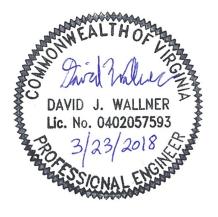
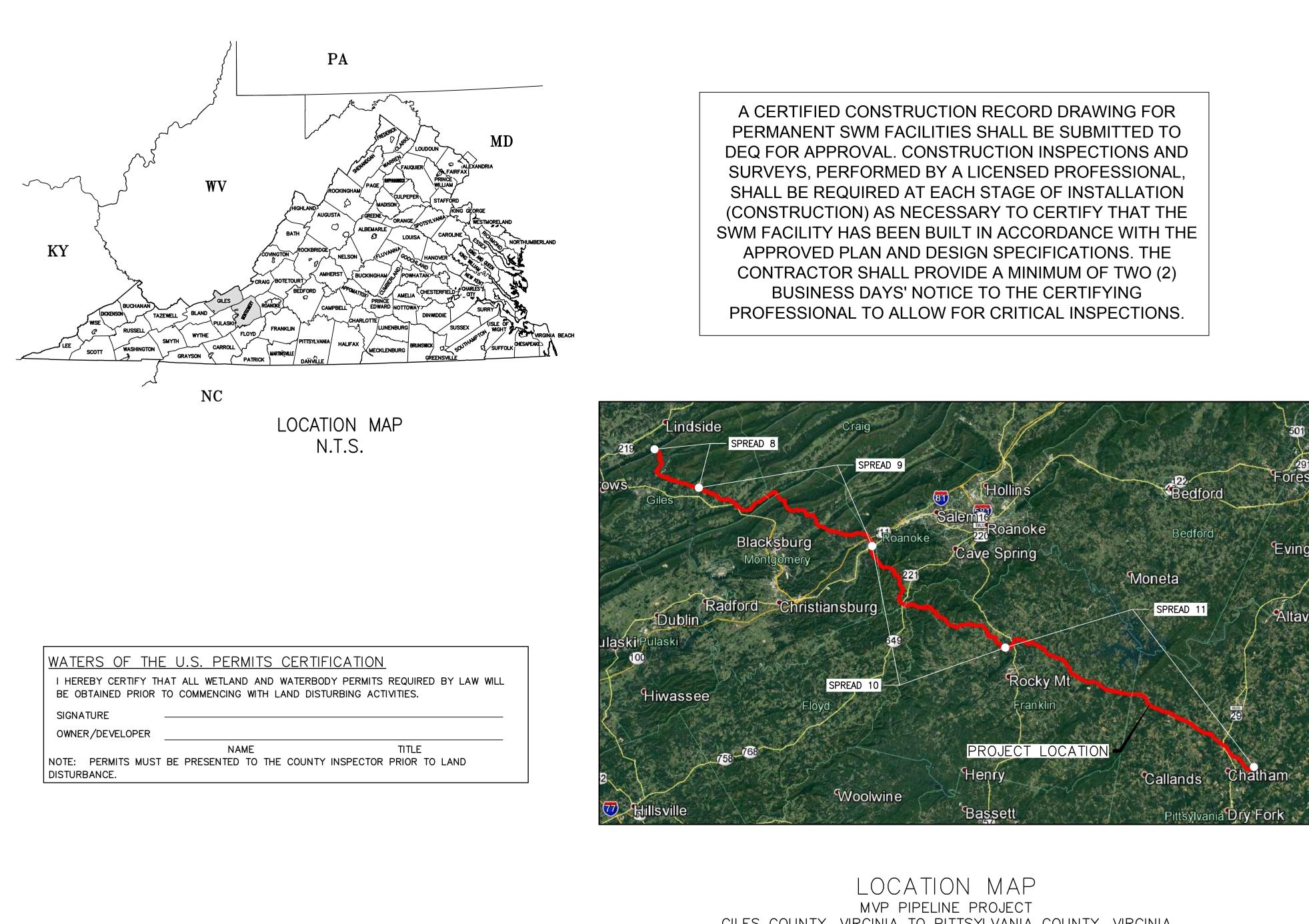
By virtue of this seal and signature, all supporting documents included in this package are accurate and support the design presented herein.



# **MOUNTAIN VALLEY PIPELINE, LLC EROSION & SEDIMENT CONTROL PLAN**

## **MVP PIPELINE PROJECT GILES COUNTY TO MONTGOMERY COUNTY SPREAD 9**



TETRA TECH CAD FILE PATH: X:\CADD\\_Pittsburgh\EQT\7157 - MVP\00 - General\E&S\Spread 9\7157ES000(S9).dwg PLOTTED ON: 2/3/2018 7:42 AM PLOTTED BY: Rickabough. Greg PLOT FILE: ENVIRONMENTAL\_COLOR.ctb

	-
SHEET No.	
0.00	COVER
0.01 TO 0.21	EROSI
0.22 TO 0.23	GENER
13.00A	VARIA
13.01 TO 13.02	KEY P
13.03EX TO 13.90EX	EXISTI
13.03ES TO 13.90ES	EROSI
13.03PC TO 13.90PC	POST



CONTRACTOR IS RESPONSIBLE TO **IDENTIFY ALL UTILITIES. THE UTILITY** LINES SHOWN ON THE PLAN ARE FOR INFORMATIONAL PURPOSES ONLY AND DO NOT REPRESENT SURVEYED LINE INFORMATION.

GILES COUNTY, VIRGINIA TO PITTSYLVANIA COUNTY, VIRGINIA

#### DRAWING INDEX DRAWING TITLE GENERAL SET SHEET ON AND SEDIMENT CONTROL DETAILS L NOTES AND LEGEND SPREAD 9 NCE AND EXEMPTION REQUESTS

NG CONDITIONS

ON & SEDIMENT CONTROL PLANS

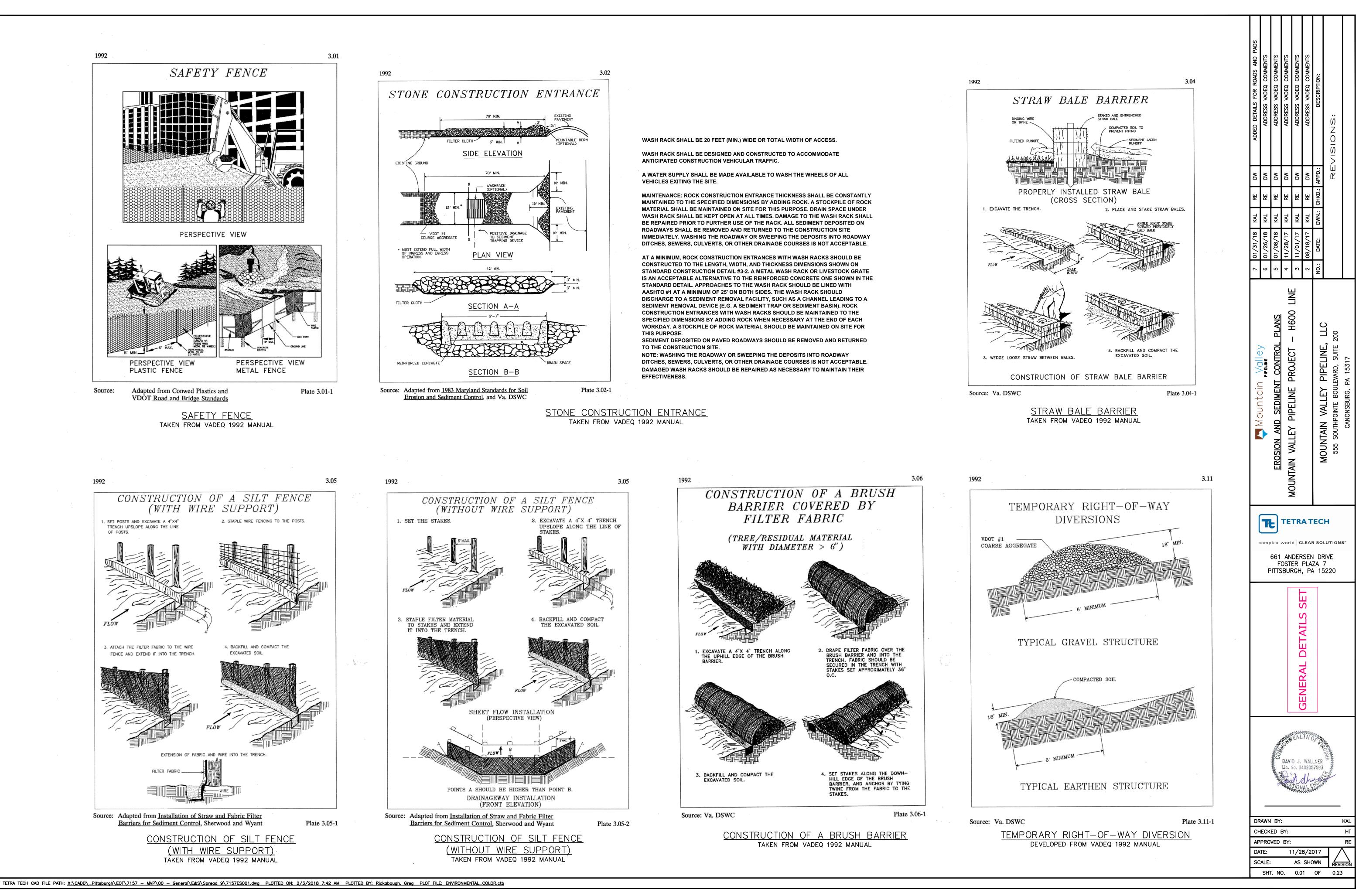
CONSTRUCTION STORMWATER AND RESTORATION PLANS

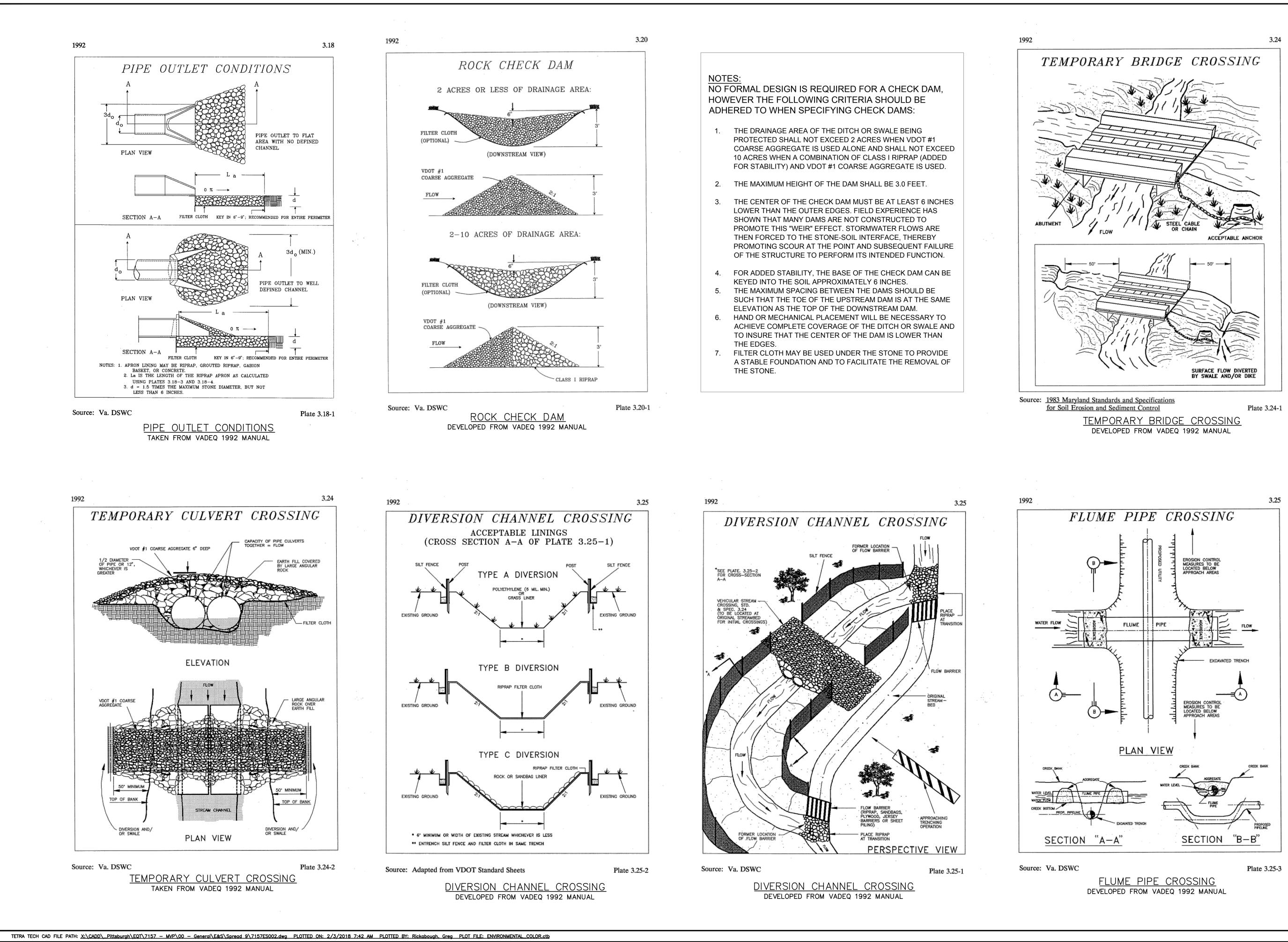


THREE DAYS BEFORE YOU DIG

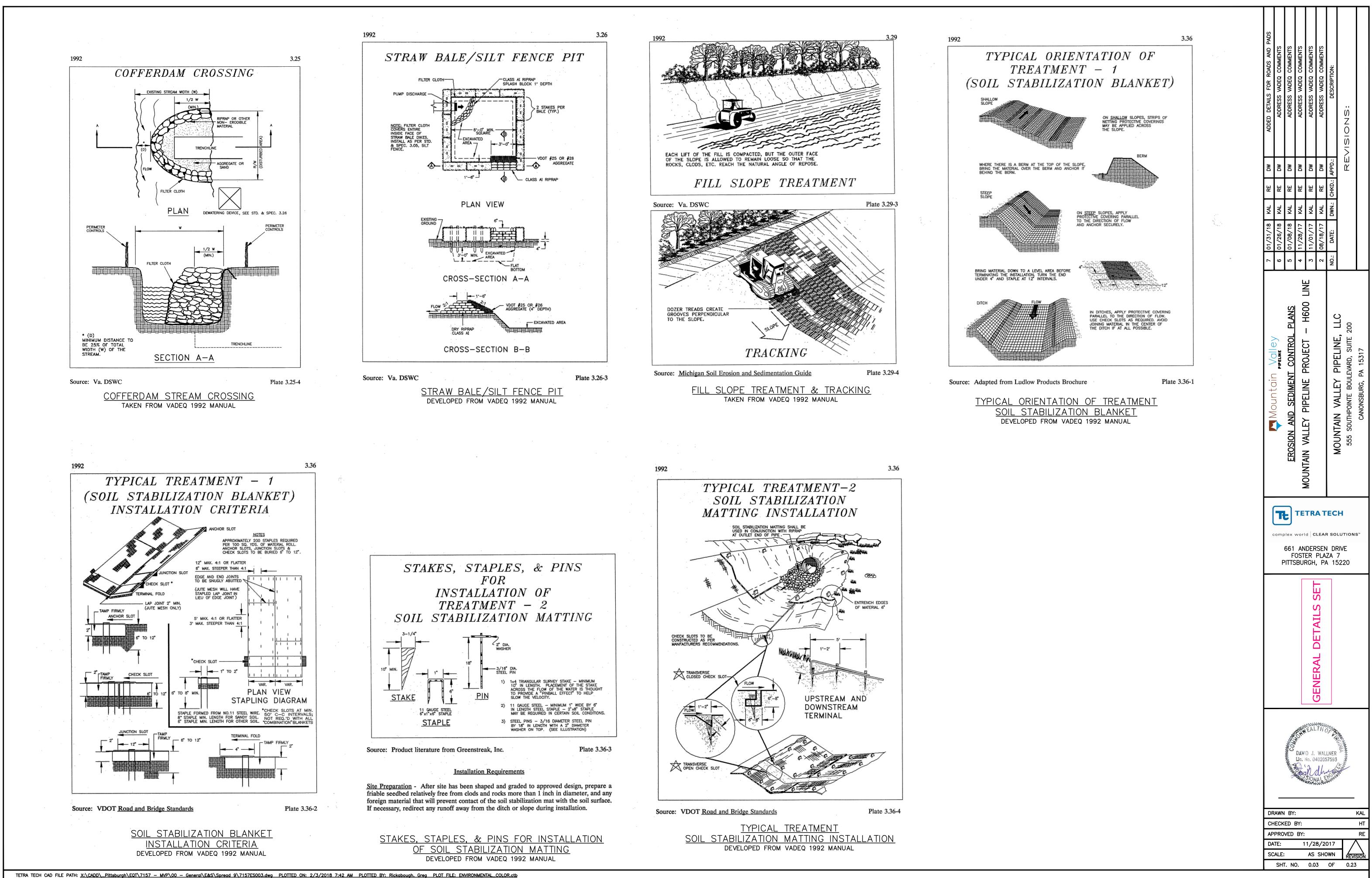
CALL VA ONE CALL SYSTEM TOLL FREE 811 OR 1-800-552-7001

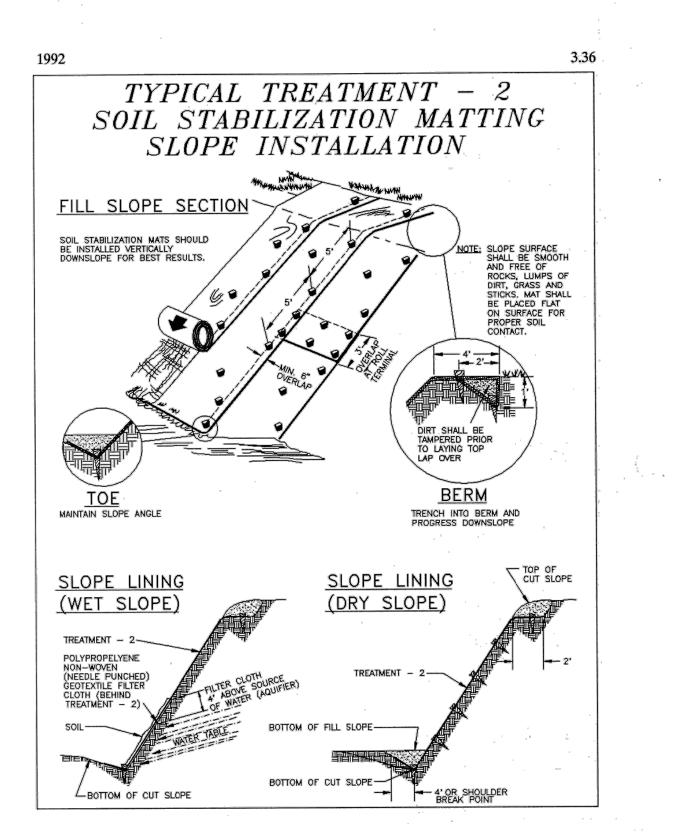
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AWN IECK PRO TE: ALE:					9	01/26/18	KAL	RE DW	ADDRESS VADEQ COMMENTS
ED VED	Transferrencessan		661 F	EROSION AND SEDIMENT CONTROL PLANS	5	01/08/18	KAL	RE DW	ADDRESS VADEQ COMMENTS
BY: BY:			worl AN OST		4	11/28/17	KAL	RE DW	ADDRESS VADEQ COMMENTS
			⊣∣c DEF ER	MUUNIAIN VALLEI FIFELINE FRUJEUI - NOUU LINE	β	11/01/11	KAL	RE DW	ADDRESS VADEQ COMMENTS
8/2	WAL	GENERAL DE LAILS SE I	LEAI SEN PLA		2	08/18/17	KAL	RE DW	ADDRESS VADEQ COMMENTS
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REVI	NIA		lution: RIVE	555 SOUTHPOINTE BOULEVARD, SUITE 200				Ľ	REVISIONS:
KAL HT RE			S™	CANONSBURG, PA 15317					





ADDED DETAILS FOR ROADS AND PADS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	DESCRIPTION:	REVISIONS:	
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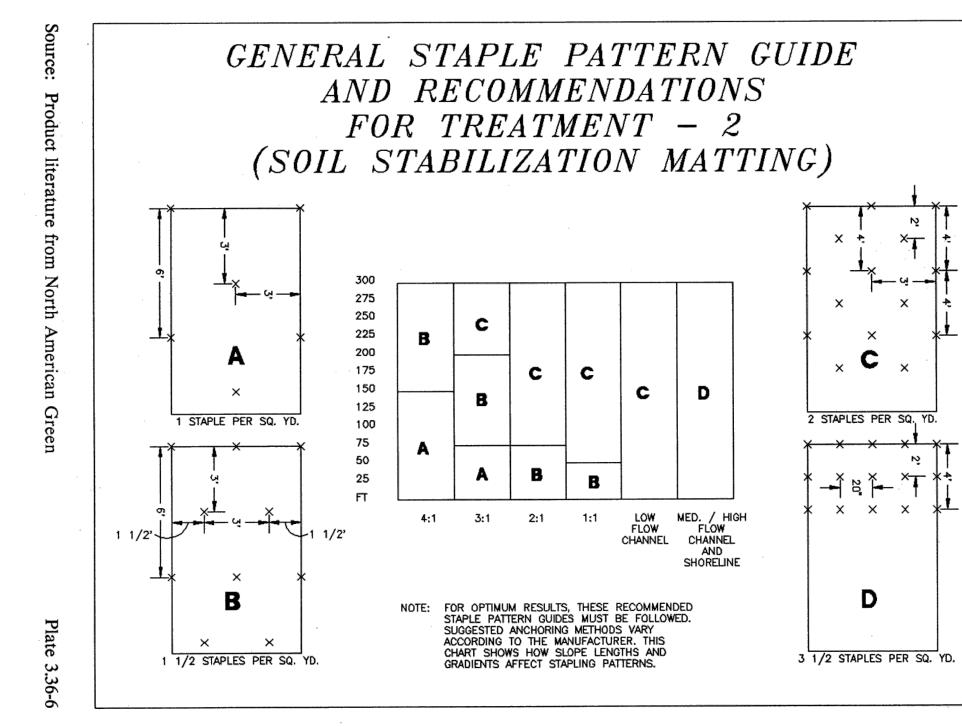


Source: VDOT Road and Bridge Standards

Plate 3.36-5

### SOIL STABILIZATION MATTING SLOPE

NOTE: FOR LANDS ON THE JEFFERSON NATIONAL FOREST, IF THE USE OF STABILIZATION NETTING IS REQUIRED/PERMITTED, WILDLIFE FRIENDLY GEOTEXTILES MUST BE USED. THESE PRODUCTS MUST EITHER NOT CONTAIN NETTING, OR NETTING MUST BE MADE OF 100% BIODEGRADABLE NON-PLASTIC MATERIALS SUCH AS JUTE, SISAL, OR COIR FIBER. PLASTIC NETTING (SUCH AS POLYPROPYLENE, NYLON, POLYETHYLENE, AND POLYESTER), EVEN IF ADVERTISED AS BIODEGRADABLE, IS NOT ACCEPTED ALTERNATIVE. ANY NETTING USED MUST ALSO HAVE A LOOSE-WEAVE DESIGN WITH MOVABLE JOINTS BETWEEN HORIZONTAL AND VERTICAL TWINES TO REDUCE THE CHANCE FOR WILDLIFE ENTANGLEMENT, INJURY, OR DEATH. (CA COASTAL COMMISSION, 2012)



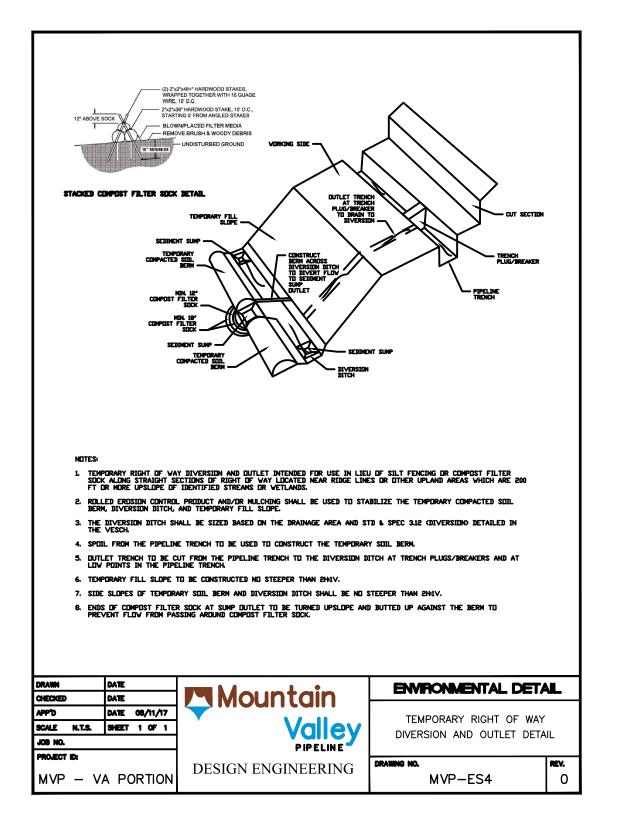
GENERAL STAPLE PATTERN GUIDE & RECOMMENDATIONS FOR TREATMENT DEVELOPED FROM VADEQ 1992 MANUAL

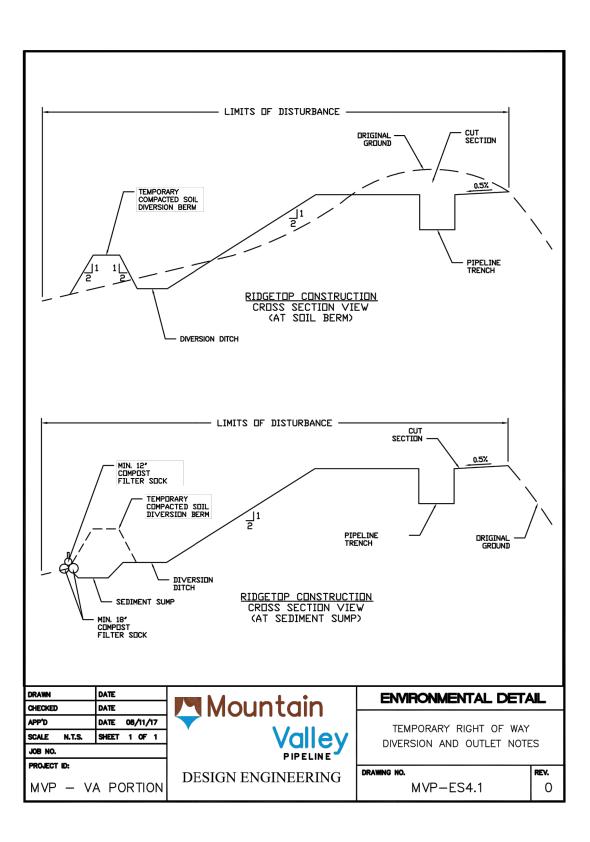
III - 368

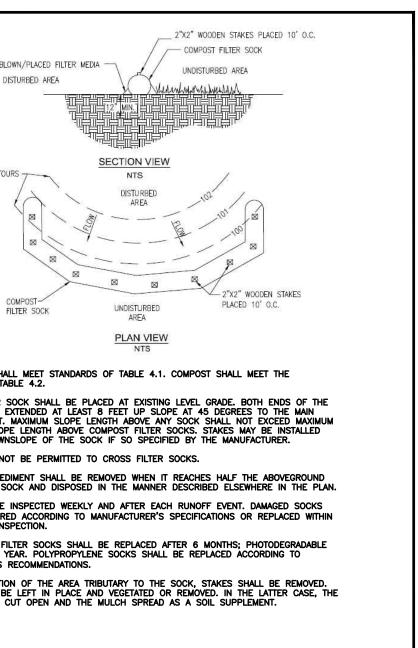
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rions" E	MOUNTAIN VALLEY PIPELINE, LLC 555 SOUTHPOINTE BOULEVARD, SUITE 200 725 SOUTHPOINTE BOULEVARD, SUITE 200	TEC AR SC N D AZA	CLEA RSEI PLA	IDEF ER RGH	TE worl AN OST	661 F(	(	(
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) )	DATE DATE 08/11/17 SHEET 1 OF 1		Valle		PUMPED WATER			APP'D	DATE 08/11/17	
	DATE						1			
			untain			/iii   / <b>iii</b>	4	CHECKED	DATE	1 🔼 Ma
	DATE				ONMENTAL D		1	DRAWN	DATE	
NO	T RESUME UNTIL THE P	ROBLEM IS CORRECT	ED.							
WH	HICHEVER IS LESS. PUMF .TER BAGS SHALL BE IN:	' INTAKES SHALL BE SPECTED DAILY, IF AI	FLOATING AND SCREENE NY PROBLEM IS DETECTE	D.		•			MESH SHALL BE	
			AN 750 GPM OR ½ THE		BY THE MANUFACTURER				UPON STABILIZATIO	
	E PUMP DISCHARGE HOS	E SHALL BE INSERT	ED INTO THE BAGS IN T PE IS RECOMMENDED FOR	HE MANNER SPECIFIED	BY THE MANUFACTURE	R			MANUFACTURER'S	RECOMMENDATIO
ST	REAMS IN STATE AND FE EA IS NOT AVAILABLE.	DERAL FORESTS, WIT	HIN 50 FEET OF ANY RI	ECEIVING SURFACE WAT	ER OR WHERE GRASSY				BIODEGRADABLE FI SOCKS AFTER 1 Y	EAR. POLYPROP
SO	ick shall be installed	BELOW BAGS LOCAT	D FOR MOST INSTALLATION TED IN TMDL WATERSHED	IS, CLASS V AND VI TR	ROUT STREAMS AND				24 HOURS OF INS	
TH	AN 5%. FOR SLOPES EX PLACED UNDER THE BA	CEEDING 5%, CLEAN	ROCK OR OTHER NON-	ERODIBLE AND NON-PO	OLLUTING MATERIAL MAY	1			SOCKS SHALL BE SHALL BE REPAIR	ED ACCORDING 1
ARI BE	EAS. WHERE THIS IS NO PLACED ON FILTER STO	T POSSIBLE, A GEOT INE TO INCREASE DIS	(GRASSY) AREA, AND DIS EXTILE UNDERLAYMENT A SCHARGE CAPACITY. BAGS	ND FLOW PATH SHALL S SHALL NOT BE PLACI	BE PROVIDED. BAGS M ED ON SLOPES GREATE	R			HEIGHT OF THE S	OCK AND DISPO
									ACCUMULATED SEE	
PR	OVIDED, FILTER BAGS SH	IALL BE REPLACED V	WHEN THEY BECOME ½ F THAT HAVE FAILED OR A /ITH LIFTING STRAPS ALR	FULL OF SEDIMENT, SP.	ARE BAGS SHALL BE	PS			TRAFFIC SHALL NO	
A :	SUITABLE MEANS OF ACC	cessing the bag wi	TH MACHINERY REQUIRED	) FOR DISPOSAL PURP	oses shall be				PERMISSIBLE SLOF	
	AOS %	Retained	ASTM D-4751	80 Sieve					SOCK SHALL BE E SOCK ALIGNMENT.	MAXIMUM SLOPE
		sistance	ASTM D-4355	70%					COMPOST FILTER	
		cture n Burst	ASTM D-4833 ASTM D-3786	110 lb 350 psi					STANDARDS OF TA	BLE 4.2.
		Tensile	ASTM D-4632	205 lb					SOCK FABRIC SHA	
		/idth Strength	ASTM D-4884	60 lb/in						
					ard					
		perty /idth Strength	Test Method	Minimum Standa 60 lb/in	ard					
ទា	TITCHED "J" TYPE SEAMS. ILTER BAGS SHALL BE MAI	THEY SHALL BE CAPA DE FROM WOVEN GEOT	BLE OF TRAPPING PARTICI	LES LARGER THAN 150 I FOLLOWING STANDARDS:	MICRONS. HIGH VOLUME				I	FILTER SOCK
L	OW VOLUME FILTER BAGS	SHALL BE MADE FROM	NON-WOVEN GEOTEXTILE	MATERIAL SEWN WITH H	IIGH STRENGTH, DOUBLE					COMPOST
										>
				INTAKE HOSE						×
	WELL VE	CETATED, GRASSY AREA		A VOV						× / -
		ATTI	FILTER BAG	The second						1.
				A- DANPS						$\left  \right  $
		Ц		EAVY DUTY LIFTING STRAPS (RECOMMENDED)						AN
		+-		AVY DUTY LICTIMO STOLOG					EXISTING CONTOU	JRS 7
				PUMP – Intake ho	ise _}					
					Ŧ					
			ILTER BAGS	Jac Law	e.					Ū
					¢					
									D	ISTURBED AREA
		(XXXX VX							BL	OWN/PLACED FILTE
			WELL VEGE	TATED, GRASSY AREA						
			1.915				-	_		





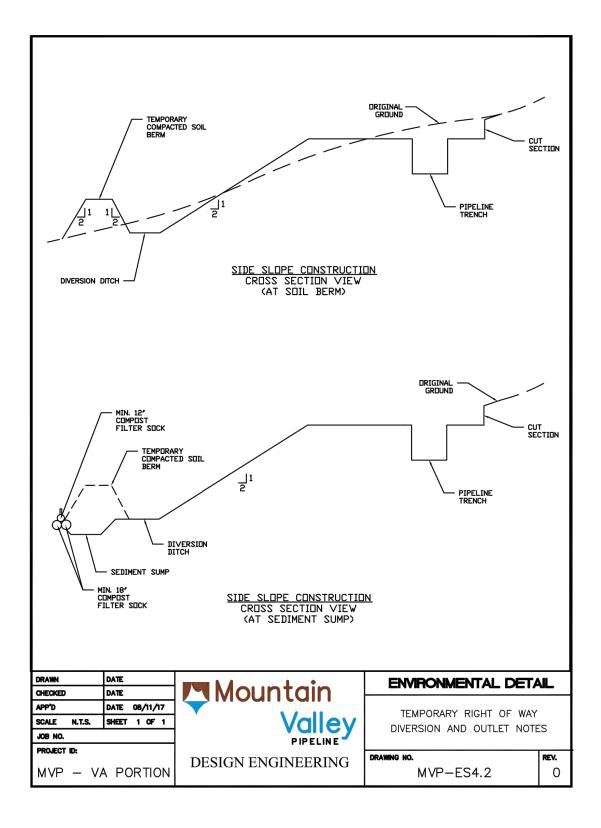


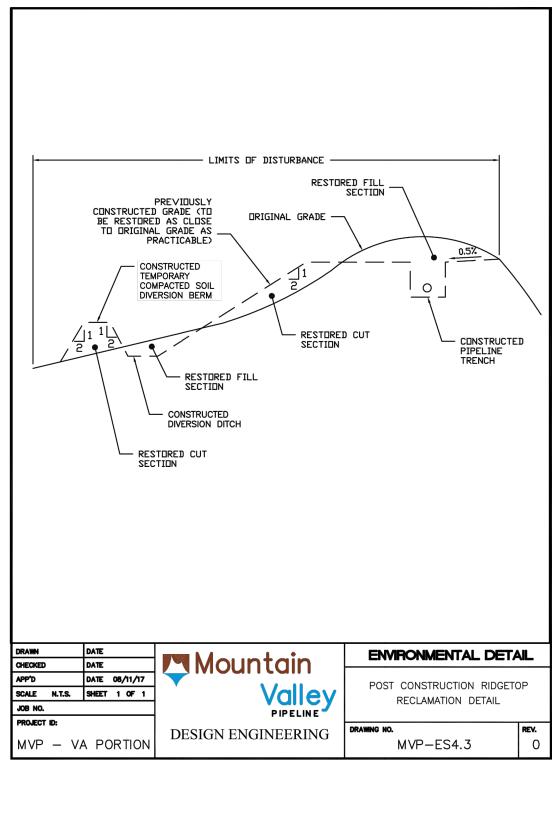
Mountain	ENVIRONMENTAL DETA	
	COMPOST FILTER SOCK	
DESIGN ENGINEERING	DRAWING NO.	REV.
	MVP-ES3	0

			TA	BLE 4.1			
		Compos	st Sock Fabric	Minimum Sp	ecifications		
Materia	al Type	3 míl HDPE	5 míl HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)	
Mate	erial	Photo-	Photo-	Bio-	Photo-	Photo-	
Characte	eristics	degradable	degradable	degradable	degradable	degradable	
			12"	12"	12"	12"	
Caraly Dia		12"	18"	18"	18"	18"	
Sock Dia	meters	18"	24"	24"	24"	24"	
			32"	32"	32"	32"	
Mesh Op	pening	3/8"	3/8"	3/8"	3/8"	1/8"	
Tens	sile						
Stren	ngth		26 psi	26 psi	44 psi	202 psi	
Ultrav	*						
Stabili Origi Strength G-15	inal (ASTM	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.	
Minin Functi Longe	num ional	6 months	9 months	6 months	1 year	2 years	
			Two-p	ly systems			
			P		HDPE biaxial ne	et	
Inner Co	nna-C-	ntainment N.	tting		Continuously wo		
	nner co	ntainment Ne	erring	Fu	sion-welded jun	ctures	
				3/4"	X 3/4" Max. aper	ture size	
	Outer	Filtration Me	sh	(Woven mechani	nposite Polypropylene Fabric ren layer and non-woven fleece anically fused via needle punch) 3/16" Max. aperture size		
Sock	fabrics	composed of	burlap may b	e used on pro	jects lasting 6 mo	onths or less.	
			TA	BLE 4.2			
			Compos	t Standards			
	Organi	c Matter Cont	ent	80%	- 100% (dry weigl	nt basis)	
	Orį	ganic Portion		F	ibrous and elong	ated	
		рН			5.5 - 8.0		
	Moi	sture Conten	t		35% - 55%		
	Р	article Size		98%	6 pass through 1"	screen	
S	Soluble !	Salt Concentra	ation	5.0 dS,	/m (mmhos/cm)	Maximum	
DATE		MP	ount	ain	ENMR	ONMENTAL	
DATE 08,	/11/17 OF 1				со	MPOST FILTER TABLES	
		DESIG	N ENGIN	FERING	DRAWING NO.		

Slope Percent
0 (
2 (or less) 5
10
15
20
25
30
35
40
45
50

DRAWN CHECKED	DATE	Mountain	ENVIRONMENTAL DETA	
APP'D	DATE DATE 08/11/17		COMPOST FILTER SOCK	
SCALE N.T.S. JOB NO.	SHEET 1 OF 1	Valley	TABLES	
project id: MVP — V	A PORTION	DESIGN ENGINEERING	drawing no. MVP-ES3.2	reev. O





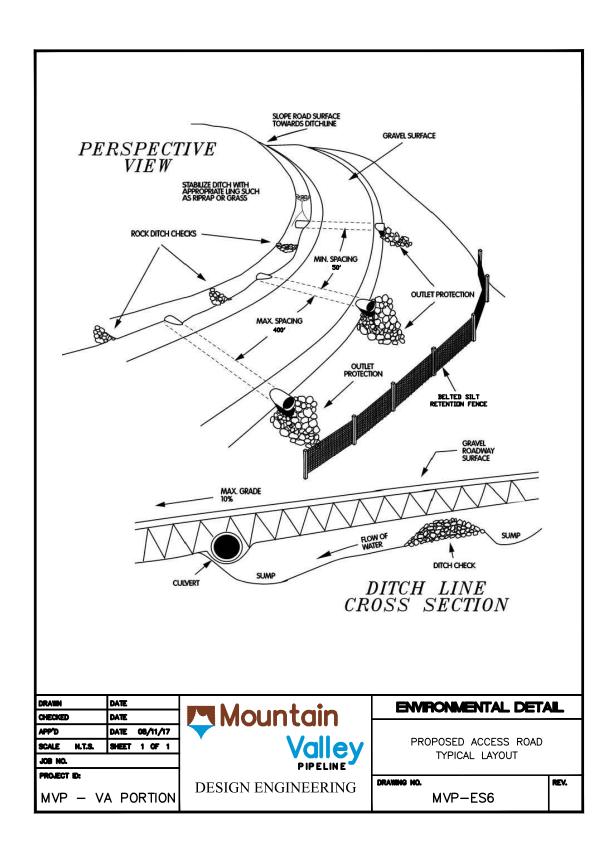
ADDED DETAILS FOR ROADS AND PADS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	DESCRIPTION:	REVISIONS:	
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L RE	LRE	L RE	L RE	L RE	L RE	N.: CHKD.:		
/18 KAL	/18 KAL	/18 KAL	17 KAL	17 KAL	/17 KAL	: DWN.:		
01/31/18	01/26/18	01/08/18	11/28/17	11/01/17	08/18/17	DATE:		
2	9	5	4	3	2	NO.:		
		EROSION AND SEDIMENT CONTROL PLANS		MOUNIAIN VALLET FIFELINE FROJEUT - ROUU LINE			555 SOUTHPOINTE BOULEVARD, SUITE 200	CANONSBURG, PA 15317
c		661 F	AN OST	⊣∣c DER ER	LEAI SEN PLA	r so I DF ZA	lution RIVE	S™
					GENERAL DE LAILS SEI			
		Contraction COLUMN		D J. No. O.		LNER 57593	ATTA OWNA A THE	
с⊦	IECK	ED VED	BY:					KAL HT RE

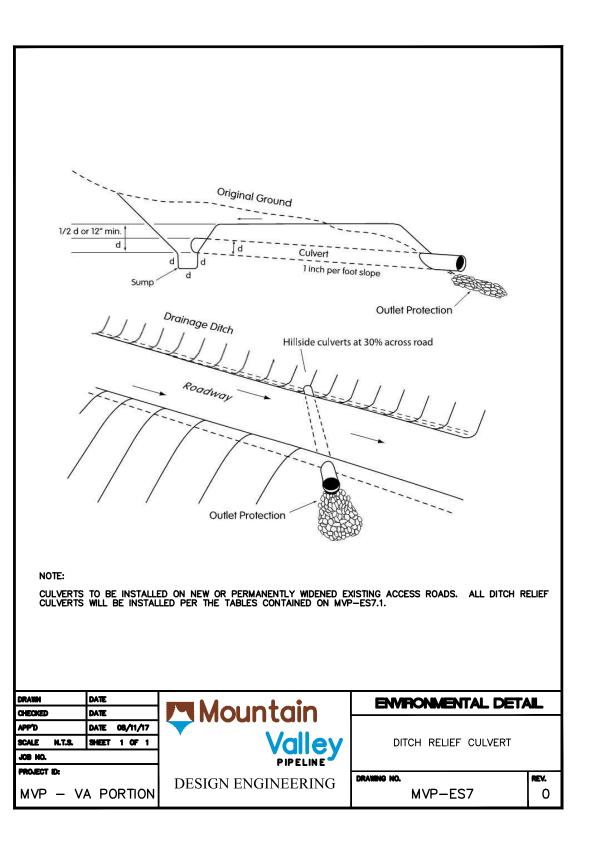
AS SHOWN SHT. NO. 0.05 OF 0.23

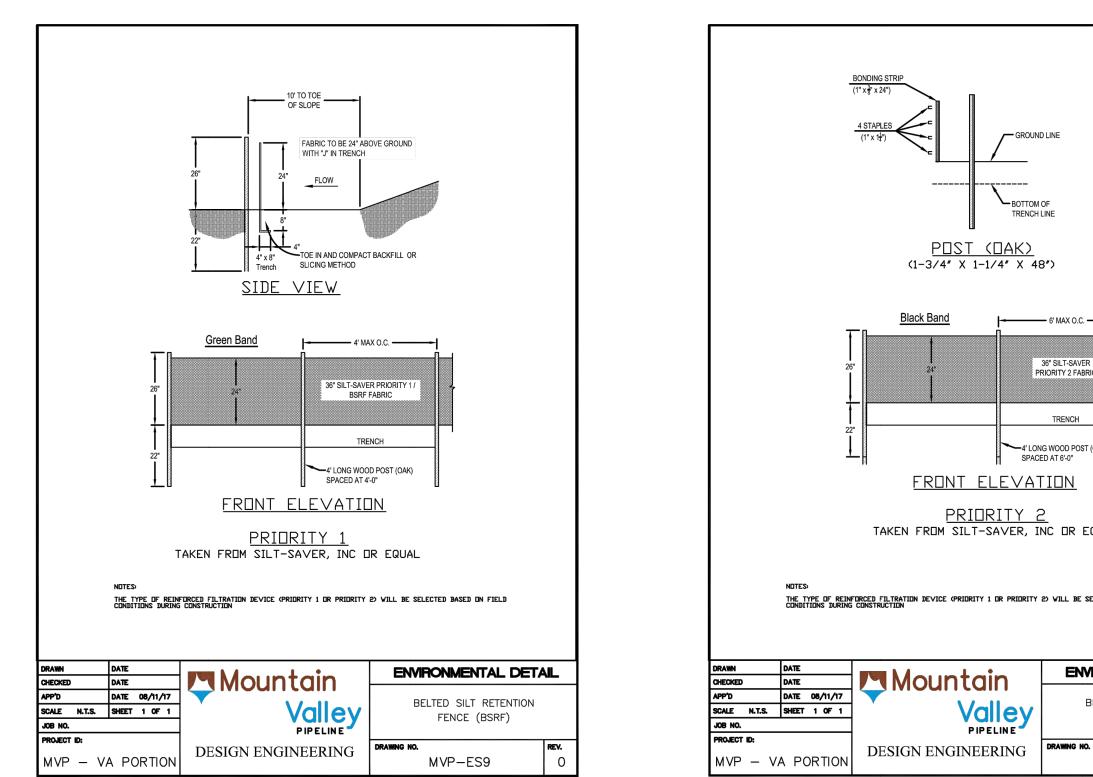
SCALE:

	Maxim um Slope L	ength for Compost.	Filter Sock in Feet	
	oped from Filtrex x Sedin ence. Refer to manufa		-	
8 in	12 in	<mark>18</mark> in	24 in	32 in
600	750	1000	1300	1650
400	500	550	650	750
200	250	300	400	500
140	170	200	325	450
100	125	140	260	400
80	100	110	200	275
60	75	90	130	200
60	75	80	115	150
60	75	80	100	125
40	50	60	80	<mark>1</mark> 00
40	50	55	65	75

MAXIMUM SLOPE LENGTH ABOVE COMPOST FILTER SOCK AND RECOMMENDED DIAMETER







300       235       200       180       165       155       150       145	12         15           12         15           12         15           12         12           12         12           12         12           12         12           12         12           12         12           12         12           12         12           12         12	15 15 15 12 12	15 15 15 15 15 15 12	18 18 18 15 15 15
200 180 165 155 150	12         15           12         12           12         12           12         12           12         12           12         12           12         12	15 15 12 12	15 15 15 12	18 15 15
180 165 155 150	12         12           12         12           12         12           12         12           12         12	15 12 12	15 15 12	15 15
165 155 150	12         12           12         12           12         12           12         12	12 12	15 12	15
155 150	12 12 12 12	12	12	
150	12 12			15
-12764811111		12		20
145			12	15
	12 12	12	12	15
1.40	12 12	12	12	15
135	12 12	12	12	15
4 - Recommen	and a bring the second second second	nt Access Roads		CMP)
Gravel		John Type in one	1	
Sandy Gravels, Aggregate Surfacing	Silty Gravels, Clayey Gravels	Plastic and Nonplastic Inorganic Clays	Inorganic Silts, Silty or Clayey Sands	Sands, Silty Sands, and Gravelly Sands
		Culvert Spacing Fee	at*	
390	315	245	170	95
335	275	210	145	85
285	230	180	125	75
240	195	150	105	65
the state of the	100000	- Lingers -		55
160	130	105	75 60	45 35
135	110			
	4 - Recommend Gravel, Sandy Gravels, Aggregate Surfacing 390 335 285 240 200	4 - Recommended Maximum Spi For Permane Gravel, Sandy Gravels, Gravels, Surfacing 390 315 335 285 285 285 230 240 195 200 160	4 - Recommended Maximum Spacing of Ditch Relie For Permanent Access Roads Soil Type in Ditch Gravel, Sandy Silty Gravels, Gravels, Clayey Aggregate Gravels Clayes Surfacing Culvert Spacing Fee 390 315 245 335 275 210 285 230 180 240 195 150	A - Recommended Maximum Spacing of Ditch Relief Culverts (18" dia. For Permanent Access Roads Soil Type in Ditch Gravel, Sandy Silty Gravels, Gravels, Clayey Aggregate Gravels Clayey Surfacing Culvert Spacing Feet* 390 315 245 170 335 275 210 145 285 230 180 125 200 160 125 90

PIPELINE

DESIGN ENGINEERING

TABLE 3.3- Sizing and Spacing of Ditch Relief Culverts for Temporart Access Roads

Grade Spaceing\* <300 300-400 400-500 500-600 >600

Road Culvert

(%)

PROJECT ID:

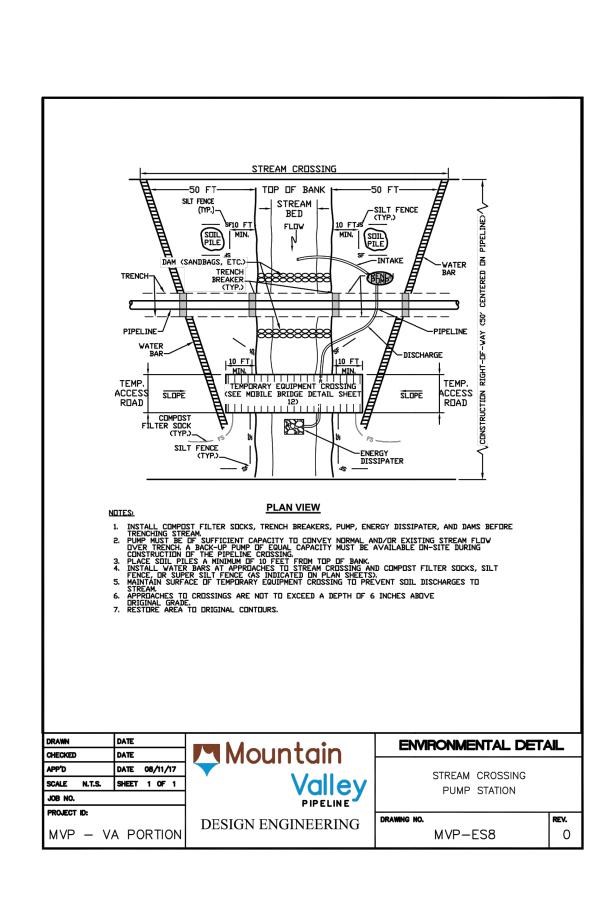
MVP - VA PORTION

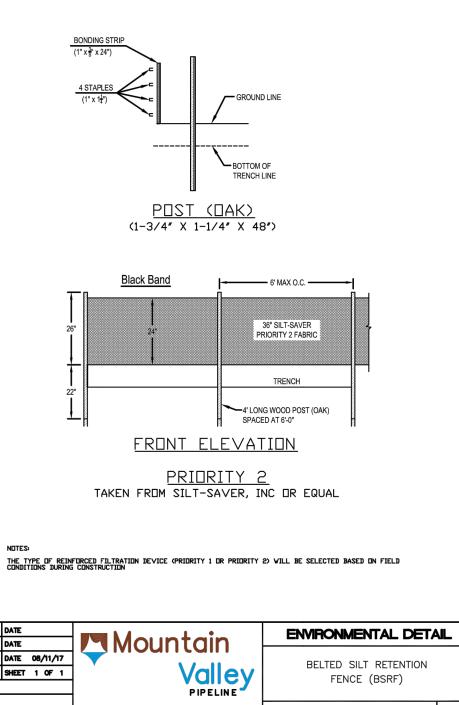
(ft)

Length of Upslope Drainage (ft)

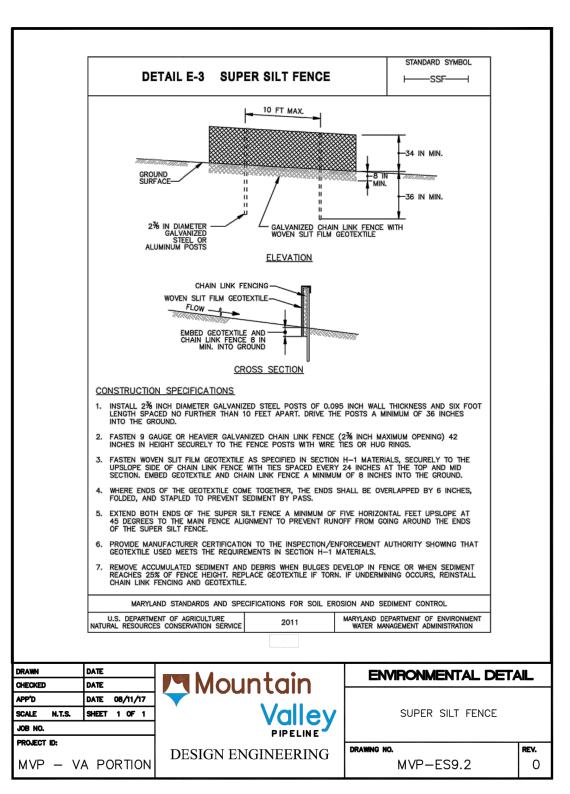
Minimum Culvert Size (in)

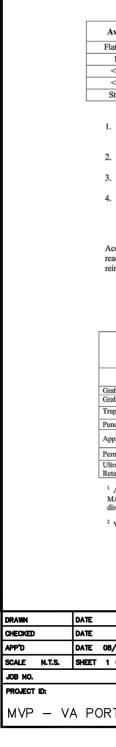
MVP-ES7.1





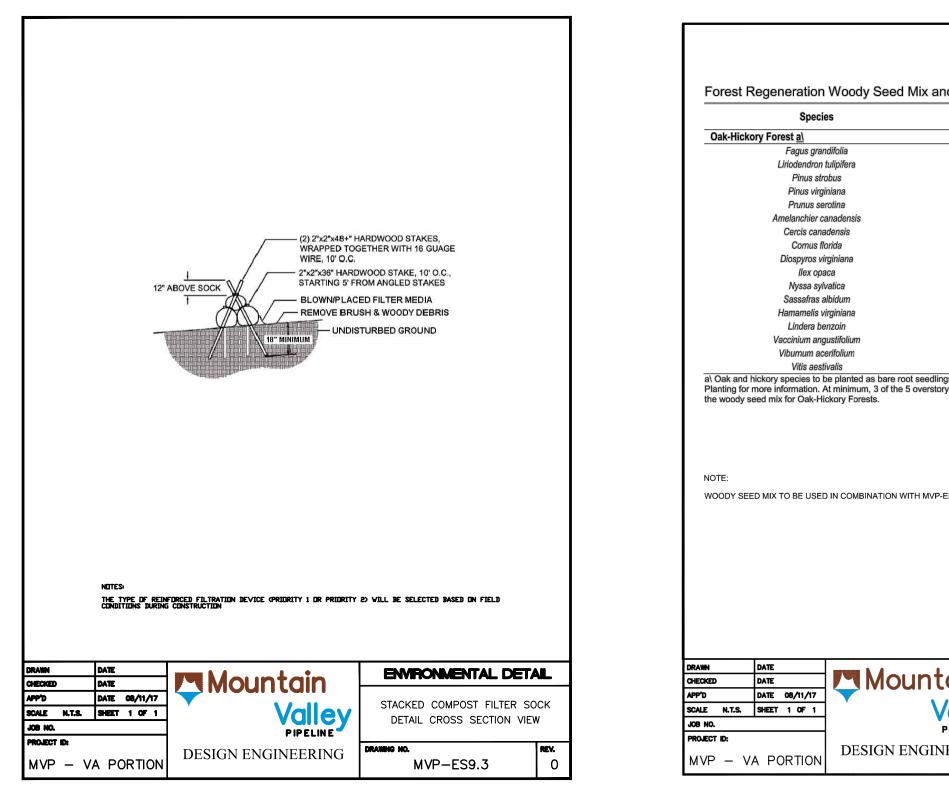
MVP-ES9.1





Maximum         Super Site Prease           Flatter than 10:1 (0 10%)         Unlimited         Unlimited           10:1 to 5:1 (10 - 20%)         200 feet         1,000 feet           -5:1 to 5:1 (20 - 33%)         150 feet         1,000 feet           -5:1 to 5:1 (20 - 33%)         100 feet         500 feet           -5:1 to 5:1 (20 - 33%)         100 feet         500 feet           -5:1 to 5:1 (20 - 33%)         50 feet         250 feet           -3:1 to 2:1 (-23 - 50%)         50 feet         250 feet	Average slope Steepness         Slope Length         Super Silt Fence Length           Flatter than 10:1 (0 - <10%)         Unlimited         Unlimited           10:1 to 5:1 (0 - 20%)         200 feet         1,500 feet           <5:1 to 3:1 (>20 - 33%)         150 feet         1,000 feet           <5:1 to 3:1 (>20 - 33%)         100 feet         500 feet           Steeper than 2:1 (>50%)         50 feet         250 feet           1. Super silt fence should be placed on the contour. No section of super silt fence is to exceed a grade of 5% for a distance of more than 50 feet.         2.           2. Super silt fence should be used with caution in areas where rocky soils may prevent trenching.         3.           3. The use of super silt fence must conform to the design constraints listed in Table E.3 above.         4.           4. Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         Maintenance           Maintenance           Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The geotextile must be replaced if form. If undermining occurs, reinstall chain link fencing and geotextile.           WWVEN           MWVEN           GeoTEXTILE         MONOTELALENT         GEOTEXTILE	1			Maxi	mum			Maxim	um	
I0:1 to 5:1 (10 - 20%)         200 feet         1,500 feet $< 51$ to 3:1 ( $220 - 33\%$ )         150 feet         1,000 feet $< 31$ to 2:1 ( $>33 - 50\%$ )         100 feet         500 feet           Steeper than 2:1 ( $>50\%$ )         30 feet         250 feet           1. Super silt fence should be placed on the contour. No section of super silt fence is to exceed a grade of 5% for a distance of more than 50 feet.         2.           2. Super silt fence should be used with caution in areas where rocky soils may prevent trenching.         3.           3. The use of super silt fence must conform to the design constraints listed in Table E.3 above.         4.           4. Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         Maintenance           Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The geotextile must be replaced if torm. If undermining occurs, reinstall chain link fencing and geotextile.         WOVEN           WOVEN           WOVEN           MONWOVEN           GEOTEXTILE           ONNWOVEN           GEOTEXTILE           Maintenance           Accumulated sediment and debris must be replaced if torm. If undermining occurs	10:1 to 5:1 (10 - 20%)       200 feet       1,500 feet $< 51$ to 3:1 (220 - 33%)       150 feet       1,000 feet $< 31$ to 2:1 (>3 - 50%)       100 feet       500 feet         Steeper than 2:1 (>50%)       50 feet       250 feet         1. Super silt fence should be placed on the contour. No section of super silt fence is to exceed a grade of 5% for a distance of more than 50 feet.       2.         2. Super silt fence should be used with caution in areas where rocky soils may prevent trenching.       3.         3. The use of super silt fence must conform to the design constraints listed in Table E.3 above.         4. Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         Maintenance         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The geotextile must be replaced if torn. If undermining occurs, reinstall chain link fencing and geotextile.         WOVEN         WOVEN         GEOTEXTILE         MONWOVEN GEOTEXTILE         GEOTEXTILE         ON MONOPLENTINE         ON MONOPLENTINE         GEOTEXTILE         ON MONOPLENTINE <td col<="" td=""><td></td><td></td><td></td><td>Slope I</td><td>Length</td><td></td><td>Supe</td><td>er Silt Fei</td><td>ice Lengfl</td></td>	<td></td> <td></td> <td></td> <td>Slope I</td> <td>Length</td> <td></td> <td>Supe</td> <td>er Silt Fei</td> <td>ice Lengfl</td>				Slope I	Length		Supe	er Silt Fei	ice Lengfl
<5:1 to 3:1 (>20 - 33%)       150 feet       1,000 feet         <3:1 to 2:1 (>33 - 50%)       100 feet       500 feet         Steeper than 2:1 (>50%)       50 feet       250 feet         1. Super silt fence should be placed on the contour. No section of super silt fence is to exceed a grade of 5% for a distance of more than 50 feet.       2.         2. Super silt fence should be used with caution in areas where rocky soils may prevent trenching.       3.         3. The use of super silt fence must conform to the design constraints listed in Table E.3 above.       4.         4. Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.       Maintenance         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The geotextile must be replaced if torm. If undermining occurs, reinstall chain link fencing and geotextile.         MOVEN MOVEN MONOPERATIENT MONOVEN GEOTEXTLE         MINIMUM AVERAGE ROLL VALUE <sup>+</sup> MINIMUM AVERAGE ROLL VALUE <sup>+</sup> PROPERTY       TEST METHOD       MD       CD       MD       CD         Grab Tensile Strength       ASTM D-4632       200 lb       370 lb       250 lb       200 lb         Grab Tensile English       ASTM D-4633       75 lb       75 lb       100 lb       60 lb	<5:1 to 3:1 (>20 - 33%)       150 feet       1,000 feet         <3:1 to 2:1 (>33 - 50%)       100 feet       500 feet         Steeper than 2:1 (>50%)       50 feet       250 feet         1. Super silt fence should be placed on the contour. No section of super silt fence is to exceed a grade of 5% for a distance of more than 50 feet.       2.         2. Super silt fence should be used with caution in areas where rocky soils may prevent trenching.       3.         3. The use of super silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         Maintenance         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The geotextile must be replaced if torm. If undermining occurs, reinstall chain link fencing and geotextile.         WOVEN MOVEN MOVEN MONOPELAMENT MONOVEN GEOTEXTILE GE		-	/							
<3:1 to 2:1 [>33 - 50%)       100 feet       500 feet         Steeper than 2:1 (>50%)       50 feet       250 feet         1. Super silt fence should be placed on the contour. No section of super silt fence is to exceed a grade of 5% for a distance of more than 50 feet.       2.50 feet         2. Super silt fence should be used with caution in areas where rocky soils may prevent trenching.       3. The use of super silt fence must conform to the design constraints listed in Table E.3 above.         4. Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.       Maintenance         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The geotextile Fabries         WOVEN SUTFILM MONOFILAMENT GEOTEXTILE         MINIMUM AVERAGE ROLL VALUE <sup>1</sup> PROPERTY       TEST METHOD       MD       CD       State cols and cols	<3:1 to 2:1 [>33 - 50%)       100 feet       500 feet         Steeper than 2:1 (>50%)       50 feet       250 feet         1. Super silt fence should be placed on the contour. No section of super silt fence is to exceed a grade of 5% for a distance of more than 50 feet.       2.         2. Super silt fence should be used with caution in areas where rocky soils may prevent trenching.       3.         3. The use of super silt fence must conform to the design constraints listed in Table E.3 above.         4. Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         Maintenance         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The geotextile Fabries         WOVEN SUPPRINT ROPERTILE         WOVEN GEOTEXTILE         MINIMUM AVERAGE ROLL VALUE <sup>1</sup> PROPERTY TEST METHOD         MINIMUM AVERAGE ROLL VALUE <sup>1</sup> PROPERTY         TEST METHOD         ASTM D-4632         15% 10% 15% 15% 50% 50%         GOTEXTILE         MINMUM AVERAGE ROLL VALUE <sup>1</sup> PROPERTY         TEST METHOD       MD <t< td=""><td></td><td></td><td>·</td><td></td><td></td><td></td><td></td><td></td><td></td></t<>			·							
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<ul> <li>5% for a distance of more than 50 feet.</li> <li>Super silt fence should be used with caution in areas where rocky soils may prevent trenching.</li> <li>The use of super silt fence must conform to the design constraints listed in Table E.3 above.</li> <li>Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         <i>Maintenance</i>         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The goetextile must be replaced if torm. If undermining occurs, reinstall chain link fencing and geotextile.     </li> <li> <b>Table H1: Geotextile Fabrics</b> </li> <li> <b>WOVEN WOVEN WOVEN WOVEN MONOVEN COUNTINE COUNTINE</b> </li> <li> <b>PROPERTY TEST METHOD MD CD MD CD</b></li></ul>	<ul> <li>5% for a distance of more than 50 feet.</li> <li>Super silt fence should be used with caution in areas where rocky soils may prevent trenching.</li> <li>The use of super silt fence must conform to the design constraints listed in Table E.3 above.</li> <li>Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         <i>Maintenance</i>         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The gootextile must be replaced if torm. If undermining occurs, reinstall chain link fencing and geotextile.     </li> <li> <b>Table H.1: Geotextile Fabrics</b> </li> <li> <b>WOVEN WOVEN WOVEN MONOVEN COUNTINE COUNTINE ACCUMUATE AGE NOT NONNOVEN COUNTINE COUNTINE Table H.1: Geotextile Fabrics</b> </li> <li> <b>WOVEN WOVEN MONOVEN MONOVEN COUNTINE COUNTINE ASTM D-4632 200 HD 200 HD</b><td></td><td></td><td></td><td>50 f</td><td>feet</td><td></td><td></td><td>250 fe</td><td>et</td></li></ul>				50 f	feet			250 fe	et	
<ul> <li>5% for a distance of more than 50 feet.</li> <li>Super silt fence should be used with caution in areas where rocky soils may prevent trenching.</li> <li>The use of super silt fence must conform to the design constraints listed in Table E.3 above.</li> <li>Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         <i>Maintenance</i>         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The goetextile must be replaced if torm. If undermining occurs, reinstall chain link fencing and geotextile.     </li> <li> <b>Table H1: Geotextile Fabrics</b> </li> <li> <b>WOVEN WOVEN WOVEN WOVEN MONOVEN COUNTINE COUNTINE</b> </li> <li> <b>PROPERTY TEST METHOD MD CD MD CD</b></li></ul>	<ul> <li>5% for a distance of more than 50 feet.</li> <li>Super silt fence should be used with caution in areas where rocky soils may prevent trenching.</li> <li>The use of super silt fence must conform to the design constraints listed in Table E.3 above.</li> <li>Extend both ends of the silt fence a minimum five (5) feet horizontally upslope at 45 degrees to the main fence alignment to prevent runoff from going around the ends of the silt fence.         <i>Maintenance</i>         Accumulated sediment and debris must be removed when bulges develop in the fence or when sediment reaches 25 percent of the fence height. The gootextile must be replaced if torm. If undermining occurs, reinstall chain link fencing and geotextile.     </li> <li> <b>Table H.1: Geotextile Fabrics</b> </li> <li> <b>WOVEN WOVEN WOVEN MONOVEN COUNTINE COUNTINE ACCUMUATE AGE NOT NONNOVEN COUNTINE COUNTINE Table H.1: Geotextile Fabrics</b> </li> <li> <b>WOVEN WOVEN MONOVEN MONOVEN COUNTINE COUNTINE ASTM D-4632 200 HD 200 HD</b><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></li></ul>										
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NONVOVEN GEOTEXTILESLIT FILM GEOTEXTILENONVOVEN GEOTEXTILENONVOVEN GEOTEXTILEPROPERTYTEST METHODMDCDMDCDMDCDGrab Tensile StrengthASTM D-4632200 lb200 lb370 lb250 lb200 lb200 lbGrab Tensile ElongationASTM D-463215%10%15%15%50%50%Trapezoidal Tear StrengthASTM D-453375 lb75 lb100 lb60 lb80 lb80 lbPuncture StrengthASTM D-6241 $450$ lb900 lb450 lb450 lbApparent Opening Size <sup>2</sup> ASTM D-4751U.S. Sieve 30U.S. Sieve 70(0.21 mm)(0.21 mm)PermitivityASTM D-44910.05 sec <sup>3</sup> 0.28 sec <sup>31</sup> 1.1 sec <sup>31</sup> Ultraviolet Resistance Retained at 500 hoursASTM D-435570% strength70% strength70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross	SLIT FILM GEOTEXTILENONOFILAMENT GEOTEXTILENONVOVEN GEOTEXTILEPROPERTYTEST METHODMDCDMDCDMDCDGrab Tensile StrengthASTM D-4632200 lb200 lb370 lb250 lb200 lb200 lbGrab Tensile ElongationASTM D-463215%10%15%15%50%50%Trapezoidal Tear StrengthASTM D-453375 lb75 lb100 lb60 lb80 lb80 lbPuncture StrengthASTM D-6241 $450$ lb900 lb450 lb450 lbApparent Opening Size <sup>2</sup> ASTM D-4751U.S. Sieve 30U.S. Sieve 70(0.21 mm)(0.21 mm)PermitivityASTM D-44910.05 sec <sup>31</sup> 0.28 sec <sup>31</sup> 1.1 sec <sup>31</sup> Ultraviolet Resistance Retained at 500 hoursASTM D-435570% strength70% strength70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross			Table I	L1: Geote	xtile Fabr	ies				
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Grab Tensile Strength         ASTM D-4632         200 lb         200 lb         370 lb         250 lb         200 lb         200 lb           Grab Tensile Elongation         ASTM D-4632         15%         10%         15%         50%         50%           Trapezoidal Tear Strength         ASTM D-4632         15%         10%         15%         50%         50%           Puncture Strength         ASTM D-6241         450 lb         900 lb         60 lb         80 lb         80 lb           Apparent Opening Size <sup>2</sup> ASTM D-4751         U.S. Sieve 30         U.S. Sieve 70         U.S. Sieve 70         U.S. Sieve 70           Ultraviolet Resistance Retained at 500 hours         ASTM D-4491         0.05 sec <sup>4</sup> 0.28 sec <sup>21</sup> 1.1 sec <sup>4</sup> <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross											
						XTILE	GEOTE	XTILE	GEOTI		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $				GEOTE MD	CD	GEOTE	XTILE JE ROLL V CD	GEOTH VALUE <sup>1</sup> MD	CD	
Puncture Strength         ASTM D-6241         450 lb         900 lb         450 lb           Apparent Opening Size <sup>2</sup> ASTM D-4751         U.S. Sieve 30 (0.59 mm)         U.S. Sieve 70 (0.21 mm)         U.S. Sieve 70 (0.21 mm)           Permittivity         ASTM D-4491         0.05 sec <sup>-1</sup> 0.28 sec <sup>-1</sup> 1.1 sec <sup>-1</sup> Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> AII numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.         CD is cross	Puncture Strength         ASTM D-6241         450 lb         900 lb         450 lb           Apparent Opening Size <sup>2</sup> ASTM D-4751         U.S. Sieve 30 (0.59 mm)         U.S. Sieve 70 (0.21 mm)         U.S. Sieve 70 (0.21 mm)           Permittivity         ASTM D-4491         0.05 sec <sup>-1</sup> 0.28 sec <sup>-1</sup> 1.1 sec <sup>-1</sup> Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> AII numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.         CD is cross	Grab Tensile S	trength	ASTM D-4632	GEOTE MD 200 lb	CD 200 lb	GEOTE JM AVERAG MD 370 lb	XTILE 3E ROLL V CD 250 Ib	GEOTH VALUE <sup>1</sup> MD 200 lb	CD 200 lb	
Apparent Opening Size         ASTM D-4/51         (0.59 mm)         (0.21 mm)         (0.21 mm)           Permitivity         ASTM D-4491         0.05 sec <sup>4</sup> 0.28 sec <sup>4</sup> 1.1 sec <sup>4</sup> Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.	Apparent Opening Size         ASTM D-4/51         (0.59 mm)         (0.21 mm)         (0.21 mm)           Permitivity         ASTM D-4491         0.05 sec <sup>4</sup> 0.28 sec <sup>4</sup> 1.1 sec <sup>4</sup> Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.         Strong Strength	Grab Tensile S Grab Tensile E	trength longation	ASTM D-4632 ASTM D-4632	GEOTE MD 200 lb 15%	XTILE MINIMU CD 200 lb 10%	GEOTE JM AVERAG MD 370 lb 15%	XTILE 3E ROLL V CD 250 Ib 15%	GEOTH VALUE <sup>1</sup> MD 200 lb 50%	CD 2001b 50%	
Image: Permittivity         ASTM D-4491         0.05 sec <sup>1</sup> 0.28 sec <sup>2</sup> 1.1 sec <sup>4</sup> Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.         CD is cross	Image: Permittivity         ASTM D-4491         0.05 sec <sup>-1</sup> 0.28 sec <sup>-1</sup> 1.1 sec <sup>-1</sup> Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.         CD is cross	Grab Tensile S Grab Tensile E Trapezoidal Te	trength longation ar Strength	ASTM D-4632 ASTM D-4632 ASTM D-4533	GEOTE MD 200 lb 15% 75 lb	XTILE MINIMU CD 200 lb 10% 75 lb	GEOTE JM AVERAO MD 370 lb 15% 100 lb	XTILE 3E ROLL V CD 250 lb 15% 60 lb	GEOTH VALUE <sup>1</sup> MD 200 lb 50% 80 lb	CD 200 lb 50% 80 lb	
Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.         CD is cross	Ultraviolet Resistance Retained at 500 hours         ASTM D-4355         70% strength         70% strength         70% strength <sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.	Grab Tensile S Grab Tensile E Trapezoidal Te Puncture Strenj	trength longation ar Strength gth	ASTM D-4632 ASTM D-4632 ASTM D-4533 ASTM D-6241	GEOTE MD 200 lb 15% 75 lb 450 U.S. Si	XTILE MINIMU CD 200 lb 10% 75 lb 0 lb ieve 30	GEOTE JM AVERAO MD 370 lb 15% 100 lb 900 U.S. Si	XTILE 3E ROLL V CD 250 lb 15% 60 lb 1b eve 70	GEOTH MD 200 lb 50% 80 lb 450 U.S. S	CD 200 lb 50% 80 lb 0 lb eve 70	
<sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.	<sup>1</sup> All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.	Grab Tensile S Grab Tensile E Trapezoidal Te Puncture Stren Apparent Oper	trength longation ar Strength gth	ASTM D-4632 ASTM D-4632 ASTM D-4533 ASTM D-6241 ASTM D-4751	GEOTE MD 200 lb 15% 75 lb 450 U.S. Si (0.59	XTILE MINIMU CD 200 lb 10% 75 lb 0 lb ieve 30 mm)	GEOTE JM AVERAG MD 370 lb 15% 100 lb 900 U.S. Si (0.21	XTILE 3E ROLL V CD 250 lb 15% 60 lb lb eve 70 mm)	GEOTH VALUE <sup>1</sup> MD 200 lb 50% 80 lb 450 U.S. S (0.21	CD 200 lb 50% 80 lb 0 lb ieve 70 mm)	
<sup>2</sup> Values for AOS represent the average maximum opening.	<sup>2</sup> Values for AOS represent the average maximum opening.	Grab Tensile S Grab Tensile E Trapezoidal Te Puncture Stren, Apparent Open Permittivity Ultraviolet Res	trength longation ar Strength gth ing Size <sup>2</sup> istance	ASTM D-4632 ASTM D-4632 ASTM D-4533 ASTM D-6241 ASTM D-4751 ASTM D-4491	GEOTE MD 200 lb 15% 75 lb 45( U.S. Si (0.59 0.05	XTILE MINIMU CD 200 lb 10% 75 lb 0 lb ieve 30 mm) sec <sup>-1</sup>	GEOTE JM AVERAG MD 370 lb 15% 100 lb 900 U.S. Si (0.21 0.28 :	XTILE 3E ROLL V CD 250 lb 15% 60 lb lb eve 70 mm) sec <sup>-1</sup>	GEOTH VALUE <sup>1</sup> MD 200 lb 50% 80 lb 450 U.S. S (0.21 1.1;	CD 200 lb 50% 80 lb 0 lb eve 70 mm) sec <sup>-1</sup>	
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Mountain	Mountain	Grab Tensile S Grab Tensile E Trapezoidal Te Puncture Stren, Apparent Open Permittivity Ultraviolet Res Retained at 500 <sup>1</sup> All numerid MARV is cal direction. <sup>2</sup> Values for	trength longation ar Strength gth ing Size <sup>2</sup> istance 0 hours c values exce culated as the AOS represen	ASTM D-4632 ASTM D-4632 ASTM D-4533 ASTM D-6241 ASTM D-4751 ASTM D-4751 ASTM D-4355 pt apparent opening s typical minus two sl at the average maxim	GEOTE MD 200 lb 15% 75 lb 45( U.S. Si (0.59 0.05 70% st ize (AOS) andard dev um openin	XTILE MINIMU CD 200 lb 10% 75 lb 0 lb ieve 30 mm) sec <sup>-1</sup> rength represent riations. N g.	GEOTE JM AVERAG MD 370 lb 15% 100 lb 9000 U.S. Si (0.21 0.28 70% st minimum av	XTILE BE ROLL V CD 250 lb 15% 60 lb lb eve 70 mm) sec <sup>-1</sup> rength erage roll w e direction;	GEOTH VALUE <sup>1</sup> MD 200 lb 50% 80 lb 45( U.S. S (0.21 1.11 70% si alues (MA ; CD is ero	CD         200 lb           50%         80 lb           10         b           sec <sup>-1</sup> rength           RV).         ss	
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08/11/17 1 OF 1 UBD/11/17 1 OF 1 UDD/11/17 SUPER SILT FENCE	08/11/17 1 OF 1 UNOUNCOIN Valley PIPELINE SUPER SILT FENCE	Grab Tensile S Grab Tensile E Trapezoidal Te Puncture Stren, Apparent Open Permittivity Ultraviolet Res Retained at 500 <sup>1</sup> All numeric MARV is cal direction. <sup>2</sup> Values for . <b>08/11/17</b>	trength longation ar Strength gth ing Size <sup>2</sup> istance 0 hours c values exce culated as the AOS represen	ASTM D-4632 ASTM D-4632 ASTM D-4533 ASTM D-6241 ASTM D-4751 ASTM D-4751 ASTM D-4355 pt apparent opening s typical minus two sl at the average maxim	GEOTE MD 200 lb 15% 75 lb 45( U.S. Si (0.59 0.05 70% st ize (AOS) iandard dev um openin	XTILE MINIMU CD 200 lb 10% 75 lb 0 lb ieve 30 mm) sec <sup>-1</sup> trength represent <i>i</i> viations. N g.	GEOTE JM AVERAU MD 370 lb 15% 100 lb 900 U.S. Si (0.21 0.28 70% st minimum ava 4D is machin	XTILE FROLL V CD 250 lb 15% 60 lb lb eve 70 mm) sec <sup>4</sup> rength rength rength rength ENN	GEOTH VALUE <sup>1</sup> MD 200 lb 50% 80 lb 450 U.S. S (0.21 1.1.1 70% sl alues (MA' ; CD is ero //RON	CD           200 lb           50%           80 lb           0 lb           ieve 70           mm)           sec <sup>-1</sup> rength           RV).           ss	
	08/11/17 1 OF 1 DESIGN ENGINEERING DRAWING NO.	Grab Tensile S Grab Tensile E Trapezoidal Te Puncture Stren Apparent Open Permittivity Ultraviolet Res Retained at 500 <sup>1</sup> All numeric MARV is cal direction. <sup>2</sup> Values for . 08/11/17 1 OF 1	trength longation ar Strength gth ing Size <sup>2</sup> istance b hours evalues excee culated as the AOS represed	ASTM D-4632 ASTM D-4632 ASTM D-4533 ASTM D-6241 ASTM D-4751 ASTM D-4491 ASTM D-4355 pt apparent opening s typical minus two st at the average maxim	GEOTE MD 200 lb 15% 75 lb 45( U.S. Si (0.59 0.05 70% st úze (AOS) andard dev um openin	XTILE MINIMU CD 200 lb 10% 75 lb 0 lb ieve 30 mm) sec <sup>-1</sup> trength represent 1 riations. M g.	GEOTE JM AVERAU MD 370 lb 15% 100 lb 900 U.S. Si (0.21 0.28 si 70% st minimum ave AD is machin	XTILE FROLL V CD 250 lb 15% 60 lb lb eve 70 mm) sec <sup>4</sup> rength rength rength rength ENN	GEOTI VALUE <sup>1</sup> MD 200 lb 50% 80 lb 450 U.S. S (0.21 1.1.1 70% sl alues (MA ; CD is ero A	CD           200 lb           50%           80 lb           1b           eve 70           mm)           sec <sup>-1</sup> rength           RV).           ss	

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	KAL	KAL	KAL	KAL	KAL	KAL	DWN.:		
	/31/18	/26/18	/08/18	/28/17	/01/17	/18/17	DATE:		
CANONSBURG, PA 15217 CANONSBURG, PA 15220 DRAWN BY: CANONSBURG, PA 1520 DRAWN BY: CANONSBURG, PA 150 DRAWN BY: CANONSBURG, PA	7 01/			4 11/	3 11/	2 08/			
Complex world CLEAR SOLUTIONS"   Complex world CLEAR SOLUTIONS"   661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220     Image: Strength of the streng	-						ž		
			EROSION AND SEDIMENT CONTROL		MOUNIAIN VALLET FIFELINE FROJEUT			555 SOUTHPOINTE BOULEVARD, SUITE 2	CANONSBURG, PA 15317
DRAWN BY: KAL CHECKED BY: RE DATE: 11/28/2017 SCALE: AS SHOWN	α		661 F	worl AN OST	⊣∣c DER ER	LEAF SEN PLA	r so I DF ZA	lution RIVE 7	S™
Lic. No. 0402057593 WWW BY: KAL CHECKED BY: HT APPROVED BY: RE DATE: 11/28/2017 SCALE: AS SHOWN					CENEDAL DETAILS SET	GENERAL DE LAILS SEI			
CHECKED BY:     HT       APPROVED BY:     RE       DATE:     11/28/2017       SCALE:     AS SHOWN		_	CLARK CONTRACTOR	Lic.	10. 04				
DATE: 11/28/2017 SCALE: AS SHOWN REVISION	СН	IECK	ED	BY:					ΗT
REVISION			vED		1/2	8/2	017	17	RE
								. /	



vvetiano	ds Seed Mix a	and Application Rates in Vi	rginia. Seeding Rate		Bloom Period
	Species	Common Name	(lbs/acre)	рН	(if applicable)
	Alisma subcordatum	Mud Plantain	0.04		
	Carex gynandra	Fringed Sedge	0.10	5.0 - 7.0	Midsummer
	Carex lupulina	Hop Sedge	1.00		May to June
	Carex lurida	Shallow Sedge	3.00	6.2 - 7.0	June to October
	Carex scoparia	Blunt Broom Sedge	1.00	4.9 - 6.8	June to July
	Carex vulpinoidea	Fox Sedge	6.90	4.6 - 6.9	July to August
	Cinna arundinacea	Wood Reedgrass	0.40	6.8 - 8.9	June to August
	Elymus virginicus	Virginia Wildrye	4.00	4.0 - 8.5	August to September
	Juncus effusus	Soft Rush	0.60	5.0 - 7.4	June to October
	Onoclea sensibilis	Sensitive Fern	0.20	5.5 - 7.0	May to June
	Scirpus cyperinus	Woolgrass	0.20		June to October
	Species	Common Name	Seeding Rate (Ibs/acre)	рН	Bloom Period (if applicable)
	Scirpus polyphyllus	Many Leaved Bulrush	0.20	4.8 - 7.2	July to September
	Asclepias incarnata	Swamp Milkweed	0.40		July to August
Eu	ıpatorium coelestinun	n Mistflower	0.10	5.0 - 8.0	June to July
E	upatorium fistulosum	Joe Pye Weed	0.14	5.5 - 7.5	July to October
E	upatorium perfoliatum	Boneset	0.20	4.5 - 7.0	July to September
1	Helenium autumnale	Common Sneezeweed	0.10		July to October
Н	eliopsis helianthoides	Oxeye Sunflower	0.40	4.0 - 7.5	August to September
	Ludwigia alternifolia	Seedbox	0.10		July to August
	Mimulus ringens	Square Stemmed	0.10		August to September
	- Verbena hastata	Monkeyflower Blue Vervain	0.72		June to September
Ve	rnonia noveboracensi		0.10		June to October
10			20.00		
FOLLOWIN PRESENT	IG RESTORATION A	USED AT A RATE OF 40 LBS/AC FOR ST. ND TEMPORARY STABILIZATION WITH A IT REESTABLISH THE WETLAND, MVP V E WETLAND.	NNUAL RYEGRASS,	SHOULD TH	E NATIVE SEEDBANK
N KED	DATE DATE	Mountain	EN	VIRONMI	ENTAL DETAIL
	DATE 08/11/17				
				WEILAN	D SEED MIX
N.T.S.	SHEET 1 OF 1				ICATION DATES
	SHEET 1 OF 1		ey	AND APPL	ICATION RATES
N.T.S. 10. ECT ID:	SHEET 1 OF 1	VOII PIPELIN DESIGN ENGINEERI			ICATION RATES

barian	Seed Mix and	d Application Rates in Virgini			
	Species	Common Name	Seeding Rate (lbs/acre)	рН	Bloom Period (if applicable)
	grostis perennans	Autumn Bentgrass	0.04	5.0 - 7.0	Midsummer
	ndropogon gerardii	Big Bluestem	0.10		May to June
E	Elymus virginicus	Virginia Wildrye	1.00	6.2 - 7.0	June to October
	Juncus effusus Juncus tenuis	Soft Rush Path Rush	3.00 1.00	4.9 - 6.8 4.6 - 6.9	June to July July to August
Par	nicum clandestinum	Deertongue	6.90	4.0 - 0.9 6.8 - 8.9	June to August
	orghastrum nutans	Indiangrass	0.40	4.0 - 8.5	August to September
	sclepias incarnata	Swamp Milkweed	4.00	5.0 - 7.4	June to October
	maecrista fasciculata	Partridge Pea	0.60	5.5 - 7.0	May to June
	atorium coelestinum	Mistflower	0.20	40 70	June to October
	patorium fistulosum patorium perfoliatum	Joe Pye Weed Boneset	0.20 0.20	4.8 - 7.2	July to September July to August
	Geum canadense	White Avens	0.40	5.0 - 8.0	June to July
	elenium autumnale	Common Sneezeweed	0.10	5.5 - 7.5	July to October
	liopsis helianthoides	Oxeye Sunflower	0.14	4.5 - 7.0	July to September
	Monarda fistulosa	Wild Bergamot	0.20		July to October
	anthemum tenuifolium		0.10	4.0 - 7.5	August to September
	Rudbeckia hirta	Blackeyed Susan	0.40		July to August
	Senna hebecarpa Verbena hastata	Wild Senna Blue Vervain	0.10 0.10		August to September June to September
	verbena nastata ionia noveboracensis	New York Ironweed	0.72		June to October
			20.00		
- 2/15: 6 - 4/30:	: ANNUAL RYEGRA	. RYEGRASS (LOLIUM MULTI-FLORUM) AN .SS (LOLIUM MULTI-FLORUM) (60-100 LBS/ SETARIA ITALICA) (50 LBS/AC)		ECALE CERE.	ALE) (50-100 LBS/AC)
	DATE			Revised	
D	DATE	Mountain		VIHONME	ENTAL DETAIL
	DATE 08/11/17			RIPARIAN	N SEED MIX
	SHEET 1 OF 1	Valle	<b>V</b>		CATION RATES
N.T.S.	-				
		PIPELINE			
		PIPELINE DESIGN ENGINEERIN	•	0.	REV.

nd Applicatio			ding Rate	_
Commo	n Name	(1	bs/acre)	
America			0.3	
Tulip I	,		0.3	
White			0.3	
	a Pine		0.3	
Black			0.3	
Canadian S			0.3	
Eastern			0.3	
Flowering	0		0.3	
Persir			0.3	
America			0.3	
	Gum		0.3	
	afras		0.3	
Witch			0.3	
	bush		0.3	
Lowbush			0.3	
Mapleleaf			0.3	
Gra ngs in addition to th			0.3	
-ES11.2 UPLAND MI	EADOW SEED I	MIX.		
tain	ENVIF	ONMENTA	L DETA	<b>JL</b>
		REGENERATION		
NEERING	DRAWING NO.	IVP-ES11.	1	reev.

Species	Common Name	Seeding Rate (Ibs/acre)	рН	Bloom Perio (if applicable
Elymus virginicus	Virginia Wildrye	4.00	5.0 - 7.4	June to Octobe
Schizachyrium scoparium	Little Bluestem	11.68	5.0 - 8.4	July to Octobe
Sorghastrum nutans	Indiangrass	1.00	5.0 - 7.8	August to Octob
Asclepias syriaca	Common Milkweed	0.10		June to Augus
Asclepias tuberosa	Butterfly Milkweed	0.10	4.8 - 6.8	June to Augus
Chamaecrista fasciculata	Partridge Pea	0.60	5.5 - 7.5	July to Septemb
Chamaecrista nictitans	Sensitive Partridge Pea	0.06		June to Octobe
Coreopsis lanceolata	Lanceleaf Coreopsis	0.44	6.0 - 7.0	April to July
Eupatorium coelestinum	Mistflower	0.04	5.5 - 7.5	July to Octobe
Heliopsis helianthoides	Oxeye Sunflower	0.40		July to Augus
Lespedeza virginica	Slender Bushclover	0.10		July to Septeml
Liatris graminifolia	Grassleaf Blazing Star	0.10	5.8 - 6.8	August to Octob
Monarda fistulosa	Wild Bergamot	0.10	6.0 - 8.0	June to Septem
Penstemon laevigatus	Appalachian Beardtongue	0.10		late May to lat August
Pycnanthemum incanum	Hoary Mountainmint,	0.20		May to June
Rudbeckia fulgida var. fulgida	Orange Coneflower	0.02	< 6.8	summer
Rudbeckia hirta	Blackeyed Susan	0.04		July to Octobe
Species	Common Name	Seeding Rate (Ibs/acre)	pН	Bloom Perio (if applicable
Senna hebecarpa	Wild Senna	0.60	6.0 - 7.0	May to July
Solidago juncea	Early Goldenrod	0.10		July to Augus
Solidago nemoralis	Gray Goldenrod	0.04		June to July
Tradescantia ohiensis	Ohio Spiderwort	0.04	6.5 - 7.5	August to Septen
Tradescantia virginiana	Virginia Spiderwort	0.10		late April to mid-
		20.00		

9/1 - 2/15: 50/50 MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WINTER RYE (SECALE CEREALE) (50-100 LBS/AC) 2/16 - 4/30: ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) (60-100 LBS/AC)

5/1 - 8/31: GERMAN MILLET (SETARIA ITALICA) (50 LBS/AC)

DRAWN	DATE		ENVIRONMENTAL DETA	41
CHECKED	DATE	Mountain		
APP'D	DATE 08/11/17		UPLAND MEADOW SEED MIX	,
SCALE N.T.S.	SHEET 1 OF 1	' Valley	AND APPLICATION RATES	
JOB NO.		PIPELINE	AND APPLICATION RATES	
PROJECT ID:			DRAWING NO.	REV.
MVP - V	A PORTION	DESIGN ENGINEERING	MVP-ES11.2	0

Species	Common Name	Seeding Rate (Ibs/acre)	рН	Bloom Period (if applicable)
Agrostis perennans	Autumn Bentgrass	3.15	5.5 - 7.5	Midsummer
Elymus virginicus	Virginia Wildrye	9.05	5.0 - 7.4	June to October
Panicum clandestinum	Deertongue	4.50	4.0 - 7.5	May to September
Schizachyrium scoparium	Little Bluestem	11.25	5.0 - 7.4	July to October
Sorghastrum nutans	Indiangrass	14.40	5.0 - 7.8	August to October
Asclepias syriaca	Common Milkweed	0.09		June to August
Aster pilosus	Heath Aster	0.05	5.4 - 7.0	After fall frost
Chamaecrista fasciculata	Partridge Pea	0.45	5.5 - 7.5	July to September
Coreopsis lanceolata	Lanceleaf Coreopsis	0.45	6.0 - 7.0	April to July
Eupatorium coelestinum	Mistflower	0.05	5.5 - 7.5	July to October
Heliopsis helianthoides	Oxeye Sunflower	0.45		July to August
Liatris graminifolia	Grassleaf Blazing Star	0.09	5.8 - 6.8	August to October
Monarda fistulosa	Wild Bergamot	0.23	6.0 - 8.0	June to September
Pycnanthemum incanum	Hoary Mountainmint	0.05	< 6.8	summer
Rudbeckia hirta	Blackeyed Susan	0.45	6.0 - 7.0	May to July
Senna hebecarpa	Wild Senna	0.23		July to August
Solidago nemoralis	Gray Goldenrod	0.05	6.5 - 7.5	August to Septembe
Tradescantia ohiensis	Ohio Spiderwort	0.05		late April to mid-Jul
		45.00		

DRAWN	DATE	Mountain	ENVIRONMENTAL DETA	AL.	
CHECKED APP'D	DATE DATE 08/11/17	Mountain 🎦			
SCALE N.T.S.	SHEET 1 OF 1	Valley	UPLAND STEEP SLOPE SEED I AND APPLICATION RATES	MIX	
JOB NO.		PIPELINE	AND APPLICATION RATES		
PROJECT ID:		DESIGN ENGINEERING	DRAWING NO.	REV.	
MVP - V	A PORTION		MVP-ES11.3	0	

Species	Common Name	Indicator Status	Riparian Planting <sup>1</sup>	Forested Wetland Planting <sup>2</sup>
	Nativ	re Trees		
Acer rubrum	Red Maple	FAC	х	х
Acer saccharinum	Silver Maple	FACW	Х	Х
Betula nigra	River Birch	FACW	Х	Х
Carpinus caroliniana	American Hornbeam	FAC	Х	х
Carya glabra	Pignut Hickory	FACU	Х	
Carya ovata	Shagbark Hickory	FACU	Х	
Chionanthus virginicus	White Fringe Tree	FAC+	х	
Diospyros virginiana	Common Persimmon	FAC-	Х	
Species	Common Name	Indicator Status	Riparian Planting <sup>1</sup>	Forested Wetland Planting <sup>2</sup>
Fraxinus pennsylvanica	Green Ash	FACW	Х	Х
Juniperus virginiana	Eastern Red Cedar	FACU	х	х
Liquidambar styraciflua	Sweet Gum	FAC	х	х
Liriodendron tulipifera	Tuliptree	FACU	Х	Х
Nyssa sylvatica	Black Gum	FAC	Х	
Platanus occidentalis	American Sycamore	FACW-	Х	Х
Populus deltoids	Eastern Cottonwood	FAC	Х	
Quercus bicolor	Swamp White Oak	FACW+	Х	Х
			v	v
Quercus falcata	Cherrybark Red Oak	FACW	х	Х
Quercus falcata Quercus phellos	Cherrybark Red Oak Willow Oak	FACW FAC+	X X	X X

FACW FACW

FACW-

Ulmus americana NOTE:

Salix nigra

Quercus palustris

\_\_\_\_

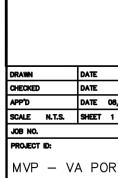
1. REFER TO MVP-ES11.8 AND MVP-ES11.9 FOR LOCATIONS OF BARE ROOT PLANTINGS.

Pin Oak Black Willow

American Elm

DRAWN	DATE		ENVIRONMENTAL DETA		
CHECKED	DATE	Mountain			
APP*D	DATE 08/11/17	NATIVE TREE AND SHRUB SPECIES FOR			
SCALE N.T.S.	SHEET 1 OF 1	' Valley	BARE ROOT PLANTINGS WITHIN RIF	PARIAN	
JOB NO.		PIPELINE	AREAS AND FORESTED WETLAN	DS	
PROJECT ID:			DRAWING NO.	REV.	
MVP - V	A PORTION	DESIGN ENGINEERING	MVP-ES11.6	0	

	Native S	hrubs		
Alnus serrulata	Brook-side Alder	OBL		Х
Amelanchier canadensis	Canada Serviceberry	FAC	Х	
Aronia arbutifolia	Red Chokecherry	FACW	Х	Х
Baccharis halimifolia	Groundsel Bush	FACW-	х	Х
Cephalanthus occidentalis	Buttonbush	OBL		Х
Cornus amomum	Silky Dogwood	FACW	х	Х
Cornus stolonifera	Red-osier Dogwood	FAC	Х	Х
Hamamelis virginiana	American Witchhazel	FAC-	Х	
llex verticillata	Common Winterberry	FACW+	Х	Х
ltea virginica	Virginia Willow	OBL		Х
Iva frutescens	Marsh Elder	FACW+	х	Х
Leucothoe racemosa	Fetter-bush	FACW	Х	Х
Lindera benzoin	Spicebush	FACW-	Х	Х
Lyonia ligustrina	Maleberry	FACW	Х	Х
Magnolia virginiana	Sweetbay Magnolia	FACW+	Х	Х
Physocarpus opulifolius	Eastern Ninebark	FACW-	Х	Х
Sambucus canadensis	American Elder	FACW-	Х	Х
Vaccinium corymbosum	Highbush Blueberry	FACW-	Х	Х
Virburnum dentatum	Arrow-wood	FAC	Х	
Viburnum prunifolium	Black-haw	FACU	Х	



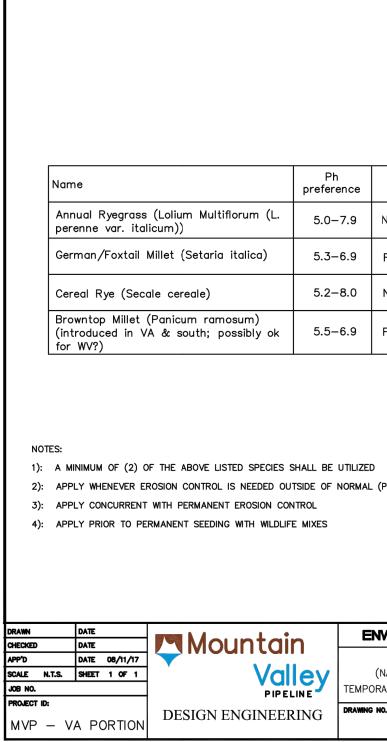
	Mountain	ENVIRONMENTAL DETA	<b>JL</b>
08/11/17 1 OF 1	Valley	NATIVE TREE AND SHRUB SPECIES BARE ROOT PLANTINGS WITHIN RIF	
	PIPELINE	AREAS AND FORESTED WETLAN	DS
	DESIGN ENGINEERING	DRAWING NO.	REV.
ORTION		MVP-ES11.7	0

ADDED DETAILS FOR ROADS AND PADS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	DESCRIPTION:		REVISIONS:	
DW	DW	DW	DW	DW	DW	APPD.:		Щ М М	
RE	RE	RE	RE	RE	RE	DWN.: CHKD.: APPD.:			
3 KAL	3 KAL	3 KAL	7 KAL	7 KAL	7 KAL	DWN.:			
01/31/18	01/26/18	01/08/18	11/28/17	11/01/17	08/18/17	DATE:			
7	9	5	4	3	2	NO.:			
C + 2		ME		Ž		6	Ļ	BO	S
		EROSION AND SEDIMENT CONTROL PLANS		MUUNIAIN VALLET PIPELINE PROJECT - ROUU LINE				555 SOUTHPOINTE BOULEVARD, SUITE 200	CANONSBURG, PA 15317
(	comp	661 F	TE worl AN OST		LEAF SEN PLA	EC R SO I DF ZA		rion E	
(	comp	661 F	TE worl AN OST	TR a c DER ER RGH	LEAF SEN PLA	EC R SO I DF ZA		rion E	
(	comp		AN OST BUI			EC S SO J DF ZA LNER		rion E	
CH	F		TE AN OST BUI DAVI Lic.			EC S SO J DF ZA LNER		rion E	s <sup>™</sup>
DR CH AP DA	F		TE AN OST BUI DAVI Lic. BY: BY:		WALL CONTRACT OF C	LINER DITT			KAL

Waterbody Name	MP	County	State	Valuable Resource
Kimballton Branch	199.1, 199.4	Giles	VA	headwaters of wild trout stream, coldwater stream
Waterbody Name	MP	County	State	Valuable Resource
Stony Creek	200.4	Giles	VA	candy darter, green floater, coldwater stream, wild trout stream
Little Stony Creek	204.4	Giles	VA	coldwater stream, wild trout stream
Sinking Creek	211.2	Giles	VA	candy darter, green floater, coldwater stream, wild trout stream, non-listed mussels
UNT Craig Creek	219.2	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
UNT Craig Creek	219.3	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
UNT Craig Creek	219.8	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
UNT Craig Creek	220.0	Montgomery	VA	Headwaters of James spinymussel occurrences, USFS lands area
Mill Creek	222.2	Montgomery	VA	upstream of Roanoke logperch suitable habitat, orangefin madtom, coldwater stream, wild trout
North Fork[Roanoke River	227.2	Montgomery	VA	Roanoke logperch present, non-listed mussels present, orangefin madtom, coldwater stream, wild trout
North Fork Roanoke River	227.4	Montgomery	VA	Roanoke logperch present, non-listed mussels present, orangefin madtom, coldwater stream, wild trout
Bradshaw Creek	230.7	Montgomery	VA	Roanoke logperch suitable habitat, orangefin madtom, coldwater stream, wild trout
Bradshaw Creek	231.5	Montgomery	VA	Roanoke logperch suitable habitat, orangefin madtom, coldwater stream, wild trout
Roanoke River	235.4	Montgomery	VA	Roanoke logperch present, orangefin madtom, non-listed mussels present
Bottom Creek	241.1	Roanoke	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
Bottom Creek	242.5	Roanoke	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream, wild trout
N DATE				
CED DATE	Mo	untain		ENVIRONMENTAL DETA
DATE 08/11/17 N.T.S. SHEET 1 OF 1 IO.	•		ey   '	STREAM CROSSINGS PROPOSED BARE ROOT SEEDING PLANTING

				upstream of Bottom Creek Gorge,	_
Mill Creek	245.1	Roanoke	VA	orangefin madtom, coldwater stream, wild trout	
Green Creek	247.1	Franklin	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream,	_
				wild trout	_
Green Creek	247.4	Franklin	VA	upstream of Bottom Creek Gorge, orangefin madtom, coldwater stream,	
North Fork Blackwater River	249.7	Franklin	VA	wild trout Roanoke logperch suitable habitat, coldwater stream wild trout stream	_
				colowater stream wild front stream	_
Waterbody Name	MP	County	State	Valuable Resource	
Teels Creek	258.2	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek	_
Teels Creek	260.3	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project	_
Teels Creek	261.0	Franklin	VA	crossings of Teels Creek upstream of Roanoke logperch suitable habitat, one of numerous project	_
Teels Creek	261.8	Franklin	VA	crossings of Teels Creek upstream of Roanoke logperch suitable habitat, one of numerous project	
Teels Creek	262.3	Franklin	VA	crossings of Teels Creek Roanoke logperch suitable habitat, one of numerous project crossings of Teels	
Little Creek	262.6	Franklin	VA	Creek contributing sediment impacts Roanoke logperch suitable habitat, numerous crossings upstream	_
Little Creek	263.3	Franklin	VA	contributing sediment impacts Roanoke logperch suitable habitat, non- listed mussels present, numerous crossings upstream contributing sediment impacts	_
Maggodee Creek	269.4	Franklin	VA	Roanoke logperch suitable habitat	_
Blackwater River	269.7	Franklin	VA	Roanoke logperch present, non-listed mussels present	_
UNT to Jacks Creek	278.8	Franklin	VA	orangefin madtom	_
Turkey Creek	280.5	Franklin	VA	orangefin madtom	_
Strawfield Creek	282.3	Franklin	VA	orangefin madtom	_
Parrot Branch	282.9	Franklin	VA	orangefin madtom	_
Jonnikin Creek	284.4	Pittsylvania	VA	orangefin madtom	_
UNT to Rocky Creek	287.1	Pittsylvania	VA	orangefin madtom	
Pigg River	289.1	Pittsylvania	VA	Roanoke logperch present, orangefin madtom, mussels present including yellow lampmussel (VA threatened)	
Harpen Creek	289.9	Pittsylvania	VA	Roanoke logperch suitable habitat, orangefin madtom	_
Harpen Creek	292.0	Pittsylvania	VA	orangefin madtom	_
WIN DATE					
CKED DATE	Mo	ountain		ENVIRONMENTAL DETA	L
D         DATE         08/11/17           ULE         N.T.S.         SHEET         1         0F         1	▼			STREAM CROSSINGS PROPOSED BARE ROOT SEEDING PLANTING	
				DARE NOOT SEEDING FLANTING	
3 NO.		PIPELIN	E		
B NO. IOJECT ID:	DESIGN	PIPELIN ENGINEERIN		AWING NO.	REV.

Scientific Nar		ithin the Jefferson Nationa Common Name	Growth Habit	pH Preference
		tive Species for Temporary Erosion		pri Fielelence
		Italian ryegrass; Annual ryegrass	Graminoid	5.0 - 7.9
Urochloa ramosa (Panicum ramosum)		Browntop millett	Graminoid	5.5-6.9
Secale cereale		Cereal rye	Graminoid	5.2-8.0
Setaria italica		Foxtail millet	Graminoid	5.3-6.9
		Native – Highly Preferred		
Sorghastrum nutans		Indiangrass	Graminoid	5.0-7.8
Tridens flavus		Purpletop	Graminoid	4.5-6.5
		Native – Preferred		1
Agrostis perennans		Autumn bentgrass; Upland bentgrass	Graminoid	5.5 - 7.5
Dichanthelium clandestinum		Deertongue	Graminoid	4.0 - 7.5
Elymus canadensis		Canada wildrye	Graminoid	5.0 - 7.9
Desmodium canadense		Showy ticktrefoil	Forb	wide tolerance
Heliopsis helianthoides		Oxeye sunflower; Smooth oxeye	Forb	unknown
Lespedeza virginica		Slender bushclover; Slender lespedeza	Forb	acid tolerant
Liatris spicata		Dense blazing star; Spiked gayfeather	Forb	5.6 - 7.5
Senna hebecarpa		Wild senna; American senna	Forb	unknown
		Native – Moderately Preferred		1
Panicum virgatum		Switchgrass	Graminoid	4.5-8.0
Chamaecrista fasciculata		Partridge pea	Forb	5.5 - 7.5
Rudbeckia hirta		Blackeyed Susan	Forb	6.0 - 7.0
WIN DATE		Aountain	ENVIRONMEN	TAL DETAIL
CKED DATE	_ <b>_</b> N	1ountain –		
	/17		US FOREST	SERVICE
CKED DATE DATE 08/11/	/17	lountain Valley		SERVICE EST) LANDS
CKED DATE "D DATE 08/11/ LE N.T.S. SHEET 1 OF	<u>/17</u>		US FOREST (NATIONAL FOR	SERVICE EST) LANDS



Scientific Name	Common Name	Growth Habit	pH Preference
Upland /	Areas - Non-native Species for Erosion	Control	
Lolium perenne subsp. multiflorum	Italian ryegrass; Annual ryegrass	Graminoid	5.0 - 7.9
Urochloa ramosa (Panicum ramosum)	Browntop millett	Graminoid	5.5 - 6.9
Secale cereale	Cereal rye	Graminoid	5.2 - 8.0
Setaria italica	Foxtail millet	Graminoid	5.3 - 6.9
	Upland Areas - Native Species		
Chasmanthium laxumª	Slender woodoats	Graminoid	4.5 - 7.0
Eragrostis spectabilisª	Purple lovegrass	Graminoid	4.0 - 7.5
Panicum virgatum	Switchgrass	Graminoid	4.5 - 8.0
Sorghastrum nutans	Indiangrass	Graminoid	5.0 - 7.8
Tridens flavusª	Purpletop	Graminoid	4.5 - 6.5
Apocynum cannabinumª	Indian hemp	Forb	4.5 - 7.0
Chamaecrista fasciculata	Partridge pea	Forb	5.5 - 7.5
Desmodium canadense	Showy ticktrefoil	Forb	wide tolerance
Desmodium paniculatum	Panicledleaf ticktrefoil	Forb	6.0 - 7.0
Elymus virginicus <sup>b</sup>	Virginia wildrye	Graminoid	5.0 - 7.4
Geum canadenseª	White avens	Forb	4.5 – 7.5
Heliopsis helianthoides	Oxeye sunflower; Smooth oxeye	Forb	unknown
Monarda fistulosa <sup>b</sup>	Wild bergamot	Forb	6.0 - 8.0
Pycnanthemum spp.b	Mountain mint	Forb	unknown
Rubus allegheniensis <sup>a</sup>	Common blackberry; Allegheny blackberry	Forb/ Subshrub	4.6 – 7.5
Rudbeckia hirta	Blackeyed Susan	Forb	6.0 - 7.0
Solidago canadensisª	Canada goldenrod	Forb	4.8 - 7.5
Tradescantia virginianaª	Virginia spiderwort	Forb	4.0 - 8.0

DRAWN	DATE		ENVIRONMENTAL DETA	AIL.
CHECKED	DATE	Mountain		
APP'D	DATE 08/11/17		US FOREST SERVICE	
SCALE N.T.S.	SHEET 1 OF 1	Valley	(NATIONAL FOREST) LANDS	
JOB NO.		PIPELINE	UPLAND AREA SEED MIX	
PROJECT ID:			DRAWING NO.	REV.
MVP - V	A PORTION	DESIGN ENGINEERING	MVP-ES12.1	0

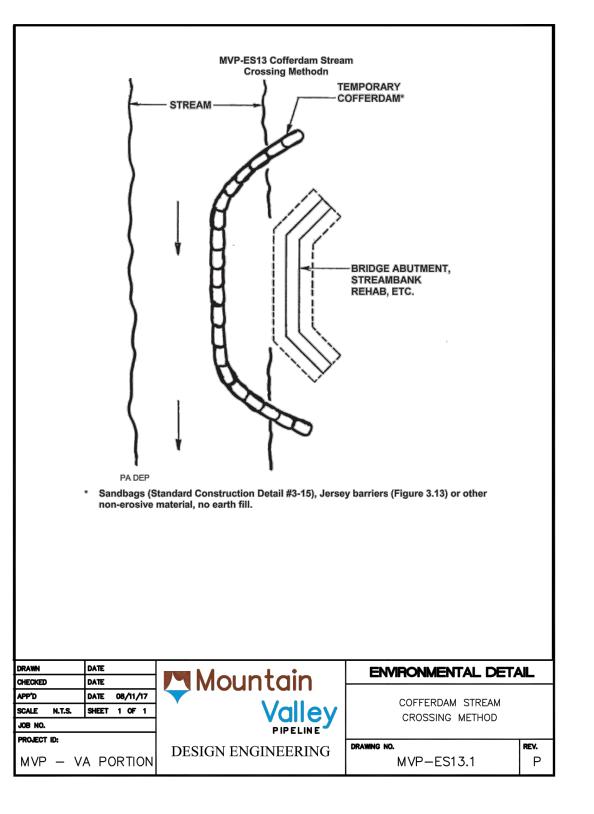
Riparian Seed Mixe Scientific Na
Lolium perenne subsp. m Urochloa ramosa (Panicul
Secale cereale
Setaria italica
Agrostis perennans
Elymus virginicus
Sorghastrum nutans
Asclepias incarnata
Chamaecrista fasciculata
Eutrochium fistulosum (Eu
fistulosum)
Eupatorium maculatum
Eupatorium perfoliatum
Helenium autumnale
Senna hebecarpa
Senna marilandica
Vernonia noveboracensis

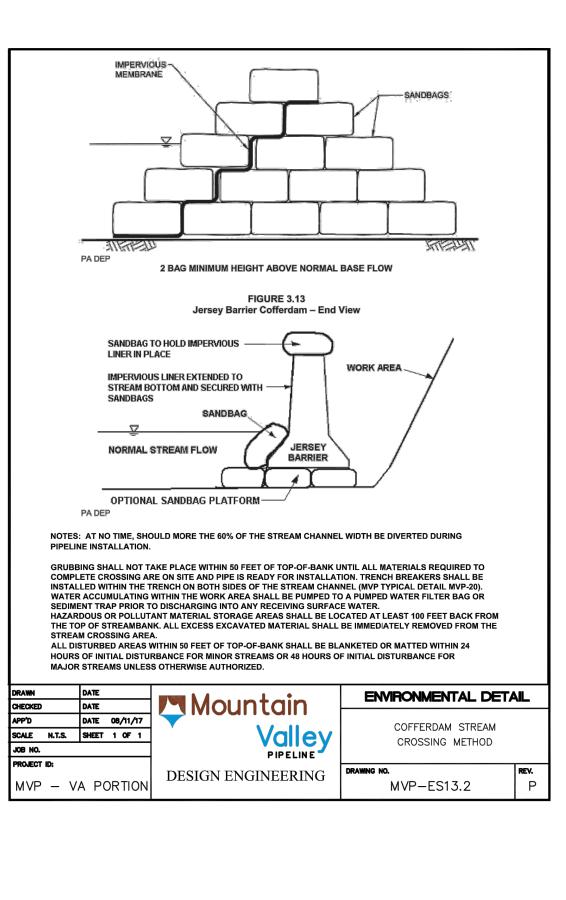
	DATE	Mountain	ENVIRONMENTAL DETA	ſ
Checked App'd Scale N.T.S.	DATE DATE 08/11/17 SHEET 1 OF 1	Valley	US FOREST SERVICE (NATIONAL FOREST) LANDS	
JOB NO.		PIPELINE	RIPARIAN SEED MIX	
project id: MVP — V/	A PORTION	DESIGN ENGINEERING	drawing no. MVP-ES12.2	<b>rev.</b> ()

	Ph preference	Wetland Indicator Status
n (L.	5.0-7.9	NI/moderate
a)	5.3–6.9	FACU
	5.2-8.0	NI/damp
) y ok	5.5-6.9	FACU

2): APPLY WHENEVER EROSION CONTROL IS NEEDED OUTSIDE OF NORMAL (PERMANENT) SEEDING SEASONS

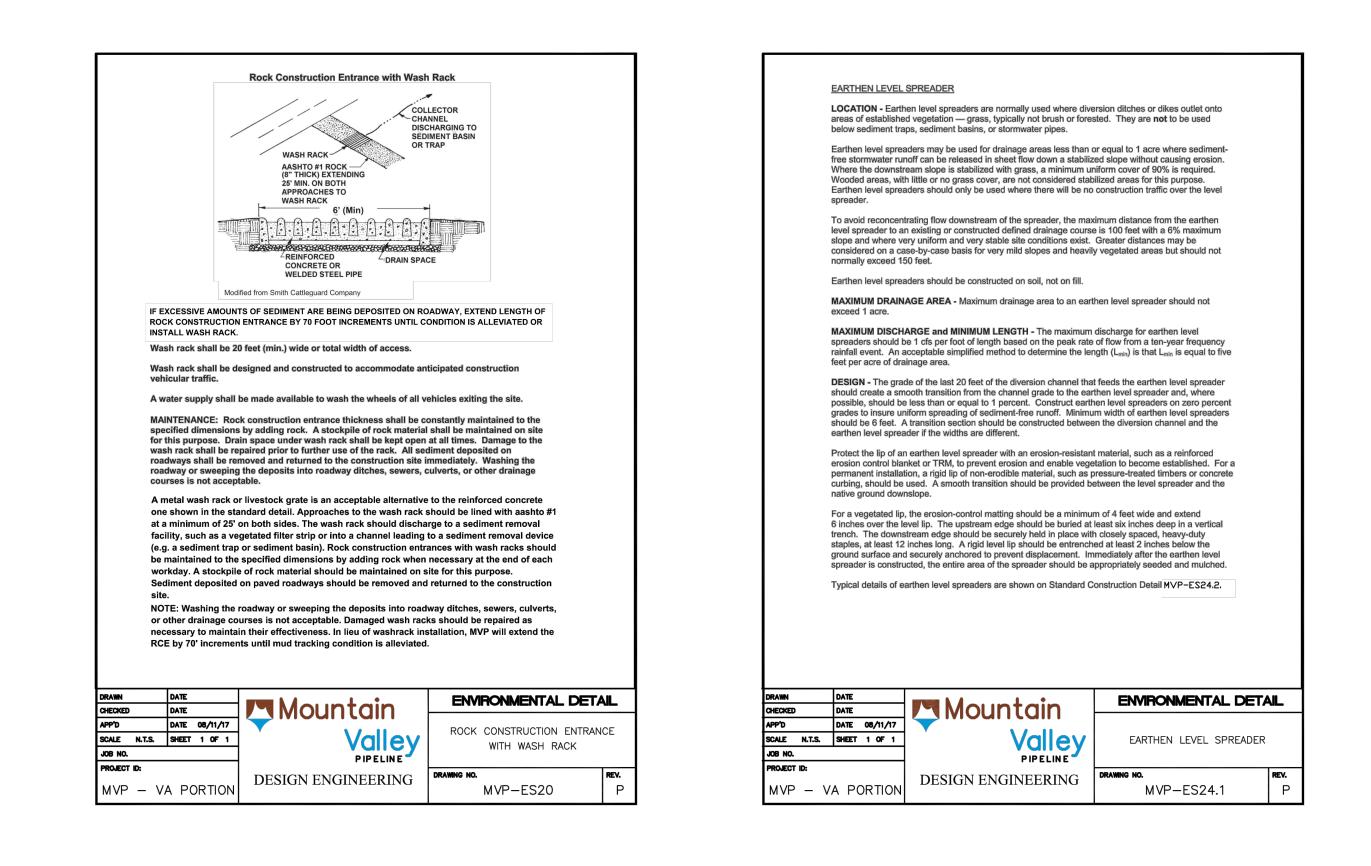
ntain	ENVIRONMENTAL DETA	<b>JL</b>
Valley	US FOREST SERVICE (NATIONAL FOREST) LANDS TEMPORARY EROSION CONTROL SF	
P IP E L IN E 🍼		
INEERING	drawing no. MVP-ES12.4	rev. O

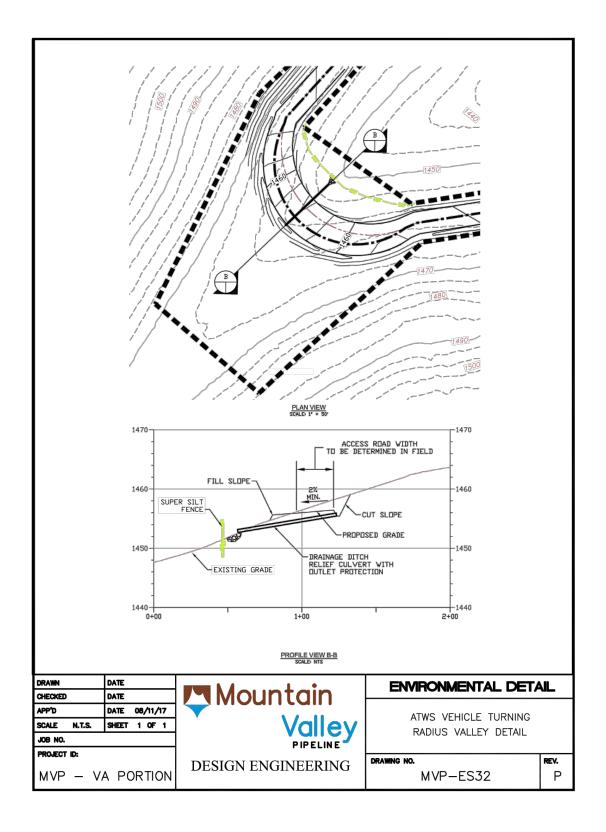


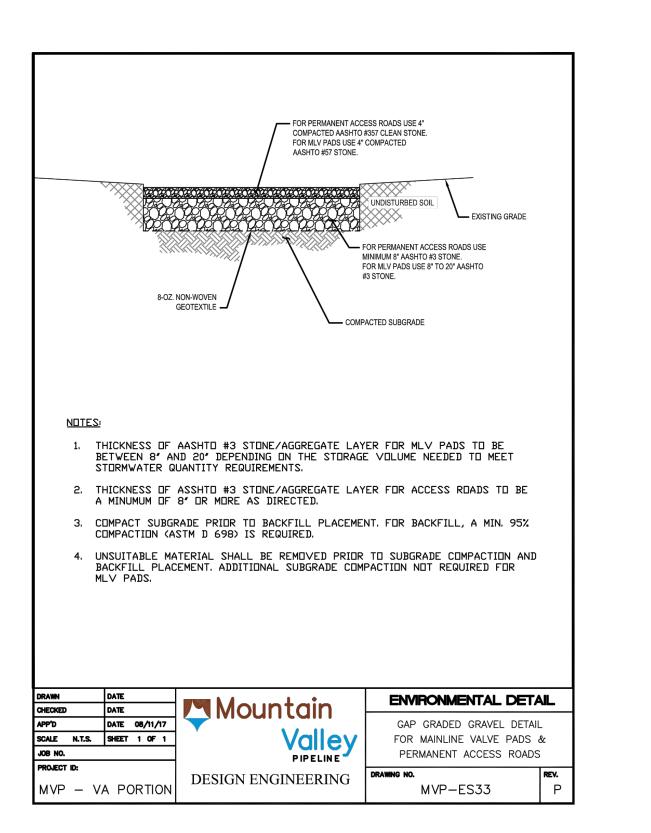


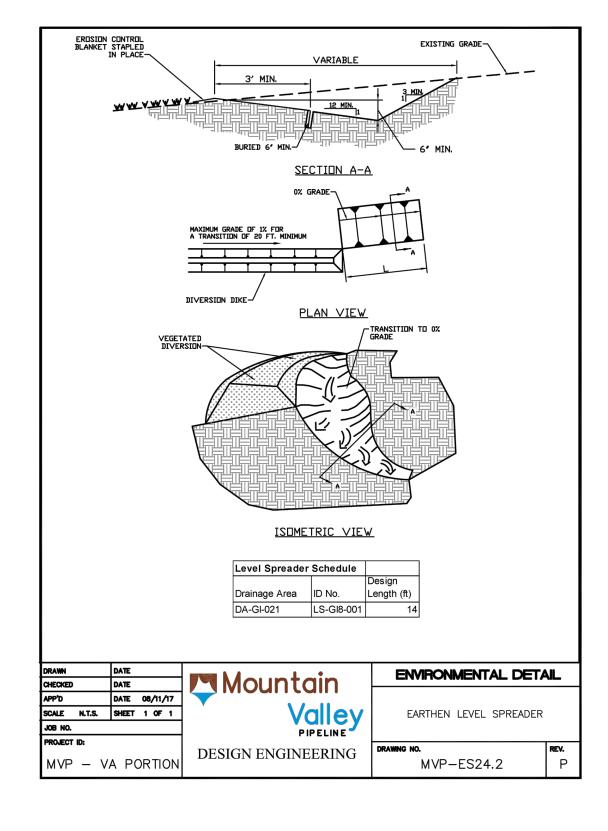
Name	Common Name	Habit	pH Preference
N	Ion-native Species for Erosion Control		
multiflorum	Italian ryegrass; Annual ryegrass	Graminoid	5.0 – 7.9
cum ramosum)	Browntop millett	Graminoid	5.5 – 6.9
	Cereal rye	Graminoid	5.2 - 8.0
	Foxtail millet	Graminoid	5.3 – 6.9
	Native Species		
	Autumn bentgrass; upland bentgrass	Graminoid	5.5 - 7.5
	Virginia Wildrye	Graminoid	5.0 - 7.4
ł	Indiangrass	Graminoid	5.0 - 7.8
ł	Swamp milkweed	Forb	5.0 - 8.0
ta	Partridge pea	Forb	5.5 - 7.5
(Eupatorium	Joe pye weed	Forb	4.5 – 7.0
	Spotted joe pye weed	Forb	5.5 - 7.0
1	Boneset	Forb	unknown
	Common sneezeweed	Forb	4.0 - 7.5
	Wild senna; American senna	Forb	unknown
1	Maryland senna	Forb / Subshrub	4.0 - 7.0
sis	New York ironweed	Forb	4.5 -8.0

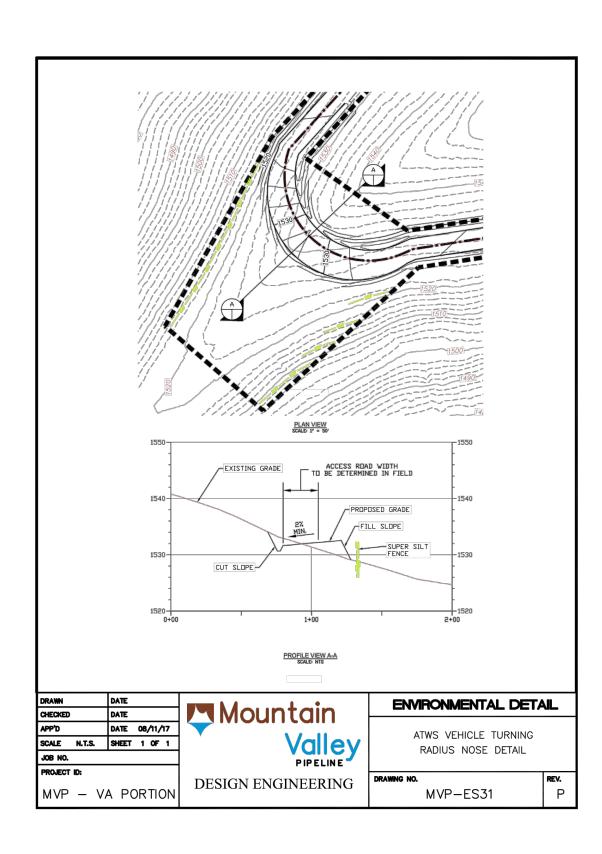
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Mollan Vallav		EROSION AND SEDIMENT CONTROL PLANS		MUUNIAIN VALLET FIFELINE FRUJEUT - NOUU LINE			555 SOUTHPOINTE BOULEVARD, SUITE 200	CANONSBURG, PA 15317
c		661 F	AN OST	a   c DER ER	SEN PLA	I DF ZA	7	5™
	F	פדדוי	SBUF		, P/	A 15	5220	
					GENERAL DE LAILS			
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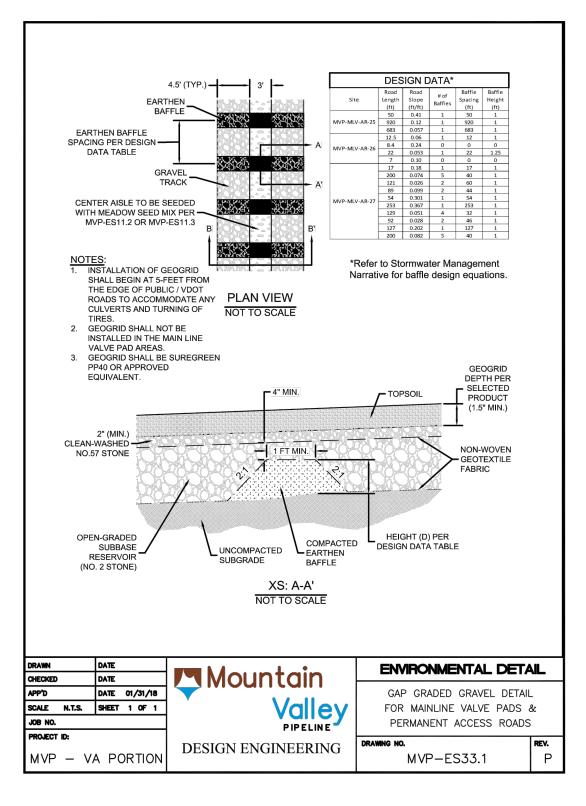


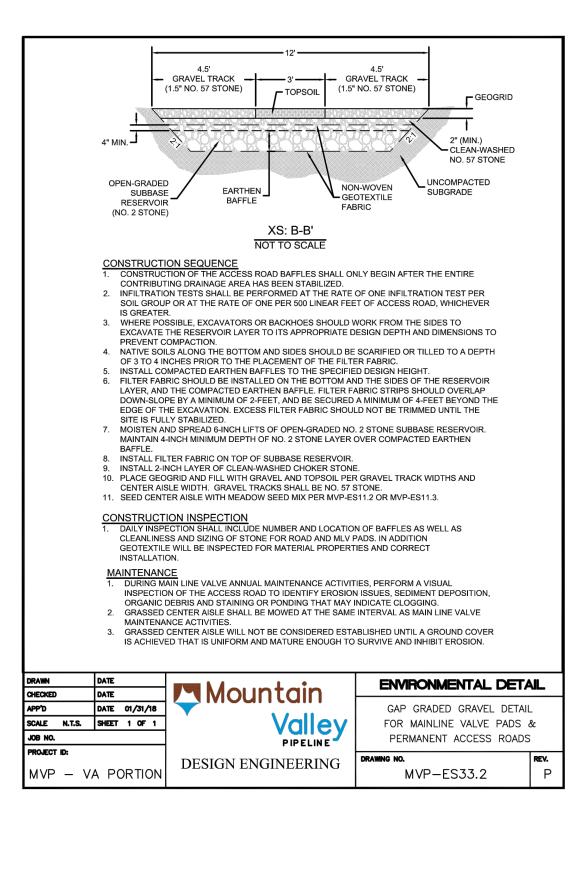




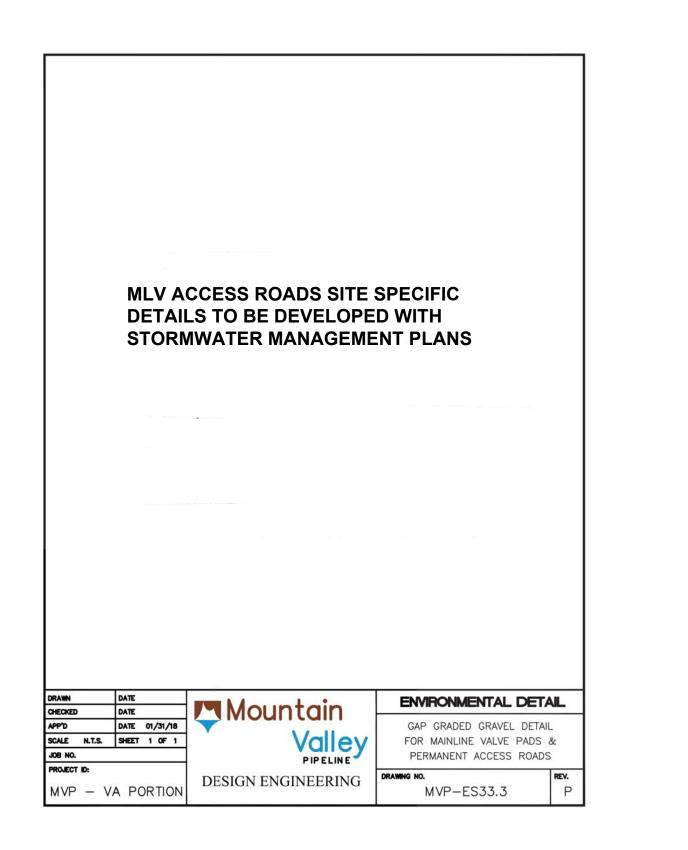


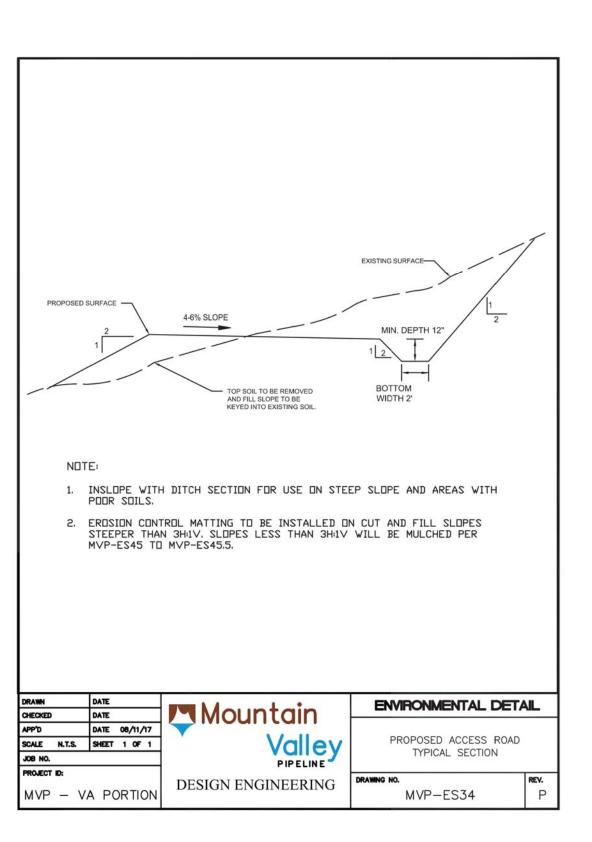


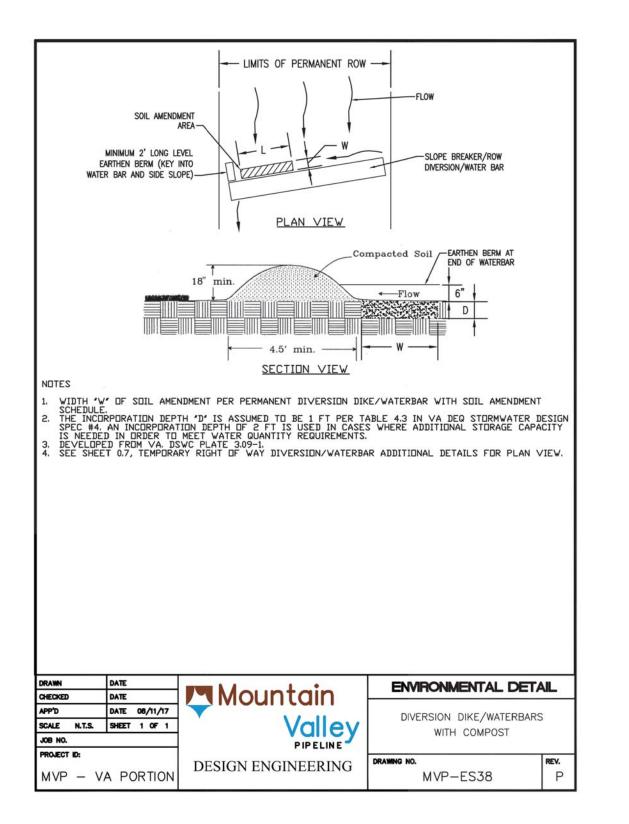


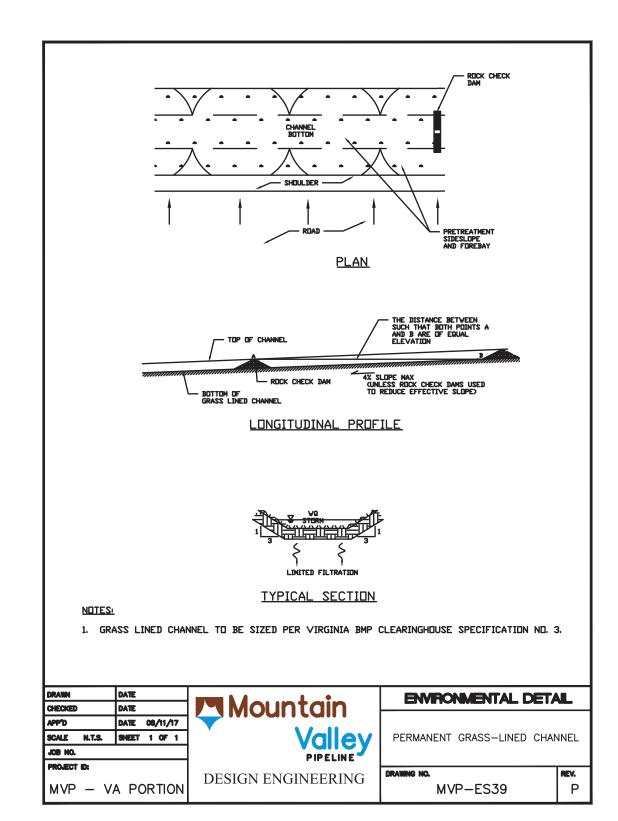


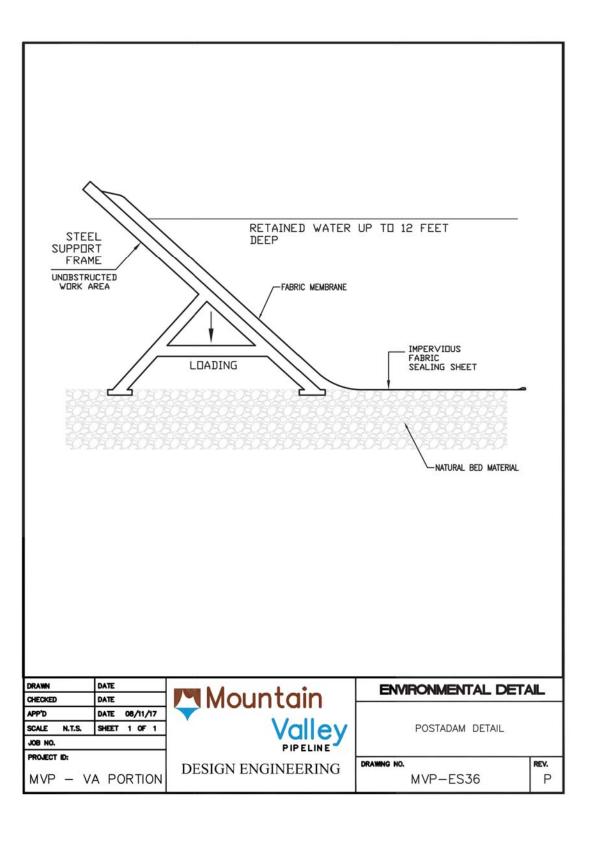
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8 KAL	8 KAL	8 KAL	7 KAL	7 KAL	7 KAL	DWN.		
03/21/18	01/26/18	01/08/18	11/28/17	11/01/17	08/18/17	DATE:		
8	9	5	4	3	2	NO.:		
Mountain Valley Pierune EROSION AND SEDIMENT CONTROL PLANS MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE S55 SOUTHPOINTE BOULEVARD, SUITE 200 555 SOUTHPOINTE BOULEVARD, SUITE 200 CANONSBURG, PA 15317								
		EROS						
c		661 F	TE worl AN OST	TR a   c DER ER	SEN PLA	EC so DF ZA	H LUTION: RIVE	S™
G		661 F	TE worl AN OST	TR a   c DER ER RGH	SEN PLA	EC so DF ZA	H LUTION: RIVE 7	S™
	F		TE AN OST BUI		SEN PLA , PA	EC A SO A 15 LNER	H LUTION RIVE 5220	
DR	F 	661 FOITTS	TE AN OST BUI			EC A SO A 15 LINER 57593	H LUTION RIVE 5220	s <sup>~</sup> KAL HT RE

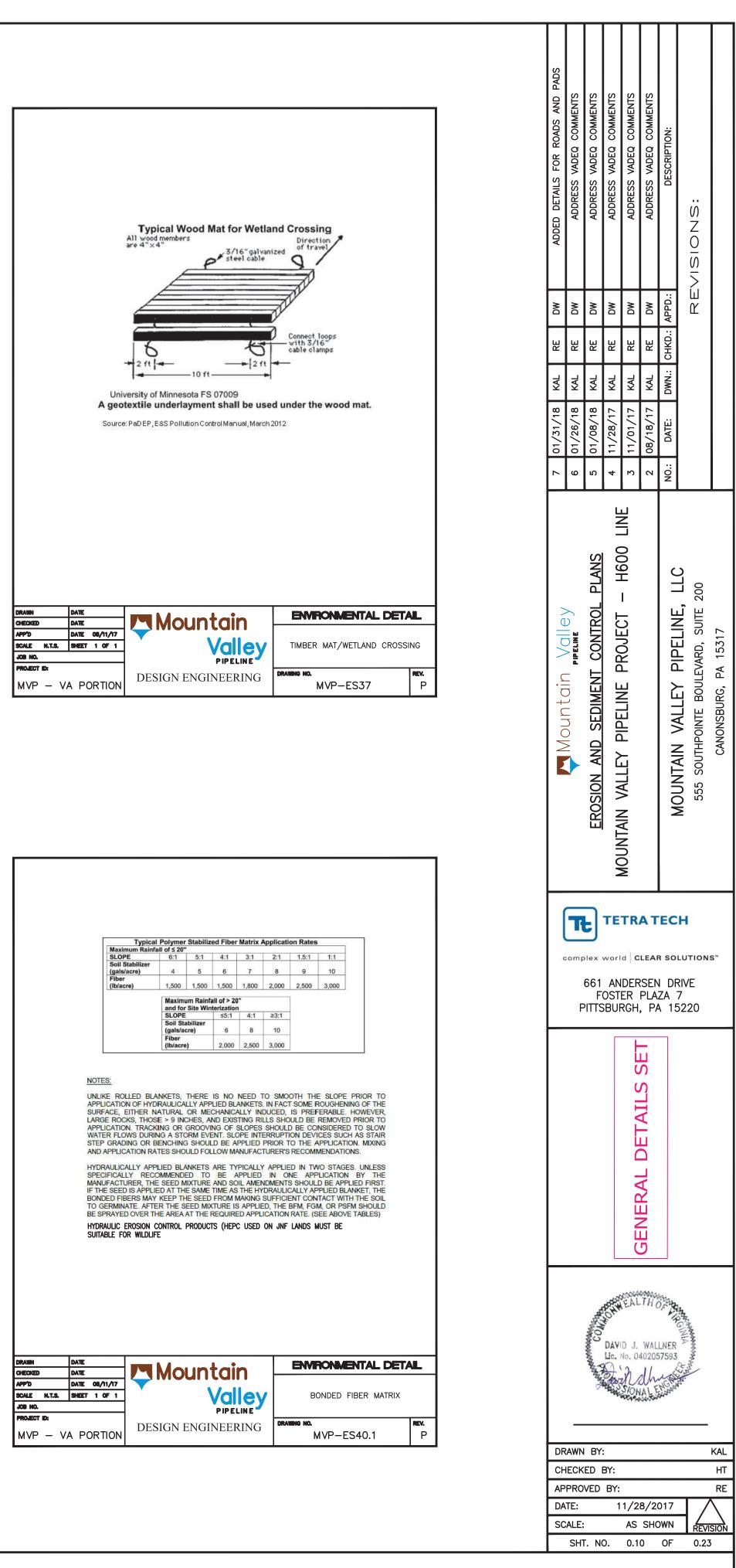


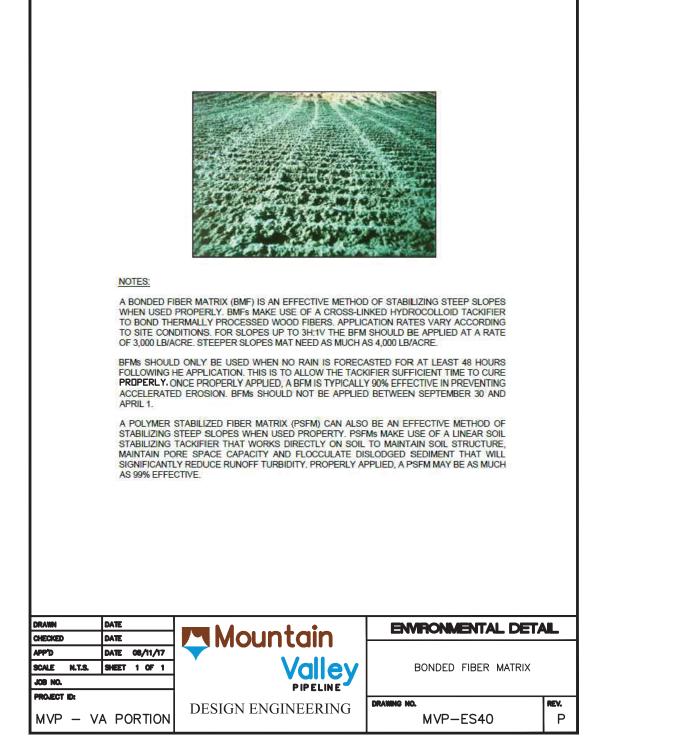


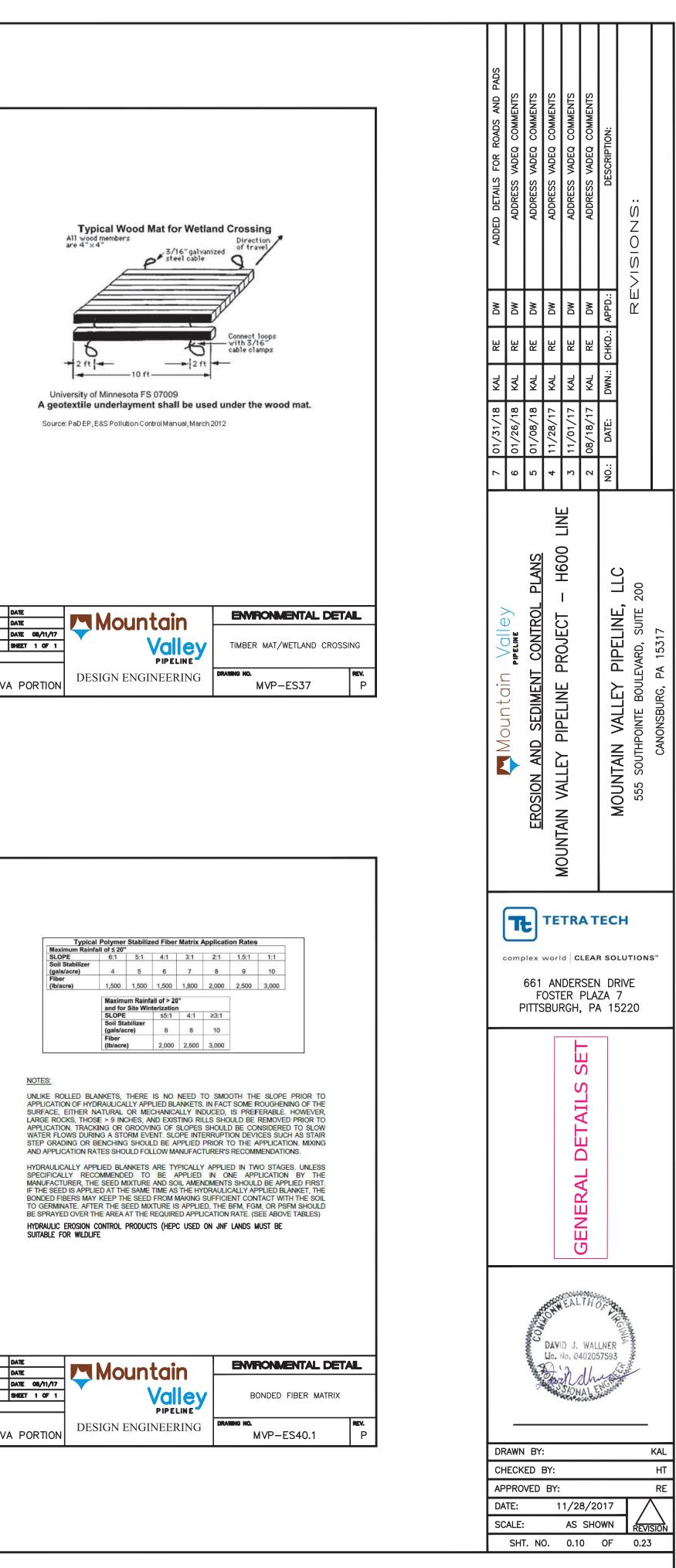


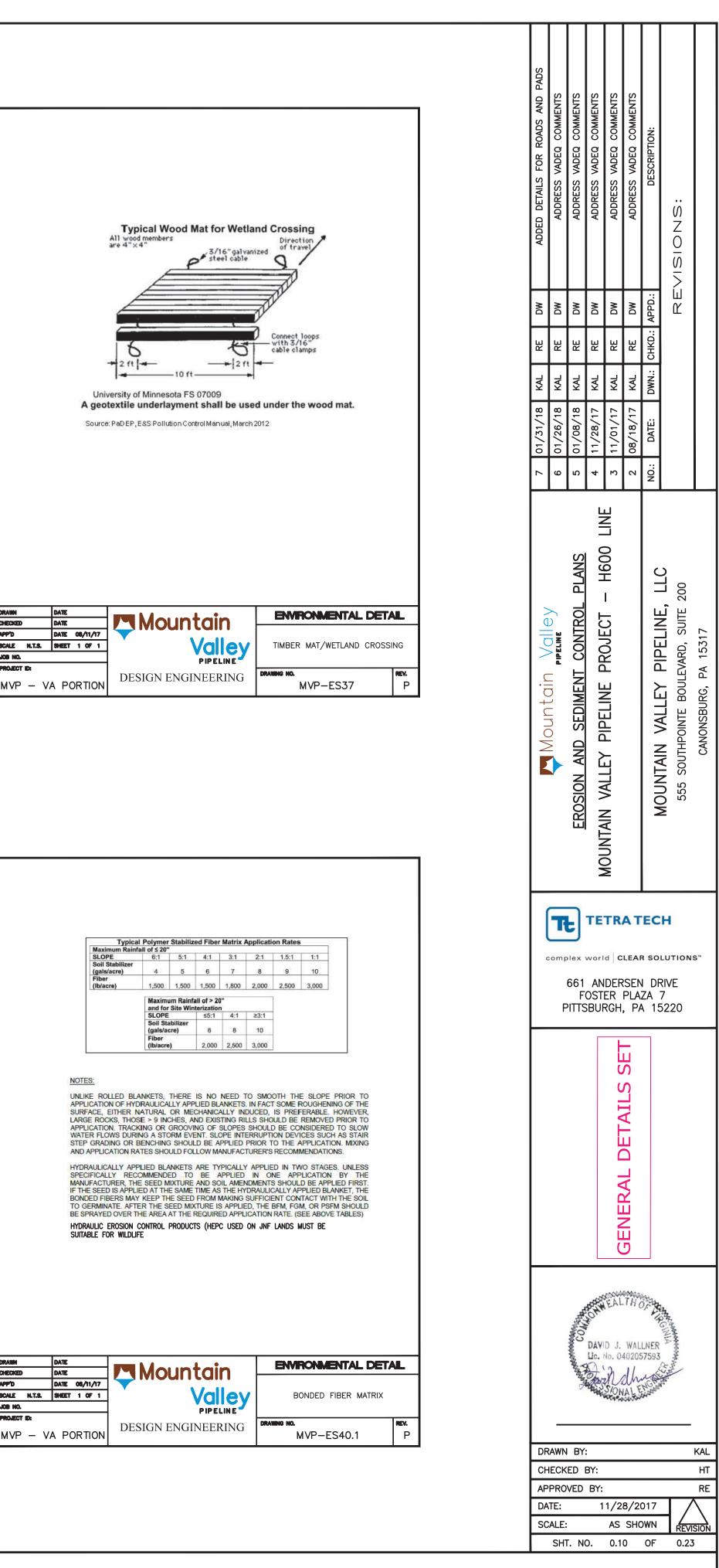


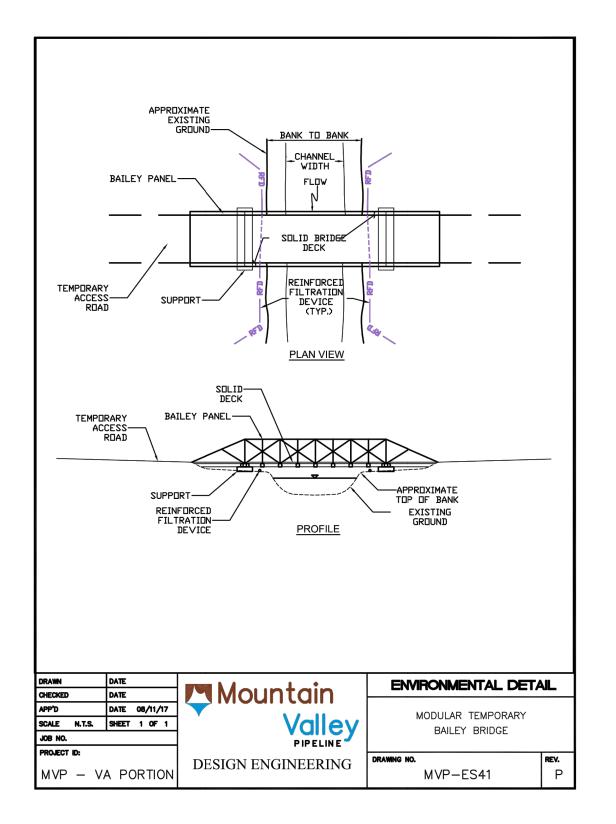


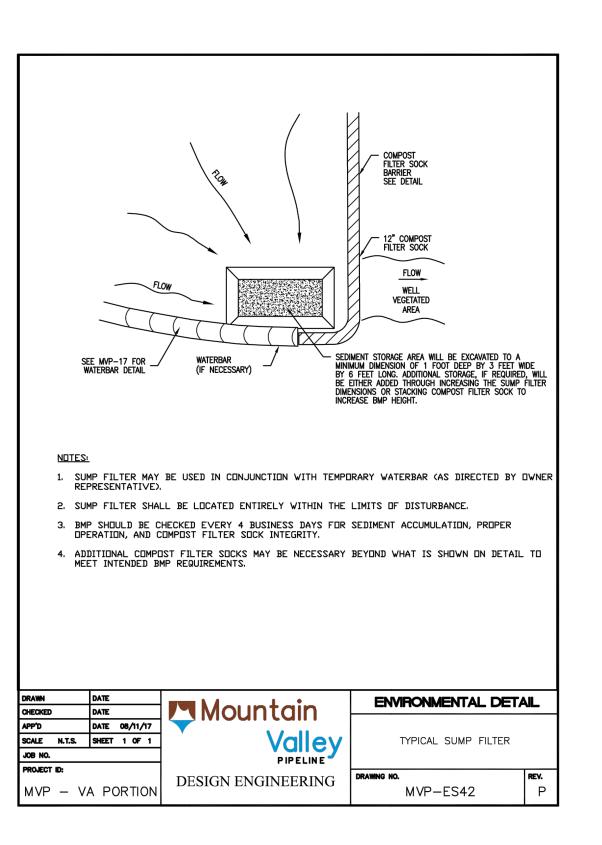


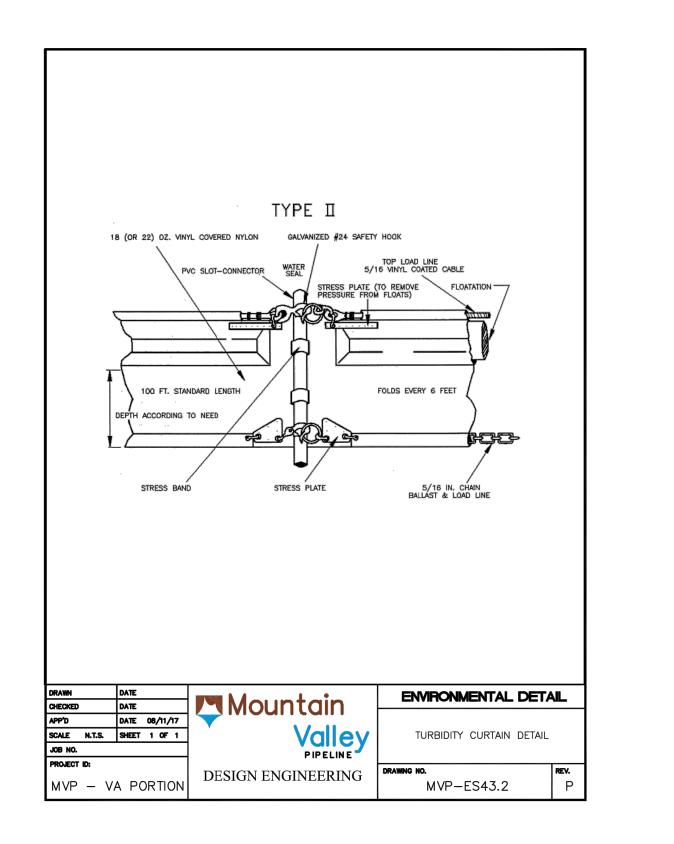


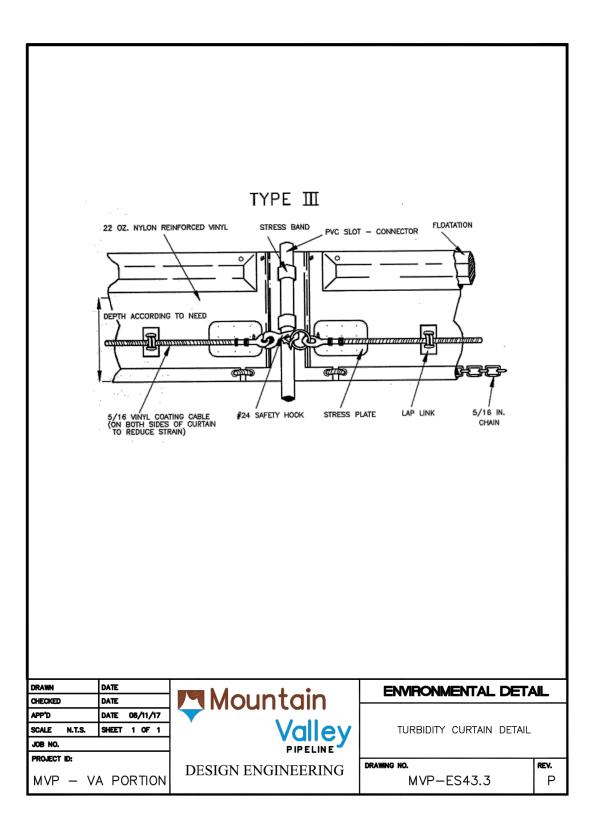


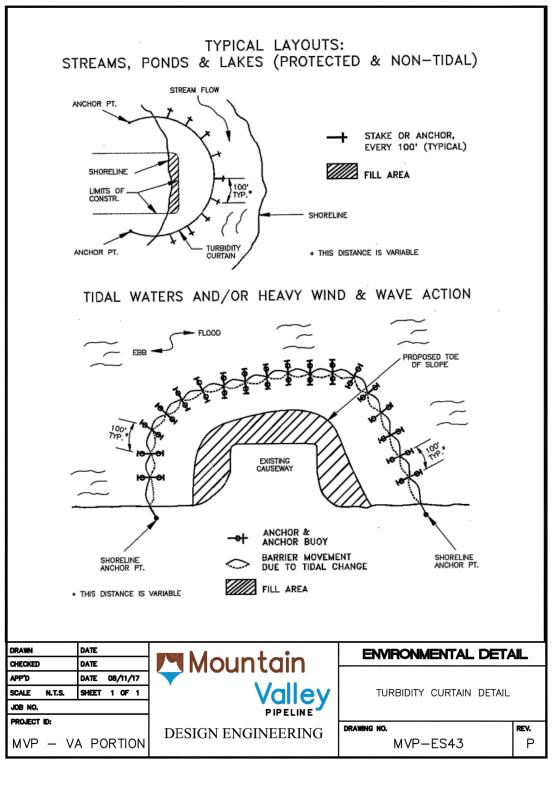


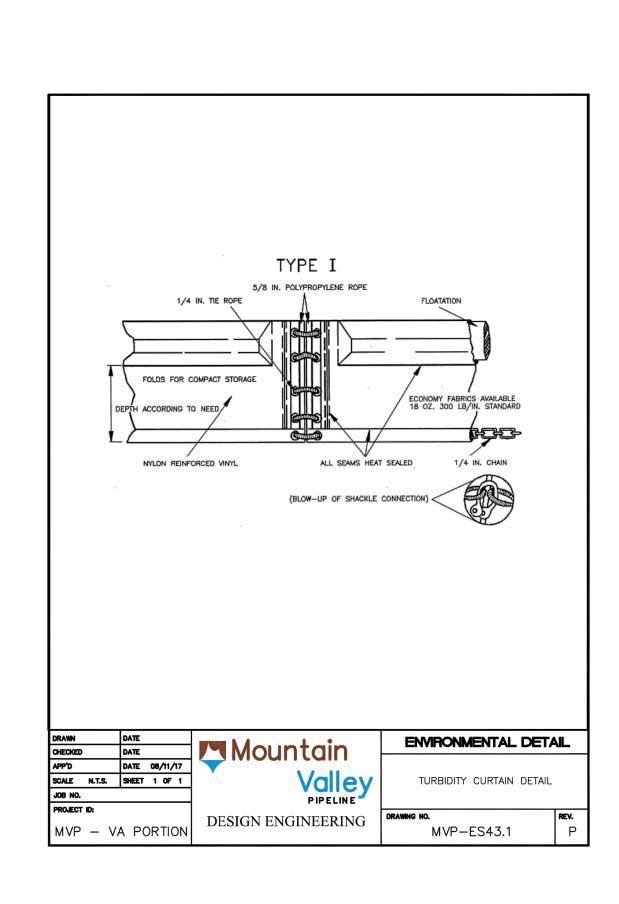










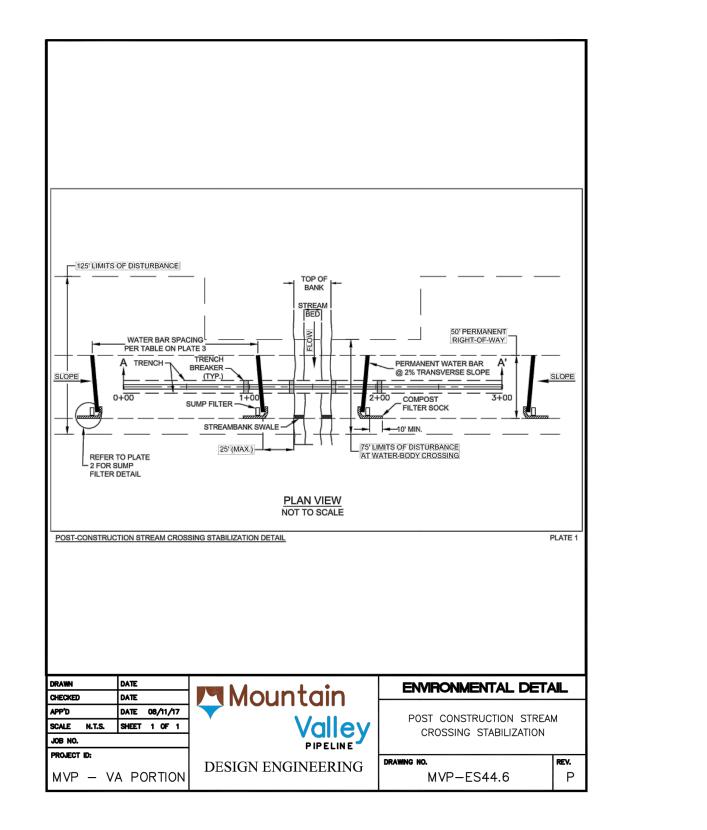


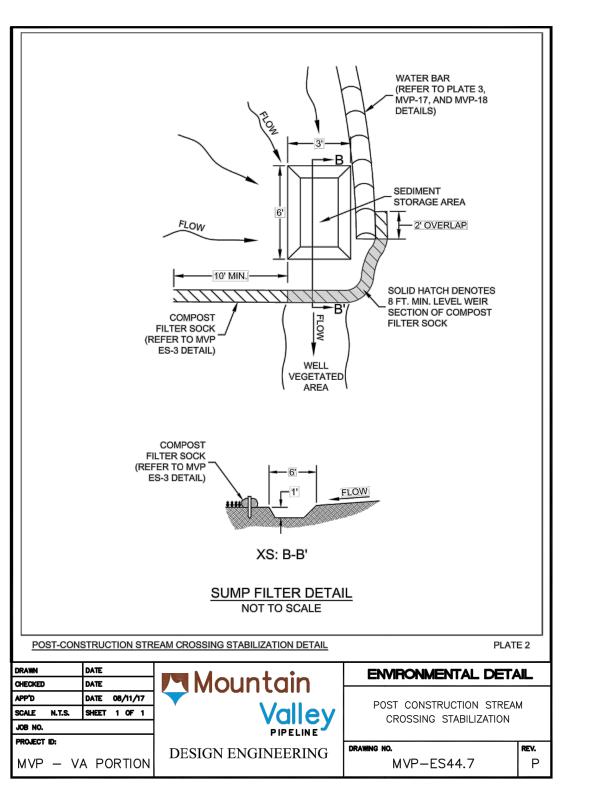
	POST-CONS	TRUCTION STREAM CROSSING M.V.P.	S STABILIZATION FOR	
		Definition		
		d sediment control measures to limit the forma g the edge of a stream, river and other waterboo	5	
		Purpose		
		potential along the edge of stream, river or othe nanent right-of-way of a pipeline.	er water body as a result of the change	
		Conditions Where Practice App	lies	
	Applicable to stream,	river or other water body crossings within the	natural gas pipeline right-of-way.	
		Planning Considerations		
		with compost filter socks and sump filters with river and other waterbody crossings in accorda on Plates 1-4		
	the MVP Environmen determined. Consider existing (or formation	rvation of the post-construction field conditions ntal Inspector, the necessity for and location of ations will include but are not limited to location of) rills and/or gullies along the streambank ar cipated potential for erosion.	streambank swales will be ons where there is visual evidence of	
	required depth. Plans	iodically removed from the sump filter and cor s shall detail how excavated sediment is to be di an approved off-site location.	-	
CHECKED	DATE DATE	🗖 Mountain	ENVIRONMENTAL DE	TAIL
APP'D SCALE N.T.S. JOB NO.	DATE 08/11/17		POST CONSTRUCTION ST CROSSING STABILIZATIO	
			1	
PROJECT ID:		DESIGN ENGINEERING	DRAWING NO.	REV.

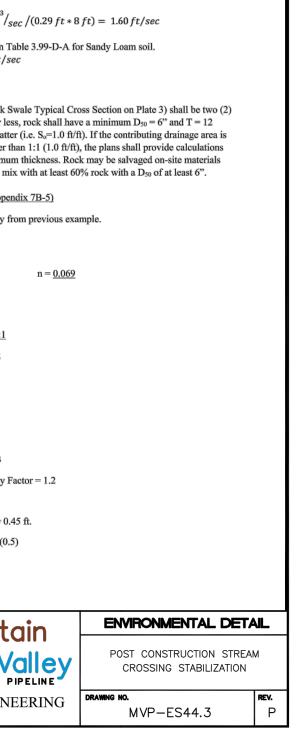
	Design Criteria						
As detailed on Plates	1-3, design criteria per specific erosion and sedir	nent control measures include:					
Water Bars / Slope B	Water Bars / Slope Breakers						
crossing as shown on	s will be installed twenty-five (25) feet from edge Plate 2. Slopes greater than 65% may require sit ions as approved by MVP Design Engineering an	e specific stabilization measures					
Excavation of Sump	Filter						
Side slopes of sump f (1) foot.	ilter should be no steeper than 1:1. The minimun	a depth of excavation should be one					
Compost Filter Sock							
velocity over the com and in need of mainte deposition.	will function as a pre-treatment for sediment rem post filter sock size conservatively assumes that enance and that no flow is occurring through the s rom this BMP should be non-erosive for the 2-ye	the sump filter is full of sediment took due to clogging or sediment					
velocities shall meet	the criteria in Table 3.99-D-A. Due to the anticip tional Method shall be used to calculate discharge	ated small size of contributing					
	Q = CiA						
where,	Q = discharge (ft³/sec) i = Rainfall intensity (inches/hour) A = Contributing drainage area (acres)						
Discharge over the co	ompost filter sock is calculated using the broad-cr	ested weir equation:					
	$Q = C_d L H^{3/2}$						
where,	Q = Discharge over weir (ft3/sec) $C_d = Weir Coefficient$ L = Length of weir crest (ft) H = Overtopping depth (ft)						
The velocity over the	weir is calculated using the following equation:						
	v = Q/A						
RAWN DATE HECKED DATE	Mountain	ENVIRONMENTAL DETAI	L				
PP'D         DATE         08/11/17           CALE         N.T.S.         SHEET         1         0F         1           OB         NO.  <		POST CONSTRUCTION STREAM CROSSING STABILIZATION					
<b>roject id:</b> MVP — VA PORTION	DESIGN ENGINEERING	drawing no. MVP-ES44.1	<b>εν.</b> Ρ				

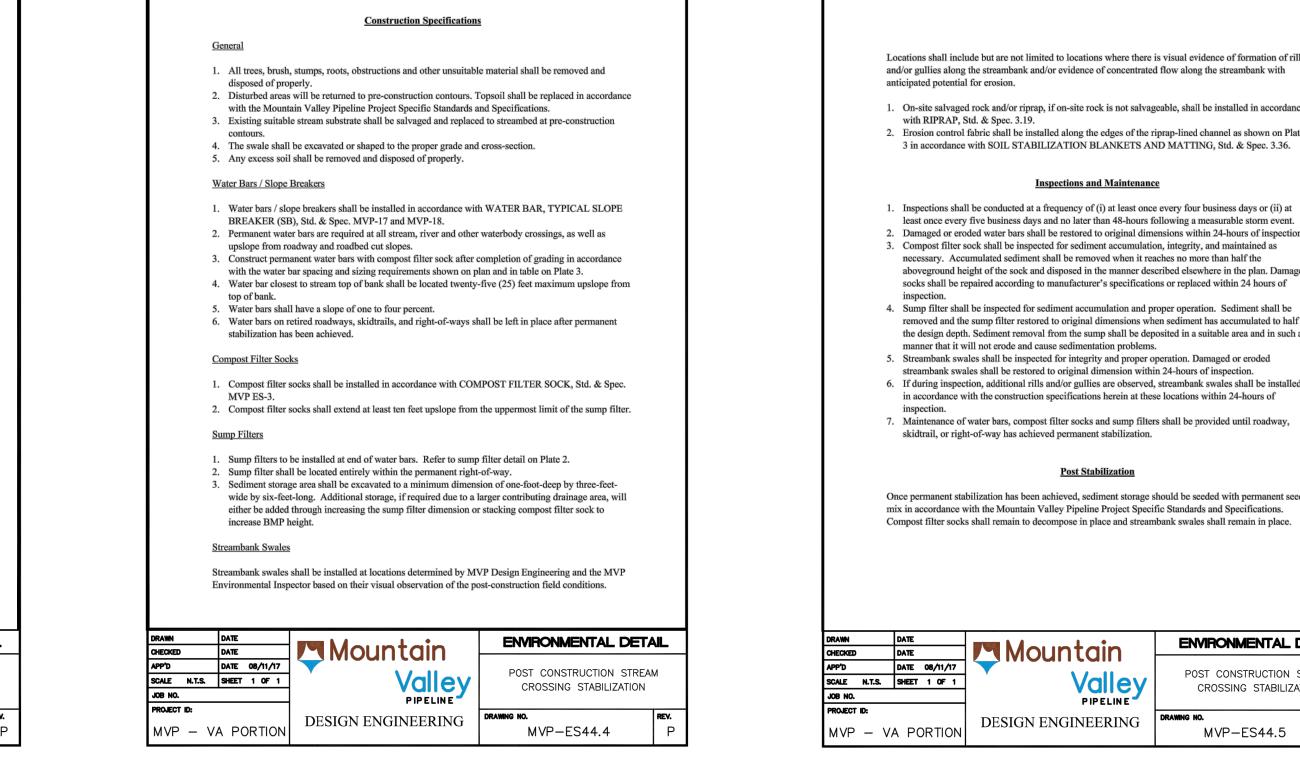
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	01/26/18	1/08/18	1/28/17	11/01/17	08/18/17			
01/31/18	01/26	01/08	11/28	11/01	08/15	: DATE:		
7	9	5	4	3	2	NO.:		
		EROSION AND SEDIMENT CONTROL PLANS		MOUNIAIN VALLET FIFELINE FROJECT - NOUO LINE			555 SOUTHPOINTE BOULEVARD, SUITE 200	CANONSBURG, PA 15317
, C		661 F	worl AN OST	⊣∣c DER ER	LEAF SEN PLA	I DF ZA	lution	S≥
					GENERAL DE LAILS SE L			
	_	COACTER COACTER	Lic.		WAL 40205		ALL AND	
		BY: ED						KAL HT
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SC	ALE: SH1		Э.	AS 0.1		OWN	REVI 0.23	

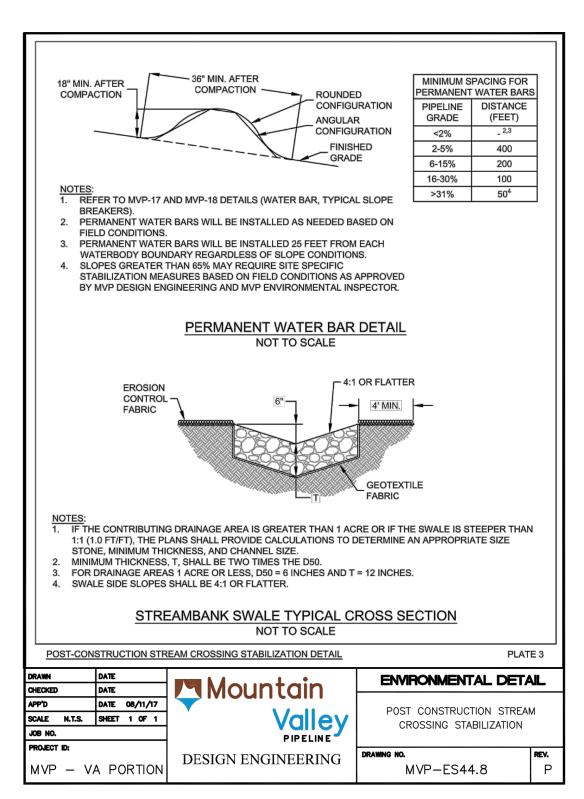
				JOB NO.		
	CROSSING STABILIZ	ZATION				
	POST CONSTRUCTION			SCALE N.T.S		▼
🎮 Mountain 🛛 -			1	CHECKED APP'D	DATE DATE 08/11/17	Moun
Mountain	ENVIRONMENTAL	. DETAIL		DRAWN	DATE	Moup
T			4			
he velocity over the compost filter sock:					-	*
$H = (Q/(C_D * L))^{\frac{2}{3}} = (3.66 \ ft^3/sec/(2.66))^{\frac{2}{3}} = (3.66 \ ft^3/sec$	$.99 * 8 ft))^{2/3} = 0.29 ft$					ssumed D50 is appropria
g the weir equation to solve for overtopping de				1	D50 Compu	ted (0.45) < D50 Assume
	<i>,</i> .				D50 = 0.001	* 6.813 / (0.5% * 0.931.5)
he discharge: Q = CiA = 0.9 * 4.07 inches/hour * 1	$acre = 3.66 \ ft^3/sec$			1	D50 = 0.001	$* V_a^3 / (d_{avg}^{0.5} * K_1^{1.5})$
ha disaharras				1		Gravity = 2.65 and Stabi
				1 I		$n^2 14^\circ / \sin^2 41.5^\circ)]^{0.5} = 0.5$
length of 8 feet, in a Sandy Loam soil installed	-					
drainage area in Giles County, an 18-inch diam	neter compost filter sook with an			1	-	$n^2 \Theta / \sin^2 \Phi ]^{0.5}$
				1	Side Slope =	$= 4:1$ $\Theta = 14^{\circ}$
				1	$\phi = 41.2^{*}$ (A	ppendix 7E-1)
Plate 5-39, Virginia Erosion and Sediment Co 3rd Ed., 1992.	ontrol Handbook,			1 I	VERIFY AS	SUMED ROCK SIZE
Source: Chapter 5, Engineering Calculations:					ASSUMED	ROCK SIZE - $D50 = 0.5$
one foot has been applied to original table.	r depuis iess mail			1	$A = 0.54 (ft^2)$	
Shales and Hard Pans <u>NOTE</u> : Correction factor value = 0.8 for flow	4.8 w denths less than			1 I		
Cobbles and Shingles	4.4			1 I	$d_n = 0.37$ (ft.	
Coarse Gravel (noncolloidal)	4.8				$S_0 = 1.00$ (ft	(ff) R = 0.18 (ff.)
Alluvial Silts (colloidal)	4.4				Q = 3.66 (cf	P = 3.02 (ft.)
Graded, Silt to Cobbles (colloidal) Alluvial Silts (noncolloidal)	4.4 4.4				CHANNEL DATA	
Graded, Loam to Cobbles (noncolloidal)	4.0			1 I	Solution:	
Stiff Clay (very colloidal)	4.0			1 I	Given: A one-acre d	rainage area in Giles Cou
Fine Gravel	4.0					
Silt Loam (noncolloidal) Ordinary Firm Loam	2.4 2.8				Calculations (from V	DOT Drainage Manual
Sandy Loam (noncolloidal)	2.0				and may contain top	soil, fines, sand, gravel in
Fine Sand (noncolloidal)	2.0					opriate size stone and mi
Soil Types	(ft./sec.)					nks with a slope of 1:1 or acre or if the swale is stee
	Corrected Permissible Velocities				times the D <sub>50</sub> . For dr	(T, as shown on Streamb ainage areas one (1) acre
PERMISSIBLE VELOCITES FOR EA					Streambank Swale	
TABLE 3.99-D-A					Streambank Swale	
$A = Flow$ area over weir ( $ft^2$ )					4. Verify that t	$1.60 \ ft/sec < 2.0$
$Q = Discharge over weir (ft^3/sec)$						
v = Velocity(ft/sec)						v = Q/A = 3.66
Q	$=$ Flow area over weir ( $ft^2$ )	= Discharge over weir (ft <sup>3</sup> /sec) = Flow area over weir (ft <sup>2</sup> )	= Discharge over weir (ft <sup>3</sup> /sec) = Flow area over weir (ft <sup>2</sup> )	= Discharge over weir (ft <sup>3</sup> /sec) = Flow area over weir (ft <sup>2</sup> )	= Discharge over weir $(ft^3/sec)$ = Flow area over weir $(ft^2)$	$= Discharge over weir (ft^3/sec)$ $= Flow area over weir (ft^2)$ 4. Verify that the fourth of the

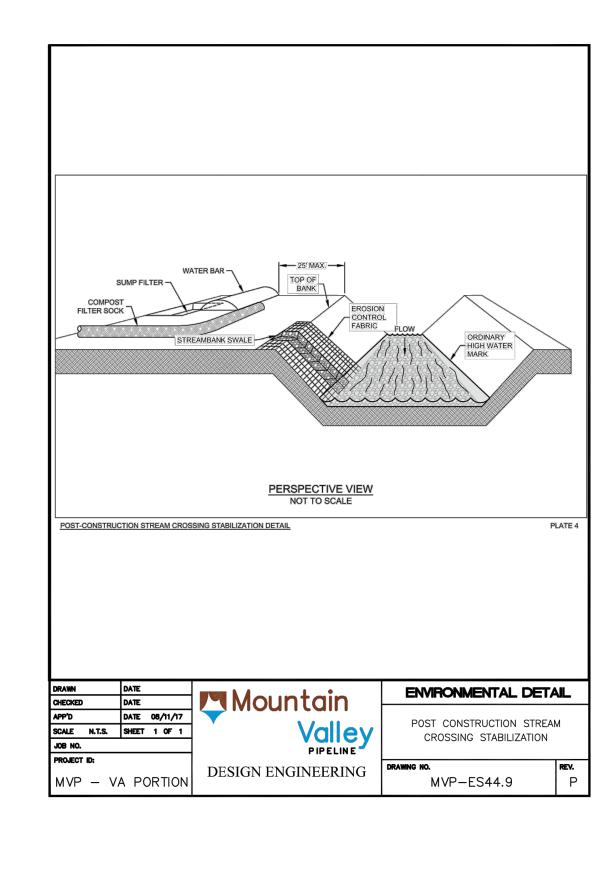












Locations shall include but are not limited to locations where there is visual evidence of formation of rills and/or gullies along the streambank and/or evidence of concentrated flow along the streambank with anticipated potential for erosion.

1. On-site salvaged rock and/or riprap, if on-site rock is not salvageable, shall be installed in accordance with RIPRAP, Std. & Spec. 3.19. 2. Erosion control fabric shall be installed along the edges of the riprap-lined channel as shown on Plate

#### **Inspections and Maintenance**

1. Inspections shall be conducted at a frequency of (i) at least once every four business days or (ii) at least once every five business days and no later than 48-hours following a measurable storm event. 2. Damaged or eroded water bars shall be restored to original dimensions within 24-hours of inspection. 3. Compost filter sock shall be inspected for sediment accumulation, integrity, and maintained as necessary. Accumulated sediment shall be removed when it reaches no more than half the aboveground height of the sock and disposed in the manner described elsewhere in the plan. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of

4. Sump filter shall be inspected for sediment accumulation and proper operation. Sediment shall be removed and the sump filter restored to original dimensions when sediment has accumulated to half the design depth. Sediment removal from the sump shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems. 5. Streambank swales shall be inspected for integrity and proper operation. Damaged or eroded streambank swales shall be restored to original dimension within 24-hours of inspection.

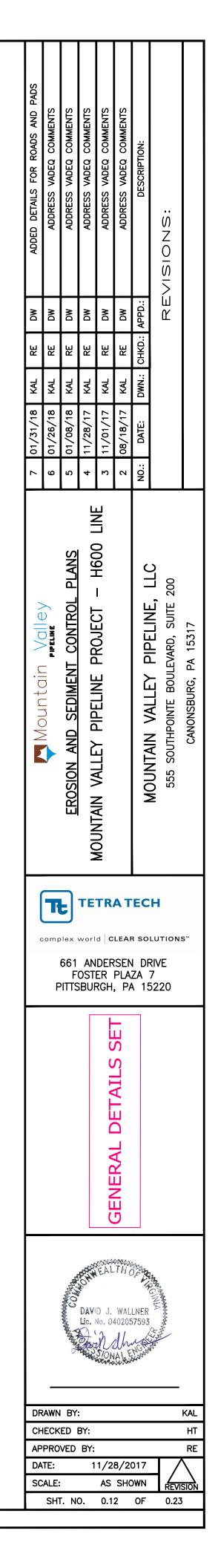
6. If during inspection, additional rills and/or gullies are observed, streambank swales shall be installed in accordance with the construction specifications herein at these locations within 24-hours of

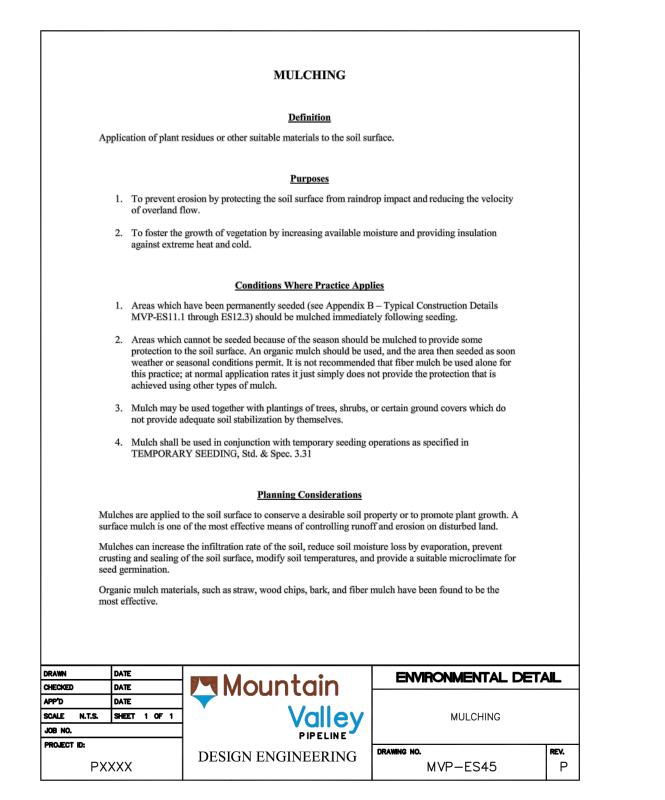
7. Maintenance of water bars, compost filter socks and sump filters shall be provided until roadway, skidtrail, or right-of-way has achieved permanent stabilization.

#### Post Stabilization

Once permanent stabilization has been achieved, sediment storage should be seeded with permanent seed mix in accordance with the Mountain Valley Pipeline Project Specific Standards and Specifications. Compost filter socks shall remain to decompose in place and streambank swales shall remain in place.

	Mountain	ENVIRONMENTAL DETA	JL
08/11/17 1 OF 1		POST CONSTRUCTION STREAD	N
RTION	DESIGN ENGINEERING	drawing no. MVP-ES44.5	<b>rev.</b> P





mulches, particularly in critical areas such as water the soil surface.
The choice of materials for mulching will be based season and economics. It is especially important to and on cut slopes and southern slope exposures.
Organic Mulches
<u>Straw</u> - The mulch most commonly used in conjunt or oats (free of troublesome weed seeds) and may be and must be anchored down by an acceptable metho
$\underline{Hay}$ – Hay shall not be used as mulch for Project as
Com Stalks - These should be shredded into 4- to 6 resistant to displacement.
<u>Wood Chips</u> - Suitable for areas that will not be clo decompose slowly and do not require tacking. They prevent nutrient deficiency in plants; however, can from trees cleared on the site.
Bark Chips, Shredded Bark - These are by-products plantings. Bark is also a suitable mulch for areas pl applied by hand or mechanically and is not usually fertilizer is not required.

susceptible to displacement.

seasonally. Creative use of these materials can reduce costs. Chemical Mulches and Soil Binders

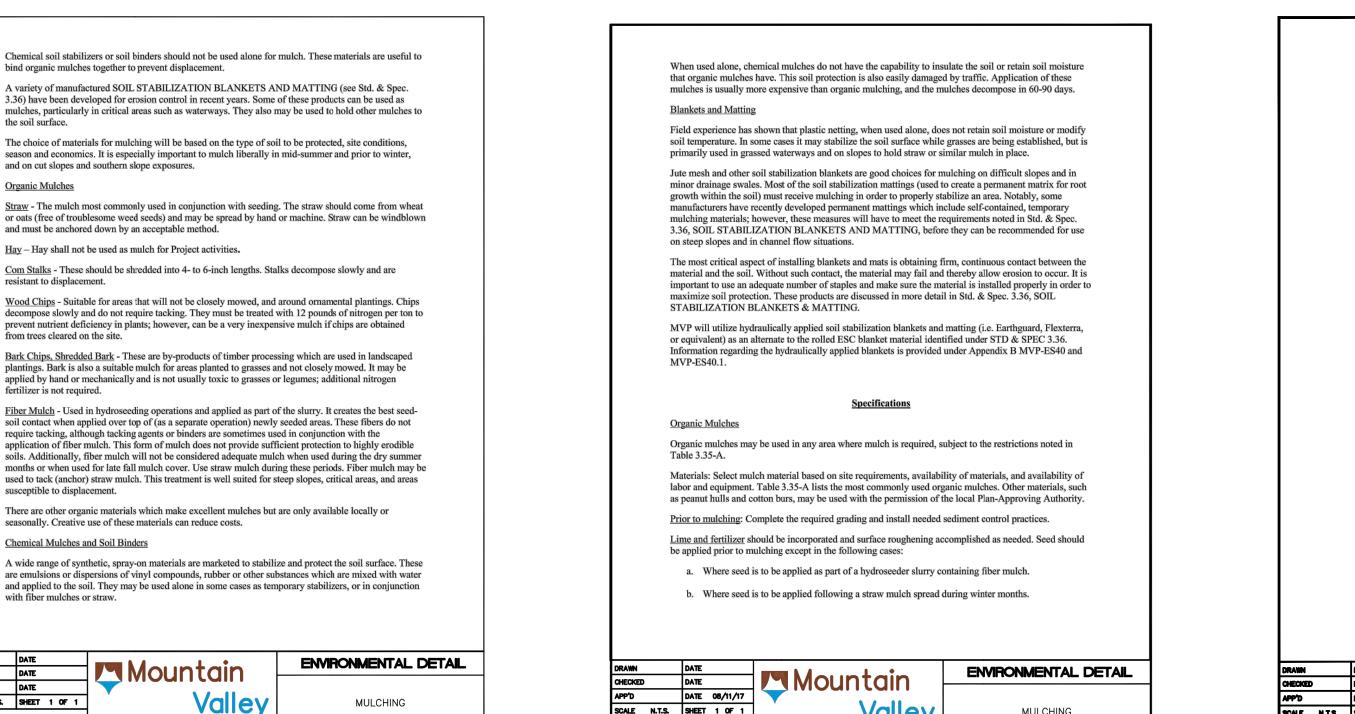
with fiber mulches or straw.

DRAWING NO.

MVP-ES45.1

DRAWN	DATE	
CHECKED	DATE	Mountain
APP'D	DATE	
SCALE N.T.S.	SHEET 1 OF 1	Vallev
JOB NO.		PIPELINE
PROJECT ID:		
PX	XXX	DESIGN ENGINEERING

PROJECT ID:		DESIGN ENGINEERING	DRAWING NO.	REV.		PXXXX	DESIGN
JOB NO.			MULCHING		JOB NO. PROJECT	· ID:	
APP'D SCALE N.T.S.	DATE SHEET 1 OF		MULCHING		SCALE	N.T.S. SHEET 1	
CHECKED	DATE				APP'D	DATE	
DRAWN	DATE	Mountain 📃	ENVIRONMENTAL DE	TAIL	CHECKED	DATE	
					DRAWN	DATE	
	<ol> <li>Peg and t other met surface, e mulch by</li> </ol>	ttings: Lightweight plastic, cotton, or paper nets may to manufacturer's recommendations. wine: Because it is labor-intensive, this method is fea hods cannot be used. Drive 8- to 10-inch wooden pe very 4 feet in all directions. Stakes may be driven be stretching twine between pegs in a criss-cross-within as around each peg.	asible only in small areas where gs to within 3 inches of the soil fore or after straw is spread. Secure				
	T sj e	<u>Note</u> : This particular method is not used as common he development of hydraulic seeding equipment pro withetic or organically based binders and tackifiers. I nvironmental concerns should be addressed to ensure of enter valuable water supplies. Avoid applications	moted the industry to turn to When this method is used, e that petroleum-based products do				
	u d	pply asphalt at 0.10 gallon per square yard (10 gal./ se heavier applications as it may cause the straw to " esignations are from the Asphalt Institute Specificati	'perch" over rills. All asphalt ions.				
	s: c R	Asphalt - Any type of asphalt thin enough to be blow atisfactory. Recommended for use are rapid curing (I aring (MC-250, MC-800) and emulsified asphalt (SS S-2, CRS-1, and CRS-2).	RC-70, RC-250, RC-800), medium 5-1, CSS-1, CMS-2, MS-2, RS-1,			son surface; i	repair as needed.
		<u>ynthetic binders</u> - Formulated binders or organically s recommended by the manufacturer to anchor mulcl				place up until plantings, ins	g or matting as necessary as l grasses are firmly establis pect periodically througho
	The follo	wing types of binders may be used:				for erosion. V mats should b	Where erosion is observed i be inspected after rainstorn
	edges of a rea shou	areas and at crests of ridges and banks, to prevent dis ld have binder applied uniformly. Binders may be ap d into the mulch as it is being blown onto the soil.	splacement. The remainder of the				and soil coverings should b
	providing	pseeder at a rate of 500-750 lbs/acre over top of stray additional mulch to the newly seeded area. alch binders: Application of liquid mulch binders and				h	Note: Chemical mulches r ydroseeded slurry at any ti nulches shall be followed.
	safely. M	ith straw. It is limited to use on slopes no steeper tha achinery shall be operated on the contour. lch: A very common practice with widespread use to				a S	From March 15 to May 1 as a with slopes no steeper SURFACE ROUGHENING thall be applied immediatel
	implemer	choring tool (often referred to as a Krimper or Krimp tt designed to punch mulch into the soil surface. This	s method provides good erosion			p	n conjunction with tempor practice.
0		Straw mulch must be anchored immediately after s lches listed in Table 3.35-A do not require anchoring nay be used:				a. V	Where no other mulching n
		traw mulch by hand, divide the area to be mulched in 70-90 lbs. (n to 2 bales) of straw in each section to				<u>Chemical Mu</u> Chemical mu	<u>ilches</u> ilches* may be used alone



SCALE N.T.S. SHEET 1 OF 1

MVP - VA PORTION

JOB NO.

PROJECT ID:

Vallev

PIPELINE

DESIGN ENGINEERING

MULCHING

MVP-ES45.2

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<ul> <li>A use dation only in the following statution:</li> <li>A with introprote yreading dating the finance when much is not required of the frame of the group bears during dating the So Spectrapher 30, provided in the group and equired protection of the society of the finance of the society of the soc</li></ul>			•	CHECKED DATE		ENVIRONMENTAL DE	<b>TAIL</b>
ee used alone only in the following situations: er mulching material is available. n with temporary seeding during the times when mulch is not required for that 15 to May 1 and August 15 to September 30, provided that they are used on pes no steeper than 4:1, which have been roughened in accordance with OUGHENING, Std. & Spec. 3.29. If rill erosion occurs, another mulch material ed immediately. To provide a suitable growth medium for final site stabilization with vegetation and promote successful reforestation	shurry at any time. Manufacturer's recomm be followed. <u>Maintenance</u> rings should be inspected periodically (part is observed in mulched areas, additional after rainstorms for dislocation or failure. Is necessary after repairing damage to the firmly established. Where mulch is used fally throughout the year to determine if r led.	nendations for application of chemical rticularly after rainstorms) to check mulch should be applied. Nets and If washouts or breakage occur, re- slope or ditch. Inspections should take n conjunction with ornamental nulch is maintaining coverage of the		<ol> <li>Where the proproviding a supervision of the second s</li></ol>	reservation or importation of topsoil is determined auitable growth medium. absoil or existing soil presents the following prob texture, pH, or nutrient balance of the available s onable means to provide an adequate growth med soil material is too shallow to provide an adequate ture and nutrients for plant growth. soil contains substances potentially toxic to plant es that are 2:1 or flatter unless other measures are <u>Planning Considerations</u> e layer of the soil profile, generally characterized ganic matter. It is the major zone of root develope and supplying a large share of the water used by pi- vides an excellent growth medium, there are disa plying topsoil, or importing topsoil, may not alwo ding operations, increasing the exposure time of of ds may compete with desirable species. il include its high organic matter content and frial t content. option of topsoiling should be compared with tha ubsoils does provide high moisture availability ar and fertilized, subsoils may provide a good grow	d to be the most effective method of lems: oil cannot be modified by lium. te root zone and to supply necessary it growth. e taken to prevent erosion and as being darker than the subsoil due ment, carrying much of the nutrients lants. dvantages to its use. Stripping, ays be cost-effective. Topsoiling can denuded areas. Most topsoil contains ble consistence, water-holding t of preparing a seedbed in subsoil. nd deter leaching of nutrients and, with medium which is generally free	TAI
	er mulching material is available. n with temporary seeding during the time 15 to May 1 and August 15 to September pes no steeper than 4:1, which have been OUGHENING, Std. & Spec. 3.29. If rill	when mulch is not required for that 30, provided that they are used on roughened in accordance with		Methods of preserving order to obtain a more To provide a suitable	<u>Definition</u> or and using the surface layer of undisturbed soil, the desirable planting and growth medium. <u>Purposes</u>	, often enriched in organic matter, in	

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DRAWN	DATE		ENVIRONMENTAL DETA	
CHECKED	DATE	Mountain		<b></b>
APP'D	DATE 08/11/17			
SCALE N.T.S.	SHEET 1 OF 1	Valley	TOPSOILING & SOIL HANDLIN	G
JOB NO.		PIPELINE		
PROJECT ID:			DRAWING NO.	REV.
MVP - V	A PORTION	DESIGN ENGINEERING	MVP-ES46.1	P

OR	GANIC MULCH	TABLE 3.35-A MATERIALS AND	APPLICATION RATES
MULCHES:	RA	TES:	NOTES:
MULCHES:	Per Acre	Per 1000 sq. ft.	NOTES:
Straw	1 ½ - 2 tons (Minimum 2 tons for winter cover)	70 – 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	Minimum 1500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods.* Apply as slurry.
Corn Stalks	4 – 6 tons	185 – 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 – 6 tons	185 – 275 lbs.	Free of coarse matter. Air- dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 – 70 cu. yds.	1-2 cu. yds.	Free of coarse matter. Air- dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.

Source: Va. DSWC

Mountain	ENVIRONMENTAL DET/	<b>VIL</b>
Valley	MULCHING	
PIPELINE		
DESIGN ENGINEERING	DRAWING NO.	REV.
DESIGN ENGINEERING	MVP-ES45.3	Р
	Mountain Valley PIPELINE DESIGN ENGINEERING	MOUNTAIN Valley PIPELINE DESIGN ENGINEERING

ds. In many cases topsoiling may not be required for the establishment of less demanding, enance plant material. Topsoiling is strongly recommended where ornamental plants or high-
turf will be grown. Topsoiling is a required procedure when establishing vegetation on s, soils containing potentially toxic materials, and soils of critically low pH (high acid) levels.
is to be done, the following items should be considered:

ether an adequate volume of topsoil exists on the site. Topsoil will be spread at a compacted oth of 2 to 4 inches (depths closer to 4 inches are preferred).

cation of the topsoil stockpile so that it meets specifications and does not interfere with work the site.

ow sufficient time in scheduling for topsoil to be spread and bonded prior to seeding or

must be taken not to apply topsoil to subsoil if the two soils have contrasting textures. yey topsoil over sandy subsoil is a particularly poor combination, as water may creep along unction between the soil layers, causing the topsoil to slough. Sandy topsoil over a clay soil is equally as likely to fail.

psoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and will be difficult to establish vegetation. Topsoiling of steep slopes should be discouraged unless od bonding of soils can be achieved.

#### **Specifications**

ation of the site shall be made to determine if there is sufficient surface soil of good quality to ing. Topsoil shall be friable and loamy (loam, sandy loam, silt loam, sandy clay loam, clay ll be free of debris, trash, stumps, rocks, roots, and noxious weeds, and shall give evidence of support healthy vegetation. It shall contain no substance that is potentially toxic to plant

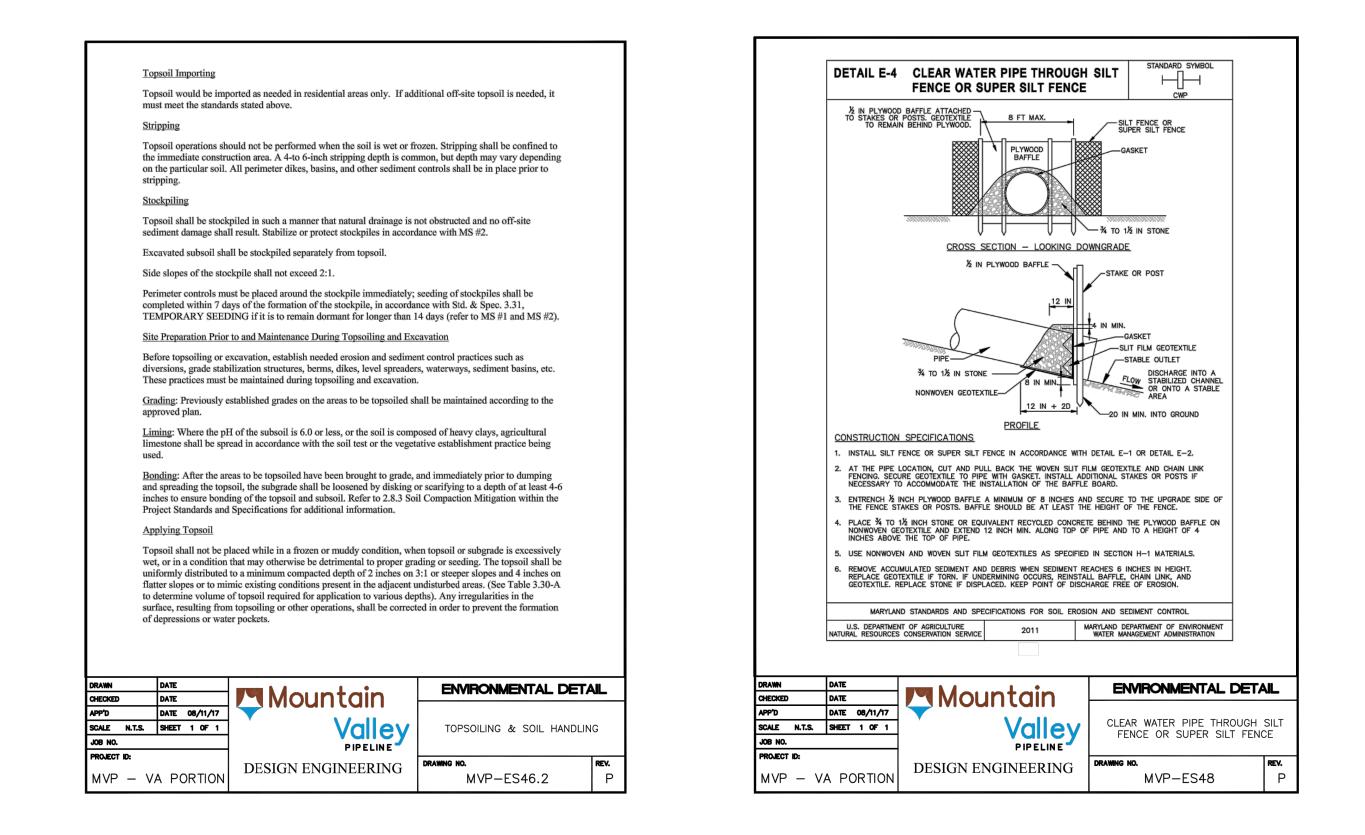
ere revegetation is of concern based on existing soil conditions and determined by the MVP ntal Inspector (EI), topsoil samples shall be taken for analysis. Samples will be collected by and sent to a recognized laboratory for analysis of the following criteria: ganic matter content shall be not less than 1.5% by weight.

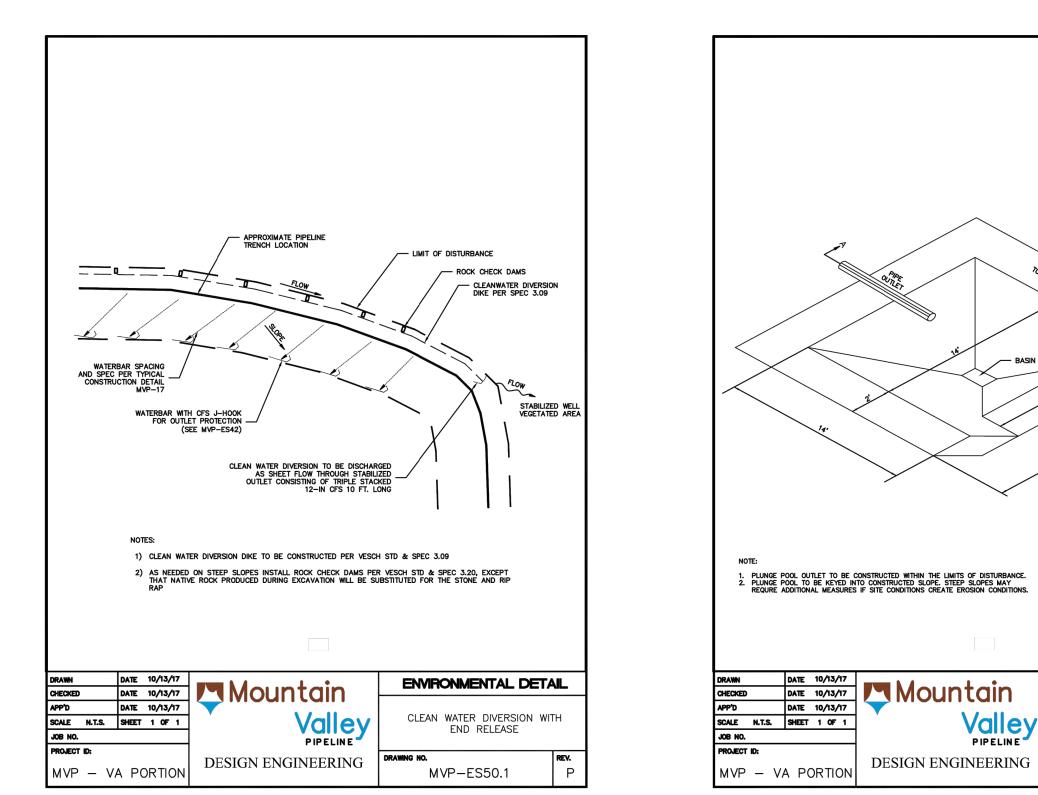
range shall be from 6.0-7.5. If pH is less than 6.0, lime shall be added in accordance with soil results or in accordance with the recommendations of the vegetative establishment practice ng used.

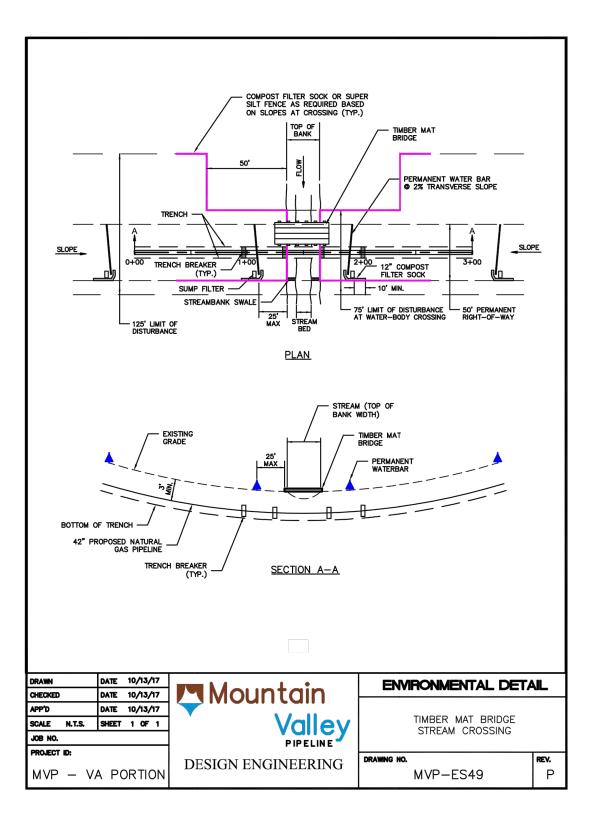
luble salts shall not exceed 500 ppm.

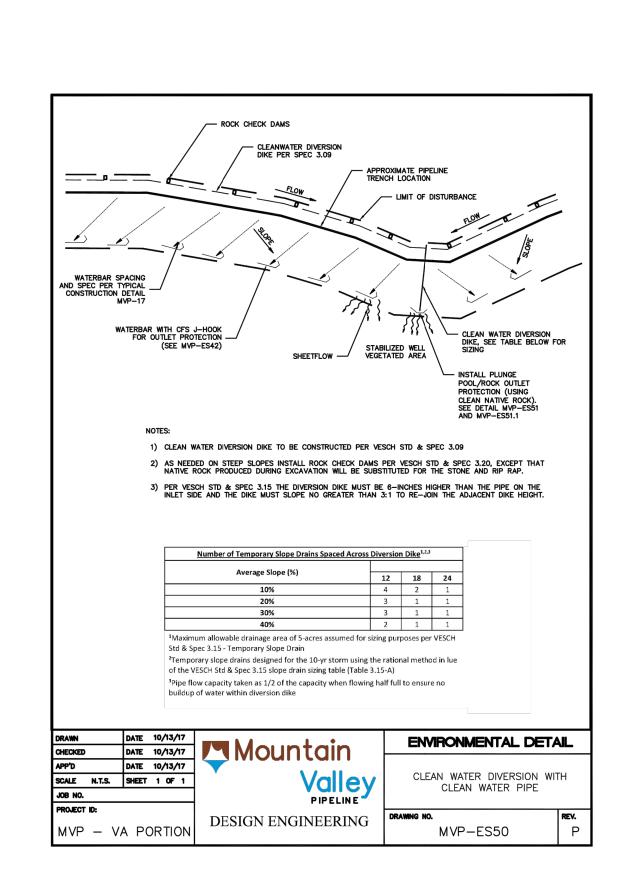
collected and sent for analysis will be identified by the MVP Constructions Spread # and tion from which the sample was obtained. Areas that fail to revegetate following restoration pled and analyzed based on the above parameters.

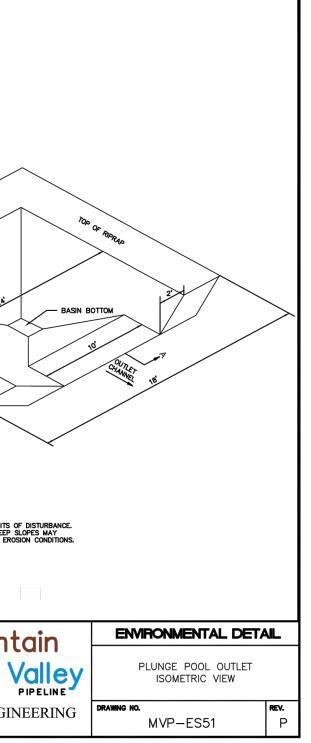
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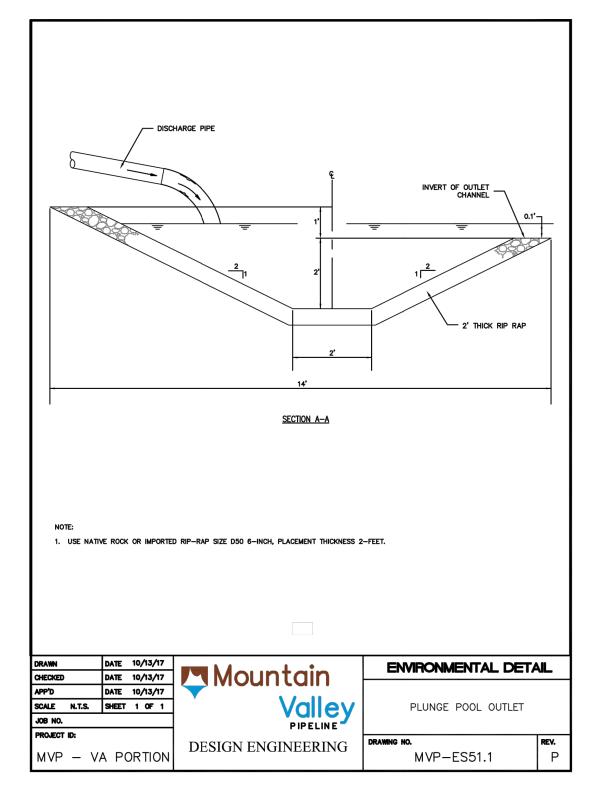


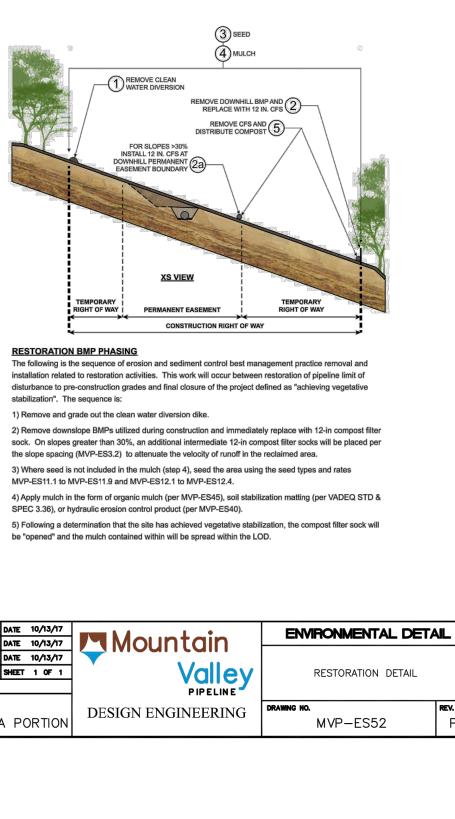


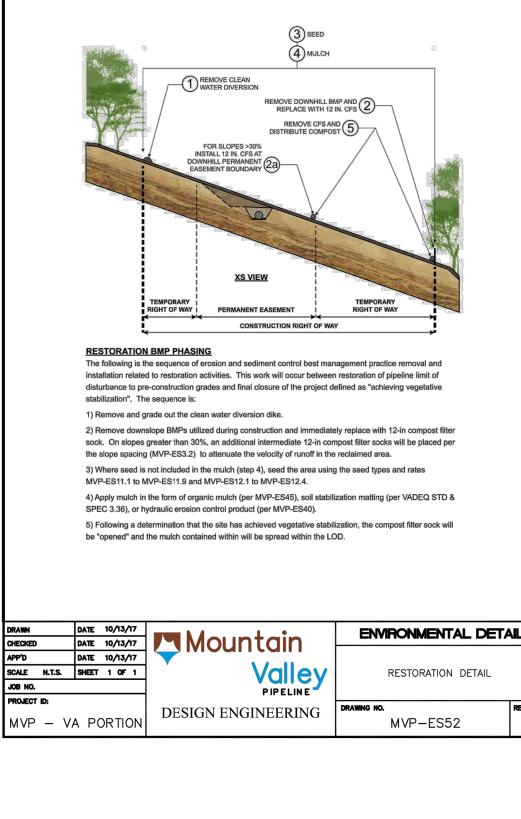




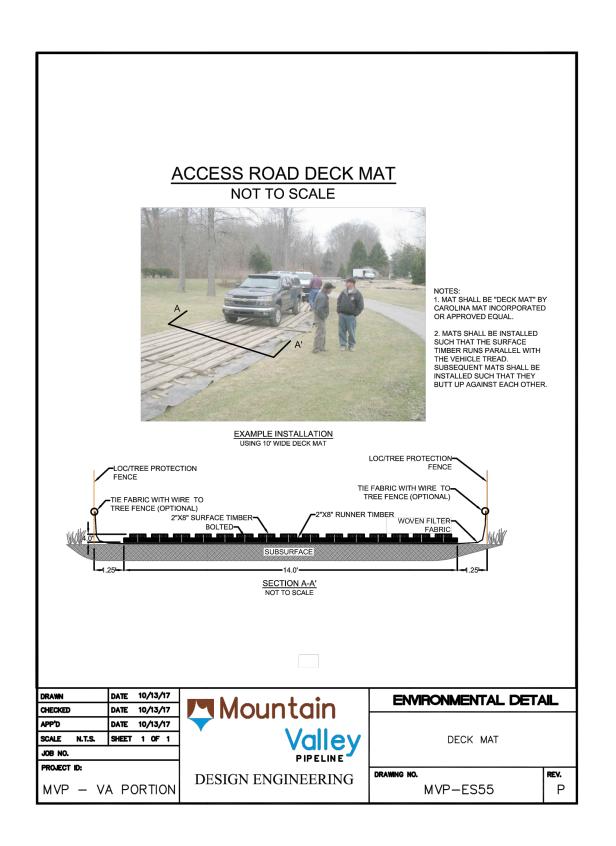


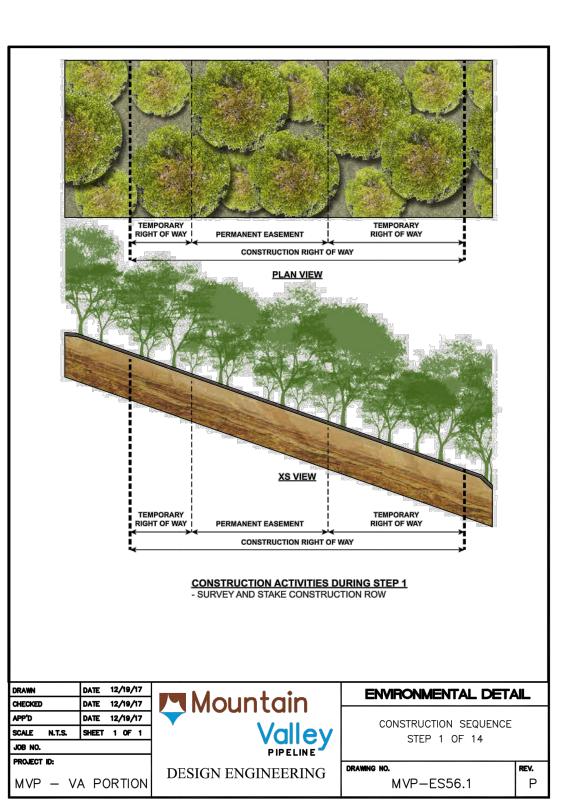


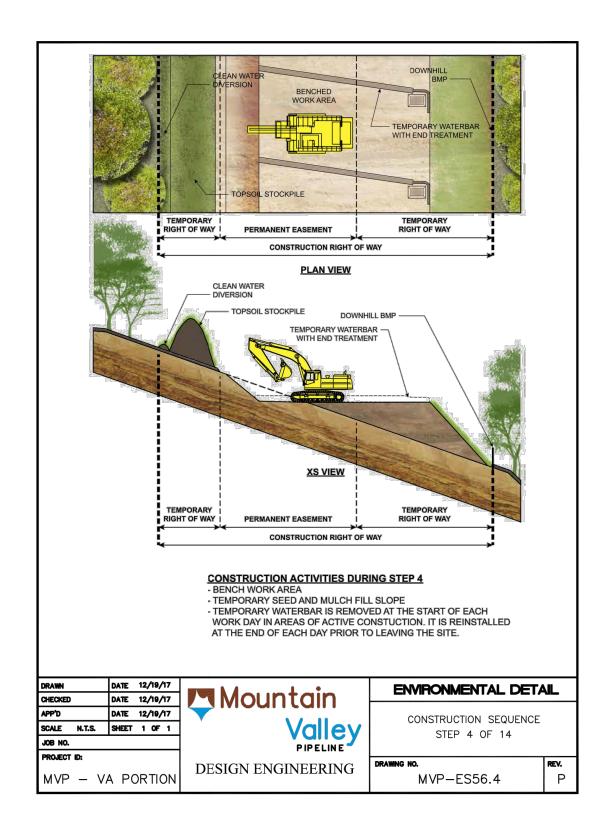


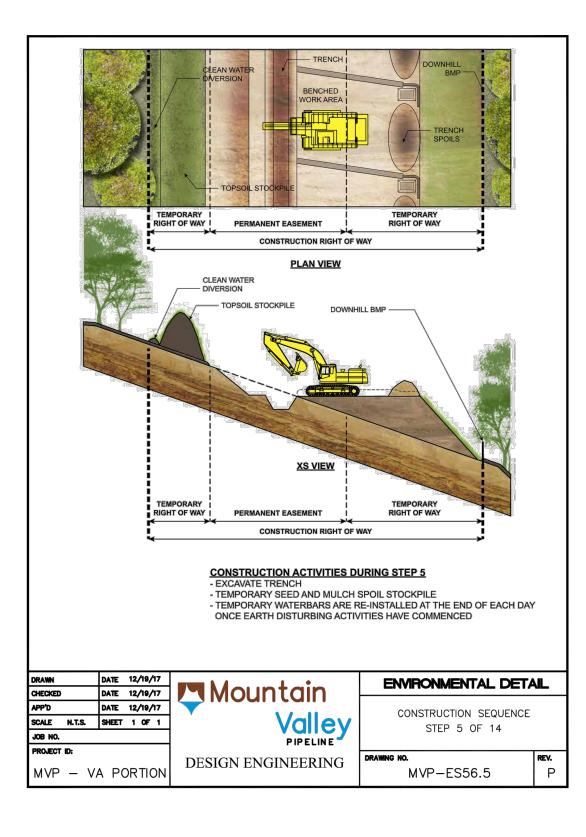


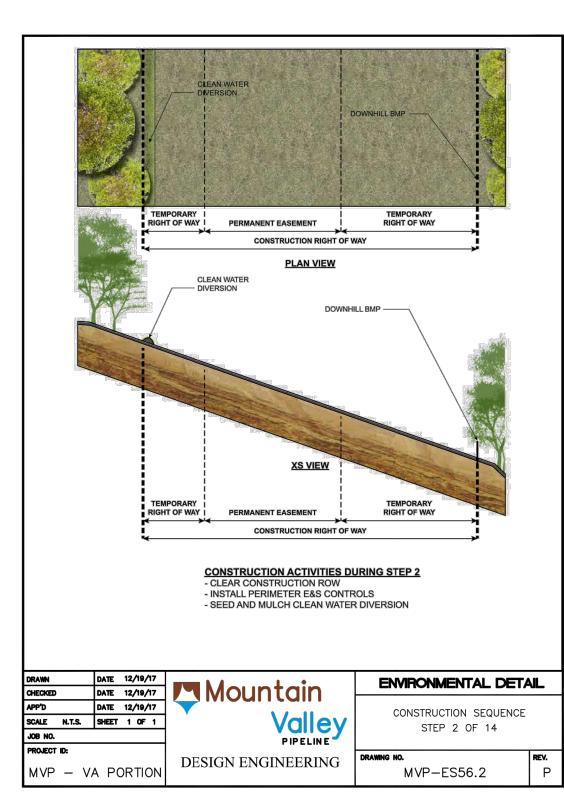
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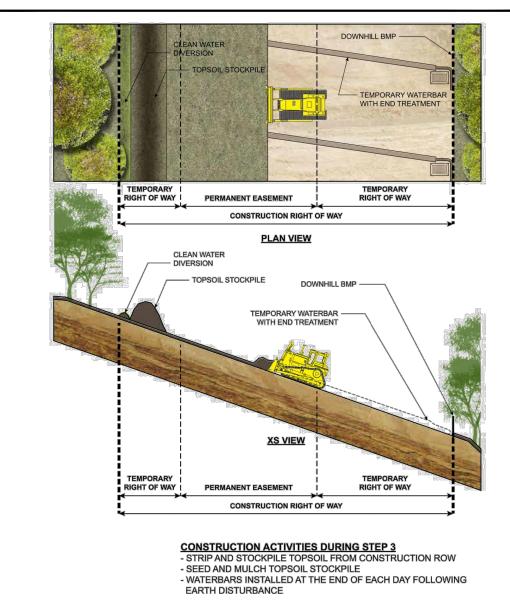




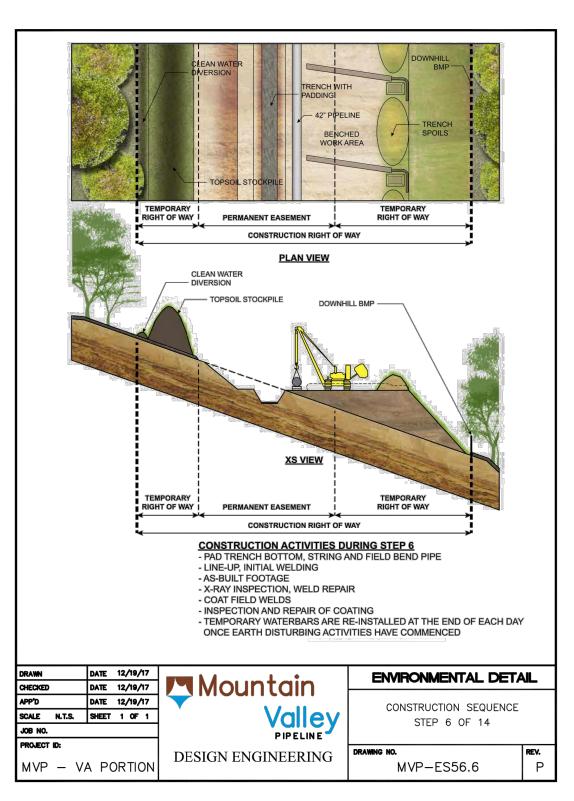


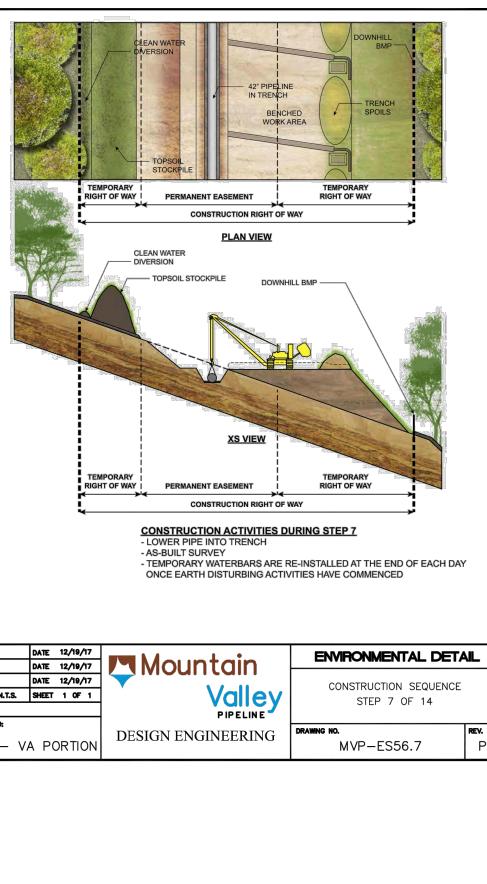


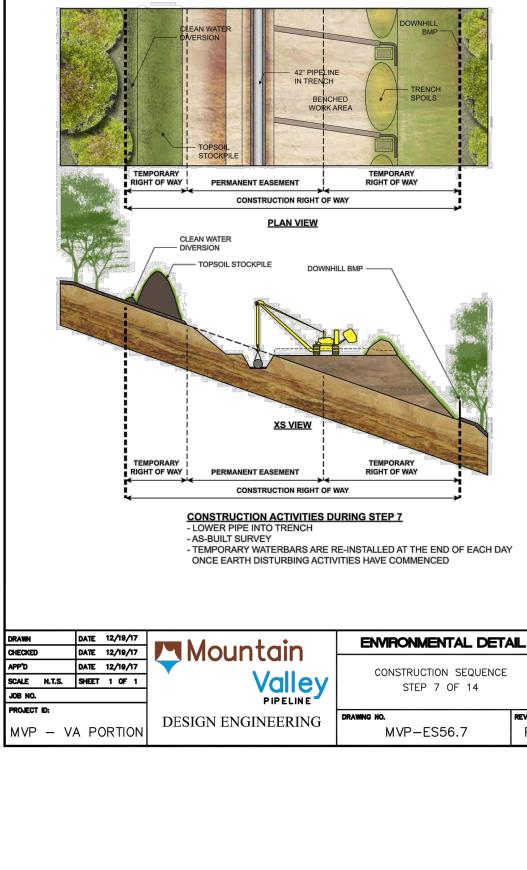




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	DATE 12/19/17 DATE 12/19/17 SHEET 1 OF 1		CONSTRUCTION SEQUENCE STEP 3 OF 14	
project id: MVP — V/	A PORTION	DESIGN ENGINEERING	drawing no. MVP-ES56.3	<b>rev.</b> P

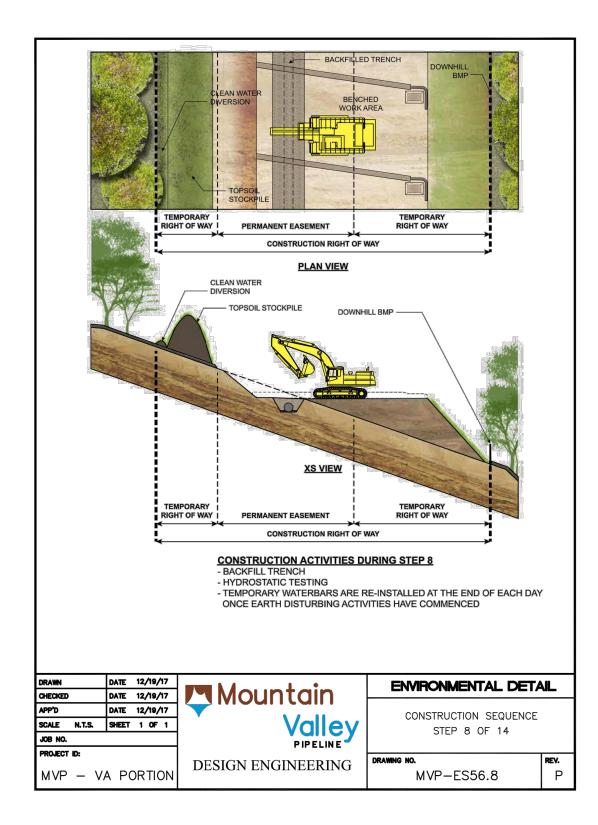


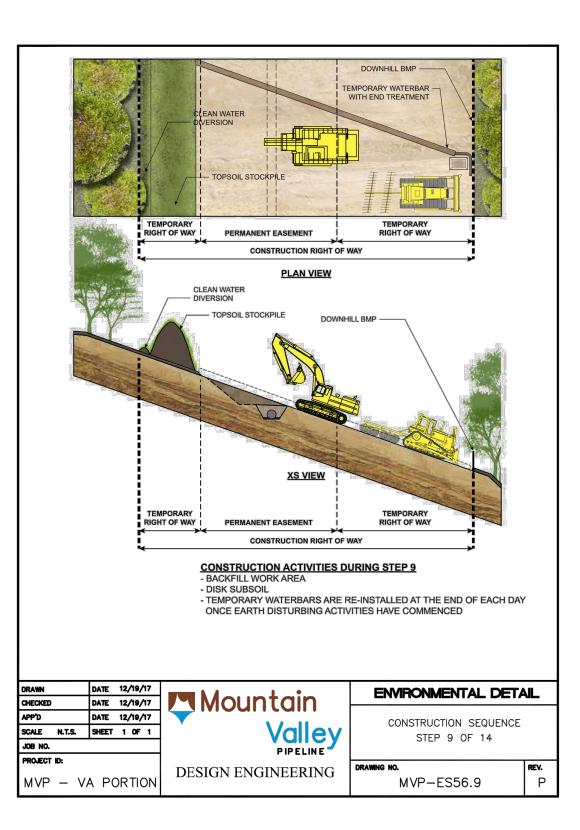


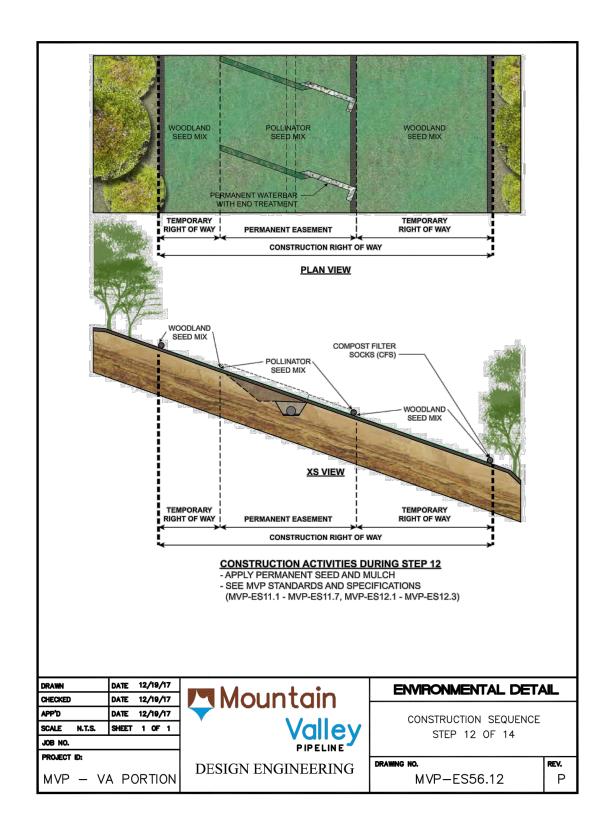


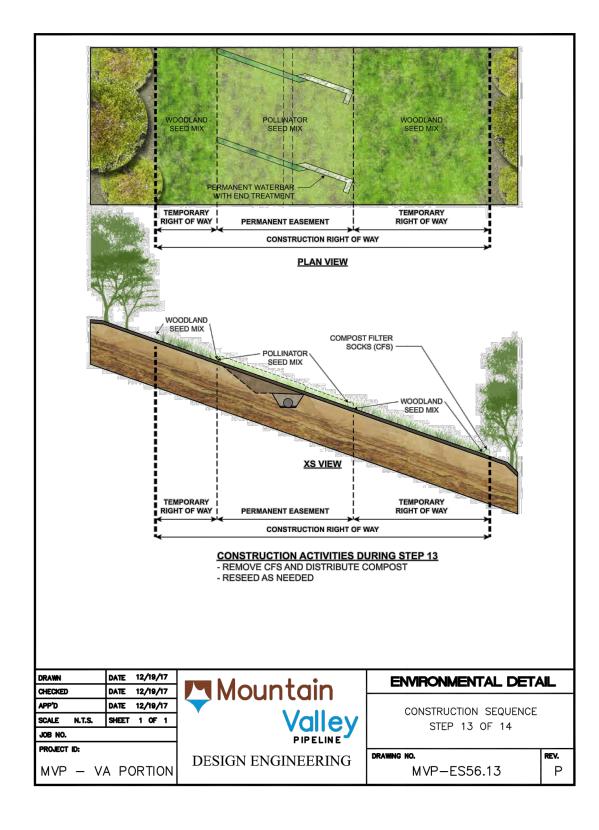
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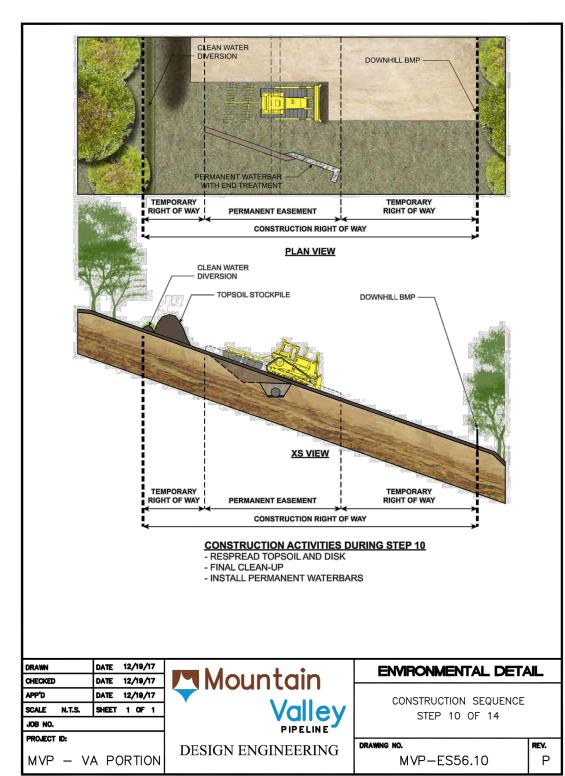




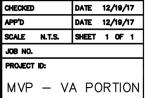


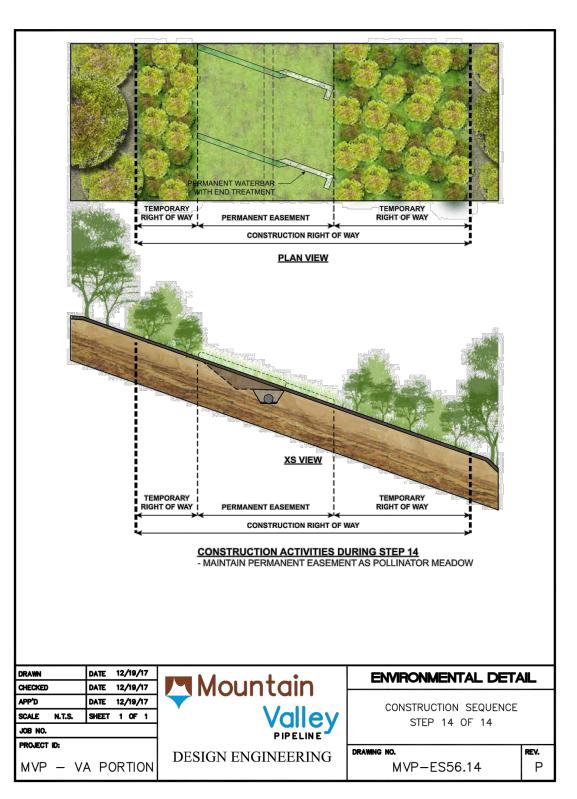


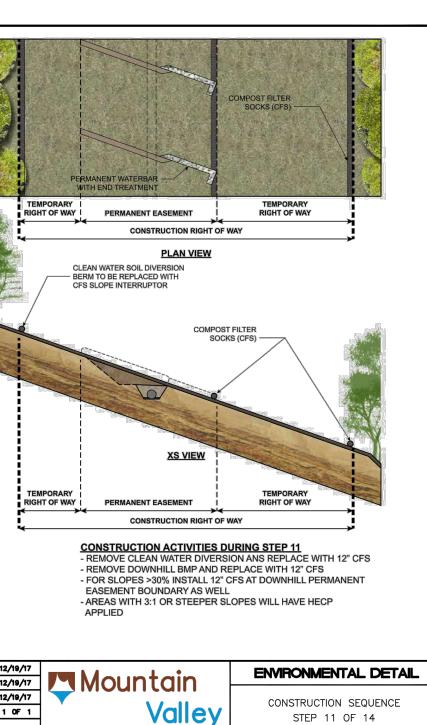




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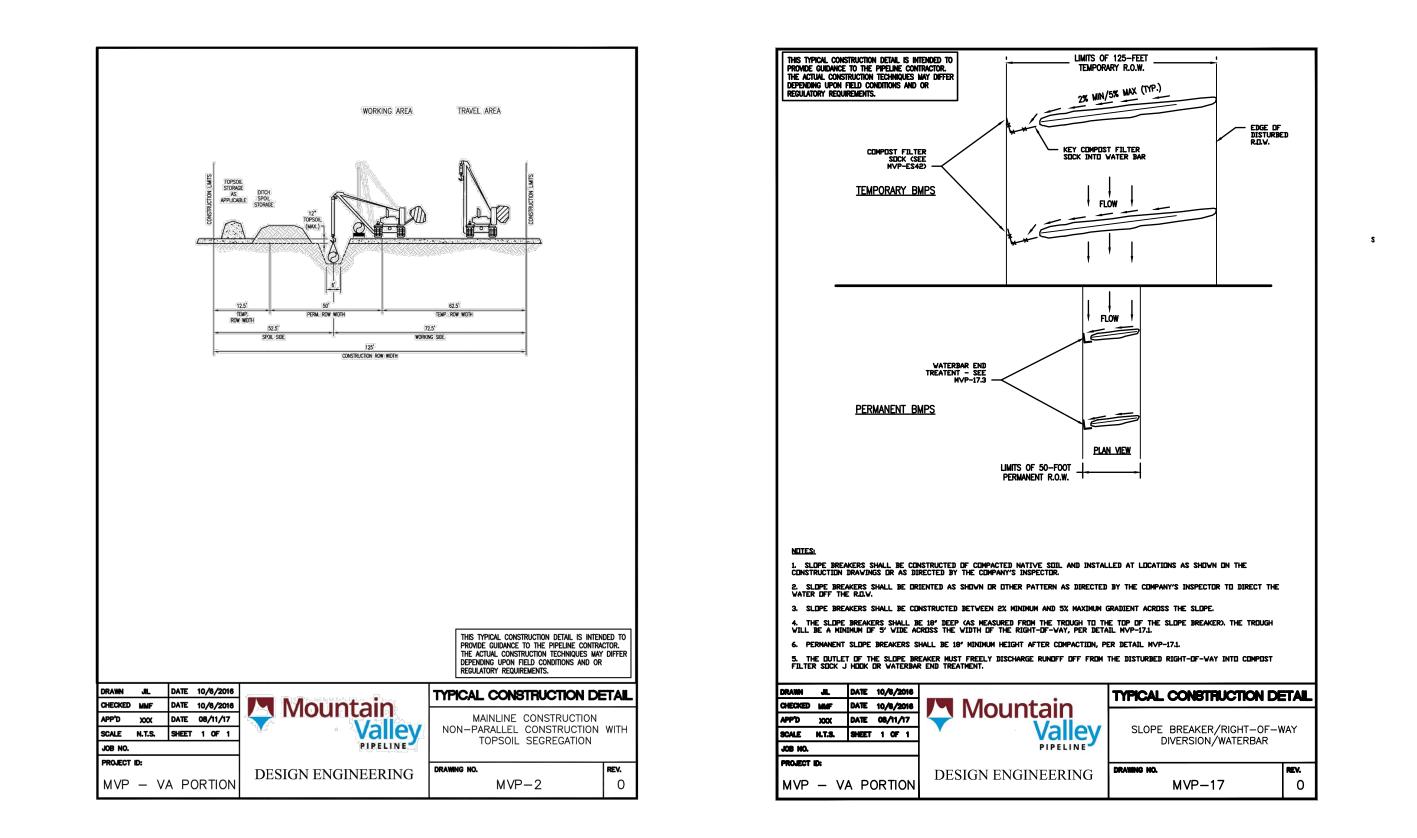
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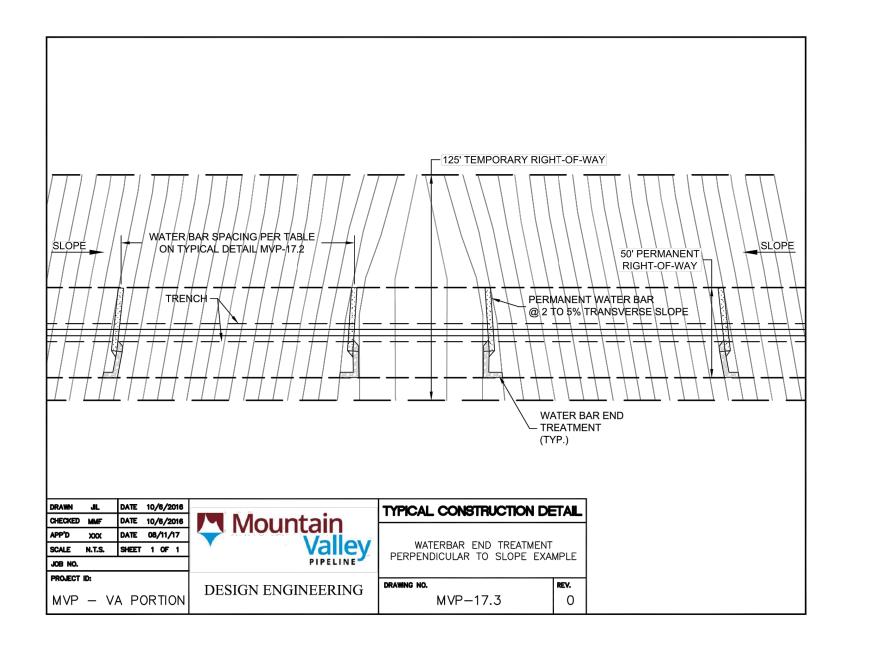
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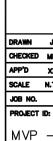
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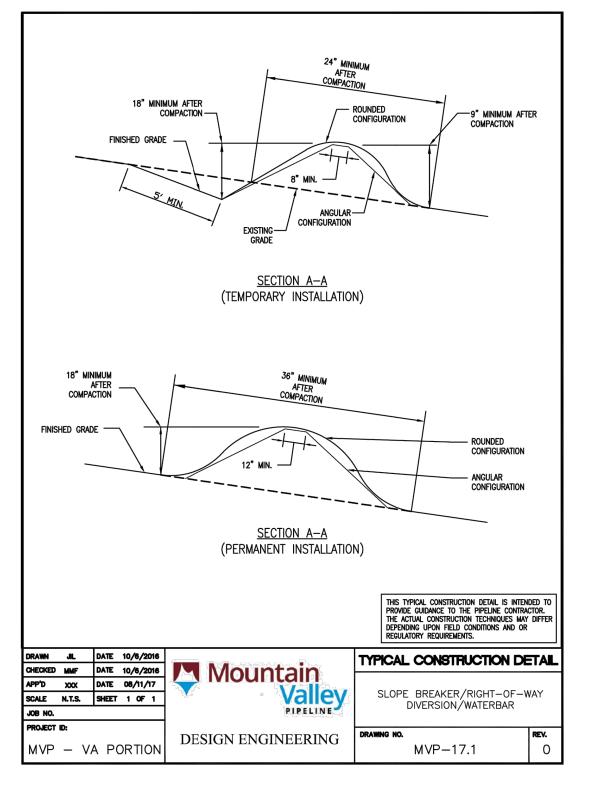
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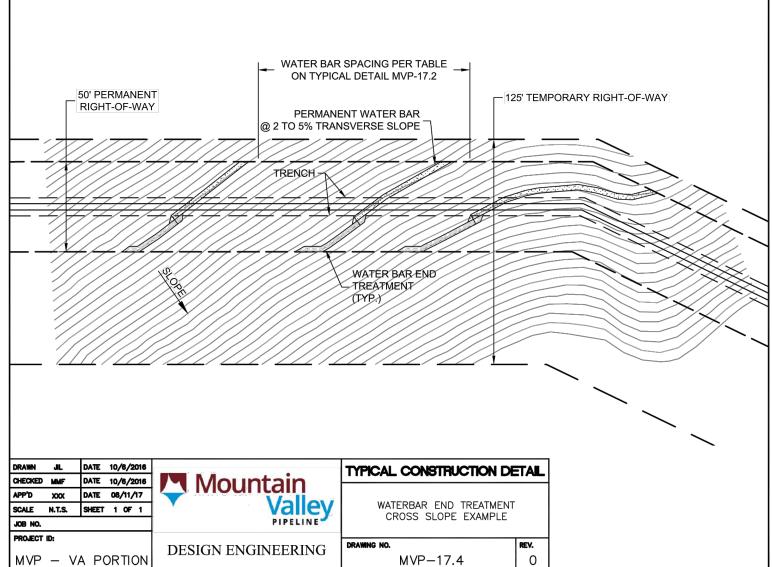


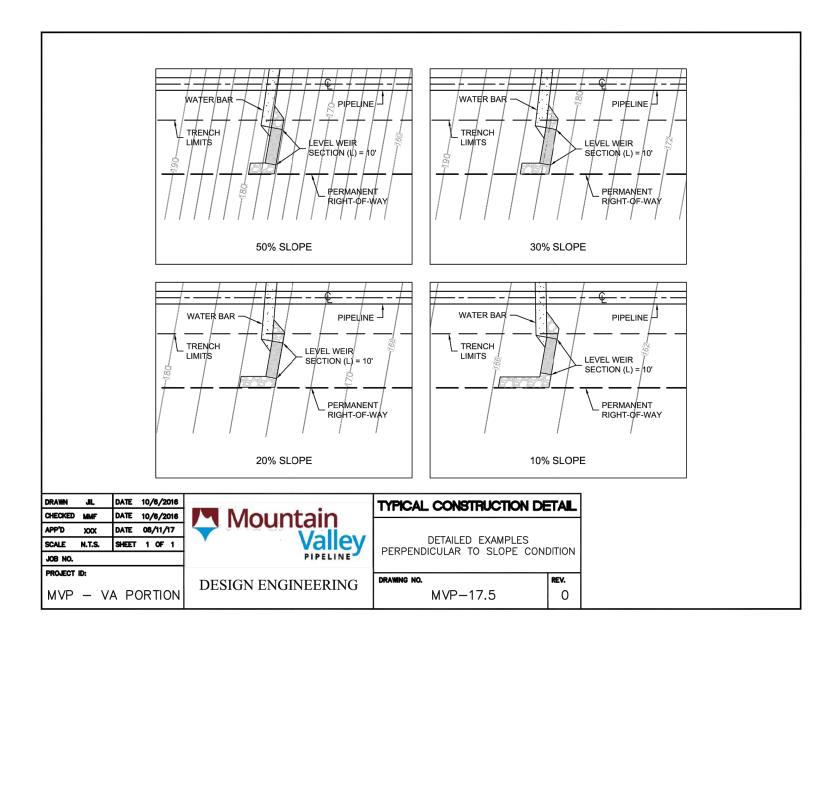












	MAXIMUM SPACING FOR					
PERMANEN I PIPELINE GRADE	PERMANENT SLOPE BREAKERS PIPELINE GRADE DISTANCE (FEET)					
<2%	- 1, 2					
2-5%	400					
6-15%	200					
16-30%	100					
>31%	50 <sup>3</sup>					

<sup>1</sup> PERMANENT SLOPE BREAKERS WILL BE INSTALLED AS NEEDED BASED ON FIELD CONDITIONS. <sup>2</sup> PERMANENT SLOPE BREAKERS WILL BE INSTALLED 25 FEET FROM EACH WATERBODY BOUNDARY REGARDLESS OF SLOPE CONDITIONS.

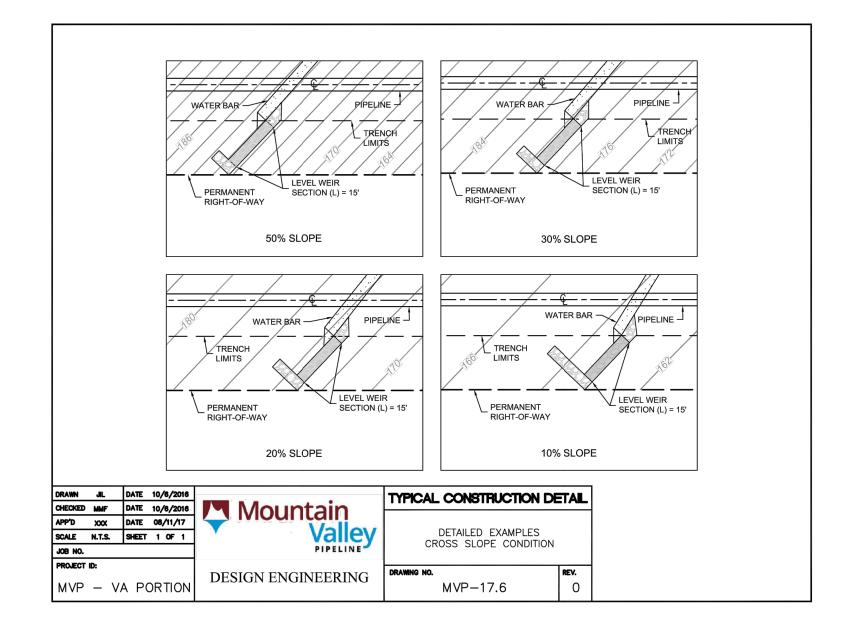
<sup>3</sup> SLOPES GREATER THAN 65% MAY REQUIRE SITE SPECIFIC STABILIZATION MEASURES BASED ON FIELD CONDITIONS AS APPROVED BY MVP DESIGN ENGINEERING AND MVP ENVIRONMENTAL INSPECTOR.

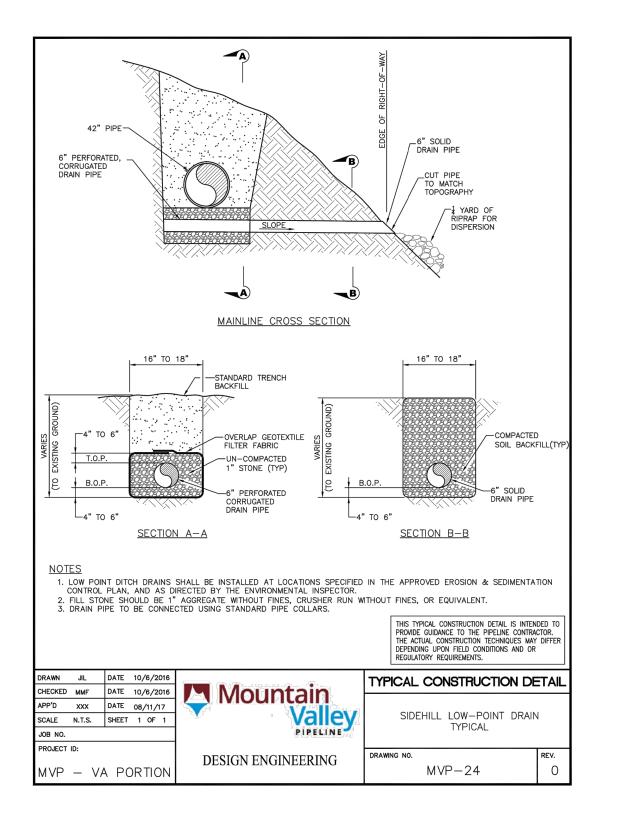
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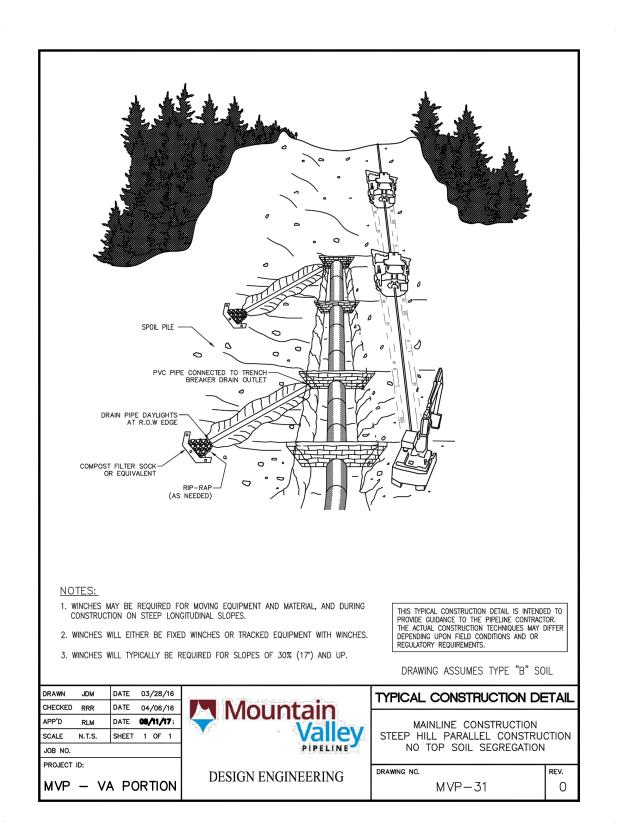
1. WATERBARS SHALL BE INSPECTED EVERY 4 BUSINESS DAYS (DAILY ON ACTIVE ROADS), DAMAGED OR ERODED WATERBARS SHALL BE RESTORED TO ORIGINAL DIMENSIONS WITHIN 24 HOURS OF INSPECTION 2. MAINTENANCE DF WATERBARS SHALL BE PROVIDED UNTIL ROADWAY, SKIDTRAIL, DR RIGHT-DF-WAY HAS ACHIEVED PERMANENT STABILIZATION 3. WATERBARS DN RIGHT-DF-WAYS SHALL BE LEFT IN PLACE AFTER PERMANENT STABILIZATION HAS BEEN ACHIE∨ED 4. SUMP FILTERS TO BE INSTALLED AT END OF TEMPORARY WATERBARS. REFER TO SUMP FILTER DETAIL MVP-ES42. 5. DUTLET PROTECTION/COMPOST FILTER SOCK SHOULD BE INSTALLED AT THE DUTLET OF ALL TEMPORARY WATERBARS PER DETAIL MVP-ES42. 6. WATERBAR END TREATMENTS WILL BE INSTALLED FDR PERMANENT WATERBARS PER DETAILS MVP-17.3 THRDUGH MVP-17.7.

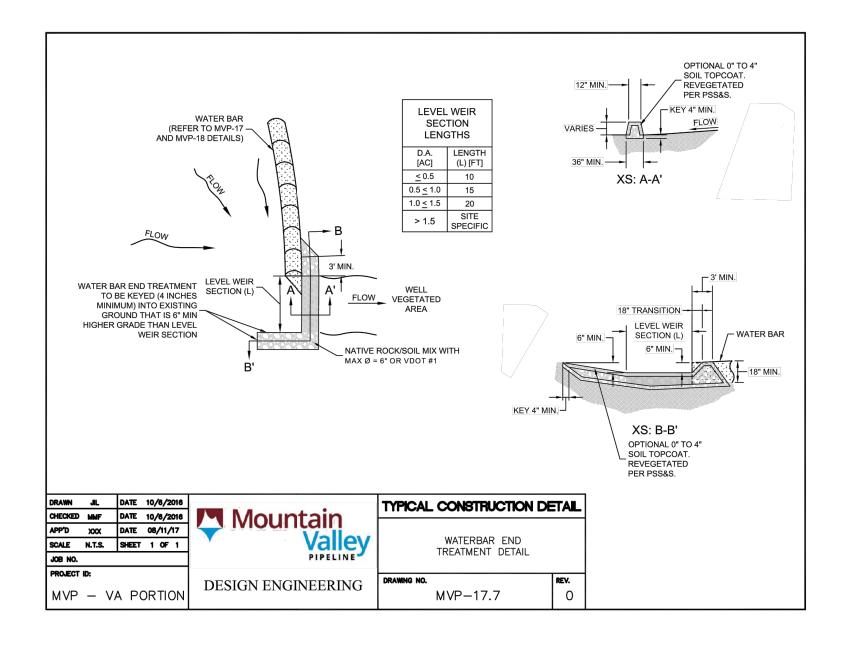
				THIS TYPICAL CONSTRUCTION DETAIL IS INTEN PROVIDE GUIDANCE TO THE PIPELINE CONTRA THE ACTUAL CONSTRUCTION TECHNIQUES MAY DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.	CTOR.
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JOB NO.		PIPELINE		DIVERSION WATERDAR	
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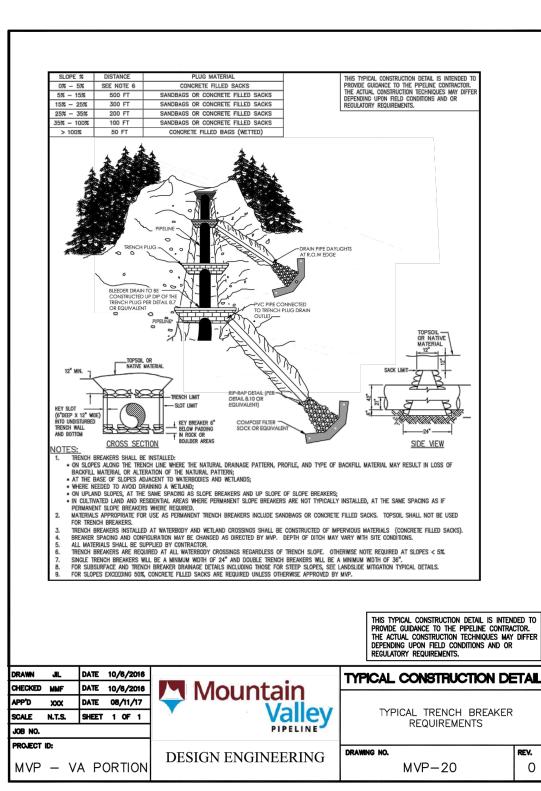
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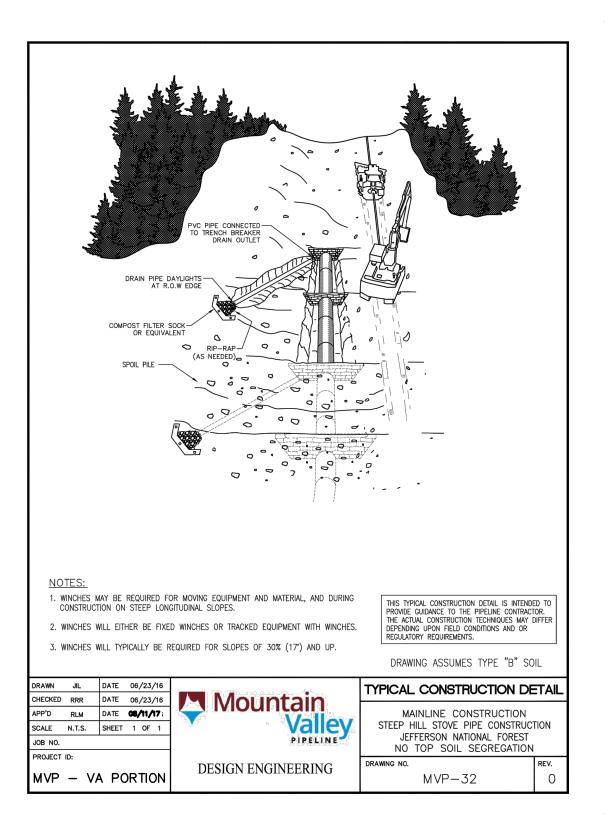


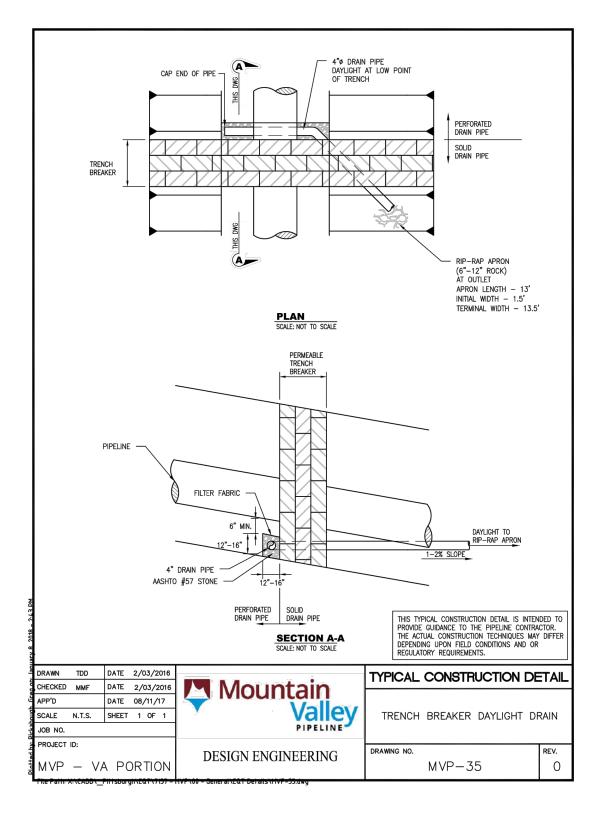






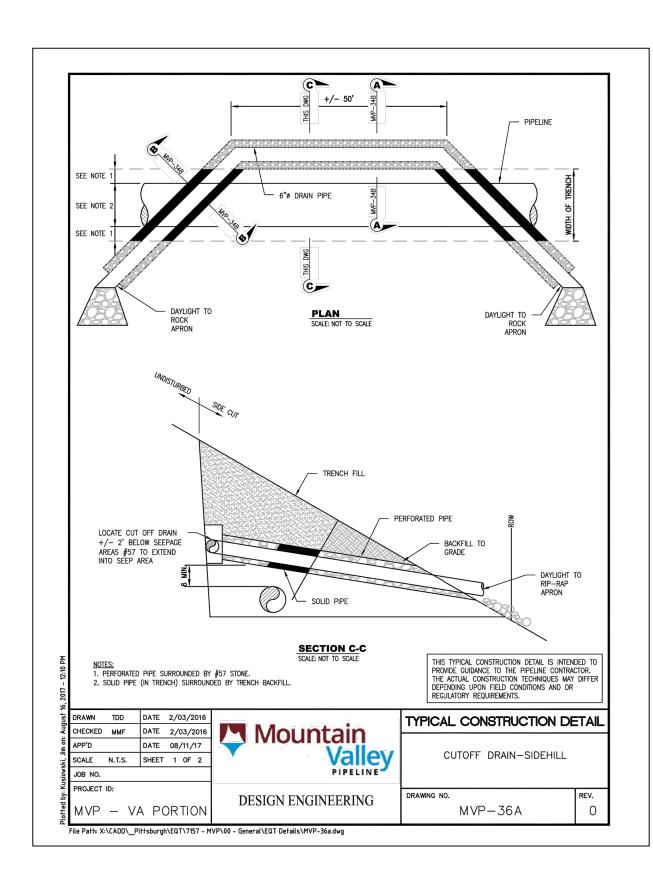


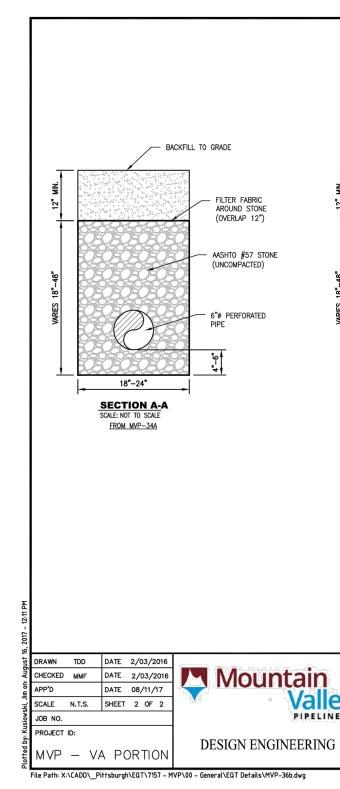


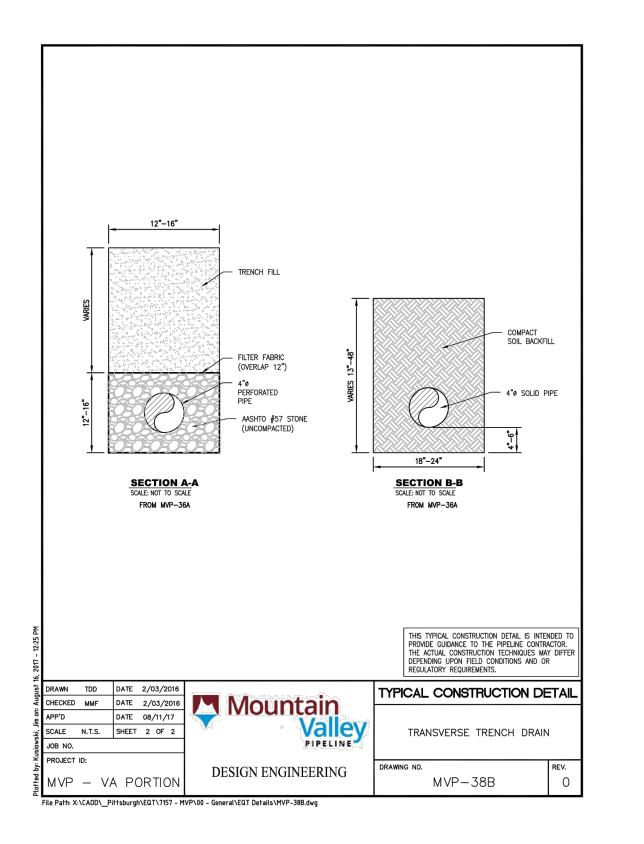


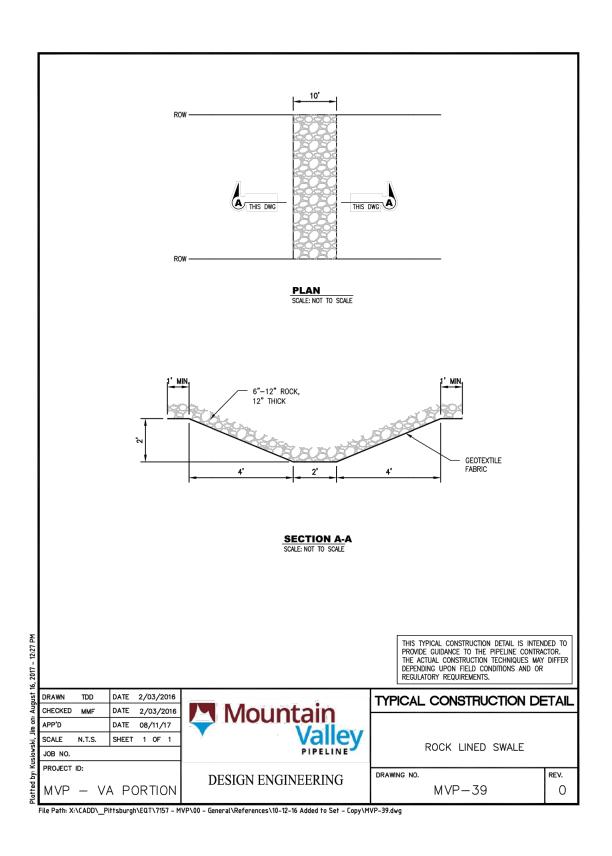
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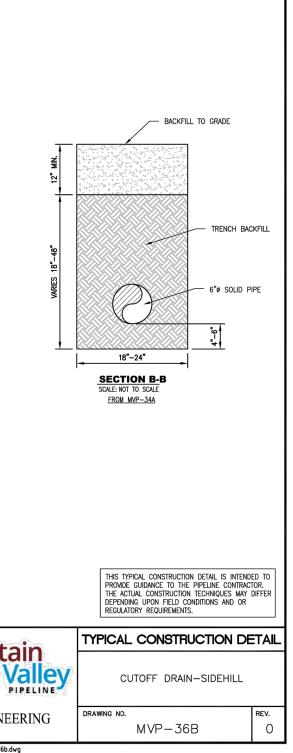
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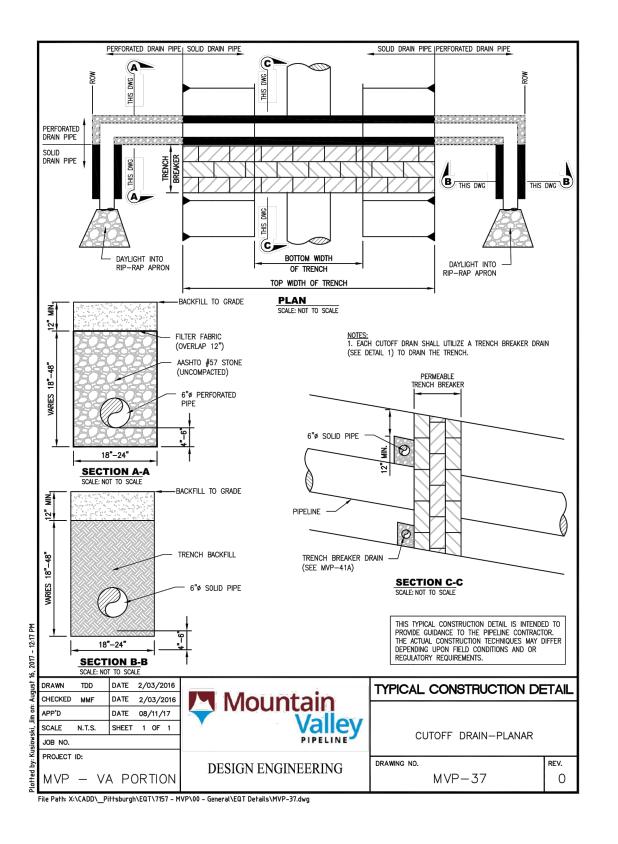


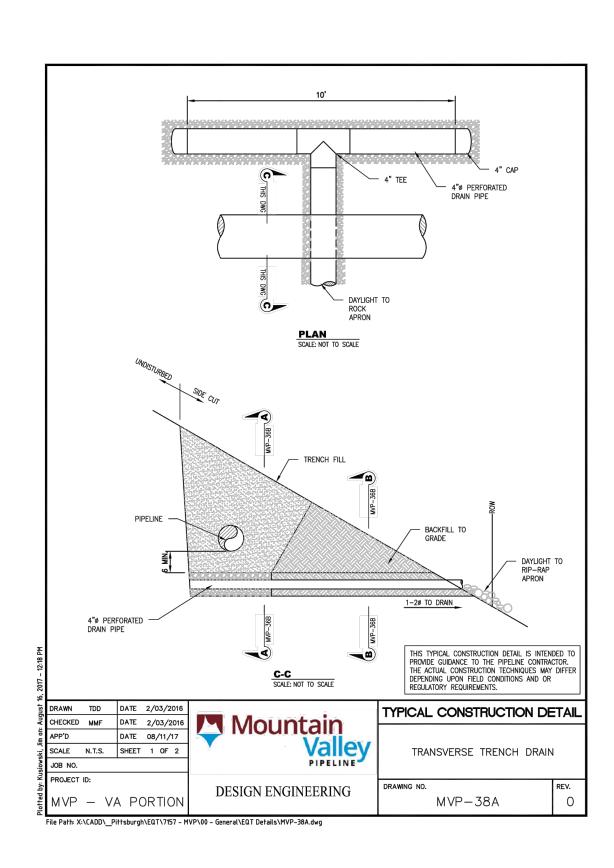


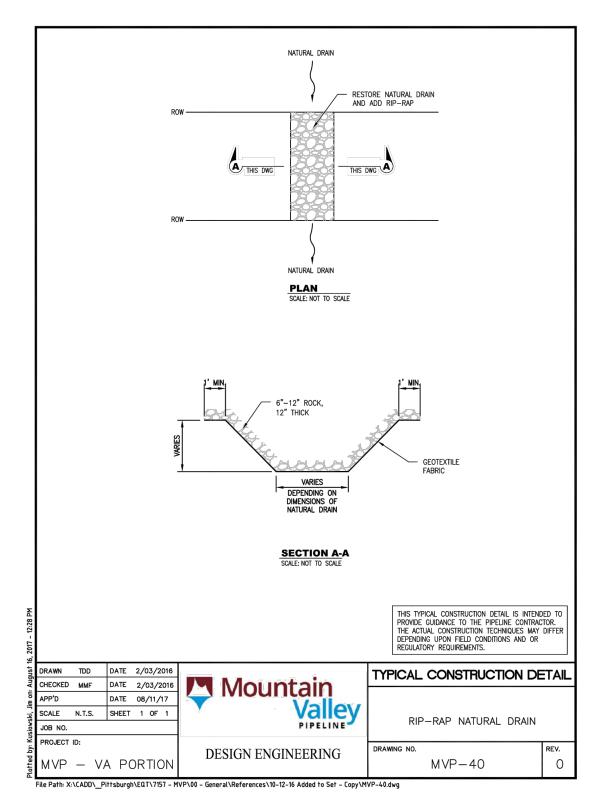


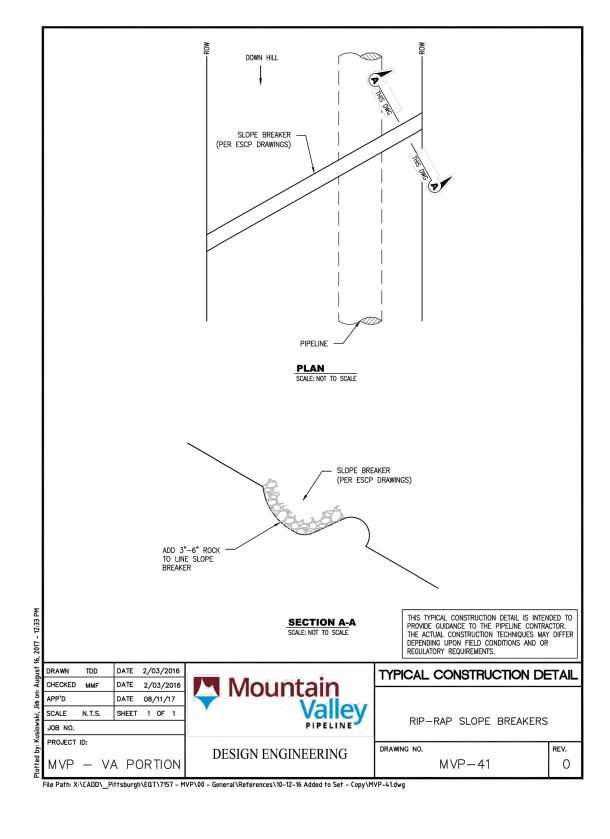


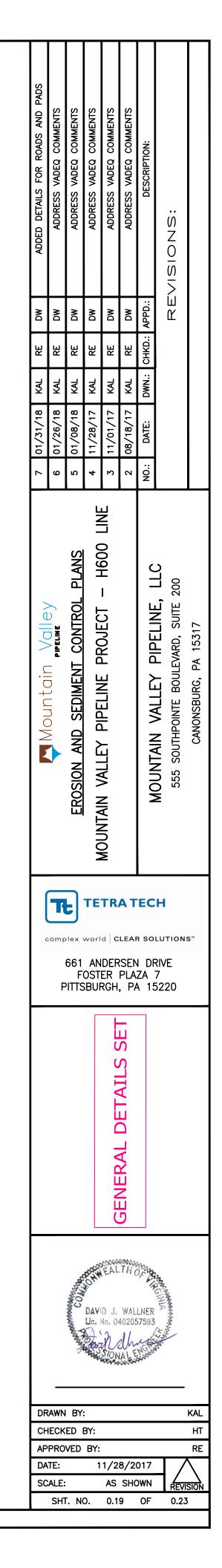


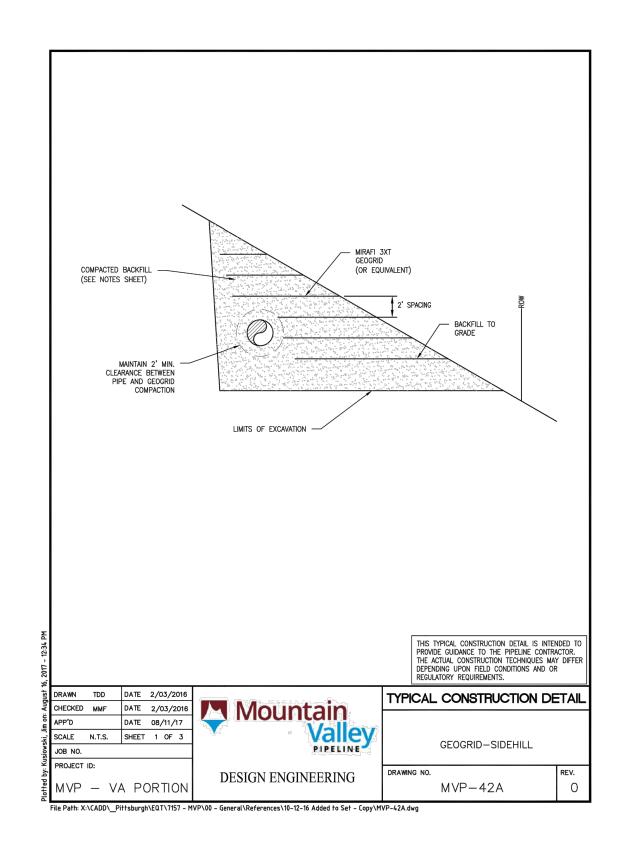


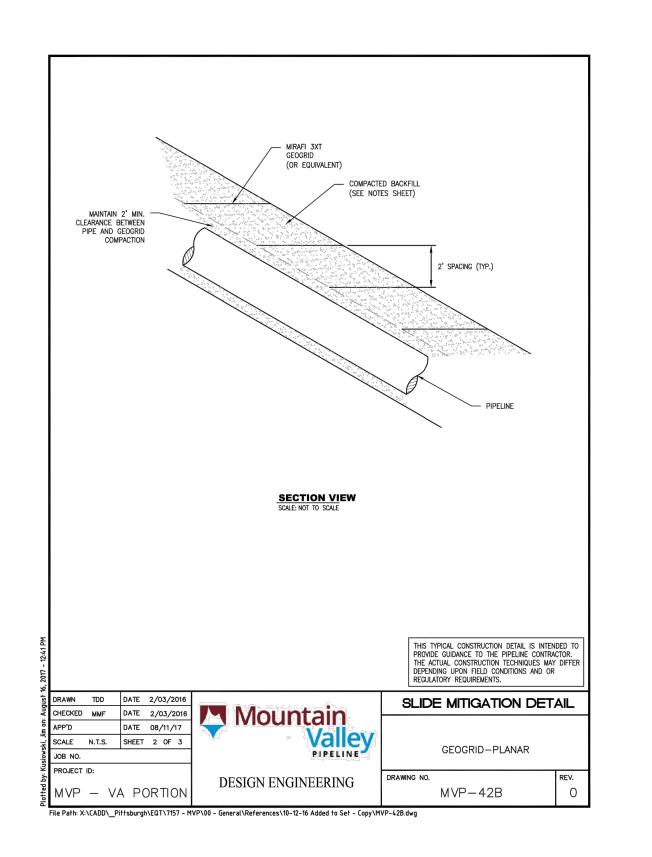


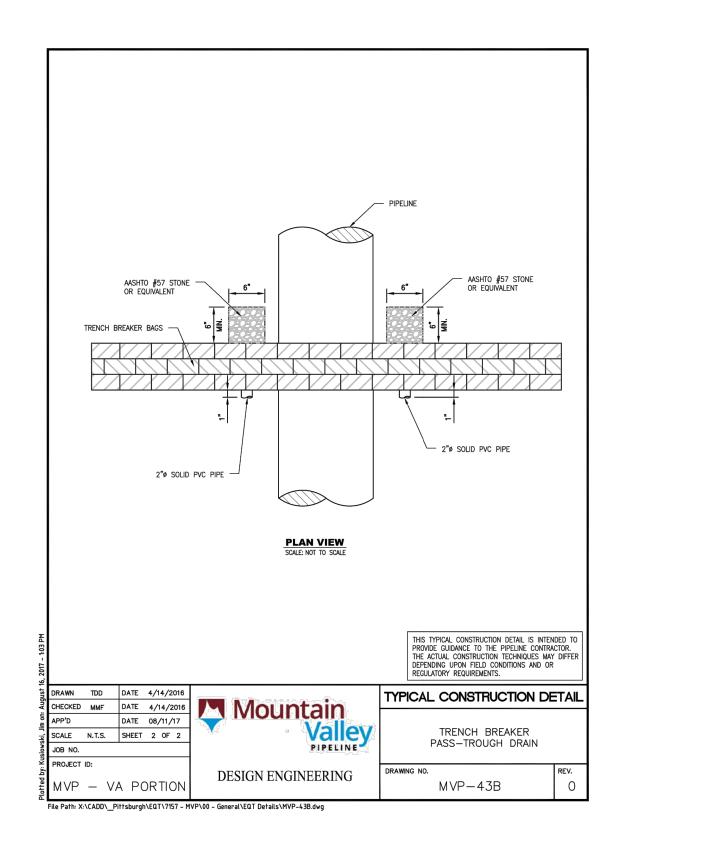


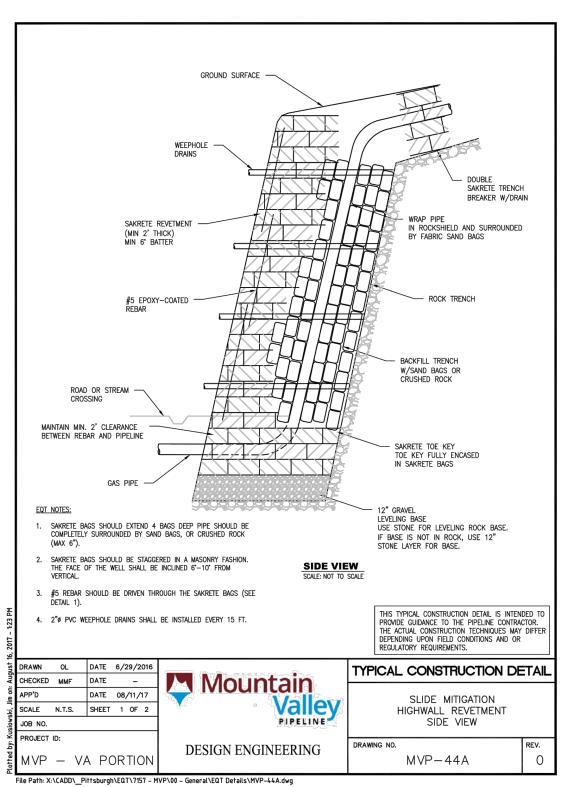


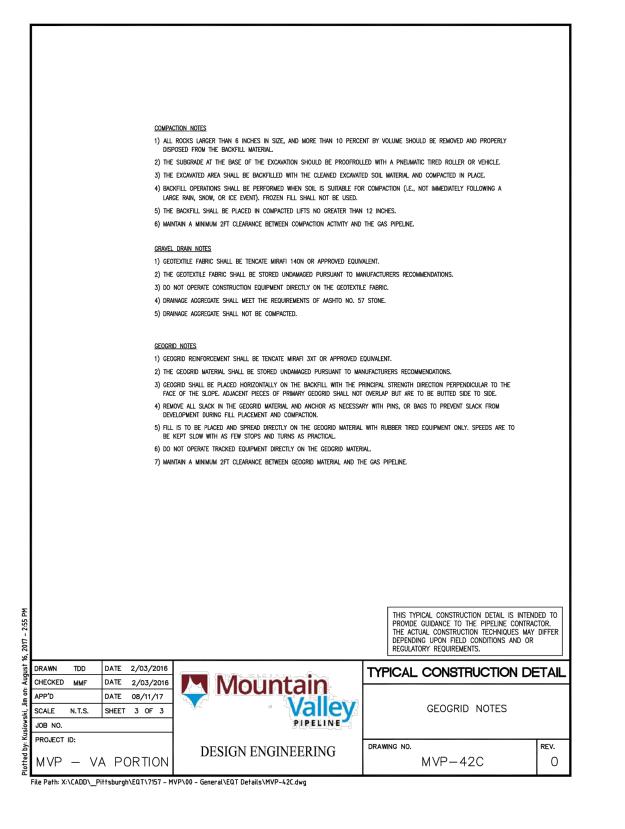


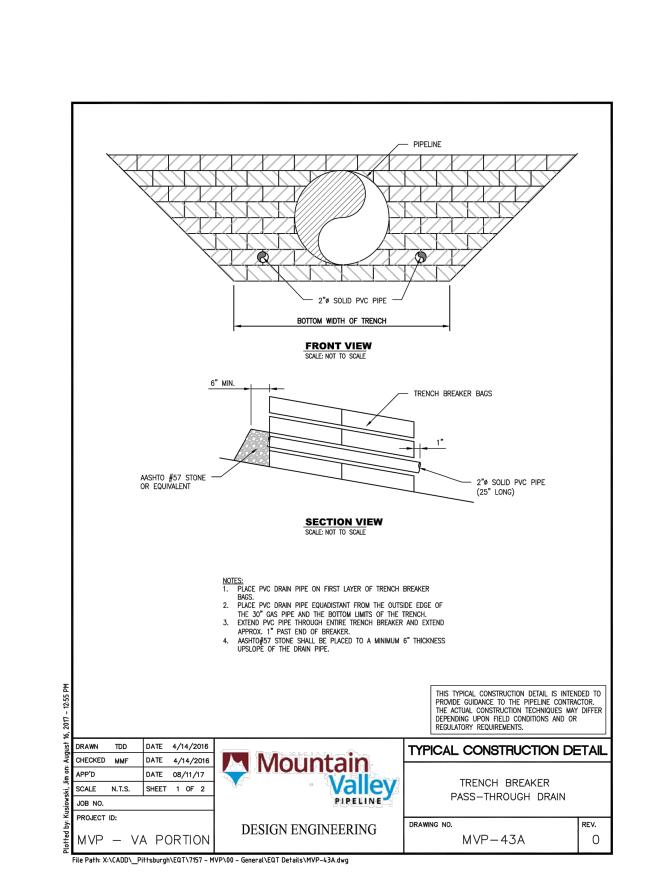


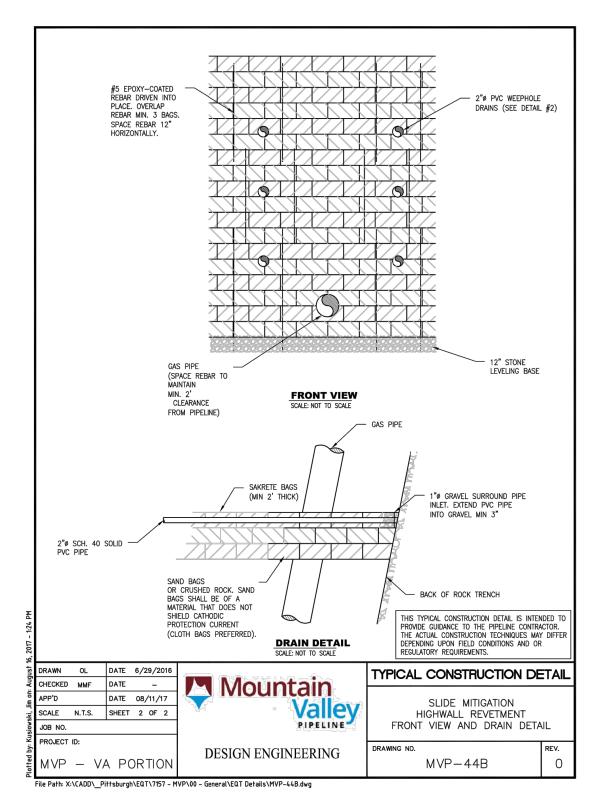












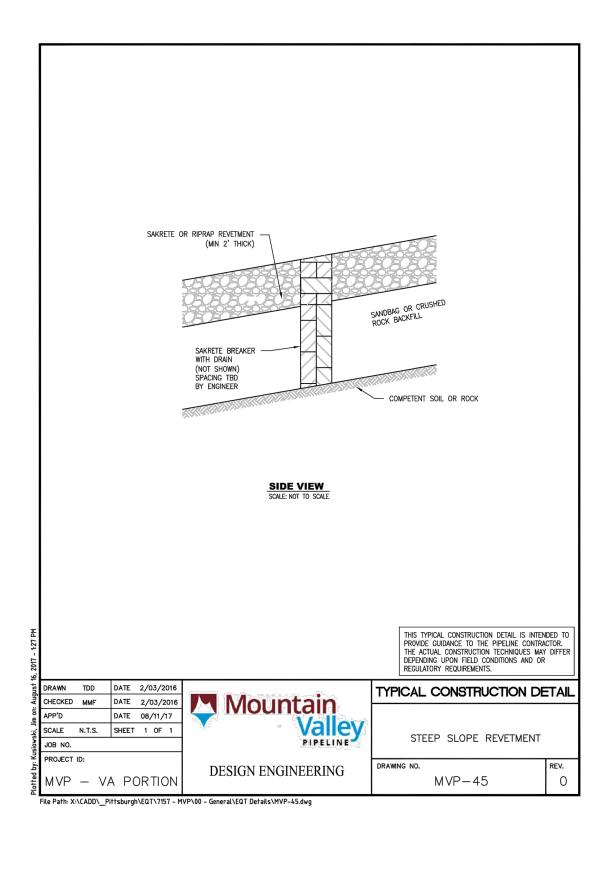
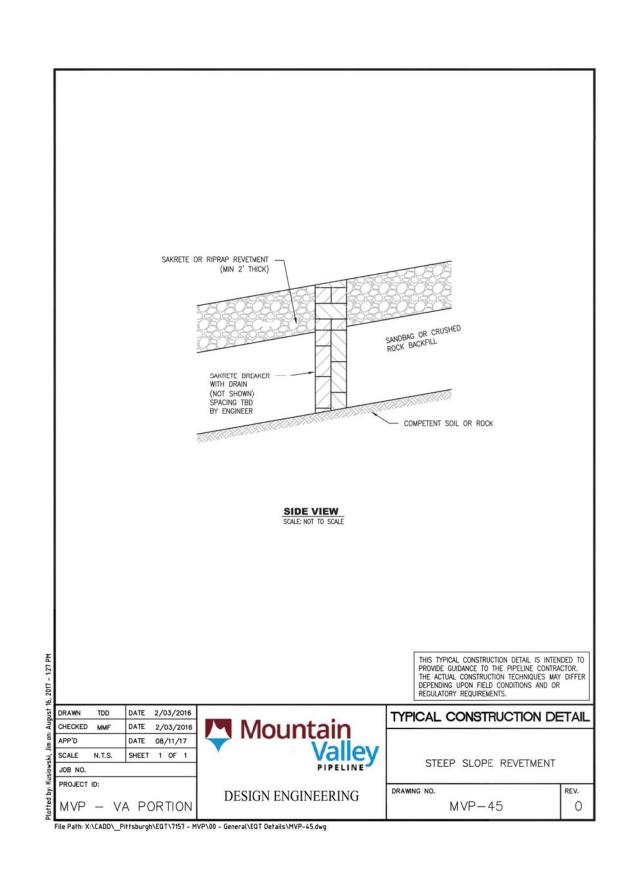
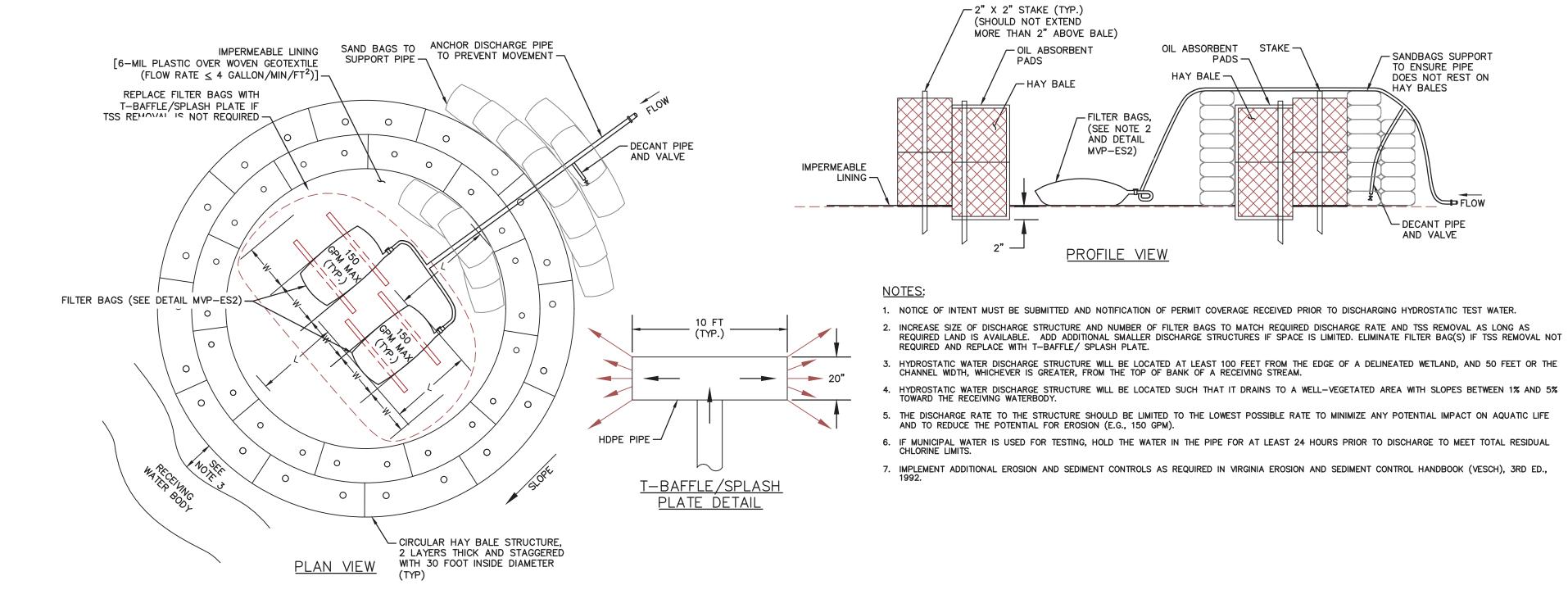
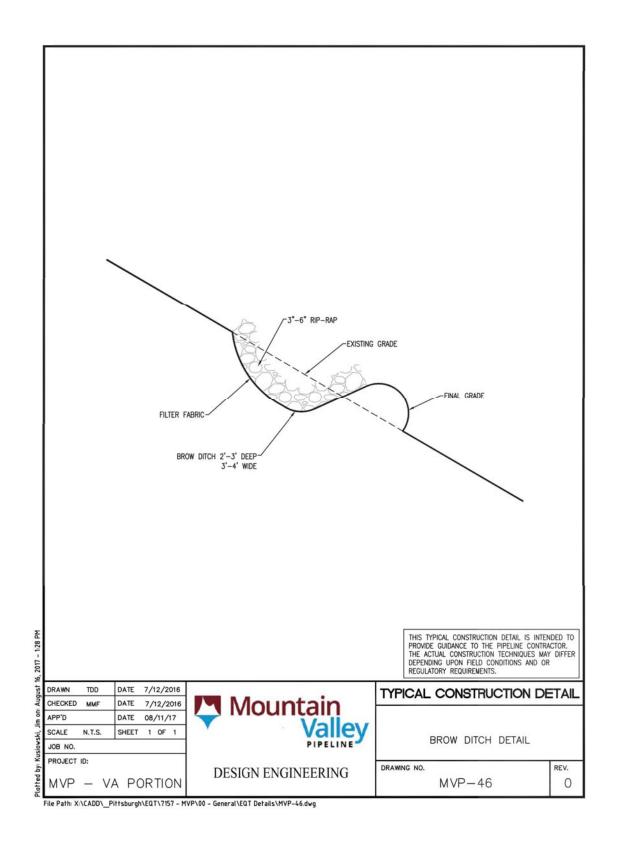


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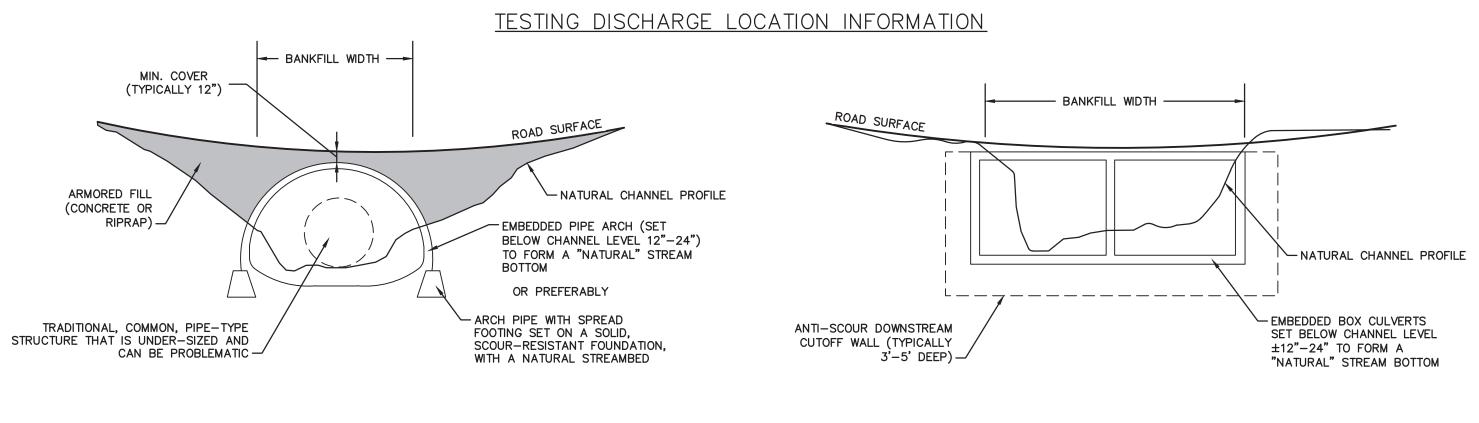
Test Break Name	Test Break Coord	dinates	Proposed Outf	all Coordinates	Anticipated Discharge Volume (gal)	Recommended Discharge Range (GPM)	Time to Release (days)	# of Hay Bale Structures	Receiving Water Name
	Latitude Longitude Latitude Longitude		Recommended Discharge Range (GPW)	Time to Release (days)	# OF Hay bale Structures				
9A	37° 20' 30.66"	-80° 37' 9.84"	37° 20' 32.42"	-80° 37' 9.64'''	3,620,000	600 to 1200	4 to 2	2 to 4	Little Stony Creek
9B	37° 16' 7.85"	-80° 18' 52.91"	37° 16' 6.010"	-80° 18' 55.920"	1,580,000	300 to 600	4 to 2	1 to 2	North Fork Roanoke River
9C	37° 13' 50.92"	-80° 11' 53.89"	37° 13' 50.290"	-80° 11' 52.360'''	3,040,000	600 to 1200	4 to 2	2 to 4	UNT to Roanoke River



			<u> 10-Year</u>		Existing	Existing	Proposed	Proposed	<u>Lidar</u>	<u>Lidar</u>	Invert	Invert_				Culvert		
	Accesss Road	Drainage Area	Design Flow	<u>Culvert</u>	Inlet Cover	Outlet Cover	Inlet Cover	Outlet Cover	Elevation at	Elevation at	Elevation at	Elevation at	Culvert		Replacement Culvert	<u>Dimensions</u>	<u>Embedment</u>	
Stream ID	<u>Station</u>	<u>(ac)</u>	<u>(cfs)</u>	Length (ft)	<u>(ft)</u> <sup>3</sup>	<u>(ft)<sup>3</sup></u>	<u>(ft)</u> <sup>4</sup>	<u>(ft)</u> <sup>4</sup>	Inlet (ft) <sup>1</sup>	<u>Outlet (ft)</u>	Inlet (ft) <sup>2</sup>	Outlet(ft) <sup>2</sup>	<u>Slope</u>	<b>Replacement Culvert Type</b>	Material	(Span/Rise)	<u>Depth (in)</u>	Scour Protection
S-MN32	33 + 35.49	426.08	524.55	12	3	3	7.667	7.667	1317.895	1317.827	1313.562	1313.494	0.6%	Box Culvert	Concrete	12'/8'	16	AASHTO Riprap Class A
S-MN33	25 + 83.30	14.23	40.40	12	2	2	2.75	2.75	1321.995	1321.737	1318.828	1318.570	2.2%	Box Culvert	Concrete	4'/3'	14	AASHTO Riprap Class A
S-MN34	20 + 88.96	87.49	278.12	12	1	1	5.313	5.313	1338.584	1337.743	1335.917	1335.076	7.0%	Box Culvert	Concrete	9'/6'	20	Grouted Riprap
<sup>1</sup> Roadway	crest elevation ba	ased on Lidar elev	ation at inlet +	required fill.														

<sup>4</sup>Fill required to accommodate box culvert.

#### DISCHARGE STRUCTURES TO BE USED FOR HYDROSTATIC TEST WATER NOT TO SCALE



"STREAM SIMULATION" EMBEDDED ARCH OR PIPE-ARCH CULVERTS

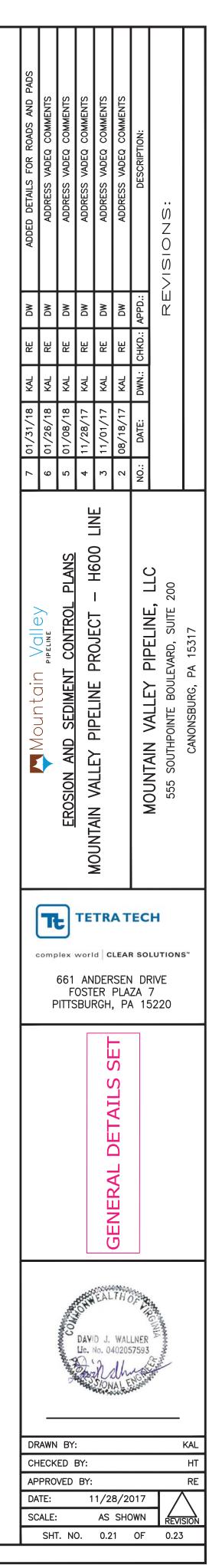
FISH PASSABLE EMBEDDED BOX CULVERT

## "FISH FRIENDLY" CULVERT STRUCTURES NOT TO SCALE

NOTE: LOW-WATER CROSSINGS THAT PROVIDE PASSAGE FOR FISH AND OTHER AQUATIC SPECIES. THE EMBEDDED CULVERTS WOULD HAVE A LAYER OF STREAMBED MATERIAL AT LEAST 1- TO 2-FOOT THICK COVERING THE CULVERT FLOOR.

<sup>2</sup> Calculated culvert invert based on Lidar elevations adjusted for stream depth from wetland data sheets.

<sup>3</sup>Based on wetland data sheet maximum top of bank height (assumed measurement from bottom of stream to top of road).



#### GENERAL CONSTRUCTION SEQUENCE

THE FOLLOWING IS A GENERAL SEQUENCE FOR EARTHMOVING ACTIVITIES ASSOCIATED WITH CONSTRUCTION OF THE PIPELINE:

- 1. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS PRIOR TO EARTH DISTURBANCE. REFER TO BEST MANAGEMENT PRACTICES (BMP) INSTALLATION AND REMOVAL NOTES. APPROPRIATE BMPS SHOULD BE PLACED AROUND SENSITIVE AREAS PRIOR TO EARTH DISTURBANCE. STONE CONSTRUCTION ENTRANCES (SCE) ARE TO BE PROVIDED AT ALL LOCATIONS WHERE ACCESS ROADS AND PIPELINES WILL BE ACCESSING OR CROSSING A PUBLIC ROADWAY. NOTE THAT SILT FENCE, COMPOST FILTER SOCK AND SUPER SILT FENCE IS BEING INSTALLED AS PART OF A "SYSTEM" OF EROSION CONTROL BMPS INCLUDING CLEAN WATER DIVERSIONS, WATERBARS AND BONDED FIBER MATRIX. THIS BMP SYSTEM APPROACH ALLOWS MVP TO MANAGE SLOPE LENGTH LIMITATIONS OF SUPER SILT BY INTRODUCING SLOPE BREAKS AND ADDITIONAL SURFACE EROSION PROTECTION.
- 2. INSTALL TEMPORARY E&S CONTROLS FOR STREAM CROSSINGS AT LOCATIONS SHOWN ON THE E&S PLAN SHEETS. NO EARTH DISTURBANCE ACTIVITIES WITHIN 50 FEET OF STREAM CHANNELS WILL BE PERFORMED UNTIL MATERIALS NEEDED TO COMPLETE THE CROSSING ARE AT THE NEAREST AVAILABLE LOCATION.
- 3. GENERAL CLEARING AND GRUBBING OF THE TREES AND BRUSH ALONG THE RIGHT-OF-WAY (ROW) FOR PIPELINE TRENCHING MAY COMMENCE TO THE WIDTH SPECIFIED IN THE ROW AGREEMENTS OR CONSTRUCTION ALIGNMENT SHEETS, WHICHEVER IS LESS. SMALLER DEBRIS, SUCH AS SHRUBS OR LIMBS, ARE TO BE CHIPPED AND UTILIZED ON-SITE AS PART OF THE SOIL STABILIZATION. WHERE CHIPPED MATERIAL IS USED AS MULCH, SPREAD AT A RATE NOT TO EXCEED 1 TON/ACRE. UNLESS OTHERWISE DIRECTED BY THE LANDOWNER, LOGS WILL EITHER BE HAULED OFF-SITE OR GIVEN TO THE LANDOWNER UPON THEIR REQUEST; STUMPS AND/OR LOGS WILL BE GROUND, CHIPPED, WINDROWED, OR HAULED OFF-SITE.
- 4. INSTALL CLEAN WATER DIVERSIONS AND CLEAN WATER DIVERSION PIPES IN ACCORDANCE WITH VESCH STD & SPEC 3.09 AND MVP-ES50 AND MCP-ES50.1. IN ADDITION, INSTALL OUTLET STRUCTURES FOR CLEAN WATER PIPES IN ACCORDANCE WITH MVP-ES51 AND MVP-ES51.1. FOLLOWING INSTALLATION OF CLEAN WATER DIVERSION BERMS STABILIZE THE UPHILL SIDE OF THE BERM USING TEMPORARY SEED, EROSION CONTROL MATTING OR BONDED FIBER MATRIX. FINALLY INSTALL ROCK CHECK DAMS IN ACCORDANCE WITH VESCH STD & SPEC 3.20 EXCEPT THAT COMPOST FILTER SOCK OR NATIVE ROCK (SIZED APPROPRIATELY PER VESCH STD & SPEC 3.20) EXCAVATED DURING GRADING WILL BE USED FOR CONSTRUCTION.
- 5. INSTALL TEMPORARY AND PERMANENT RIGHT-OF-WAY DIVERSIONS/WATERBARS IMMEDIATELY AFTER INITIAL DISTURBANCE OF THE SOIL IN ACCORDANCE WITH THE WATERBAR SPACING AND SIZING REQUIREMENTS SHOWN ON THE PLAN AND DETAIL SHEETS (SEE DETAILS VADEQ STD & SPEC 3.11 AND MVP-17). RIGHT-OF-WAY DIVERSIONS/WATERBARS WILL BE CONSTRUCTED OF SOIL, AND USED TO REDUCE RUNOFF VELOCITY AND DIVERT WATER OFF THE PIPELINE ROW. WATERBARS WILL BE INSTALLED WITH SUMP FILTERS (DETAIL MVP-ES42) AT THE DISCHARGE END.
- 6. EXCAVATE PIPELINE TRENCH AND BEGIN GRADING OF PROPOSED METER AND RECTIFIER ANODE BED SITES. THE PROPOSED CONSTRUCTION ROW AND EXTRA WORKSPACES ARE TO BE USED AS A WORK AREA FOR TRENCH EXCAVATION, EQUIPMENT MOVEMENT AND THE TEMPORARY STORAGE OF SOIL STOCKPILES, AS NEEDED. EQUIPMENT, SOIL STOCKPILES, AND OTHER MATERIALS ARE TO REMAIN UPSLOPE OF BMPS DURING CONSTRUCTION ACTIVITIES. REFER TO BMP INSTALLATION AND REMOVAL SEQUENCE FOR THE BMPS TO BE USED FOR PROTECTION DURING TRENCH EXCAVATION AND AROUND TEMPORARY SOIL STOCKPILES. STOCKPILES AND NON-WORK AREA SLOPES WILL BE STABILIZED THROUGH AN APPLICATION OF EITHER MULCH (ORGANIC, EROSION CONTROL BLANKET OR BONDED FIBER MATRIX) OR TEMPORARY SEED. SEGREGATION OF TOPSOIL AND SUBSOIL WILL BE PERFORMED WHERE TRENCH EXCAVATION TAKES PLACE IN AN AGRICULTURAL, WETLAND, OR RESIDENTIAL AREA.
- 7. PIPELINE SECTIONS WILL BE TRANSPORTED TO THE WORK AREA AND STRUNG ALONG THE WORKING SIDE OF THE ROW PARALLEL TO THE TRENCH LINE. WELDING CAN OCCUR IN OR OUT OF THE TRENCH. THE PIPELINE WILL BE BENT TO CONFORM TO THE TRENCH CONTOUR, ALIGNED WELDED AND PLACED ON TEMPORARY SUPPORTS ALONGSIDE THE TRENCH. WELDS WILL BE VISUALLY AND RADIO-GRAPHICALLY INSPECTED AND REPAIRED AS NECESSARY. THE PIPE SECTION WILL BE LOWERED INTO THE TRENCH AND PLACED ON PADDING PER MVP CONSTRUCTION STANDARDS. ANY WETNESS ENCOUNTERED DURING CONSTRUCTION WORK WILL BE DEWATERED BY USING PUMPS, HOSES, AND PUMPED BAGS (DETAIL MVP-ES2), AND WILL BE DISCHARGED TO A WELL VEGETATED, UPLAND AREA.
- 8. STREAM PIPELINE CROSSING CONSTRUCTION METHODS WILL BE INSTALLED AT LOCATIONS SHOWN ON THE E&S PLAN SHEETS AND AS SPECIFIED ON DETAIL SHEET. STREAM BANK STABILIZATION WILL BE INSTALLED IMMEDIATELY FOLLOWING COMPLETION OF PIPELINE INSTALLATION AS SHOWN ON THE DETAIL SHEET.
- 9. INSTALL TRENCH BREAKERS AT LOCATIONS SHOWN ON THE DRAWINGS OR AS DIRECTED BY MVP AND AS SPECIFIED ON THE DETAIL SHEET (DETAIL MVP-20).
- 10. THE TRENCH WILL SUBSEQUENTLY BE BACKFILLED WITH SUITABLE EXCAVATED MATERIAL. THE BACKFILL MATERIAL WILL BE SLIGHTLY CROWNED IN UPLAND AREAS TO ALLOW FOR SETTLEMENT THAT MAY OCCUR. CROWNING THE SOIL SLIGHTLY OVER THE PIPELINE WILL HELP PREVENT FUTURE STORM WATER-RELATED PROBLEMS FROM SETTLING OF THE BACKFILLED AREA. NO CROWNING OF SOILS WILL TAKE PLACE IN WETLANDS, STREAMS, OR FLOOD PLAINS. IN AREAS WHERE TOPSOIL HAS BEEN SEGREGATED, THE SUBSOIL WILL BE REPLACED FIRST, AND THEN THE TOPSOIL WILL BE SPREAD OVER THE AREA FROM WHICH IT WAS REMOVED. DISTURBED AREAS WILL BE RESTORED TO THEIR APPROXIMATE ORIGINAL TOPOGRAPHIC CONTOURS.
- 11. STABILIZE EXPOSED AND UNWORKED SOILS BY APPLICATION OF EFFECTIVE BMPS THAT PROTECT THE SOIL FROM THE EROSIVE FORCES OF RAINDROPS, FLOWING WATER, AND WIND. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. WHERE A DENUDED AREA WILL REMAIN IDLE FOR MORE THAN 7 CALENDAR DAYS, TEMPORARY SEEDING (VA STD & SPEC 3.31, TABLE 3.31-B) WILL BE APPLIED TO THE ROUGH GRADED AREA. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
- 12. IN THE UNLIKELY EVENT THAT THERE ARE EXCESS EXCAVATED MATERIALS REMAINING AFTER THE TRENCH HAS BEEN BACKFILLED, THE MATERIAL IS TO BE DISPOSED OF WITHIN THE EXISTING ROW IN AN UPLAND AREA OUTSIDE OF THE 100-YEAR FLOOD PLAIN. MATERIAL WILL BE SPREAD IN A THIN LAYER AND TIED INTO EXISTING CONTOURS TO CREATE POSITIVE DRAINAGE FOR STORMWATER RUNOFF.
- 13. CONSTRUCT PERMANENT RIGHT-OF-WAY DIVERSION/WATERBARS AFTER COMPLETION OF GRADING IN ACCORDANCE WITH THE WATERBAR SPACING AND SIZING REQUIREMENTS SHOWN ON PLAN AND DETAIL SHEETS (DETAIL MVP-17).
- 14. PRIOR TO SEEDING MVP WILL DISC AREAS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION. DISCING WILL BE PERFORMED ON SUBSOILS TO A DEPTH OF 4-6" AND AGAIN FOLLOWING TOPSOILING.
- 15. REVEGETATE DISTURBED AREA PER THE TABLES ON DETAILS MVP-ES11.1 TO 11.9 AND MVP-12.1 TO 12.4 OR PER LANDOWNER REQUEST. FOR 3:1 OR STEEPER SLOPES THE DISTURBED AREA WILL HAVE EROSION CONTROL FABRIC (BLANKETING, HYDROSEEDING, FLEXTERRA, OR APPROVED EQUAL) INSTALLED AS SHOWN ON DETAIL SHEET (DETAILS VA STD & SPEC 3.36, MVP-ES40 AND MVP ES-40.1).
- 16. RE-ESTABLISH APPROPRIATE DRAINAGE IN EXISTING ROAD CHANNELS PRIOR TO SEEDING AND MULCHING.
- 17. CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS ON AT LEAST THE FOLLOWING FREQUENCIES:
  - A. IN NON-TMDL WATERSHEDS
     AT LEAST ONCE EVERY FIVE BUSINESS DAYS, OR
  - •AT LEAST ONCE EVERY 10 BUSINESS DAYS AND NO LATER THAN 48 HOURS FOLLOWING A MEASURABLE STORM EVENT (OR ON THE NEXT BUSINESS DAY IF THE STORM EVENT OCCURS WHEN THERE ARE MORE THAN 48 HOURS BETWEEN BUSINESS DAYS. B. IN TMDL WATERSHEDS:
  - AT LEAST ONCE EVERY FOUR BUSINESS DAYS, OR
  - •AT LEAST ONCE EVERY 5 BUSINESS DAYS AND NO LATER THAN 48 HOURS FOLLOWING A MEASURABLE STORM EVENT (OR ON THE NEXT BUSINESS DAY IF THE STORM EVENT OCCURS WHEN THERE ARE MORE THAN 48 HOURS BETWEEN BUSINESS DAYS.

TEMPORARY BMP'S WILL BE REMOVED UPON ACHIEVING VEGETATIVE STABILIZATION, WHICH IS DEFINED AS "A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION". DISTURBED AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RESEEDED AS NEEDED UNTIL THE ENDPOINT IS ACHIEVED.

18. ALL POLLUTANTS, INCLUDING WASTE MATERIALS AND DEMOLITION DEBRIS THAT OCCUR ON SITE DURING CONSTRUCTION SHALL BE HANDLED AND LEGALLY DISPOSED OF IN A MANNER THAT DOES NOT CAUSE CONTAMINATION OF SURFACE WATERS. WOODY DEBRIS MAY BE CHIPPED AND SPREAD ON-SITE. FOR STREAM CROSSINGS, REFER TO THE FOLLOWING STEPS:

- 1. INSTALL TEMPORARY EQUIPMENT BRIDGE, BYPASS HOSE, FLUME, PUMP, OR COFFERDAM AS DESCRIBED IN STREAM CROSSING DETAILS AROUND THE WORK AREA.
- 2. DEWATER WORK AREA UTILIZING PUMP WATER FILTER BAGS. WHERE POSSIBLE, EXCAVATION WILL BE FROM THE TOP OF THE STREAM BANK.
- 3. INSTALL TRENCH PLUGS, PIPE, AND BACKFILL.
- 4. STABILIZE CHANNEL EXCAVATION AND STREAM BANKS PRIOR TO REDIRECTING STREAM FLOW.
- 5. REMOVE BYPASS HOSE, FLUME, PUMP, AND TEMPORARY DAM AS NEEDED.
- IF WORKING WITHIN A WETLAND AREA, FOLLOW THE GENERALIZED CONSTRUCTION SEQUENCE BELOW:
- 1 INSTALL EITHER SUPER SILT FENCE, ORANGE CONSTRUCTION FENCE, OR COMPOST FILTER SOCKS ALONG THE PERIMETERS OF THE SITE AS SHOWN ON THE CONSTRUCTION DRAWINGS.
- 2. MATS, PADS, OR SIMILAR DEVICES WILL BE USED DURING THE CROSSINGS OF WETLANDS. ORIGINAL GRADES THROUGH WETLANDS MUST BE RESTORED AFTER TRENCHING AND BACKFILLING. ANY EXCESS FILL MATERIALS MUST BE REMOVED FROM THE WETLAND AND NOT SPREAD WITHIN WETLANDS.
- 3. SOIL EXCAVATED FROM WETLAND AREAS WILL BE CAREFULLY REMOVED WITH THE ROOTS INTACT. THIS SOIL WILL BE PLACED IN A SEPARATE STOCKPILE TO BE REUSED DURING THE WETLAND SURFACE RESTITUTION.
- 4. DEWATER WORK AREA UTILIZING PUMPED WATER FILTER BAGS.
- 5. INSTALL PIPE.
- 6. INSTALL TRENCH PLUGS IN WETLAND AREAS TO PREVENT THE TRENCH FROM DRAINING THE WETLAND OR CHANGING ITS HYDROLOGY.
- 7. BACKFILL PIPE TRENCH. BACKFILL THE TOP 12-INCHES OF THE EXCAVATED TRENCH WITH THE STOCKPILED WETLAND SOIL TO MATCH ORIGINAL SURFACE GRADES.
- 8. COMPACT BACKFILL AND GRADE THE SURFACE OF THE TRENCH AREA TO ALLOW FOR POSITIVE DRAINAGE TO SOIL E&SCS AND TO PREPARE DISTURBED AREAS FOR PERMANENT TRENCH RESTORATION.
- 9. MAINTAIN ALL E&SCS DEVICES UNTIL SITE WORK IS COMPLETE AND A GROUND COVER IS ACHIEVED THAT IS UNIFORM AND MATURE ENOUGH TO SURVIVE AND INHIBIT EROSION.
- 10. REMOVE ALL SOIL AND E&SC MEASURES UPON ESTABLISHMENT OF A GROUND COVER THAT IS UNIFORM AND MATURE ENOUGH TO SURVIVE AND INHIBIT EROSION. RE-GRADE AND REVEGETATE AREAS DISTURBED DURING THE REMOVAL OF THE SOIL E&SCS.

#### BMP MAINTENANCE

- TEMPORARY AND PERMANENT EROSION AND SEDIMENT CONTROL BMPS SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO ASSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. MAINTENANCE AND REPAIR SHALL BE CONDUCTED IN ACCORDANCE WITH THE APPROVED STANDARDS AND SPECIFICATIONS.
- IN NON-AGRICULTURAL AREAS THE VISUAL SURVEY SHALL BE COMPARED TO THE DENSITY AND COVER OF ADJACENT UNDISTURBED LANDS. IN AGRICULTURAL AREAS, THE VISUAL SURVEY SHALL BE COMPARED TO THE ADJACENT UNDISTURBED PORTIONS OF THE SAME FIELD, UNLESS THE EASEMENT AGREEMENT SPECIFIES OTHERWISE.
- WETLANDS ALONG THE PROPOSED PIPELINE ARE EXPECTED TO EXHIBIT VARYING DEGREES OF SATURATION AND WATER ELEVATION, REQUIRING A VARIETY OF PLANT SPECIES TO BE RE-ESTABLISHED. IN UNSATURATED WETLANDS, MOST VEGETATION WILL BE REPLACED BY SEEDING. SATURATED WETLANDS WILL TYPICALLY BE ALLOWED TO RE-VEGETATE NATURALLY. WETLAND REVEGETATION WILL BE CONSIDERED SUCCESSFUL WHEN THE COVER OF HERBACEOUS AND/OR WOODY SPECIES IS AT LEAST 80 PERCENT OF THE TYPE, DENSITY, AND DISTRIBUTION OF THE VEGETATION IN ADJACENT WETLAND AREAS THAT WERE NOT DISTURBED BY CONSTRUCTION. REVEGETATION EFFORTS WILL CONTINUE UNTIL WETLAND REVEGETATION IS SUCCESSFUL.
- CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS AT LEAST ONCE EVERY FOUR BUSINESS DAYS.
- TEMPORARY EROSION AND SEDIMENT CONTROL BMPS SHOULD BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION IS ACHIEVED OR AFTER THE TEMPORARY BMPS ARE NO LONGER NEEDED. TRAPPED SEDIMENT SHALL BE REMOVED OR STABILIZED ON SITE. DISTURBED SOIL RESULTING FROM REMOVAL OF BMPS OR VEGETATION SHALL BE PERMANENTLY STABILIZED.

#### RESTORATION BMP PHASING

THE FOLLOWING IS THE SEQUENCE OF EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICE REMOVAL AND INSTALLATION RELATED TO RESTORATION ACTIVITIES. THIS WORK WILL OCCUR BETWEEN RESTORATION OF PIPELINE LIMIT OF DISTURBANCE TO PRE-CONSTRUCTION GRADES AND FINAL CLOSURE OF THE PROJECT DEFINED AS "ACHIEVING VEGETATIVE STABILIZATION". THE SEQUENCE IS:

1) REMOVE AND GRADE OUT THE CLEAN WATER DIVERSION DIKE.

2) REMOVE DOWNSLOPE BMPS UTILIZED DURING CONSTRUCTION AND IMMEDIATELY REPLACE WITH 12-IN COMPOST FILTER SOCK. ON SLOPES GREATER THAN 30%, AN ADDITIONAL INTERMEDIATE 12-IN COMPOST FILTER SOCKS WILL BE PLACED PER THE SLOPE SPACING (MVP-ES3.2) TO ATTENUATE THE VELOCITY OF RUNOFF IN THE RECLAIMED AREA.

3) APPLY SPECIALTY SEEDS AS REQUIRED THAT WILL NOT BE INCLUDED IN THE MULCH PHASE (STEP 4), SEED THE AREA USING THE SEED MIXES AND RATES SPECIFIED IN MVP-ES11.1 TO MVP-ES11.9 AND MVP-ES12.1 TO MVP-ES12.4.

4) APPLY MULCH IN THE FORM OF ORGANIC MULCH (PER MVP-ES45), SOIL STABILIZATION MATTING (PER VADEQ STD & SPEC 3.36), OR HYDRAULIC EROSION CONTROL PRODUCT (PER MVP-ES40).

5) FOLLOWING A DETERMINATION THAT THE SITE HAS ACHIEVED VEGETATIVE STABILIZATION, THE COMPOST FILTER SOCK WILL BE "OPENED" AND THE MULCH CONTAINED WITHIN WILL BE SPREAD WITHIN THE LIMITS OF DISTURBANCE.

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BEST MANAGEMENT PRACTICES (BMP) INSTALLATION & REMOVAL NOTES	STREAM
TEMPORARY AND PERMANENT BMPS WILL BE USED DURING CONSTRUCTION ACTIVITIES TO AVOID AND/OR MINIMIZE ADVERSE ENVIRONMENTAL EFFECTS OF CONSTRUCTION ACTIVITIES.	<u>GENERAL:</u> PROCEDURE
THE FOLLOWING ARE GENERAL BMP INSTALLATION NOTES FOR PIPELINE CONSTRUCTION ACTIVITIES.	MINIMIZ     PIPELIN
<ul> <li>A STONE CONSTRUCTION ENTRANCE, PER VESCH STD &amp; SPEC 3.02 AND MVP-ES20, SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC WILL BE ACCESSING A PAVED ROAD DIRECTLY FROM A DISTURBED AREA.</li> </ul>	ONLY T     LIMIT O     FROM 1
• TEMPORARY SEDIMENT BARRIERS, INCLUDING APPROPRIATELY SIZED COMPOST FILTER SOCK, SILT FENCE OR SILT FENCE WILL BE PLACED AROUND SOIL STOCKPILES, AS NEEDED.	• STORIN AREAS
<ul> <li>COMPOST FILTER SOCK WILL BE PLACED AROUND WETLANDS AND WATERBODIES IN AND ADJACENT TO THE WORK AREA PRIOR TO ANY TRENCHING ACTIVITIES. COMPOST FILTER SOCK HAS BEEN SIZED PER MVP-ES3 AND THE SIZE IS SPECIFIED ON THE PLAN SETS UTILIZING THE LINE TYPES CONTAINED IN THE LEGEND ON EACH SHEET.</li> </ul>	SPOIL F     ONCE V     EMPHAS
• STOCKPILE SLOPES WILL BE 2:1 OR FLATTER, AND STOCKPILES WILL NOT EXCEED 35 FEET IN HEIGHT.	SPOILS

- TEMPORARY STREAM CROSSINGS SHALL BE INSTALLED AS INDICATED ON THE E&S PLAN SHEETS AND AS PER THE E&S DETAIL SHEETS.
- WATERBARS WILL BE INSTALLED IMMEDIATELY AFTER INITIAL DISTURBANCE OF THE SOIL IN ACCORDANCE WITH THE SPACING AND SIZING REQUIREMENTS SHOWN ON PLAN AND DETAIL SHEET. WATERBARS WILL BE CONSTRUCTED OF SOIL TO REDUCE RUNOFF VELOCITY AND DIVERT WATER OFF THE PIPELINE ROW.
- EXCAVATED TRENCH SPOIL MATERIAL WILL BE USED FOR TEMPORARY RIGHT OF WAY DIVERSIONS AS SHOWN IN THE DETAIL AT THE LOCATIONS INDICATED ON THE PLAN SHEETS.
- TRENCH DEWATERING, IF NEEDED, WILL BE CONDUCTED USING A PUMP AND HOSE. WATER WILL BE RELEASED INTO A FILTER BAG THAT WILL BE LOCATED IN A WELL-VEGETATED UPLAND AREA.
- TRENCH BREAKERS WILL BE INSTALLED ON SLOPES ADJACENT TO STREAMS, WETLANDS, AND ROAD CROSSINGS TO PREVENT SUBSURFACE EROSION. TRENCH BREAKERS WILL BE INSTALLED AS SHOWN ON THE DETAILS.
- THE WORK AREA WILL BE BACKFILLED FOLLOWING PIPELINE INSTALLATION OR OTHER EXCAVATION WORK. IN AREAS WHERE TOPSOIL HAS BEEN SEGREGATED. THE SUBSOIL WILL BE REPLACED FIRST, AND THEN THE TOPSOIL WILL BE SPREAD OVER THE AREA FROM WHICH IT WAS REMOVED. DISTURBED AREAS WILL BE RESTORED TO THEIR ORIGINAL TOPOGRAPHIC CONTOURS.
- PERMANENT WATERBARS, WILL BE CONSTRUCTED WITH A TWO PERCENT (TYPICAL) OUTSLOPE TO DIVERT SURFACE FLOW TO A WELL VEGETATED STABLE AREA.
- IMMEDIATELY FOLLOWING BACKFILLING ALL DISTURBED AREAS WILL BE GRADED IN PREPARATION FOR SEEDING AND MULCHING. PRIOR TO SEEDING MVP WILL DISC AREAS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION. DISCING WILL BE PERFORMED ON SUBSOILS TO A DEPTH OF 4-6" AND AGAIN FOLLOWING TOPSOILING. THE CONSTRUCTION SITE SHOULD BE STABILIZED AS SOON AS POSSIBLE AFTER COMPLETION. ESTABLISHMENT OF FINAL COVER MUST BE INITIATED NO LATER THAN 7 DAYS AFTER REACHING FINAL GRADE. REFER TO TABLES ON THIS SHEET FOR TEMPORARY AND PERMANENT SEEDING SPECIFICATIONS.
- FOR 3:1 OR STEEPER SLOPES THE DISTURBED AREA WILL HAVE EROSION CONTROL BLANKETING INSTALLED AS INDICATED ON DETAIL SHEET.
- TEMPORARY SEDIMENT BARRIERS WILL BE MAINTAINED UNTIL VEGETATION HAS BECOME ESTABLISHED WITH A GROUND COVER THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION. ONCE THIS COVERAGE HAS BEEN OBTAINED, APPROPRIATE CONTROLS WILL BE REMOVED FROM THE WORK AREA. AREAS DISTURBED DURING THE REMOVAL OF THE EROSION CONTROLS WILL BE STABILIZED IMMEDIATELY.
- ALL WASTE MATERIAL WILL BE TRANSPORTED OFFSITE FOR RECYCLING AND/OR DISPOSAL AT A FACILITY APPROVED TO RECEIVE THE MATERIAL.
- IN NON-AGRICULTURAL AREAS THE VISUAL SURVEY SHALL BE COMPARED TO THE DENSITY AND COVER OF ADJACENT UNDISTURBED LANDS. IN AGRICULTURAL AREAS, THE VISUAL SURVEY SHALL BE COMPARED TO THE ADJACENT UNDISTURBED PORTIONS OF THE SAME FIELD, UNLESS THE EASEMENT AGREEMENT SPECIFIES OTHERWISE.
- WETLANDS ALONG THE PROPOSED PIPELINE ARE EXPECTED TO EXHIBIT VARYING DEGREES OF SATURATION AND WATER ELEVATION, REQUIRING A VARIETY OF PLANT SPECIES TO BE RE-ESTABLISHED. IN UNSATURATED WETLANDS, MOST VEGETATION WILL BE REPLACED BY SEEDING. SATURATED WETLANDS WILL TYPICALLY BE ALLOWED TO RE-VEGETATE NATURALLY. WETLAND REVEGETATION WILL BE CONSIDERED SUCCESSFUL WHEN THE COVER OF HERBACEOUS AND/OR WOODY SPECIES IS AT LEAST 80 PERCENT OF THE TYPE, DENSITY, AND DISTRIBUTION OF THE VEGETATION IN ADJACENT WETLAND AREAS THAT WERE NOT DISTURBED BY CONSTRUCTION. REVEGETATION EFFORTS WILL CONTINUE UNTIL WETLAND REVEGETATION IS SUCCESSFUL.

PERMANENT STABILIZATION SHALL OCCUR IMMEDIATELY UPON INSTALLATION, BACKFILLING, AND GRADING AT EACH STREAM CROSSING.

#### CROSSING PROCEDURES

ES THAT WILL BE FOLLOWED AT STREAM CROSSING LOCATIONS INCLUDE THE FOLLOWING:

ZE CLEARING AND GRUBBING OF VEGETATION UP TO STREAMS, AS POSSIBLE, UNTIL THE TIME OF THE NE INSTALLATION;

THAT AREA WHICH IS REQUIRED FOR PIPELINE INSTALLATION SHALL BE DISTURBED WITHIN THE PROPOSED OF DISTURBANCE OR RIGHT-OF-WAY AT STREAM CROSSINGS; LOCATING STAGING AREAS 50 FEET AWAY THE STREAM, WHERE POSSIBLE;

IG CHEMICALS, STORING EQUIPMENT, WASHING EQUIPMENT, OR REFUELING EQUIPMENT MUST BE DONE IN THAT ARE GREATER THAN 100 FEET AWAY FROM THE STREAM;

PILE PLACEMENT AND BMPS WILL BE MONITORED AT ALL TIMES DURING STREAM CROSSING PROCEDURES; WORK WITHIN A STREAM AREA IS STARTED, IT WILL BE CONDUCTED CONTINUOUSLY TO COMPLETION; SIS WILL BE PLACED ON MINIMIZING TIME OF DISTURBANCE;

FROM STREAM CROSSINGS MUST BE PLACED AT LEAST 10 FEET FROM THE WATER'S EDGE; AND

• CONSTRUCTION EQUIPMENT WILL NOT BE ALLOWED IN THE STREAM CHANNEL WHEN EXCAVATION CAN BE DONE FROM EITHER SIDE OR A TEMPORARY CROSSING WHILE WORKING AT THE STREAM CROSSING.

• ESC BMPS WILL BE MONITORED/MAINTAINED AT ALL TIMES FOLLOWING INITIAL EARTH DISTURBANCE AND WILL CONTINUE UNTIL RESTORATION IS DEEMED COMPLETE.

THE FOLLOWING SECTIONS DESCRIBE STREAM CROSSING TECHNIQUES THAT MAY BE USED DURING PIPELINE RELOCATION /INSTALLATION ACTIVITIES. REFER TO THE DETAIL SHEETS AND APPROVED STANDARDS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

#### DRY CROSSING TECHNIQUES:

THESE TECHNIQUES WILL BE USED TO PERFORM PIPELINE WORK IN A RELATIVELY DRY WORKING CONDITION OR AROUND THE OPEN EXCAVATION. THESE TECHNIQUES INCLUDE PUMP AROUND AND FLUME PIPE CROSSING METHODS. THE LIMITING FACTORS FOR THESE TECHNIQUES ARE USUALLY STREAM SIZE, FLOW, AND WATER DEPTH.

DIRECTIONAL BORING IS ALSO A TECHNIQUE THAT CAN BE UTILIZED AS IT WILL LESSEN THE IMPACTS ON THE WATERBODIES.

E&S CONTROL MEASURES WILL BE INSTALLED PRIOR TO ANY EARTH DISTURBANCE AND MONITORED/MAINTAINED UNTIL CONSTRUCTION AND RESTORATION THROUGH THE WATER-BODY IS COMPLETE.

FLUME PIPE METHOD: PLEASE SEE DETAIL SHEETS AND SWPPP FOR MORE INFORMATION ON THE FLUME PIPE METHOD. THIS PROCEDURE INVOLVES CONSTRUCTING TWO BULKHEADS, EITHER SANDBAGS OR PLASTIC DAMS, TO DIRECT THE STREAM FLOW THROUGH A FLUME PIPE PLACED OVER THE TRENCH PRIOR TO EXCAVATION. THE FLUME SHALL BE ALIGNED AS TO PREVENT BANK EROSION AND BED SCOUR. THE FLUME WILL NOT BE REMOVED DURING TRENCHING, PIPE LAYING OR BACKFILLING.

PUMP AROUND METHOD: PLEASE SEE THE DETAIL SHEETS AND APPROVED STANDARDS AND SPECIFICATIONS FOR MORE INFORMATION ON THE PUMP AROUND METHOD. THIS PROCEDURE INVOLVES CONSTRUCTING TWO BULKHEADS, EITHER SANDBAGS OR PLASTIC DAMS. THE UPSTREAM DAM WILL CAUSE THE WATER TO POND WHERE IT CAN BE PUMPED AROUND THE WORK AREA AND BE DISCHARGED BEHIND THE DOWNSTREAM BULKHEAD. PUMPS OF SUFFICIENT SIZE TO TRANSMIT THE FLOW DOWNSTREAM WILL BE USED. BACKUP PUMPS MUST BE ON-SITE. PUMP INTAKES MUST BE SCREENED. PUMP DISCHARGES MUST NOT CAUSE SCOUR.

TEMPORARY ROAD CROSSINGS

TEMPORARY ROAD CROSSINGS, CONSISTING OF BRIDGES OF TIMBER MATS OR CLEAN ROCK FILL AND FLUME(S), WILL BE INSTALLED TO CROSS MINOR OR INTERMEDIATE STREAMS. TIMBER MATS SHALL BE USED TO CROSS SMALLER STREAMS WHERE THE SPAN OF THE MAT WILL STRETCH FROM BANK TO BANK. CLEAN ROCK FILL AND FLUMED CROSSINGS WILL BE UTILIZED WHERE IT IS NOT FEASIBLE TO UTILIZE TIMBER MATS. AS AN ALTERNATIVE, PORTABLE BRIDGES MAY BE USED INSTEAD FOR SMALL CROSSINGS. EQUIPMENT WILL NOT BE ALLOWED TO FORD FLOWING STREAMS DURING CONSTRUCTION ACTIVITIES. TEMPORARY ROAD CROSSINGS OF STREAMS MUST MAINTAIN FOR ADEQUATE FLOW DOWNSTREAM.

#### STREAM BANK STABILIZATION:

LEGEND	<ul> <li>CLEAN WATER DIVERSION DIKE (SEE DETAIL MVP-ES50 AND MVP-ES51</li> <li>STREAM</li> <li>US FOREST SERVICE (NATIONAL FOREST) LANDS</li> <li>APPALACHIAN NATIONAL SCENIC TRAIL</li> <li>EXISTING ROAD/TRAIL</li> <li>EXISTING PROPERTY LINE</li> <li>EXISTING STATE LINE</li> <li>EXISTING COUNTY LINE</li> <li>POND</li> <li>WETLAND</li> </ul>	ADDED DETAILS FOR ROADS AND PADS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	ADDRESS VADEQ COMMENTS	VADEQ	ADDRESS VADEQ COMMENTS	DESCRIPTION:	SIONS:
	- ACID FORMING MATERIAL							).: 	Г Ц
AGRI AGRI AGRI	– AGRICULTURAL LAND USE BOUNDARY • PROPOSED LIMIT OF DISTURBANCE	MQ	Ŋ	M	M	ð	MQ	: APPD.:	Ц
	PROPOSED ACCESS ROAD CENTERLINE	RE	R	R	湿	Ä	RE	CHKD.:	
SF SF	- PROPOSED PIPELINE - PROPOSED SILT FENCE	KAL	KAL	KAL	KAL	KAL	KAL	DWN.:	
SSF SSF	- PROPOSED SUPER SILT FENCE (SEE DETAIL MVP–ES9.2) - PROPOSED REINFORCED FILTRATION DEVICE (SEE DETAILS MVP–ES9, 9.1, 9.2, 9.3)	1/18	6/18	8/18	8/17	1/17	8/17	TE:	
OCSF	- ORANGE CONSTRUCTION SAFETY FENCE	01/31	01/26	01/08,	11/28,	11/01/	08/18/	DATE:	
	- PROPOSED 12" COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2) - PROPOSED 18" COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)	2	9	പ	4	ю	2	NO.:	
	- PROPOSED 24" COMPOST FILTER SOCK (SEE DETAILS MVP-ES3, 3.1, 3.2)				L	LINE			
_>_>_	– GRASS–LINED CHANNEL (SEE DETAIL MVP–ES39) – CLEAN WATER DIVERSION PIPE				6				
	TIMBER MAT (SEE DETAIL MVP-ES37)			PLANS		DUOH			
	STEEP SLOPE EROSION CONTROL (SEE NOTE 2)	2	$\geq$					- -	<b>г, ц</b> ТЕ 200
	STEEP SLOPE AREAS (SEE NOTE 4)			CONTRO		<b>PRUJECI</b>			D, SUITE 5317
	PROPOSED ROCK CONSTRUCTION ENTRANCE PROPOSED TRENCH BREAKER (SEE DETAIL MVP-20)				ן כ				ے <u>تا</u>
<b>→</b>	TEMPORARY ROW DIVERSION/WATER BAR (VADEQ STD & SPEC 3.11)	; +		SEDIMENT		PIPELINE			
<b>Å</b>	PERMANENT SLOPE BREAKER/ROW DIVERSION/WATER BAR (SEE DETAILS MVP-17, ES38, AND SCHEDULE)			AND SEI	l r	<u>Т</u> Т			z
ACCORDANCE 2. FLEXTERRA, E	REGATION WILL BE PERFORMED IN ALL-CONSTRUCTION AREAS OF THE PROJECT IN WITH DETAIL MVP-ES46.1 THROUGH MVP-ES46.3. ARTHGUARD OR EQUIVALENT MAY BE USED AS A SUBSTITUTE TO EROSION CONTROL			EROSION		MUUNIAIN			
<ol> <li>CONTRACTOR FOR INFORMAT</li> <li>SLOPES OF 3 SLOPE TECHN STABILIZATION MOUNTAIN VAI</li> <li>WHERE CONST THE CONTRACT</li> <li>IMPROVEMENTS</li> </ol>	DIRECTED BY MVP. IS RESPONSIBLE TO IDENTIFY ALL UTILITIES. THE UTILITY LINES SHOWN ON THE PLAN ARE FIONAL PURPOSES ONLY AND DO NOT REPRESENT SURVEYED LINE INFORMATION. O' OR GREATER EXIST. CONSTRUCTION FOR STEEP SLOPES TO BE PERFORMED USING STEEP IQUES IDENTIFIED IN THE DETAIL SHEETS. ALSO REFER TO THE SITE—SPECIFIC DESIGN OF MEASURES IN SELECTED HIGH—HAZARD PORTIONS OF THE ROUTE OF THE PROPOSED LEY PIPLELINE PROJECT. TRUCTION CONDITIONS PRECLUDE THE USE OF DIVERSION DITCHES DUE TO SITE CONDITIONS TOR WILL INSTALL SILT FENCE AT THE DIRECTION OF MVP. S TO PERMANENT AND TEMPORARY ACCESS ROADS WILL BE PERFORMED PER THE SITE ESS ROAD DETAILS.		com	ب اور 661 F	wor AN OST	Id   C IDEF ER	RSEN PLA	r so I DF ZA	lutions™ RIVE
7. TEMPORARY A PERMANENT R 8. ALL NON VMF	CCESS ROAD CROSSING OF STREAMS AND WETLANDS WILL UTILIZE TIMBERMATS. ANY OAD CROSSINGS WILL BE CONDUCTED VIA CULVERTS. IC STREAM CROSSINGS WILL BE PERFORMED AS DESCRIBED IN THE STREAM CROSSING ED IN THIS PACKAGE.						GENERAL DETAILS SET		
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