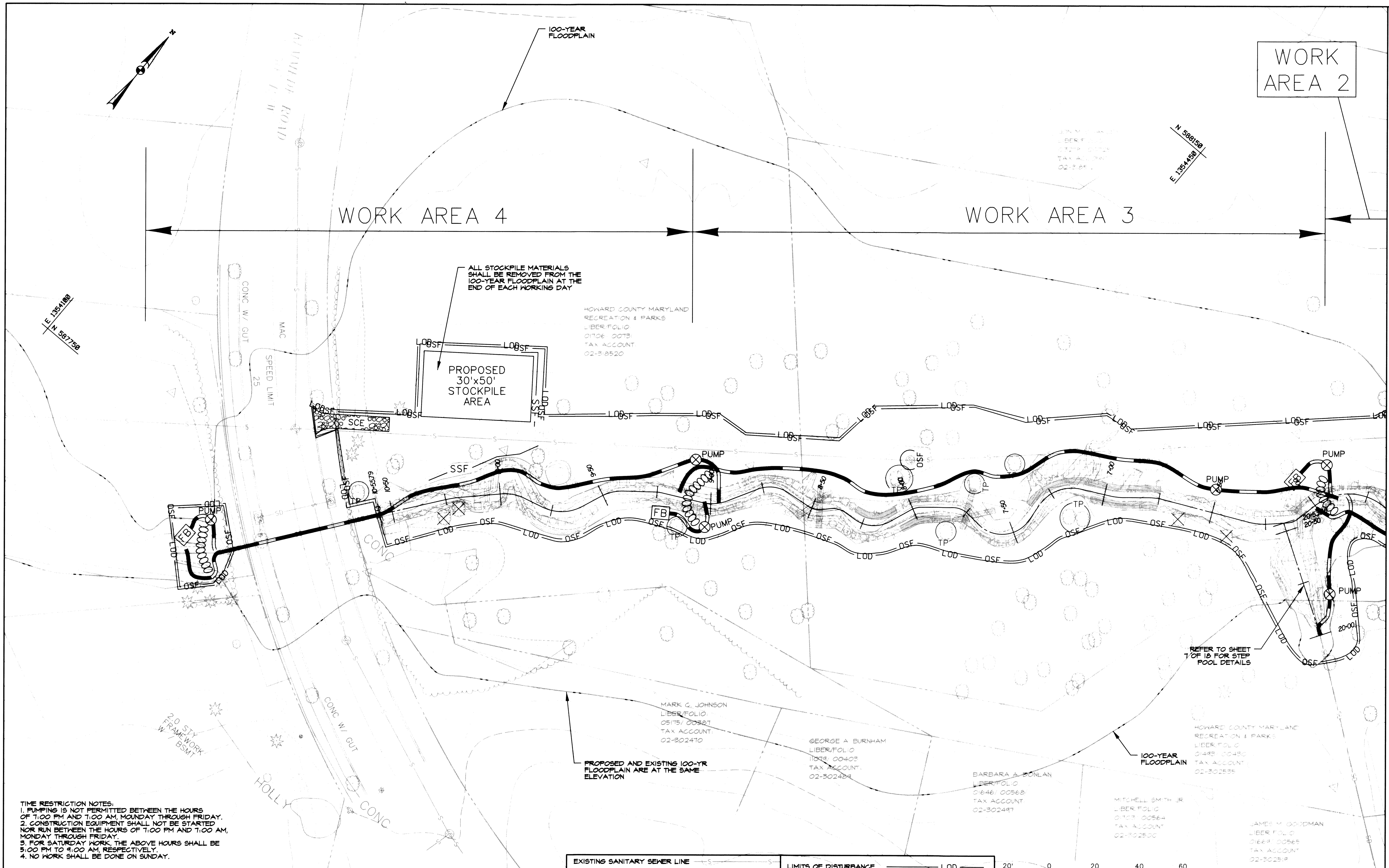
THIS DEVELOPMENT IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.



TIME RESTRICTION NOTES:  
1. PUMPING IS NOT PERMITTED BETWEEN THE HOURS OF 7:00 PM AND 7:00 AM, MONDAY THROUGH FRIDAY.  
2. CONSTRUCTION EQUIPMENT SHALL NOT BE STARTED NOR RUN BETWEEN THE HOURS OF 7:00 PM AND 7:00 AM, MONDAY THROUGH FRIDAY.  
3. FOR SATURDAY WORK, THE ABOVE HOURS SHALL BE 5:00 PM TO 9:00 AM, RESPECTIVELY.  
4. NO WORK SHALL BE DONE ON SUNDAY.

SCALE:	1" = 20'
DATE:	SEPTEMBER 2012
KCI JOB NO.:	01-081795.60
CAPITAL PROJECT NO.:	D-118
PERMIT ISSUE:	
CONSTRUCTION ISSUE:	





**WORK AREA 2**

**WORK AREA 4**

**WORK AREA 3**

PROPOSED 30'x50' STOCKPILE AREA

ALL STOCKPILE MATERIALS SHALL BE REMOVED FROM THE 100-YEAR FLOODPLAIN AT THE END OF EACH WORKING DAY

HOWARD COUNTY MARYLAND RECREATION & PARKS  
LIBER FOLIO 01706 0073  
TAX ACCOUNT 02-3-8520

MARK G. JOHNSON  
LIBER FOLIO 05175/00587  
TAX ACCOUNT 02-302470

GEORGE A. BURNHAM  
LIBER FOLIO 11073/00403  
TAX ACCOUNT 02-302489

BARBARA A. BONLAN  
LIBER FOLIO 01846/00568  
TAX ACCOUNT 02-302497

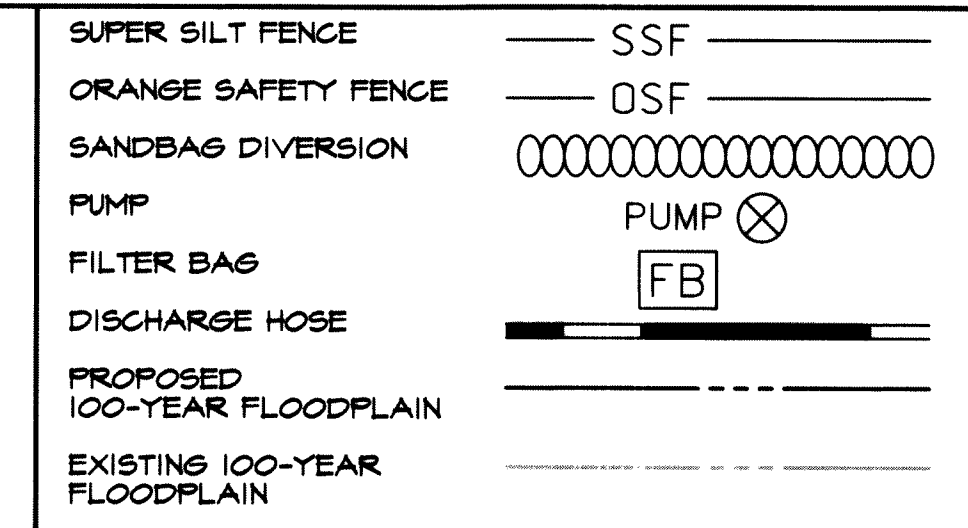
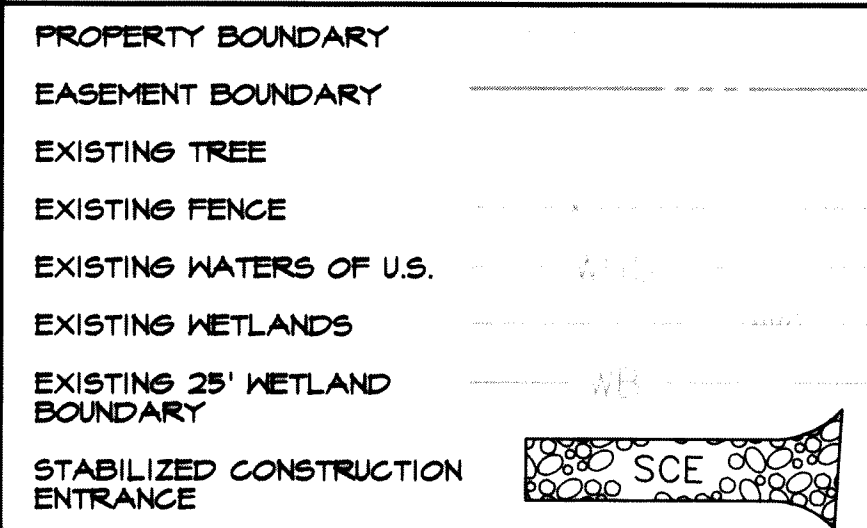
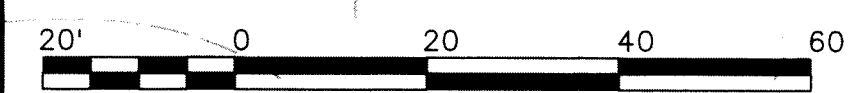
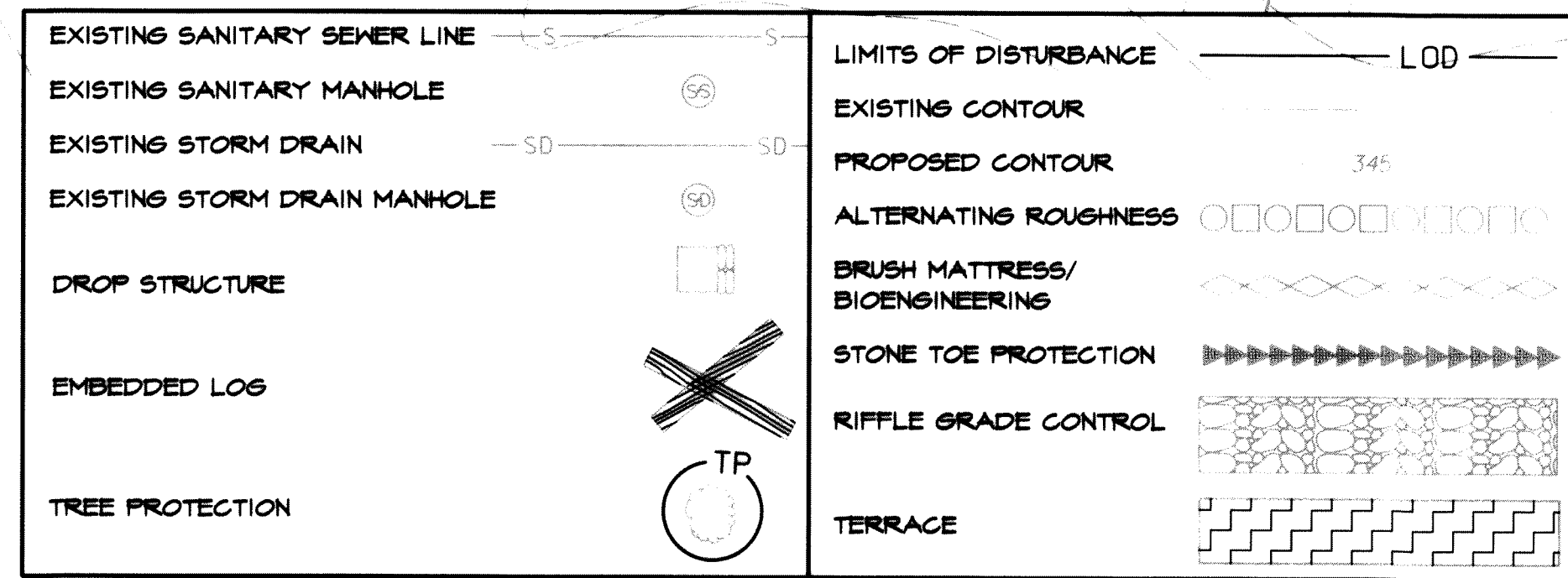
MITCHELL SMITH JR  
LIBER FOLIO 01103/00564  
TAX ACCOUNT 02-302500

HOWARD COUNTY MARYLAND RECREATION & PARKS  
LIBER FOLIO 01706 0073  
TAX ACCOUNT 02-302585

JAMES M. GOODMAN  
LIBER FOLIO 01689/00565  
TAX ACCOUNT 02-302519

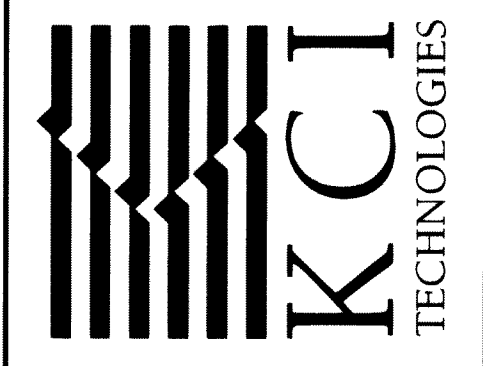
**TIME RESTRICTION NOTES:**  
1. PUMPING IS NOT PERMITTED BETWEEN THE HOURS OF 1:00 PM AND 1:00 AM, MONDAY THROUGH FRIDAY.  
2. CONSTRUCTION EQUIPMENT SHALL NOT BE STARTED NOR RUN BETWEEN THE HOURS OF 1:00 PM AND 1:00 AM, MONDAY THROUGH FRIDAY.  
3. FOR SATURDAY WORK, THE ABOVE HOURS SHALL BE 9:00 PM TO 4:00 AM, RESPECTIVELY.  
4. NO WORK SHALL BE DONE ON SUNDAY.

MATCH LINE A-A



NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
www.kci.com



ELMEDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
3101 COLUMBIA GATEWAY CENTER  
COLUMBIA, MD 21046

**EROSION AND SEDIMENT CONTROL PLAN**

SCALE: 1" = 20'  
DATE: SEPTEMBER 2012  
KCI JOB NO.: 01-081795.60  
CAPITAL PROJECT NO.: D-1158  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

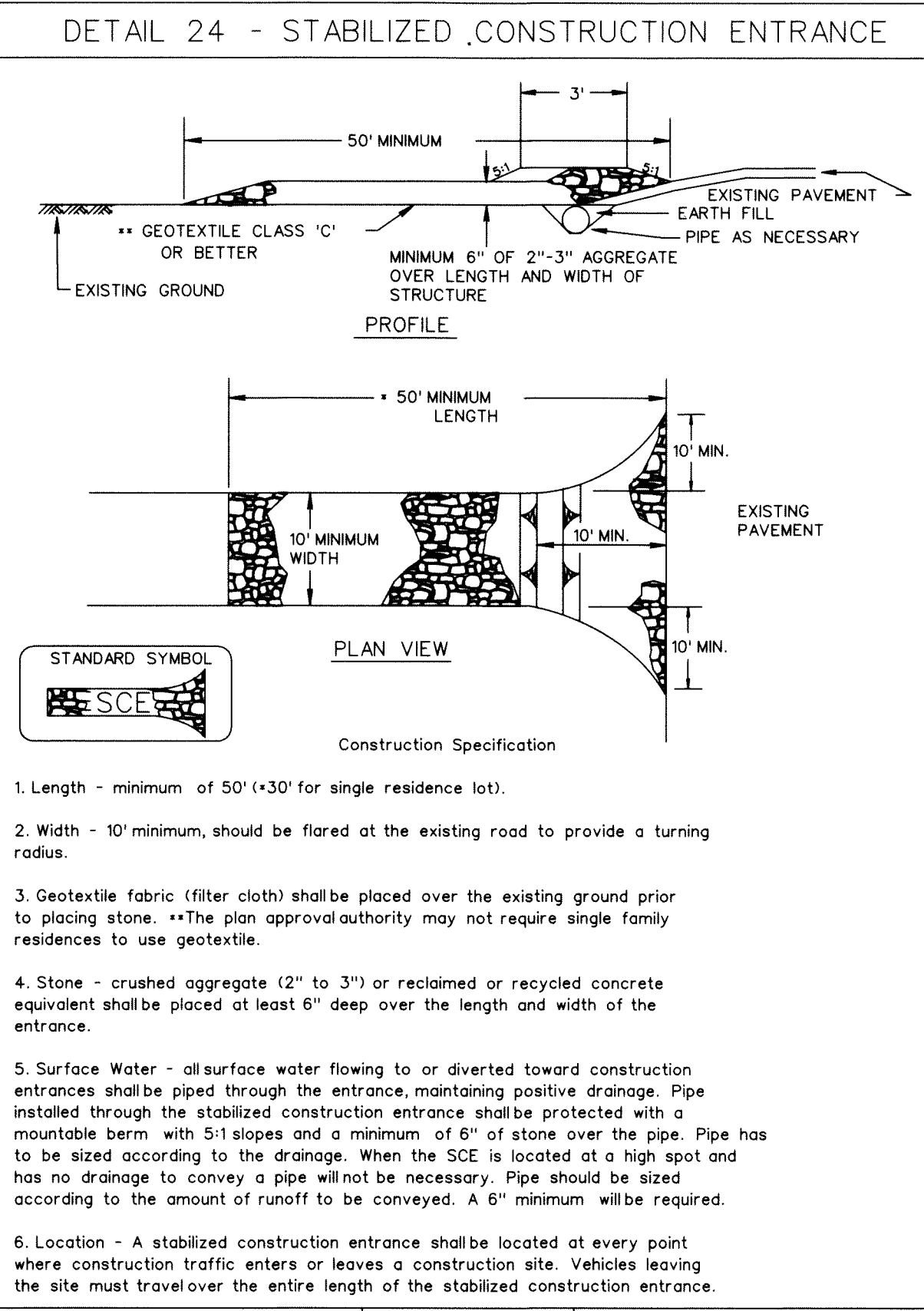
John P. Roberts  
PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 38311. EXPIRATION DATE: JANUARY 6, 2014.

THIS DEVELOPMENT IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

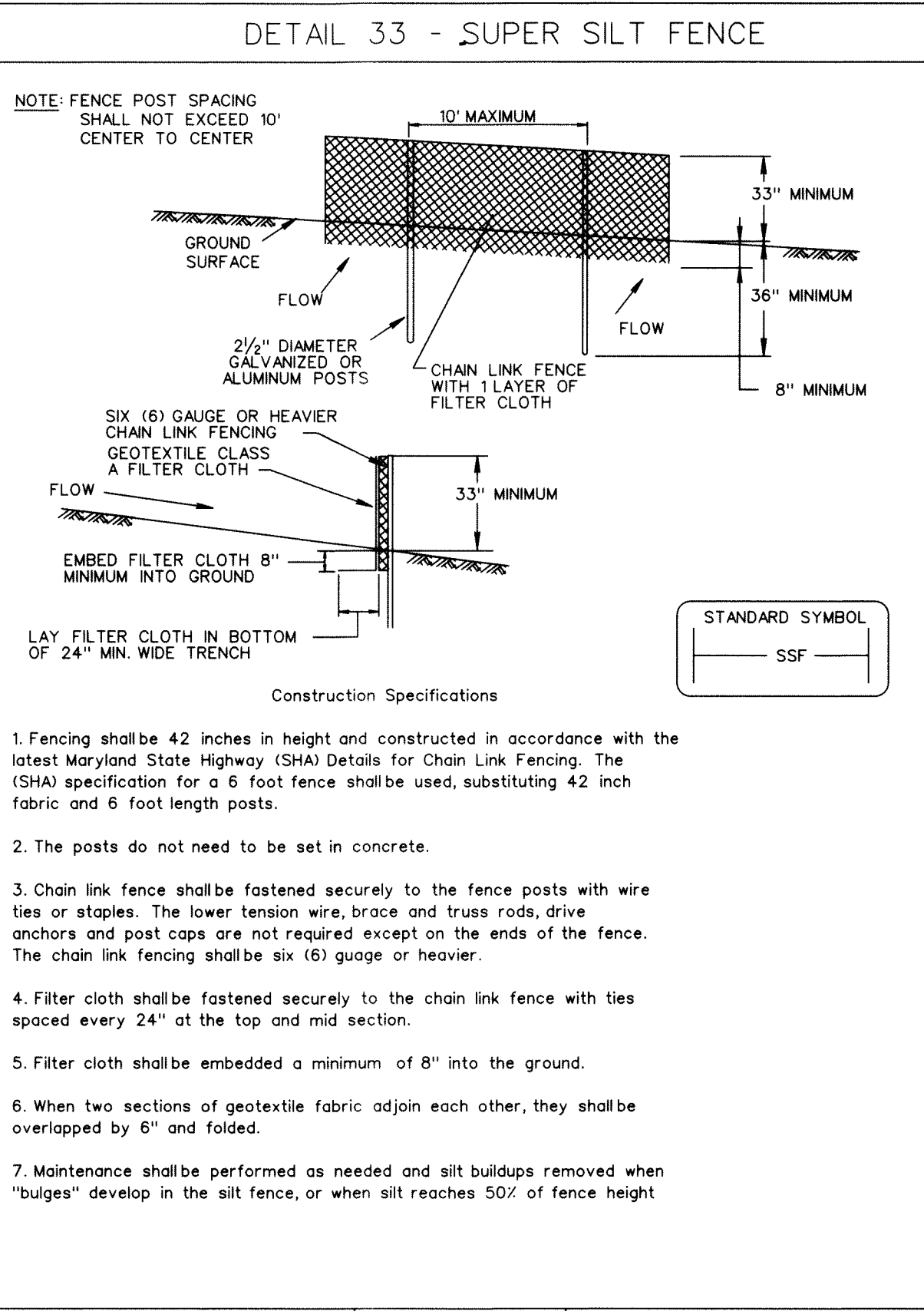
John P. Roberts  
HOWARD SCD  
DATE 10/1/12

Mark De Luca  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
DATE 9/27/12





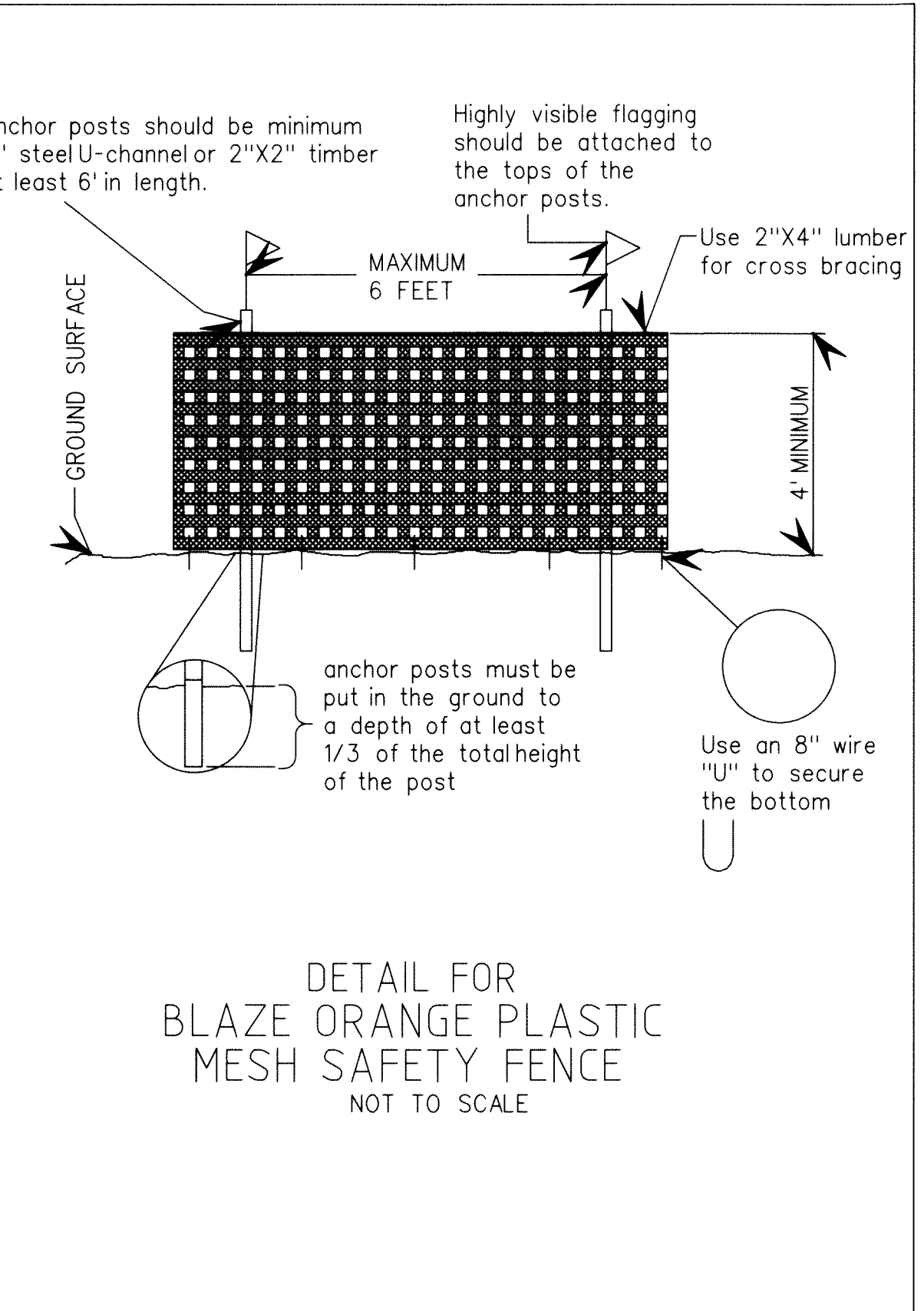
- Length - minimum of 50' (+30' for single residence lot).
- Width - 10' minimum, should be flared at the existing road to provide a turning radius.
- Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. The plan approval authority may not require single family residences to use geotextile.
- Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
- Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
- Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.



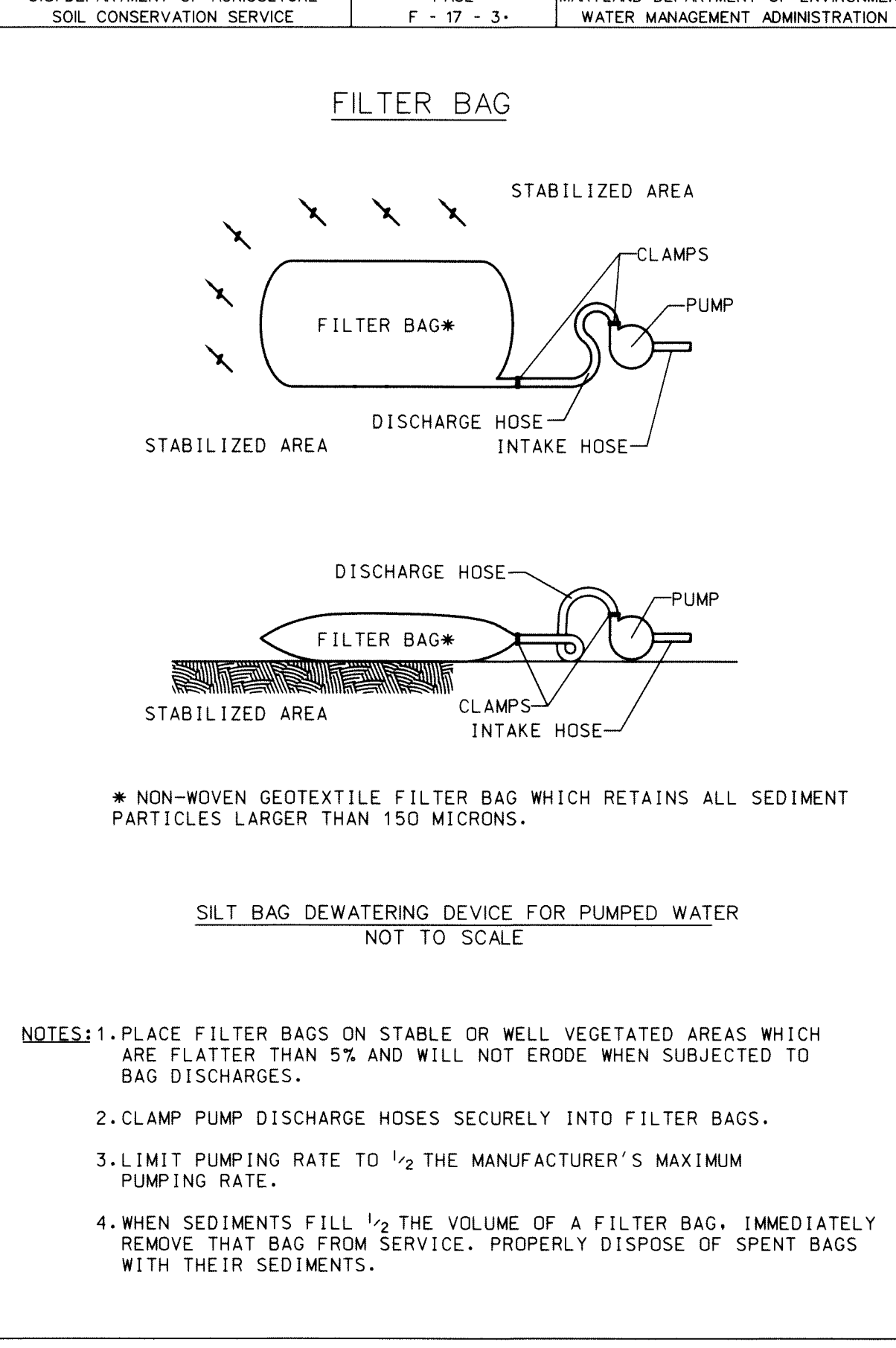
- Fencing shall be 42 inches in height and constructed in accordance with the latest Maryland State Highway (SHA) Details for Chain Link Fencing. The (SHA) specification for a 6 foot fence shall be used, substituting 42 inch fabric and 6 foot length posts.
- The posts do not need to be set in concrete.
- Chain link fence shall be fastened securely to the fence posts with wire ties or staples. The lower tension wire, brace and truss rods, drive anchors and post caps are not required except on the ends of the fence. The chain link fencing shall be six (6) gauge or heavier.
- Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
- Filter cloth shall be embedded a minimum of 8" into the ground.
- When two sections of geotextile fabric adjoin each other, they shall be overlapped by 6" and folded.
- Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height.

Design Criteria

Slope	Slope Steepness	Slope Length (maximum)	Silt Fence Length (maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 33%	5:1 - 3:1	100 feet	1,000 feet
33 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	250 feet



- Anchor posts should be minimum 2" steel U-channel or 2"x2" timber at least 6' in length.
- Highly visible flagging should be attached to the tops of the anchor posts.
- Use 2"x4" lumber for cross bracing.
- MAXIMUM 6 FEET
- MINIMUM 4
- Use an 8" wire "U" to secure the bottom.



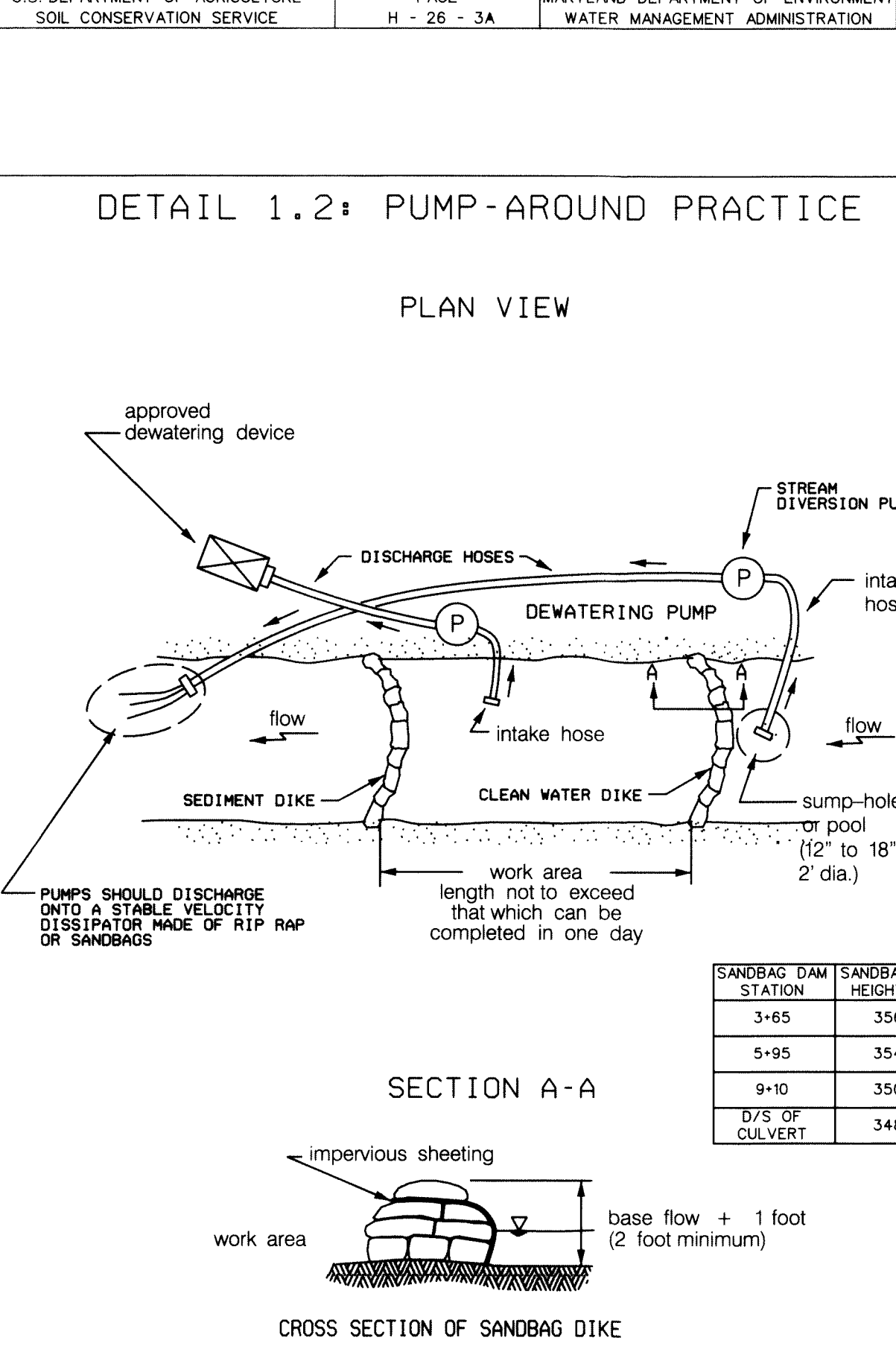
1. PLACE FILTER BAGS ON STABLE OR WELL VEGETATED AREAS WHICH ARE FLATTER THAN 5% AND WILL NOT ERODE WHEN SUBJECTED TO BAG DISCHARGES.
2. CLAMP PUMP DISCHARGE HOSES SECURELY INTO FILTER BAGS.
3. LIMIT PUMPING RATE TO 1/2 THE MANUFACTURER'S MAXIMUM PUMPING RATE.
4. WHEN SEDIMENTS FILL 1/2 THE VOLUME OF A FILTER BAG, IMMEDIATELY REMOVE THAT BAG FROM SERVICE. PROPERLY DISPOSE OF SPENT BAGS WITH THEIR SEDIMENTS.

FILTER BAG SPECIFICATIONS

- FILTER BAG SHALL BE MADE OF NON-WOVEN GEOTEXTILE WITH A MINIMUM SURFACE AREA OF 225 SQUARE FEET PER SIDE.
- ALL STRUCTURAL SEAMS SHALL BE SEWN WITH A DOUBLE STITCH USING A DOUBLE NEEDLE MACHINE WITH HIGH STRENGTH THREAD. SEAM STRENGTH SHALL WITHSTAND 100 LB/IN USING ASTM D-4884 TEST METHOD.
- FILTER BAG SHALL HAVE A NOZZLE LARGE ENOUGH TO ACCOMMODATE A FOUR(4) INCH DIAMETER PUMP DISCHARGE HOSE.
- NOZZLE SHALL BE SEALED TIGHTLY AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE TO PREVENT UNFILTERED WATER FROM ESCAPING.
- FILTER BAG SHALL BE PLACED ON A LEVEL OR GENTLY SLOPING (5% MAXIMUM) AREA.
- FILTER BAG SHALL BE PLACED UPON A BASE OF STRAW BALES OR THREE (3) INCHES OF CLEAN STONE TO PROMOTE DEWATERING THROUGH BOTTOM SURFACE OF THE FILTER BAG.
- PUMPING RATES SHALL BE CONTROLLED TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG. AS THE BAG BECOMES FILLED WITH SEDIMENT THE PUMPING RATE SHALL BE REDUCED.
- THE FILTER BAG SHALL BE DEWATERED, REMOVED AND DISPOSED OF UPON COMPLETION OF PUMPING OPERATIONS OR AFTER IT HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. THE DEWATERED SEDIMENT FROM THE BAG SHALL BE SPREAD IN AN UPLAND AREA AND STABILIZED WITHIN 24 HOURS.
- THE GEOTEXTILE FABRIC SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS WITH PROPERTIES DETERMINED IN ACCORDANCE WITH THE FOLLOWING PROCEDURES:

WEIGHT	10 OZ/YD	ASTM D-3778
GRAB TENSILE	210 LBS.	ASTM D-4632
PUNCTURE	150 LBS.	ASTM D-4833
FLOW RATE	70 GAL/MIN/FT2	ASTM D-4491
PERMITIVITY (SEC)	1.3	ASTM D-4991
UV RESISTANCE	70%	ASTM D-4355
APPARENT OPENING SIZE (AOS)	40-80	ASTM D-4751

NOTE: ALL WATER COLLECTED WITHIN THE LIMIT OF DISTURBANCE (WITH THE EXCEPTION OF WATER DIVERTED AROUND THE WORK AREA) SHALL BE PUMPED THROUGH THE FILTER BAG.



- MGWC 12: PUMP-AROUND PRACTICE
- Temporary measure for dewatering in-channel construction sites
- DESCRIPTION
- The work should consist of installing a temporary pump around and supporting measures to divert flow around in-stream construction sites.
- IMPLEMENTATION SEQUENCE
- Sediment control measures, pump-around practices, and associated channel and bank construction should be completed in the following sequence (refer to Detail 1.2):
  - Construction activities including the installation of erosion and sediment control measures should not begin until all necessary easements and/or right-of-ways have been acquired. All existing utilities should be marked in the field prior to construction. The contractor is responsible for any damage to existing utilities that may result from construction and should repair the damage at his/her own expense to the county's or utility company's satisfaction.
  - The contractor should notify the Maryland Department of the Environment or WMA sediment control inspector at least 5 days before beginning construction. Additionally, the contractor should inform the local environmental protection and resource management inspection and enforcement division and the provider of local utilities a minimum of 48 hours before starting construction.
  - The contractor should conduct a pre-construction meeting on site with the WMA sediment control inspector, the county project manager, and the engineer to review limits of disturbance, erosion and sediment control requirements, and the sequence of construction. The contractor should stake out all limits of disturbance prior to the pre-construction meeting so they may be reviewed. The participants will also designate the contractor's staging areas and flag all trees within the limit of disturbance, which will be removed for construction access. Trees should not be removed within the limit of disturbance without approval from the WMA or local authority.
  - Construction should not begin until all sediment and erosion control measures have been installed and approved by the engineer and the sediment control inspector. The contractor should stay within the limits of the disturbance as shown on the plans and minimize disturbance within the work area whenever possible.
  - Upon installation of all sediment control measures and approval by the sediment control inspector and the local environmental protection and resource management inspection and enforcement division, the contractor should begin work at the upstream section and proceed downstream beginning with the establishment of stabilized construction entrances. In some cases, work may begin downstream if appropriate. The sequence of construction must be followed unless the contractor gets written approval for deviations from the WMA or local authority. The contractor should only begin work in an area which can be completed by the end of the day including grading adjacent to the channel. At the end of each workday, the work area must be stabilized and the pump around removed from the channel. Work should not be conducted in the channel during rain events.
  - Sandbag dikes should be situated at the upstream and downstream ends of the work area as shown on the plans and stream flow should be pumped around the work area. The pump should discharge onto a stable velocity dissipater made of riprap or sandbags.
  - Water from the work area should be pumped to a sediment filtering measure such as a dewatering basin, sediment bag, or other approved source. The measure should be located such that the water drains back into the channel below the downstream sandbag dike.
  - Traversing a channel reach with equipment within the work area where no work is proposed should be avoided. If equipment has to traverse such a reach for access to another area, then timber mats or similar measures should be used to minimize disturbance to the channel. Temporary stream crossings should be used only when necessary and only where noted on the plans or specified. (See Section 4, Stream Crossings, Maryland Guidelines to Waterway Construction).
  - All stream restoration measures should be installed as indicated by the plans and all banks graded in accordance with the grading plans and typical cross-sections. All grading must be stabilized at the end of each day with seed and mulch or seed and matting as specified on the plans.
  - After an area is completed and stabilized the clean water dike should be removed. After the first sediment flush, a new clean water dike should be established upstream from the old sediment dike. Finally, upon establishment of a new sediment dike below the old one, the old sediment dike should be removed.
  - A pump around must be installed on any tributary or storm drain outfall, which contributes baseflow to the work area. This should be accomplished by locating a sandbag dike at the downstream end of the tributary or storm drain outfall and pumping the stream flow around the work area. This water should discharge onto the same velocity dissipater used for the main stem pump around.
  - If a tributary is to be restored, construction should take place on the tributary before work on the main stem reaches the tributary confluence. Construction in the tributary, including pump around practices, should follow the same sequence as for the main stem of the river or stream. When construction on the tributary is completed, work on the main stem should resume. Water from the tributary should continue to be pumped around the work area in the main stem.
  - The contractor is responsible for providing access to and maintaining all erosion and sediment control devices until the sediment control inspector approves their removal.
  - After construction, all disturbed areas should be regraded and revegetated as per the planting plan.

THIS DEVELOPMENT IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.

John R. Robertson  
HOWARD SCD  
DATE 10/1/12

9/27/12  
DATE

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES

TEMPORARY INSTREAM CONSTRUCTION MEASURES  
REVISED NOVEMBER 2000  
PAGE 12 - 3

MARYLAND DEPARTMENT OF THE ENVIRONMENT  
WATER MANAGEMENT ADMINISTRATION

EROSION AND SEDIMENT CONTROL DETAILS

SCALE: N/A

DATE: SEPTEMBER 2012

KCI JOB NO.: 01-081795-60

CAPITAL PROJECT NO.: D-1158

PERMIT ISSUE:

CONSTRUCTION ISSUE:

SHEET NO.: 12 OF 18

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
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www.kci.com

KCI TECHNOLOGIES

BY: Ashley Pliner, Division: P050, Natural Resources, Emp. No. 2008-01081795-60, Drawings: esd02.pliner.dgn

PROFESSIONAL CERTIFICATION. 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 NO. 38311, EXPIRATION DATE: JANUARY 6, 2014.

NO.	REVISIONS DESCRIPTION	DATE

KCIFILE: MA\_2008 \ 01081795.60 \



SEQUENCE OF CONSTRUCTION

1. OBTAIN GRADING PERMIT. STREAM CLOSURE PERIOD IS MARCH 1-MAY 31, INCLUSIVE. MDE PERMIT TRACKING NO. 201261030. PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES, A VIDEOTAPE AND PHOTOGRAPHS OF THE PROPOSED WORK AREA SHALL BE TAKEN. (1 DAY)

HOWARD COUNTY CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTES

- 1. A minimum of 48 hours notice must be given to the Howard County Department of Inspections. Licenses and Permits, Sediment Control Division prior to the start of any construction (410 313-1855).

HOWARD SOIL CONSERVATION DISTRICT TEMPORARY SEEDING NOTES

Apply to graded or cleared areas likely to be re-disturbed where a short-term vegetative cover is needed. Seedbed preparation: -- Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

HOWARD SOIL CONSERVATION DISTRICT PERMANENT SEEDING NOTES

(For areas within LOD with no designated planting area symbol use permanent seeding below. For all areas denoted by symbol see Sheets 14-16 for permanent seeding.) Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed.

Mulching - Apply 1-1/2 to 2 tons per acre (70 to 90 lbs/1000 sq. ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool.

Maintenance - Inspect all seeding areas and make needed repairs, replacements and reseeding.

21.0 STANDARD AND SPECIFICATIONS FOR TOPSOIL

Definition: Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation. Purpose: To provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.

- I. This practice is limited to areas having 2:1 or flatter slopes where: a. The texture of the exposed subsoil/parent materials is not adequate to produce vegetative growth.

- III. For sites having disturbed areas under 5 acres: i. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.

MARYLAND DEPARTMENT OF THE ENVIRONMENT BEST MANAGEMENT PRACTICES FOR WORKING IN NONTIDAL WETLANDS, WETLAND BUFFERS, WATERWAYS, AND 100-YEAR FLOODPLAINS

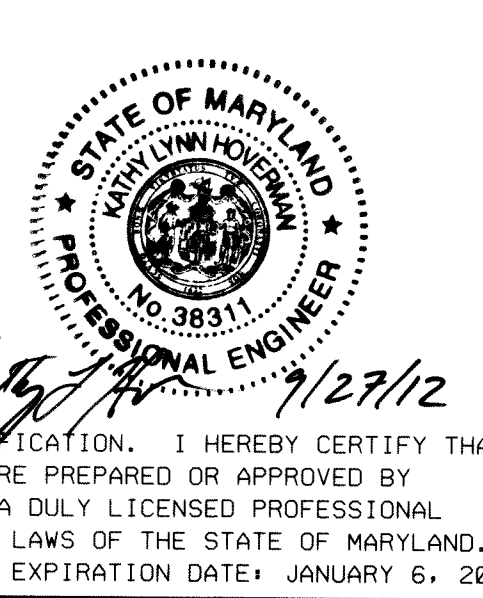
- 1. NO EXCESS FILL, CONSTRUCTION MATERIAL, OR DEBRIS SHALL BE STOCKPILED OR STORED IN NONTIDAL WETLANDS, NONTIDAL WETLAND BUFFERS, WATERWAYS, OR THE 100-YEAR FLOODPLAIN.

PERMANENT SEEDING SUMMARY

Table with 7 columns: NO. SPECIES, APPLICATION RATE (LB/AC), SEEDING DATES, SEEDING DEPTHS, FERTILIZER RATE (10-20-20), LIME. Rows include Tall Fescue, Perennial Ryegrass, Kentucky Bluegrass, and Red Top.

TEMPORARY SEEDING SUMMARY

Table with 7 columns: NO. SPECIES, APPLICATION RATE (LB/AC), SEEDING DATES, SEEDING DEPTHS, FERTILIZER RATE (10-10-10), LIME RATE. Rows include Rye and Rye Plus Foxtail Millet.



THIS DEVELOPMENT IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT. Signature: John R. Robertson, Howard SCD, dated 9/27/12.

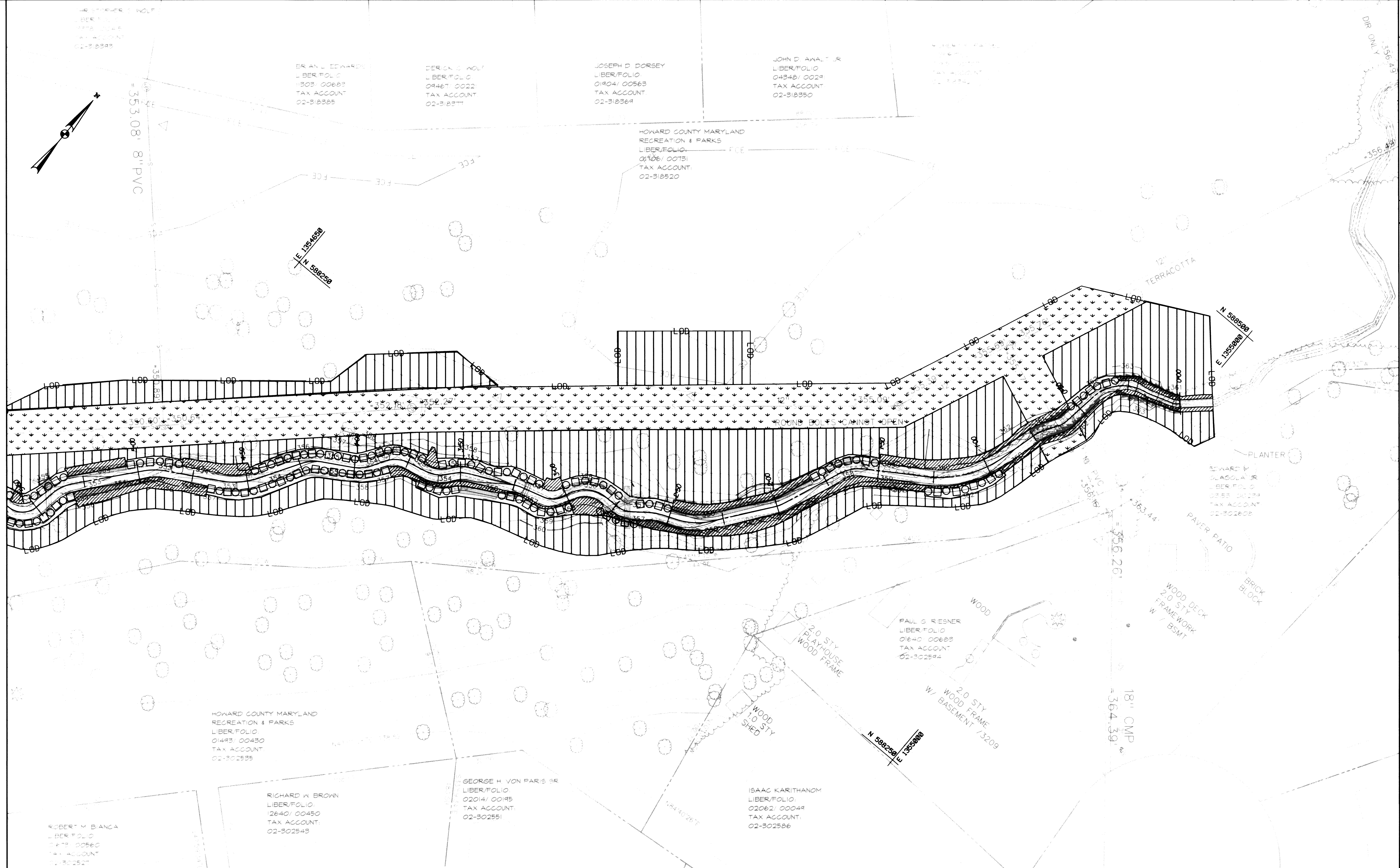
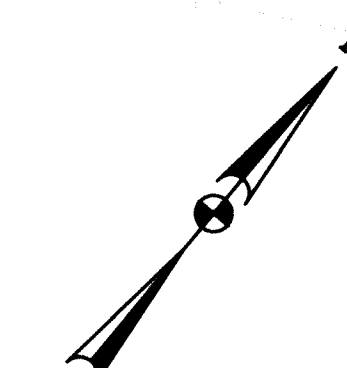
ENGINEER'S CERTIFICATE: "I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY SOIL CONSERVATION DISTRICT".

DEVELOPER'S CERTIFICATE: "I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE THE BEGINNING OF THE PROJECT."

Vertical sidebar containing: DATE, REVISIONS DESCRIPTION, NO., KCI FILE # (MAY 2008 \ 01081795.60), ADDRESS (936 RIDGEBROOK ROAD, SPARKS, MARYLAND 21152), CONTACT (TELEPHONE: (410) 316-7800, FAX: (410) 316-7818, WWW.KCI.COM), KCI TECHNOLOGIES logo, PROJECT INFO (ELMEDE ROAD STREAM RESTORATION PROJECT, CAPITAL PROJECT D-1168), TITLE (EROSION AND SEDIMENT CONTROL NOTES), SCALE (N/A), DATE (SEPTEMBER 2012), KCI JOB NO. (01-081795.60), CAPITAL PROJECT NO. (D-1168), PERMIT ISSUE, CONSTRUCTION ISSUE, SHEET NO. (13 OF 18).



MATCH LINE A-A



**LEGEND**

	RIPARIAN ZONE
	EASEMENT ZONE
	TUBELINGS
	ALTERNATING ROUGHNESS PLANTINGS

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
 SPARKS, MARYLAND 21152  
 TELEPHONE: (410) 316-7800  
 FAX: (410) 316-7818  
 www.kci.com

**KCI**  
 TECHNOLOGIES

ELMMEDE ROAD  
 STREAM RESTORATION PROJECT  
 CAPITAL PROJECT D-158

HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
 1000 COLUMBIA AVENUE, SUITE 200  
 COLUMBIA, MD 21046

**LANDSCAPE PLAN**

SCALE: 1" = 20'  
 DATE: SEPTEMBER 2012  
 KCI JOB NO.: 01-081795.60  
 CAPITAL PROJECT NO.: D-1158  
 PERMIT ISSUE:  
 CONSTRUCTION ISSUE:

SHEET NO.: 14 OF 18

PROFESSIONAL CERTIFICATION. 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 NO. 38311, EXPIRATION DATE: JANUARY 6, 2014

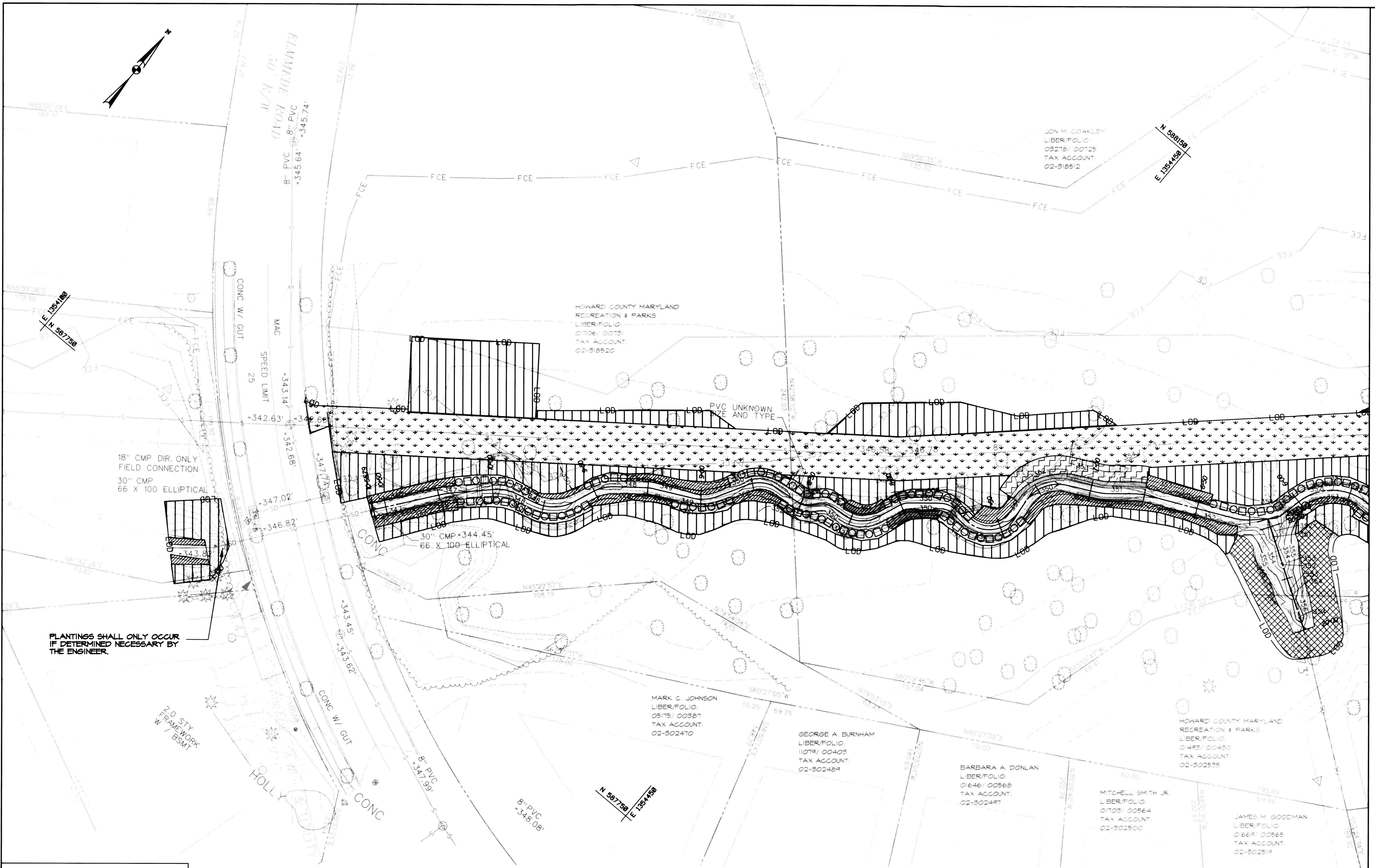
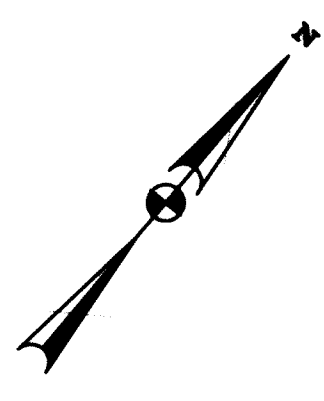
*Robert M. Bianca*  
 ROBERT M. BIANCA  
 LIBER/FOLIO: 0473/00960  
 TAX ACCOUNT: 02-302527

STATE OF MARYLAND  
 PROFESSIONAL ENGINEER  
 No. 38311  
 9/27/12

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
 CHIEF BUREAU OF ENVIRONMENTAL SERVICES  
*Mark D. ...*  
 DATE: 9/27/12

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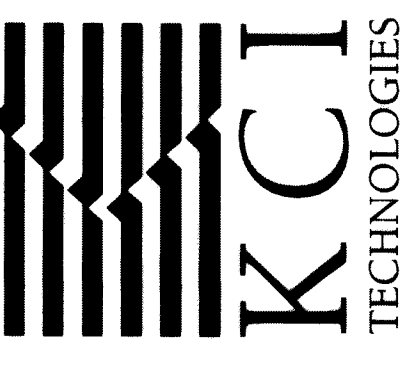




MATCH LINE A-A

NO.	REVISIONS DESCRIPTION	DATE

936 RIDGEBROOK ROAD  
SPARKS, MARYLAND 21152  
TELEPHONE: (410) 316-7800  
FAX: (410) 316-7818  
www.kci.com



ELMMEDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STREETS AND HIGHWAYS DIVISION  
695 COLUMBIA, MD 21046

LANDSCAPE PLAN

SCALE: 1" = 20'  
DATE: SEPTEMBER 2012  
KCI JOB NO.: 01-081795.60  
CAPITAL PROJECT NO.: D-1158  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

STATE OF MARYLAND  
PROFESSIONAL ENGINEER  
No. 38311  
9/27/12  
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DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
9/27/12

**LEGEND**

	RIPARIAN ZONE		ALTERNATING ROUGHNESS PLANTINGS
	EASEMENT ZONE		WETLAND TERRACE ZONE
	TUBELINGS		OUTFALL PROTECTION

BT: Elizabeth Spencer, Division: P&S, "Natural Res. Emp. FILE: M:\2008\01081795.60\Drawings\1502a1m.dgn"



# MASTER PLANT SCHEDULE

## RIPARIAN ZONE (SHEETS 14-15 OF 18)

(26035 SQ FT/0.60 AC)

Quantity	Botanical Name	Common Name	Size	Form	Spacing/Rate
<b>SHRUBS</b>					
38	<i>Cephalanthus occidentalis</i>	Button bush	4' Height	Container	6'-8' O.C.
37	<i>Ilex vreticillata</i>	Winterberry holly	4' Height	Container	6'-8' O.C.
37	<i>Cornus racemosa</i>	Gray Dogwood	4' Height	Container	6'-8' O.C.
37	<i>Cornus amomum</i>	Silky Dogwood	4' Height	Container	6'-8' O.C.
37	<i>Sambucus canadensis</i>	Elderberry	4' Height	Container	6'-8' O.C.
<b>TREES</b>					
47	<i>Platanus occidentalis</i>	Sycamore	2" Caliper	Container	11' O.C.
47	<i>Quercus palustris</i>	Pin oak	2" Caliper	Container	11' O.C.
46	<i>Liriodendron tulipifera</i>	Tulip poplar	2" Caliper	Container	11' O.C.

## ALTERNATING ROUGHNESS PLANTINGS (SHEETS 5-6 AND 14-15 OF 18)

(911 LF)

Qty	Botanical Name	Common Name	Size	Form	Spacing/Rate	Deer Tolerance
<b>TREES</b>						
19	<i>Celtis occidentalis</i>	Hackberry	2" Caliper	B&B	12' O.C.	High
19	<i>Quercus bicolor</i>	Swamp White Oak	2" Caliper	B&B	12' O.C.	High
19	<i>Platanus occidentalis</i>	Sycamore	2" Caliper	B&B	12' O.C.	High
19	<i>Acer saccharinum</i>	Silver Maple	2" Caliper	B&B	12' O.C.	High
<b>LIVE STAKES</b>						
190	<i>Cornus racemosa</i>	Gray Dogwood	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF	Moderate
190	<i>Cornus amomum</i>	Silky Dogwood	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF	High
190	<i>Salix sericea</i>	Silky Willow	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF	High
190	<i>Salix nigra</i>	Black Willow	3' Length 0.5"-1.5" dia.	Dormant stems	5/cluster/6 LF	Moderate
<b>LIVE POSTS</b>						
76	<i>Alnus incana ssp rugosa</i>	Speckled alder	6' Length 2" min. dia.	Dormant stems	1/cluster/6 LF	High
76	<i>Salix sericea</i>	Silky Willow	6' Length 2" min. dia.	Dormant stems	1/cluster/6 LF	High

Note: Alternate Roughness Planting locations shall be staked for approval by the engineer, prior to installation. Dormant stem quantities represent the total number of individual stems.

## OUTFALL PROTECTION ZONE (SHEET 15 OF 18)

(1393 SQ FT/0.03 AC)

Quantity	Botanical Name	Common Name	Size	Form	Spacing/Rate
<b>SHRUBS</b>					
4	<i>Lindera benzoin</i>	Spicebush	4' Height	Container	5'-6' O.C.
4	<i>Rhododendron atlanticum</i>	Dwarf Azalea	4' Height	Container	5'-6' O.C.
4	<i>Rhus aromatica</i>	Fragrant Sumac	4' Height	Container	5'-6' O.C.
5	<i>Aronia melanocarpa</i>	Chokeberry	4' Height	Container	5'-6' O.C.
<b>TREES</b>					
2	<i>Platanus occidentalis</i>	Sycamore	2" Caliper	Container	11' O.C.
3	<i>Quercus palustris</i>	Pin oak	2" Caliper	Container	11' O.C.
3	<i>Liriodendron tulipifera</i>	Tulip poplar	2" Caliper	Container	11' O.C.

## TUBELINGS (SHEETS 14-15 OF 18)

(4183 SQ FT/0.10 AC)

Quantity	Botanical Name	Common Name	Size	Form	Spacing/Rate
262	<i>Cornus racemosa</i>	Gray dogwood	12" Length	Rooted cuttings	2' O.C.
262	<i>Cornus amomum</i>	Silky dogwood	12" Length	Rooted cuttings	2' O.C.
261	<i>Salix sericea</i>	Silky willow	12" Length	Rooted cuttings	2' O.C.
261	<i>Salix nigra</i>	Black willow	12" Length	Rooted cuttings	2' O.C.

## WETLAND TERRACE ZONE (SHEET 9 OF 18)

(559 SQ FT/0.01 AC)

Quantity	Botanical Name	Common Name	Size	Form	Spacing/Rate
<b>POSTS</b>					
9	<i>Salix sericea</i>	Silky willow	6' Length 2" min. dia.	Dormant stems	4' O.C.
9	<i>Salix nigra</i>	Black willow	6' Length 2" min. dia.	Dormant stems	4' O.C.
9	<i>Cornus racemosa</i>	Gray dogwood	6' Length 2" min. dia.	Dormant stems	4' O.C.
8	<i>Cornus amomum</i>	Silky dogwood	6' Length 2" min. dia.	Dormant stems	4' O.C.
<b>LIVE BRANCHES FOR LAYERING</b>					
1056	<i>Platanus occidentalis</i>	American Sycamore	6' Length	Dormant stems	11 BRANCHES/LF
1056	<i>Salix sericea</i>	Silky willow	6' Length	Dormant stems	11 BRANCHES/LF

Note: Dormant stem quantities represent the total number of individual stems.

## WETLAND HERBACEOUS SEED MIX FOR TERRACES

% OF MIX	Botanical Name	Common Name
23	<i>Carex vulpinoidea</i>	Fox sedge
20	<i>Elmyrus virginica</i>	Virginia wild rye
10	<i>Sparganium eurycarpum</i>	Giant bur reed
5	<i>Carex crinita</i>	Fringed (nodding) sedge
5	<i>Carex gynandra</i>	Nodding sedge
5	<i>Carex lurida</i>	Lurid (shallow) sedge
5	<i>Juncus effusus</i>	Soft rush
5	<i>Scirpus cyperinus</i>	Wool grass
5	<i>Sparganium americanum</i>	Eastern bur reed
4	<i>Carex scoparia</i>	Blunt broom sedge
4	<i>Glyceria grandis</i>	American mannagrass
3	<i>Verbena hastata</i>	Blue vervain
2	<i>Carex comosa</i>	Cosmos (bristly) sedge
2	<i>Carex lupulina</i>	Hop sedge
1	<i>Glyceria canadensis</i>	Rattlesnake grass
1	<i>Leersia oryzoides</i>	Rice cutgrass

TOTAL QUANTITY: 0.28 LBS.  
Application rate of 0.5 LBS/1,000 SF

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## BRUSH MATTRESS (SHEET 9 OF 18)

(402 LF)

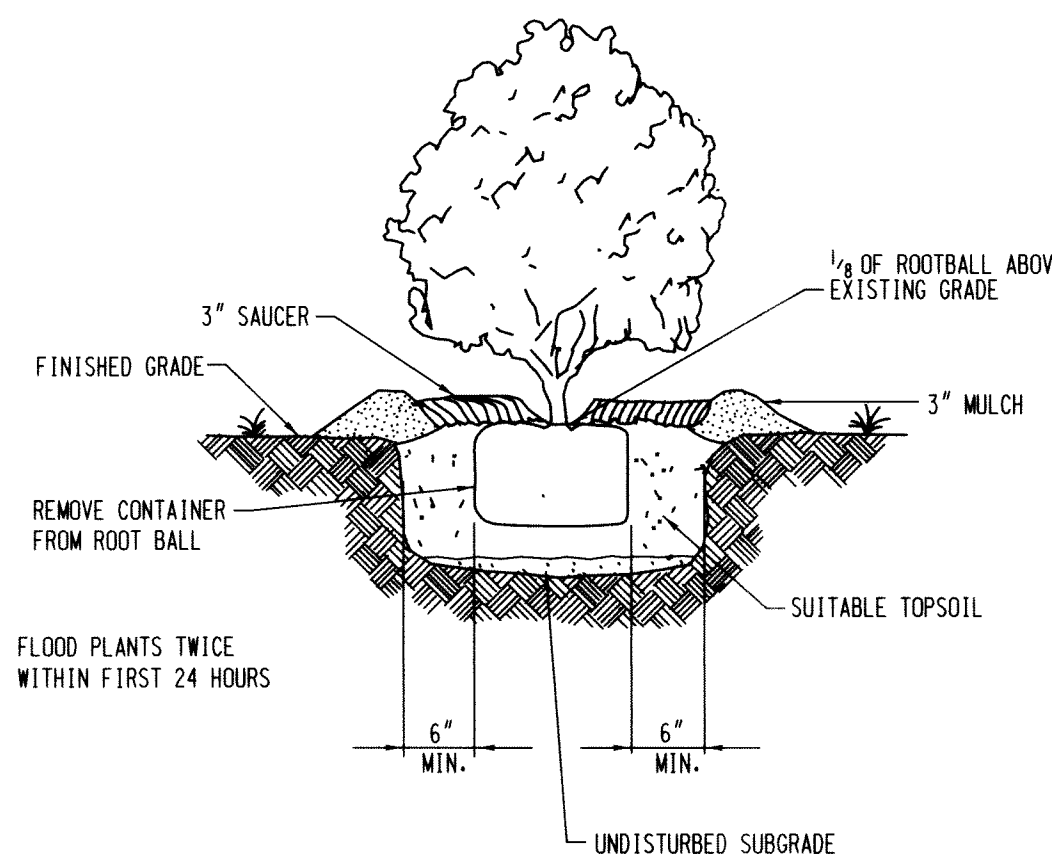
Quantity	Botanical Name	Common Name	Size	Form	Spacing/Rate
1156	<i>Salix discolor</i>	Pussy willow	3' Length	Dormant stems	8-15 stems/LF
1156	<i>Cephalanthus occidentalis</i>	Buttonbush	3' Length	Dormant stems	8-15 stems/LF
1156	<i>Salix lucida</i>	Shining willow	3' Length	Dormant stems	8-15 stems/LF
1155	<i>Viburnum dentatum</i>	Arrowwood	3' Length	Dormant stems	8-15 stems/LF

Note: Dormant stem quantities represent the total number of individual stems.

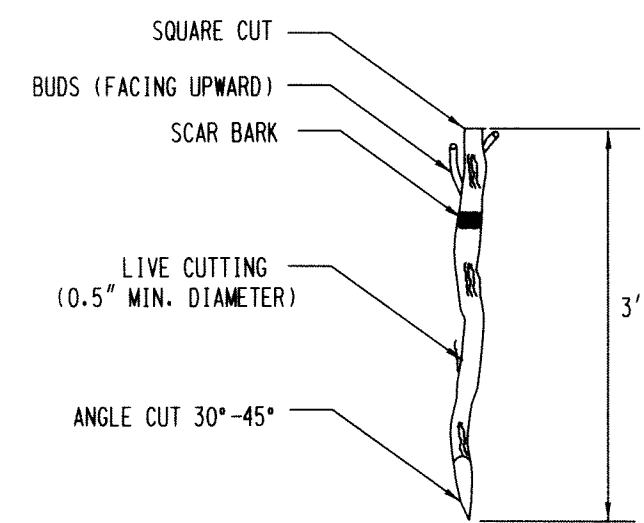
## PERMANENT SEEDING FOR LIVE STAKES, OUTFALL PROTECTION, RIPARIAN ZONE, AND EASEMENT ZONE (SHEETS 14-15 OF 18)

(51862 SQ FT/1.19 AC)

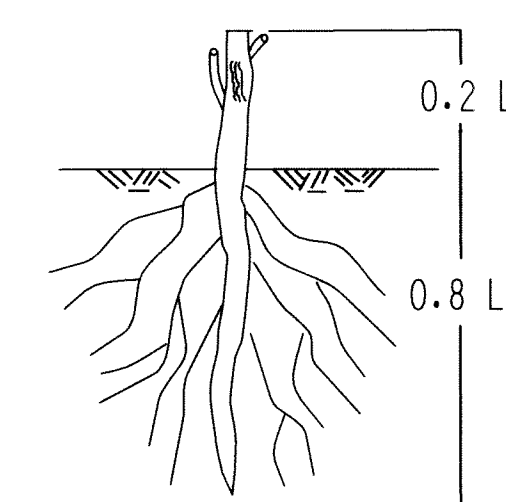
Botanical Name	Common Name	Application Rate (lbs/ac)	% of Mix	Quantity (lbs)
<i>Panicum virgatum</i>	Switchgrass	18.0	24%	21.4
<i>Poa palustris</i>	Fowl bluegrass	30.0	40%	35.7
<i>Panicum clandestinum</i>	Deer tongue grass	18.0	24%	21.4
<i>Bromus ciliatus</i>	Fringed brome	9.0	12%	10.7
<b>TOTALS</b>		<b>75.0 lbs/ac</b>		<b>89.2</b>



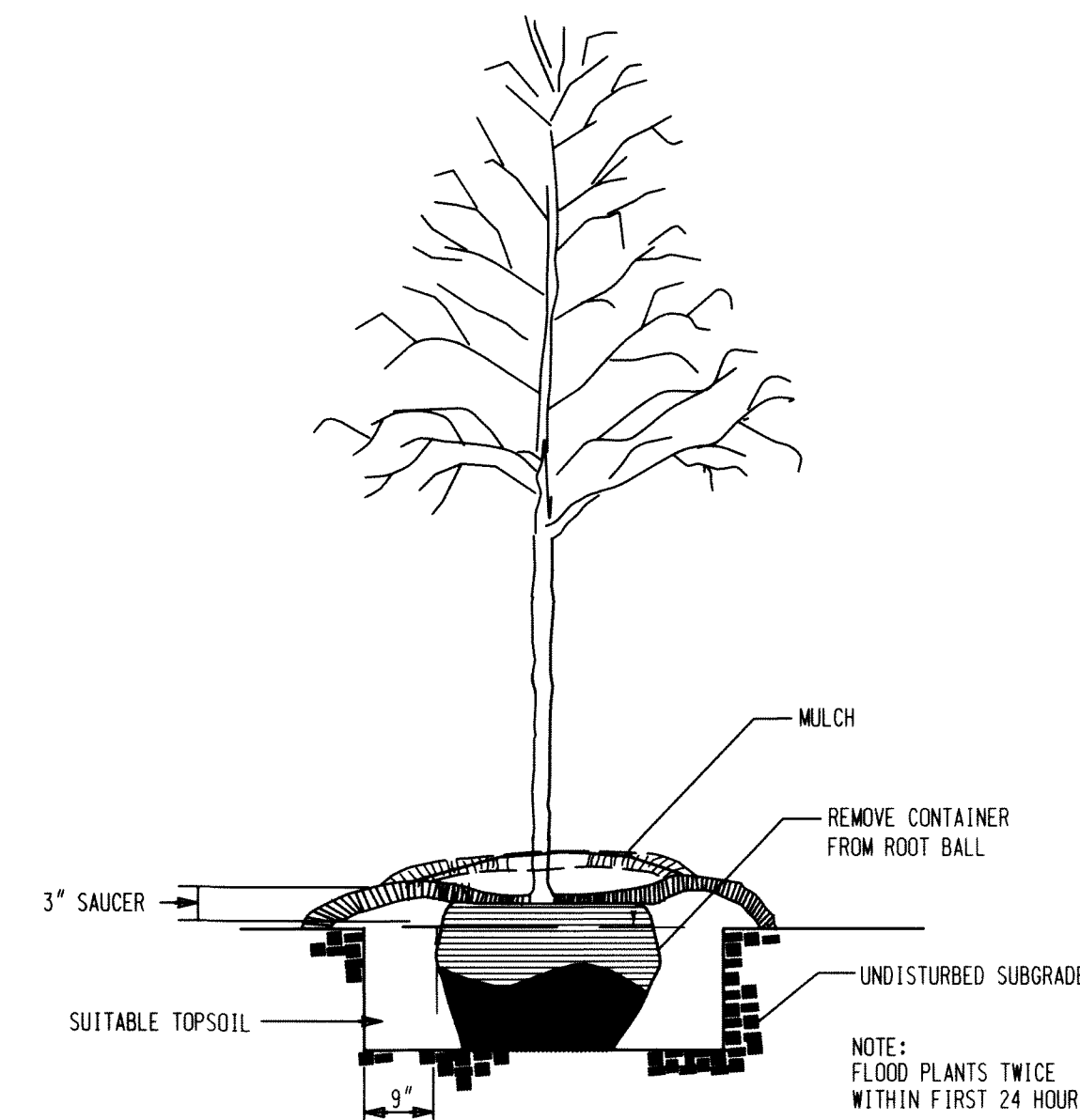
SHRUB PLANTING DETAIL  
NOT TO SCALE



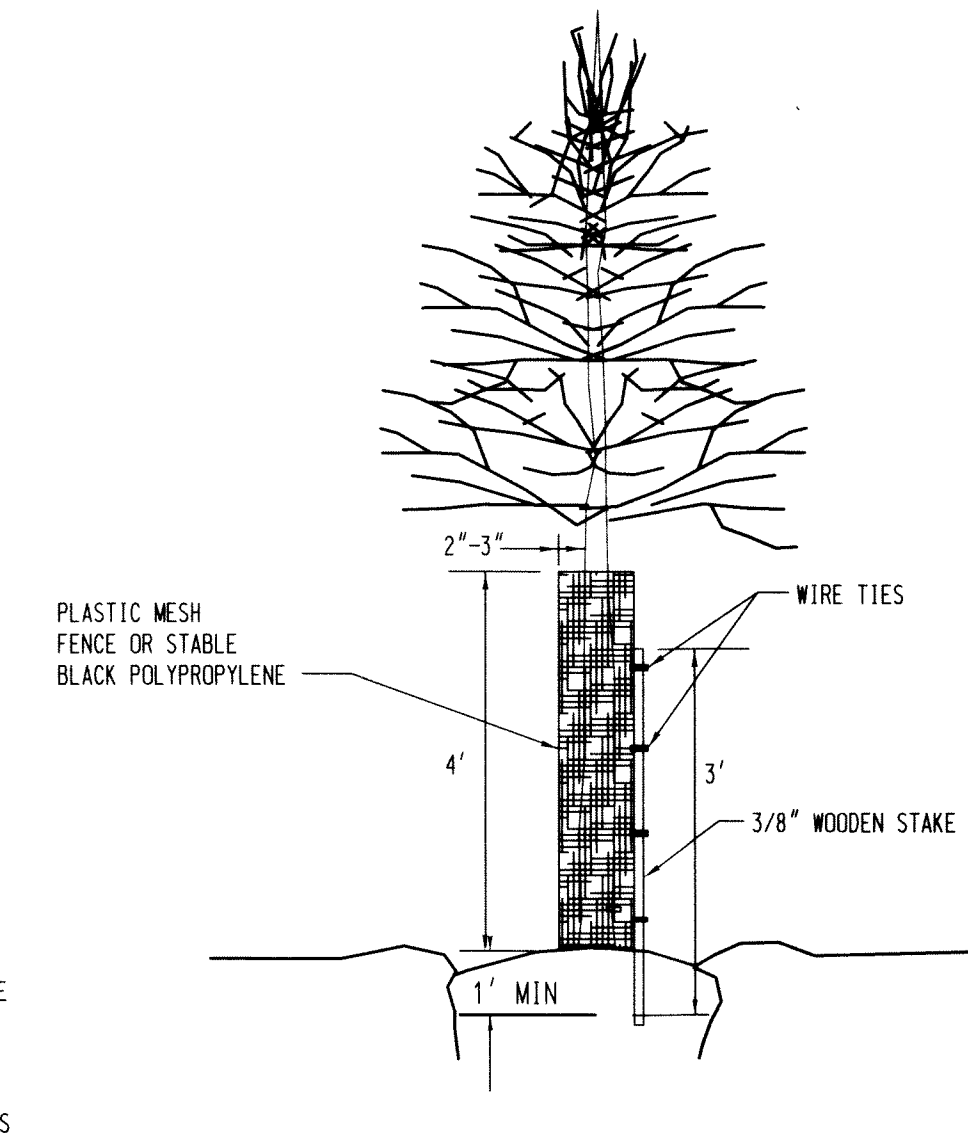
LIVE STAKE DETAIL  
NOT TO SCALE



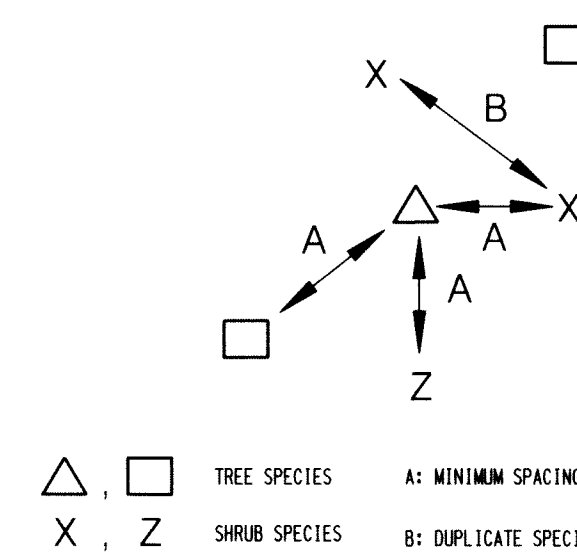
TUBELING DETAIL  
NOT TO SCALE



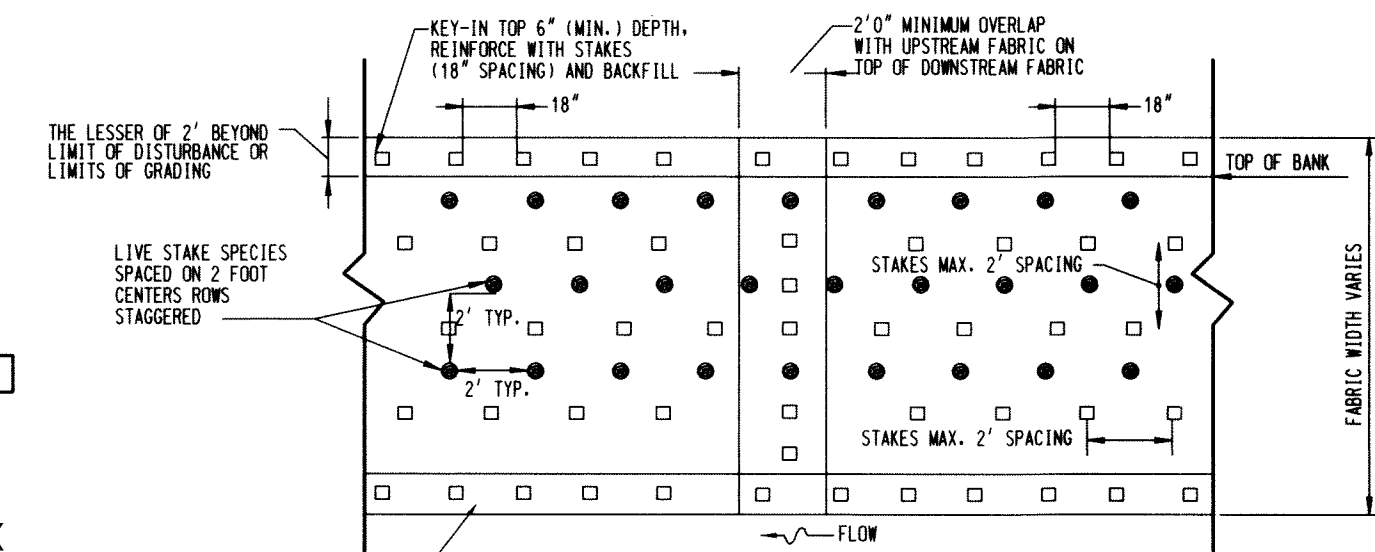
TREE PLANTING DETAIL  
NOT TO SCALE



TREE SHELTER DETAIL  
NOT TO SCALE



TREE AND SHRUB RANDOM SPACING  
NOT TO SCALE



TYPICAL PLAN VIEW  
NATURAL FIBER MATTING WITH LIVE STAKES  
NOT TO SCALE

NOTES:  
1. NATURAL FIBER MATTING TO BE ROLLED LENGTHWISE ALONG STREAMBANK EXTENDING TO THE BOTTOM OF TOE PROTECTION AND A MINIMUM OF ONE FOOT PAST TOP OF BANK. IF MORE THAN ONE ROLL IS REQUIRED, MID-BANK OVERLAP SHOULD BE A MINIMUM OF ONE FOOT AND SECURELY FASTENED WITH STAKES. (SEE SPECIFICATIONS FOR MATERIALS)  
2. NATURAL FIBER MATTING IS TO BE INSTALLED ON ALL GRADED BANK SLOPES THAT ARE NOT PROTECTED BY STONE TOE, IMBRICATED BANK PROTECTIONS, OR BRUSH MATTRESS.

NO.	REVISIONS DESCRIPTION	DATE

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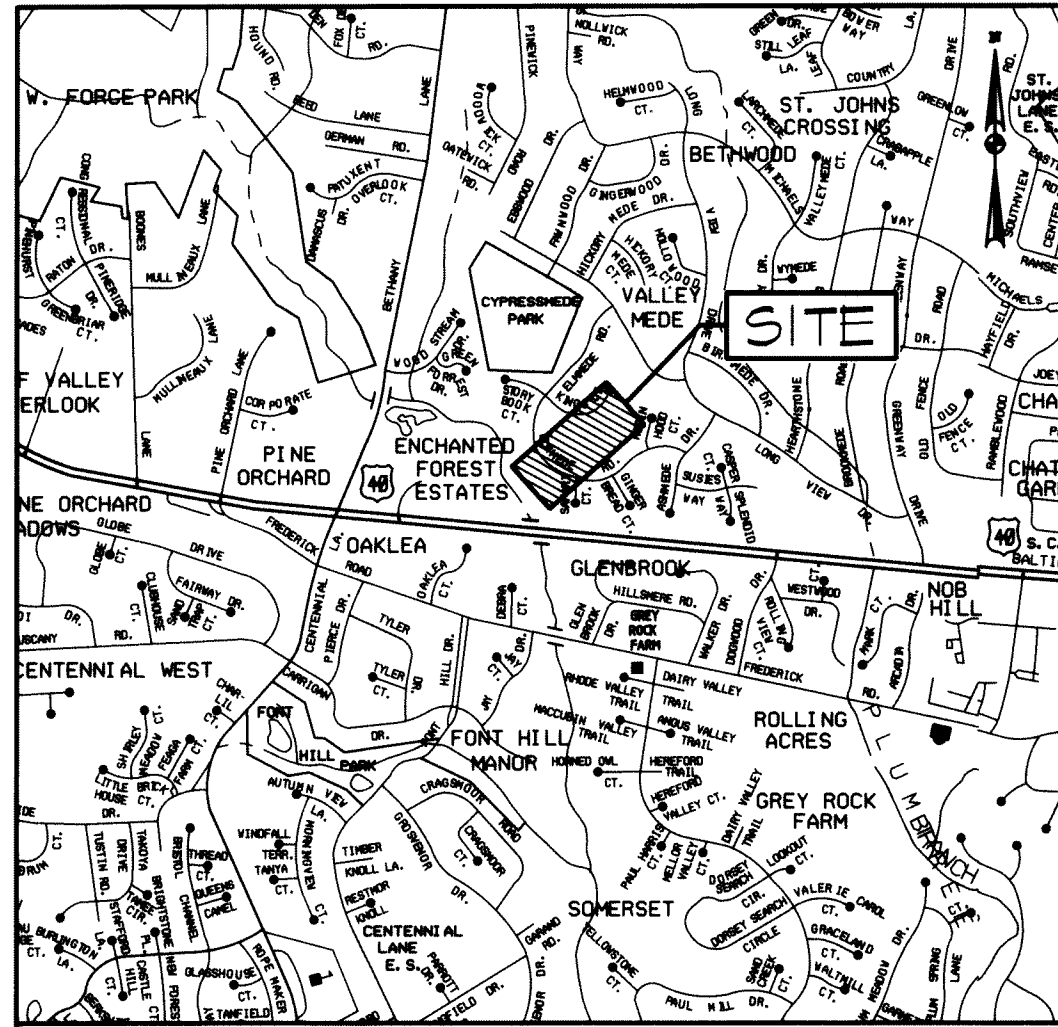
ELMWIDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
ENVIRONMENTAL MANAGEMENT DIVISION  
5700 COLUMBIA AVE., 2ND FLOOR  
COLUMBIA, MD 21046

## LANDSCAPE DETAILS

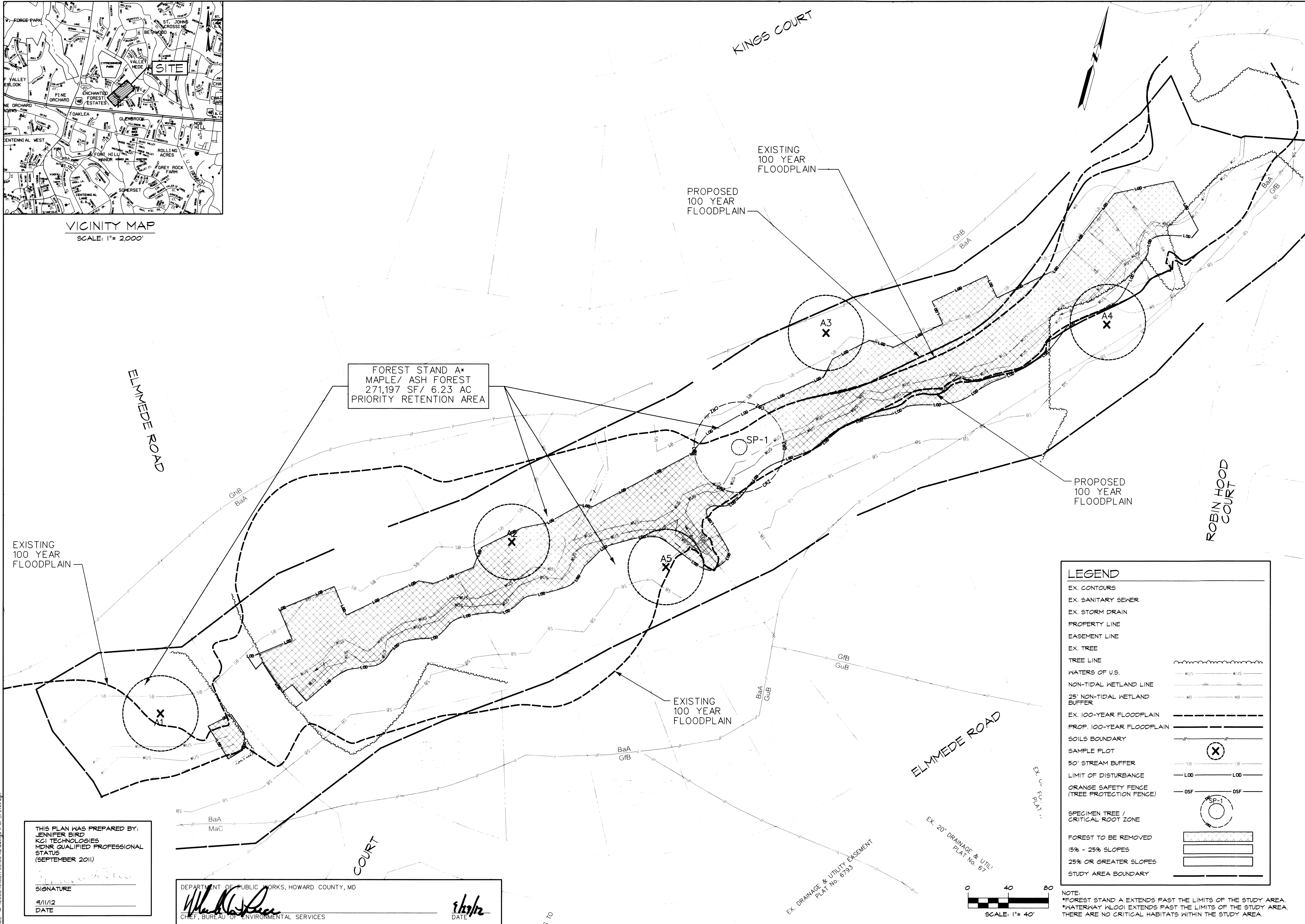
SCALE: NTS  
DATE: SEPTEMBER 2012  
KCIJOB NO.: 01-081795.60  
CAPITAL PROJECT NO.: D-1158  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:

BY: Elizabeth Spencer, Division: P&S, Natural Resources & Erosion Control, License No. 38311, Expiration Date: January 6, 2014  
DATE: 9/27/12  
PROFESSIONAL CERTIFICATION. 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.





VICINITY MAP  
SCALE: 1" = 2,000'



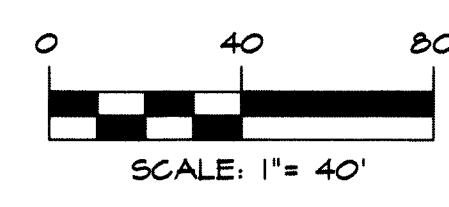
LEGEND	
EX. CONTOURS	---
EX. SANITARY SEWER	---
EX. STORM DRAIN	---
PROPERTY LINE	---
EASEMENT LINE	---
EX. TREE	○
TREE LINE	---
WATERS OF U.S.	WUS
NON-TIDAL WETLAND LINE	---
25' NON-TIDAL WETLAND BUFFER	WB
EX. 100-YEAR FLOODPLAIN	---
PROP. 100-YEAR FLOODPLAIN	---
SOILS BOUNDARY	---
SAMPLE PLOT	⊗
50' STREAM BUFFER	SB
LIMIT OF DISTURBANCE	LOD
ORANGE SAFETY FENCE (TREE PROTECTION FENCE)	OSF
SPECIMEN TREE / CRITICAL ROOT ZONE	○
FOREST TO BE REMOVED	▨
15% - 25% SLOPES	▨
25% OR GREATER SLOPES	▨
STUDY AREA BOUNDARY	---

NOTE:  
\*FOREST STAND A EXTENDS PAST THE LIMITS OF THE STUDY AREA.  
\*WATERWAY WLOO EXTENDS PAST THE LIMITS OF THE STUDY AREA.  
THERE ARE NO CRITICAL HABITATS WITHIN THE STUDY AREA.

THIS PLAN HAS PREPARED BY:  
JENNIFER BIRD  
KCI TECHNOLOGIES  
MDNR QUALIFIED PROFESSIONAL STATUS  
(SEPTEMBER 2011)

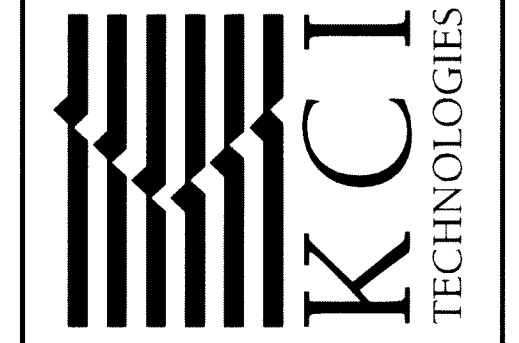
SIGNATURE \_\_\_\_\_  
DATE 4/1/12

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
  
 CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
 DATE 4/1/12



NO.	REVISIONS DESCRIPTION	DATE

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ELMEDDE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158  
HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS  
STORMWATER MANAGEMENT DIVISION  
6705 COLUMBIA AVE  
COLUMBIA, MD 21046

FOREST CONSERVATION PLAN

SCALE: 1" = 40'  
DATE: SEPTEMBER 2012  
KCIJOB NO.: 01-081795.60  
CAPITAL PROJECT NO.: D-1158  
PERMIT ISSUE:  
CONSTRUCTION ISSUE:



**FOREST CONSERVATION NOTES**

1. THE LOD WAS USED AS THE TOTAL TRACT AREA AND AS THE NET TRACT AREA (NTA) FOR FOREST CONSERVATION CALCULATIONS AS APPROVED UNDER WAIVER PETITION WP- 1111.
2. 1.53 ACRES OF CLEARING WILL BE WITHIN THE 100-YEAR FLOODPLAIN. THESE AREAS WILL BE REPLANTED AS SEEN ON THE LANDSCAPE PLAN SHEETS 14 & 15 AND THE LANDSCAPE NOTES AND DETAILS ON SHEET 16.
3. ALL EFFORTS TO MINIMIZE THE AREA OF DISTURBANCE WILL BE MADE.
4. NO FOREST MITIGATION IS REQUIRED.

**GENERAL NOTES**

1. PROJECT AREA IS LOCATED ON ONE PROPERTY OWNED BY HOWARD COUNTY RECREATION AND PARKS (MAP 0024, GRID 0002, PARCEL 0020).
2. EXISTING ZONING: R-20, SINGLE
3. EXISTING LAND USE: RESIDENTIAL - RURAL MEDIUM DENSITY
4. WATERS OF THE U.S. WERE DELINEATED BY KCI TECHNOLOGIES, INC. ON AUGUST 17, 2011. WATERS OF THE U.S. SHOWN REPRESENT THE UNVERIFIED USAGE/MDE WATER RESOURCE BOUNDARIES.
5. TOTAL AREA OF NONTIDAL WETLANDS WITHIN THE PROJECT AREA: 0.06 AC.
6. TOTAL LINEAR FEET OF PERENNIAL AND INTERMITTENT STREAMS: 1,462 LF.
7. TOTAL FORESTED AREA WITHIN LIMITS OF DISTURBANCE: 1.34 AC.
8. THERE ARE NO CRITICAL HABITAT AREAS WITHIN THE PROJECT AREA. NO RARE, THREATENED OR ENDANGERED SPECIES WERE ENCOUNTERED DURING THE FIELD INVESTIGATIONS. IN ADDITION, CORRESPONDENCE WITH THE MARYLAND HISTORIC TRUST, THE U.S. FISH AND WILDLIFE SERVICE, AND THE MARYLAND DEPARTMENT OF NATURAL RESOURCES INDICATE THERE ARE NO RECORDS OF HISTORIC RESOURCES OR SENSITIVE NATURAL RESOURCES WITHIN THE AFFECTED AREA.
9. NO SPECIMEN TREES WILL BE REMOVED.
10. TREE SAVE IS SHOWN ON TREES WITHIN THE LOD BECAUSE AN ATTEMPT WILL BE MADE TO SAVE THESE TREES. TREES WILL ONLY BE REMOVED IF NECESSARY FOR GRADING OR ACCESS.
11. THE COORDINATES SHOWN HEREON ARE BASED ON HOWARD COUNTY GEODETIC CONTROL, WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NUMBERS 30EC AND 31GB WERE USED FOR THIS SITE. THE EXISTING TOPOGRAPHY IS TAKEN FROM FIELD RUN SURVEY WITH ONE FOOT CONTOUR INTERVALS PREPARED BY KCI TECHNOLOGIES, INC., IN JANUARY 2011.
12. ALL WETLAND AND WUS SYSTEMS DENOTED WITH AN ASTERISK (\*) CONTINUE BEYOND THE LIMITS OF THE STUDY AREA.

**SOILS TABLE**

Soil Symbol	Soil Unit Name	Percent Slope	K <sub>f</sub> value	Hydric (Y/N)
BaA	Baile silt loam	0 to 3	0.2	Y
GfB	Gladstone-Urban Land Complex	0 to 8	0.32	N
GhB	Glenelg-Urban Land Complex	0 to 8	0.28	N
MaC	Manor Loam	8 to 15	0.28	N

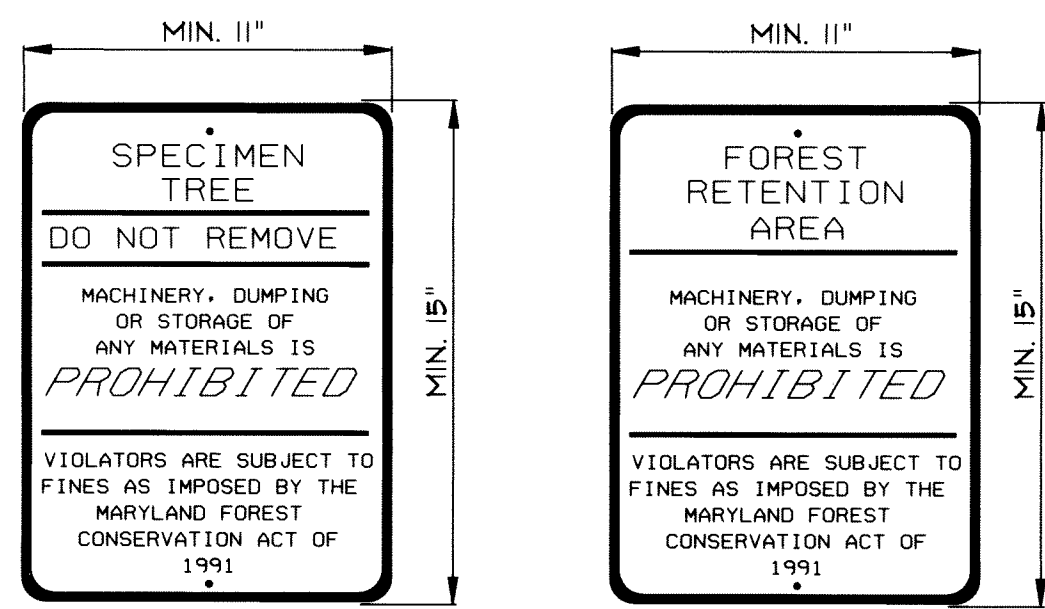
**SPECIMEN TREE TABLE**

Number	Species	Common Name	Size, DBH (in)	Condition
SP-1	<i>Fraxinus pennsylvanica</i>	Green ash	30.0	Good

**Forest Conservation Worksheet**

<b>Net Tract Area</b>		
A. Total Tract Area	A=	1.58 ac.
B. Area within 100-year Floodplain	B=	1.30 ac.
C. Area to Remain in Agricultural Production	C=	0.00 ac.
D. Net Tract Area (D=(A-B-C))	D=	0.28 ac.
<b>Land Use Category :</b>		
E. Afforestation Threshold (D x 20%)	E=	0.06 ac.
F. Conservation Threshold (D x 25%)	F=	0.07 ac.
<b>Existing Forest Cover</b>		
G. Existing Forest Cover (excluding floodplain)	G=	0.00 ac.
H. Area of Forest Above Afforestation Threshold (1) If G<=E then H=0 and I=0, go to L (2) If G>E then H=G-E, go to I	H=	0.00 ac.
I. Area of Forest Above Conservation Threshold (1) If G<=F then I=0, go to L (2) If G>F then I=G-F, go to J	I=	0.00 ac.
<b>Break Even Point</b>		
J. Forest Retention Above Threshold with no Mitigation (1) If I>0 then J=(0.2 x I) + F, go to K (2) If I=0, J=0, go to L	J=	0.00 ac.
K. Clearing Permitted Without Mitigation (K=G-J)	K=	0.00 ac.
<b>Proposed Forest Clearing</b>		
L. Total Area of Forest to be Cleared	L=	0.00 ac.
M. Total Area of Forest to be Retained (M=G-L)	M=	0.00 ac.
<b>Planting Requirements</b>		
N. Reforestation for Clearing Above the Conservation Threshold (1) If L=L then N=0, P=0, Q=0, R=0, S=0, go to T (2) If M>F then N=L x 0.25, P=0, go to Q (3) If M<=F then N=L x .025, go to P	N=	0.00 ac.
P. Reforestation for Clearing Below the Conservation Threshold (1) If G>F and M>F then P=0, Q=0, go to R (2) If G>F and M<=F then P=2.0 x ( F-M ), Q=0, go to R (3) If G<=F then P=2.0 x L, Q=0, go to R	P=	0.00 ac.
Q. Credit for Retention Above the Conservation Threshold (1) If M>F then Q=M-F, go to R (2) If M<=F then Q=0, go to R	Q=	0.00 ac.
R. Total Reforestation Required (1) If Q>N and M>E then R=0, S=0, go to T (2) If Q<=N and M>E then R=( N-P )-Q, S=0, go to T (3) If Q<=N and M<=E then R=N+P, go to S	R=	0.00 ac.
S. Total Afforestation Required (1) If G<=E and M<=E then S=E-G, go to T (2) If G<=E and M>E then S=0, go to T	S=	0.06 ac.
T. Total Reforestation and Afforestation Requirement T=( R+S )	T=	0.06 ac.

Note: Use 0 for all negative numbers that result from the calculations

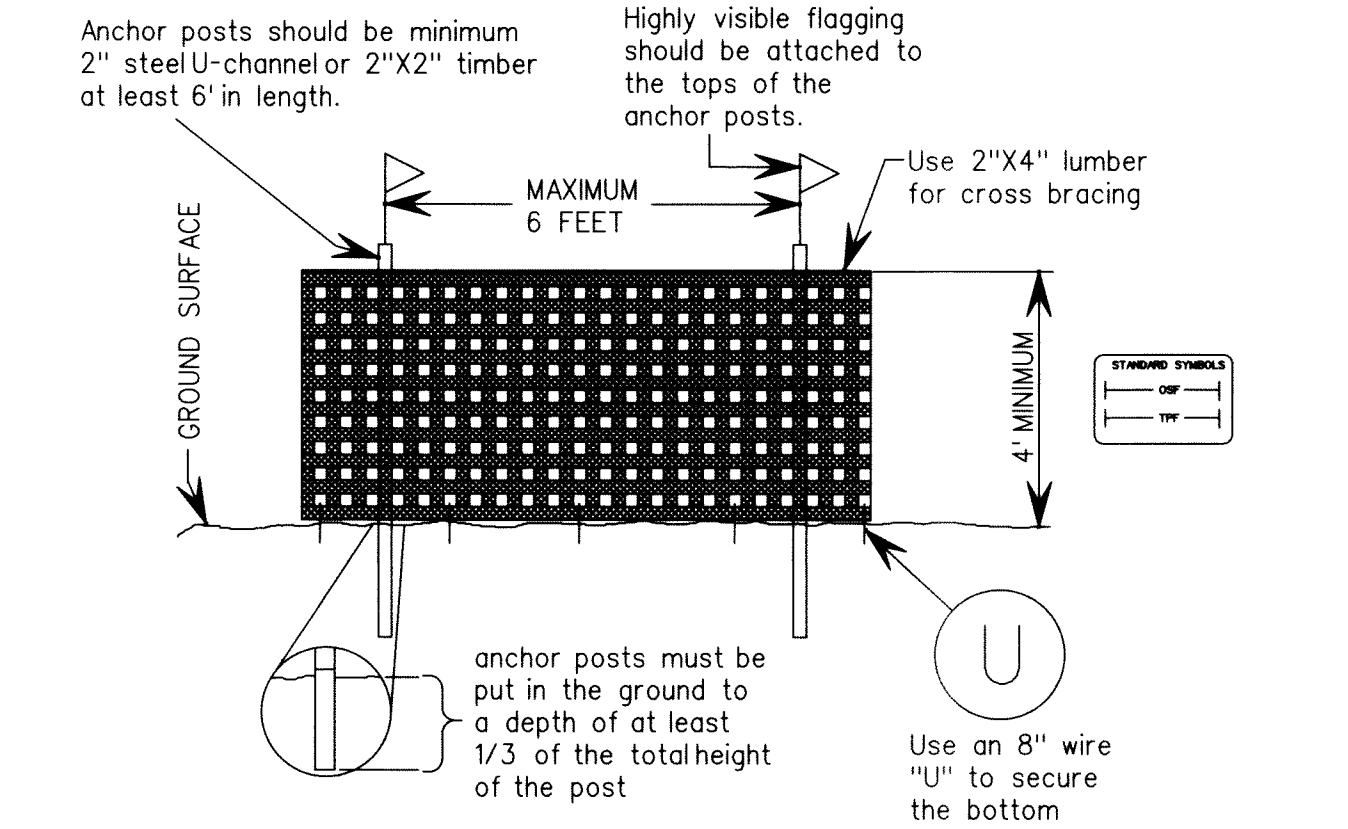


**FOREST CONSERVATION SIGNAGE**

NOT TO SCALE

**NOTES:**

1. BOTTOM OF SIGN TO BE HIGHER THAN TREE PROTECTION FENCE.
2. SIGNS TO BE PLACED 50 TO 100' APART. CONDITIONS ON SITE AFFECTING VISIBILITY MAY WARRANT PLACING SIGNS CLOSER OR FARTHER APART WITHIN THE ACCEPTABLE NOTED RANGE.
3. ATTACHMENT OF SIGNS TO TREES IS PROHIBITED.
4. SIGNS MAY BE REMOVED FROM RESIDENTIAL LOTS UPON ISSUANCE OF USE AND OCCUPANCY RETENTION FOREST ONLY.
5. ALL SIGNAGE MUST REMAIN DURING THE MAINTENANCE PERIOD.
6. THE SIGNS NOTIFY CONSTRUCTION WORKERS AND FUTURE RESIDENTS OF THE NEWLY PLANTED MATERIAL, IMPROVING THE TREES' SURVIVAL RATES.
7. SIGNS MAY BE ADAPTED BY RESIDENTS FOR IDENTIFICATION OF FOREST RETENTION AREAS.



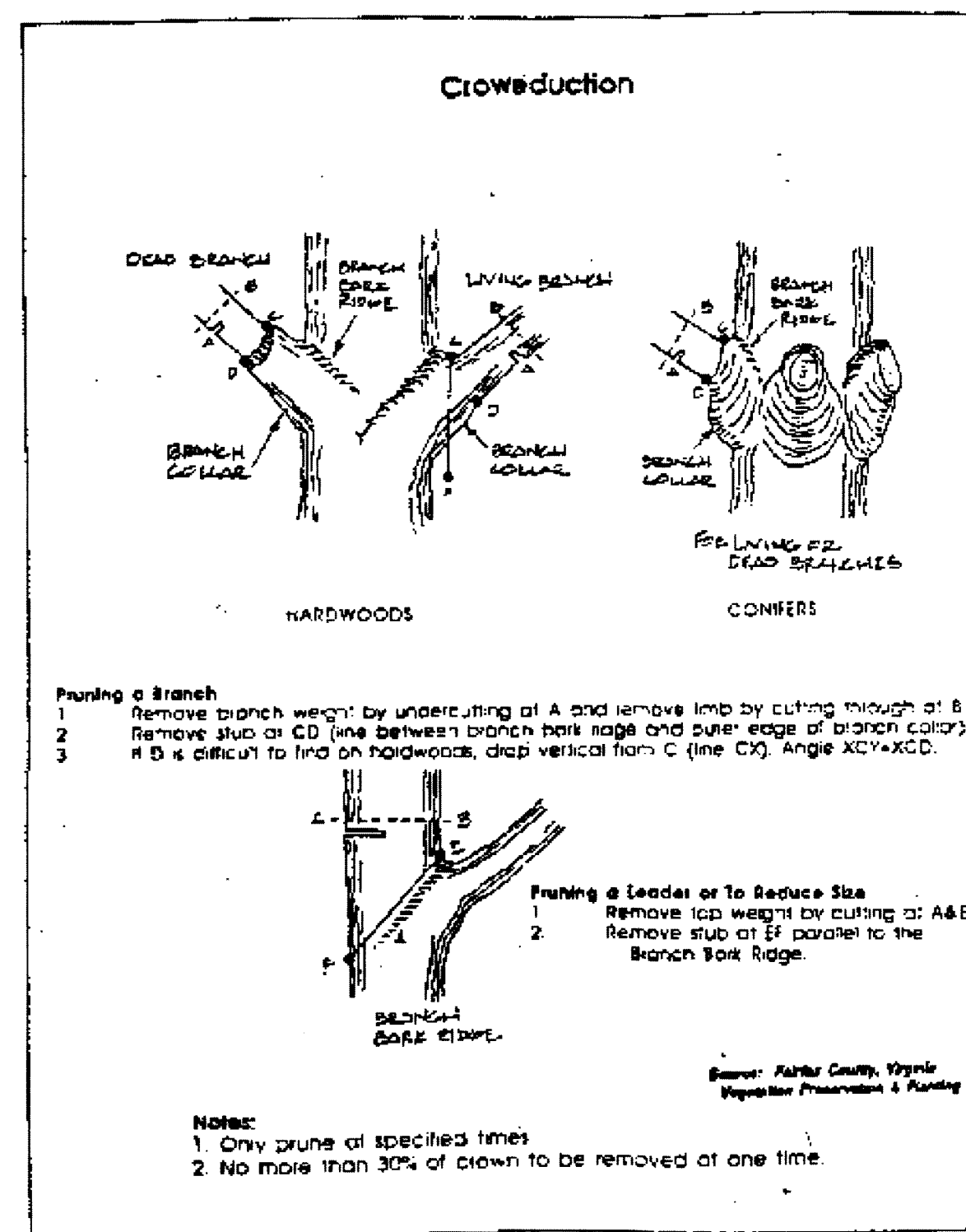
**BLAZE ORANGE PLASTIC MESH SAFETY FENCE/TREE PROTECTION DETAIL**

NOT TO SCALE

**PLACEMENT OF ORANGE HIGH VISIBILITY FENCE:**

1. ORANGE HIGH VISIBILITY FENCE SHALL BE MANUALLY INSTALLED ALONG THE LIMITS OF DISTURBANCE, WHERE THAT LIMIT IS WITHIN 50' OF THE FOREST CONSERVATION/FOREST BUFFER EASEMENTS AND SHALL FUNCTION AS A FOREST PROTECTION DEVICE.
2. RETENTION AREA WILL BE SET AS PART OF THE REVIEW PROCESS.
3. BOUNDARIES OF THE RETENTION AREA SHALL BE STAKES AND FLAGGED PRIOR TO INSTALLING THE DEVICE.
4. ROOT DAMAGE SHALL BE AVOIDED.
5. PROTECTIVE SIGNAGE MAY ALSO BE USED.
6. DEVICE SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

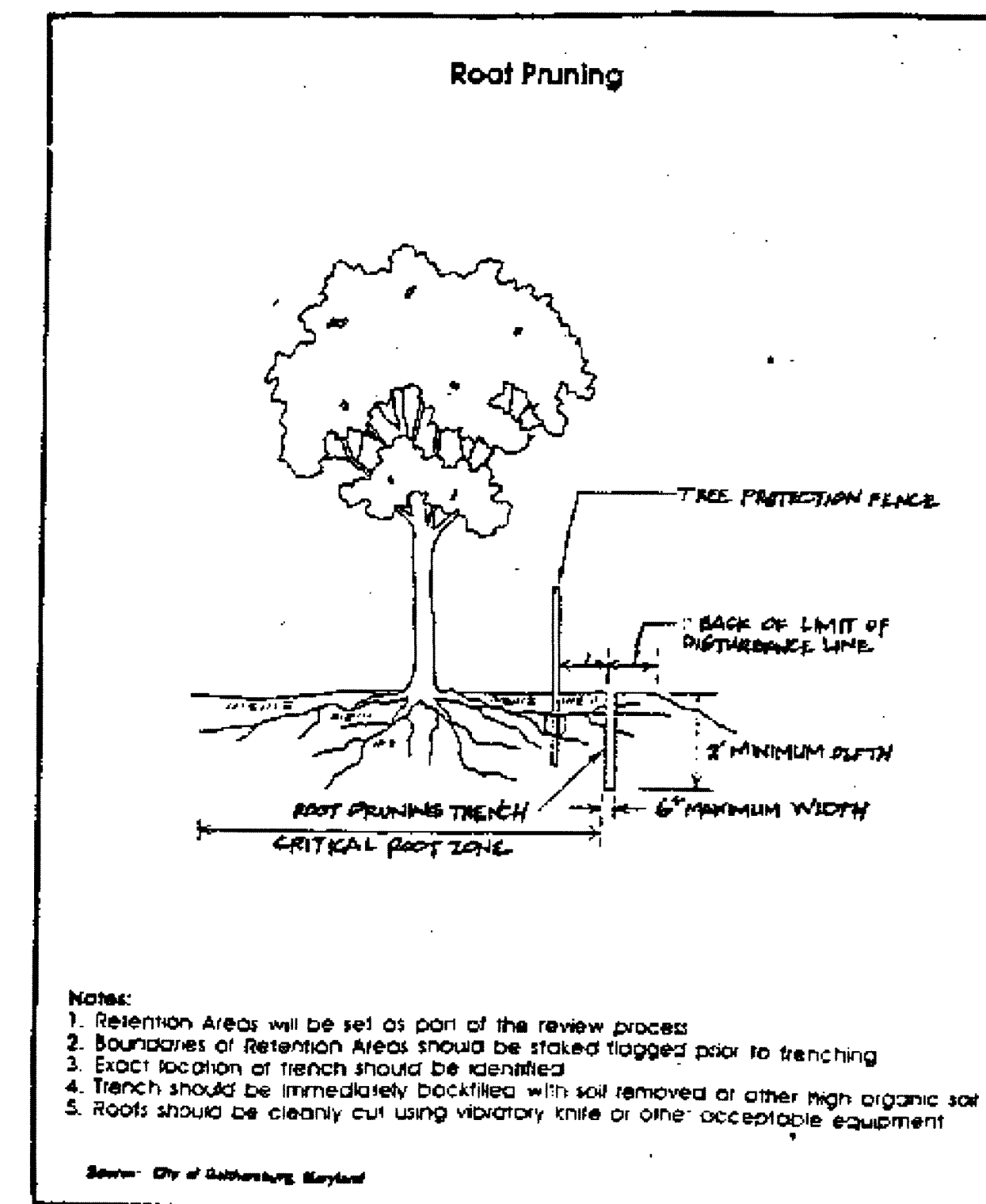
EXHIBIT G - 14



**CROWN REDUCTION**

NOT TO SCALE

EXHIBIT G - 15



**ROOT PRUNING**

NOT TO SCALE

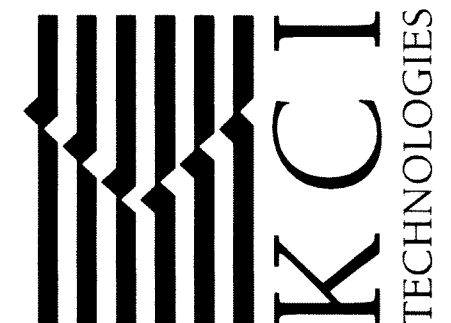
THIS PLAN WAS PREPARED BY:  
JENNIFER BIRD  
KCI TECHNOLOGIES  
MDNR QUALIFIED PROFESSIONAL STATUS  
(SEPTEMBER 2011)

SIGNATURE  
DATE: 9/11/12

DEPARTMENT OF PUBLIC WORKS, HOWARD COUNTY, MD  
CHIEF, BUREAU OF ENVIRONMENTAL SERVICES  
DATE: 9/27/12

NO.	REVISIONS DESCRIPTION	DATE

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ELMDEE ROAD  
STREAM RESTORATION PROJECT  
CAPITAL PROJECT D-1158

**FOREST CONSERVATION PLAN NOTES AND DETAIL**

SCALE: AS SHOWN

DATE: SEPTEMBER 2012

KCI JOB NO.: 01-081795-60

CAPITAL PROJECT NO.: D-1158

PERMIT ISSUE:

CONSTRUCTION ISSUE: