

MVP PIPELINE PROJECT

MVP-PY-006

VARIANCE AND DEVIATION REQUESTS

NOTE: NOT ALL OF THE FOLLOWING VARIANCE AND DEVIATION REQUESTS APPLY TO THE MVP-PY-006 LAYDOWN YARD.

STEEP SLOPE EROSION CONTROL PRODUCTS

FOLLOWING RESTORATION OF THE ROW TO PRE-EXISTING CONTOURS AND CONDITIONS, MVP WILL UTILIZE SOIL STABILIZATION BLANKETS (OR THEIR EQUIVALENT) TO STABILIZE SLOPES EXCEEDING 33% TO PREVENT EROSION OF THE DISTURBED SOILS. THERE ARE SEVERAL VARIATIONS OF THESE PRODUCTS INCLUDING: ROLLED EROSION CONTROL BLANKET, AND HYDRAULICALLY APPLIED EROSION CONTROL PRODUCT.

ROLLED EROSION CONTROL BLANKET

ROLLED EROSION CONTROL BLANKET (ECB) IS A WOVEN MAT CONSISTING OF A MONOFILAMENT NETTING (OR SIMILAR) BACKED STRAW MAT THAT IS MECHANICALLY ANCHORED TO THE SOIL. PRIOR TO INSTALLATION, THE SOIL IS SCARIFIED AND SMOOTHED PRIOR TO APPLICATION OF SEEDING AND SOIL AMENDMENTS. ROLLED ECB IS THEN INSTALLED BY HAND OVER THE SEEDING/SOIL AMENDMENTS AND MECHANICALLY ANCHORED TO THE SOIL USING DEGRADABLE METAL ANCHORS.

BONDED FIBER MATRIX

BONDED FIBER MATRIX (BFM) IS A HYDRAULICALLY APPLIED SOIL STABILIZER THAT IS EFFECTIVE IN STABILIZING STEEP SLOPES. AS PER MANUFACTURER SPECIFICATIONS, BFM APPLICATION RATES VARY DEPENDING ON SLOPE AND SOIL CONDITIONS, BUT APPLICATION RATES ARE TYPICALLY BETWEEN 1,500 TO 4,000 LBS/ACRE. SOME MANUFACTURERS OFFER BFM PRODUCTS IN PELLETED FORM FOR APPLICATION VIA BROADCAST SPREADER AND INTENDED FOR USE IN REMOTE AREAS WHERE WATER SUPPLIES ARE LIMITED, WHERE ACCESS VIA HYDROSEEDER IS DIFFICULT OR WHERE SMALL AREA COVERAGE IS NECESSARY. ONCE APPLIED, THE PELLETED BFM IS ACTIVATED BY PRECIPITATION EVENT FOLLOWING APPLICATION. BFM SHOULD NOT BE APPLIED WHEN RAIN IS FORECAST WITHIN 24 - 48 HOURS OF APPLICATION. APPLICATION OF BFM IS TYPICALLY 90% EFFECTIVE IN PREVENTING ACCELERATED EROSION FROM OCCURRING WITHIN THE AREA OF APPLICATION. WHEN APPLICATION OF THESE PRODUCTS INCLUDES A POLYMER (ANIONIC) STABILIZER, BFM CAN BE UP TO 99% EFFECTIVE IN REDUCING TURBIDITY AND SEDIMENT RUNOFF FROM DISTURBED AREAS. INFORMATION ON THE USE OF BFM IS PROVIDED UNDER TYPICAL CONSTRUCTION DETAIL MVP-CS40 (BONDED FIBER MATRIX).

HYDRAULIC EROSION CONTROL PRODUCTS

HYDRAULIC EROSION CONTROL PRODUCTS (HECP) ARE TYPICALLY INSTALLED USING A HYDROSEEDER TO APPLY A LIQUID SOLUTION OF SEED, SOIL AMENDMENTS, MULCH (WOOD FIBER, WOOD CHIPS OR SIMILAR WOOD MATERIALS OR NEWSPRINT) AND MULCH TACKIFIER TO STABILIZE THE SOIL. UNLIKE ROLLED ECB PRODUCTS, HECP MAKES SOIL CONTACT WITH THE SOIL REGARDLESS OF SOIL SURFACE CONDITIONS AND A ROUGHENED SURFACE IS PREFERRED. REMOVAL OF LARGE ROCKS AND EXISTING RILLS SHOULD BE UNDERTAKEN PRIOR TO APPLICATION. TRACKING OF SLOPES SHOULD BE CONSIDERED TO SLOW RUNOFF DURING A STORM EVENT.

HECP TYPE 4

HECP TYPE 4 IS A PRODUCT APPROVED BY THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD BRIDGE SPECIFICATIONS FOR USE ON SEVERE SLOPES UP TO 100% (1V:1H), AND MEETS THE CRITERIA SPECIFIED BY IN TABLE II-22A BELOW. MVP WILL UTILIZE HECP TYPE 4 IN AREAS OF SIDE HILL CONSTRUCTION THAT EXCEED 33% CROSS SLOPE DURING PROJECT RESTORATION ACTIVITIES. THE SPECIFIC MANUFACTURER AND PRODUCT HAVE NOT BEEN DETERMINED AT THIS TIME, BUT MVP INTENDS TO USE PRODUCTS CONTAINED IN THE VDOT MATERIALS DIVISION APPROVED MATERIALS LIST, LIST NO. 79, (79) MULCHES (HECP TYPES 1-4) - (MAINTENANCE DIVISION), (OR THEIR EQUIVALENT) THAT MEET THE MINIMUM REQUIREMENTS DEFINED IN TABLE II-22A AND THE VDOT SPECIAL PROVISION FOR ROADSIDE DEVELOPMENT AND SOIL STABILIZATION, DATED JULY 12, 2016, AND UPDATED JUNE 1, 2017, PERTAINING TO WOOD CELLULOSE FIBER MULCH FOR HYDRAULIC SEEDING MANUFACTURER CERTIFICATIONS.

THE HECF WILL BE APPLIED TO DISTURBED AREAS WHERE UPSLOPE FLOW LENGTH HAS POTENTIAL TO RESULT IN CHANNELIZED EROSION. WHEN APPLIED TO SLOPES OF GREATER THAN 33%, PROFILE PRODUCTS (THE MANUFACTURER OF FLEXTERRA HP-FGM WHICH IS ON LIST 79 AS AN APPROVED MANUFACTURER OF HECF TYPE IV) RECOMMENDED A MAXIMUM SLOPE LENGTH OF 125- FEET WHICH IS EQUAL THE LIMIT OF DISTURBANCE TO BE RECLAIMED ALONG THE PIPELINE RIGHT-OF-WAY. IN LOCATIONS WHERE EXPANDED WORKSPACE AREAS, OR DIAGONAL CROSS SLOPES RESULT IN FLOW LENGTHS EXCEEDING 125- FEET OF DISTURBED AREA, MVP WILL INSTALL AN ADDITIONAL TEMPORARY MEASURE (I.E. COMPOST FILTER SOCK) TO SERVE AS A SLOPE BREAK. COMPOST FILTER SOCK INSTALLATIONS WILL BE IMPLEMENTED IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS. SIZING WILL BE IN ACCORDANCE WITH THE FLOW LENGTHS OCCURRING WITHIN THE LIMIT OF DISTURBANCE.

FOLLOWING TREATMENT OF DISTURBED STEEP SLOPE SIDE HILL AREAS WITH TYPE 4 HEAP, THE DISTURBED AREA WOULD BE CONSIDERED STABILIZED. UPGRADE/CLEAN WATER DIVERSIONS MAY BE REMOVED IMMEDIATELY PRIOR TO HEAP TYPE IV APPLICATION OR LEFT IN PLACE AT THE DISCRETION OF THE MVP LEI/EI DETERMINED ON A CASE BY CASE BASIS. MONITORING AND INSPECTION ACTIVITIES WILL CONTINUE UNTIL THE AREAS ARE PERMANENTLY STABILIZED WITH VEGETATION AS OUTLINED IN THE PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS (APPROVED JUNE 20, 2017).

TABLE II-22A

HECP PROPERTY	TEST METHOD ¹	HECP TYPE 1	HECP TYPE 2	HECP TYPE 3	HECP TYPE 4
PHYSICAL	REQUIREMENT				
COLOR	VISUALLY OBSERVED	COLORED TO PROVIDE CONTRAST UPON APPLICATION, SHALL BE STABLE AND NOT STAIN CONCRETE OR PAINTED SURFACES.			
ORGANIC MATTER	ASTM D2974	90% MINIMUM			
WATER HOLDING CAPACITY	ASTM D7367	400% MINIMUM	500% MINIMUM	600% MINIMUM	700% MINIMUM
ACUTE TOXICITY	ASTM 7101 EPA 2021.0-1	NON TOXIC			
ENDURANCE	REQUIREMENT				
FUNCTIONAL LONGEVITY	VDOT APPROVED TESTING METHODS ³	UP TO 2 MONTHS	UP TO 3 MONTHS	UP TO 6 MONTHS	UP TO 12 MONTHS
PERFORMANCE	REQUIREMENT				
MAXIMUM SLOPE APPLICATION	OBSERVED	4.0 H:1V	3.0 H:1V	2.0 H:1V	1.0 H:1V
RAINFALL EVENT (R- FACTOR)	ASTM D6459 ²	N/A	75 < R	140 < R	175 < R
COVER FACTOR	ASTM D6459 ²	C ≤ 0.50	C ≤ 0.10	C ≤ 0.05	C < 0.01
VEGETATION ESTABLISHMENT	ASTM D7322 ²	200% MINIMUM	300% MINIMUM	400% MINIMUM	500% MINIMUM

1 ALL PRODUCTS MUST MEET THE REQUIREMENTS OF THIS SPECIFICATION TO BE LISTED ON THE MATERIALS DIVISION'S APPROVED LIST FOR HECPS.

2 ASTM TEST METHODS DEVELOPED FOR ROLLED EROSION CONTROL PRODUCTS (RECPs) THAT HAVE BEEN MODIFIED TO ACCOMMODATE HYDRAULIC EROSION CONTROL PRODUCTS (HECPs).

3 FUNCTIONAL LONGEVITY PERFORMED AT A VDOT TEST FACILITY OR TEST FACILITY APPROVED BY VDOT.

WOOD CELLULOSE FIBER MULCH FOR HYDRAULIC SEEDING MANUFACTURER'S CERTIFICATIONS

PROPERTY	VALUE
FIBER OR PARTICLE SIZE	
LENGTH	TO APPROXIMATELY 0.39 INCH (10 MM)
THICKNESS OR DIAMETER	APPROXIMATELY 0.04 INCH (1 MM)
NET DRY WEIGHT CONTENT (VTM-47)	MINIMUM STATED ON BAG
PH RANGE (TAPPI T509 OR ASTM D 778)	4.0 TO 8.5
ASH CONTENT (TAPPI T413 OR ASTM D 586)	MAXIMUM 7.0%
WATER-HOLDING CAPACITY (VTM-46)	MINIMUM 90%

TETRA TECH CAD FILE PATH: P:\B14\100\B14188B\B14188B-15\CAD\SDI-PY006-Montgomery\B14188B-15_VARIANCE AND DEVIATION REQUESTS.dwg PLOTTED ON: 4/18/2018 9:32 AM PLOTTED BY: Laura Avers PLOT FILE: DAA.stb

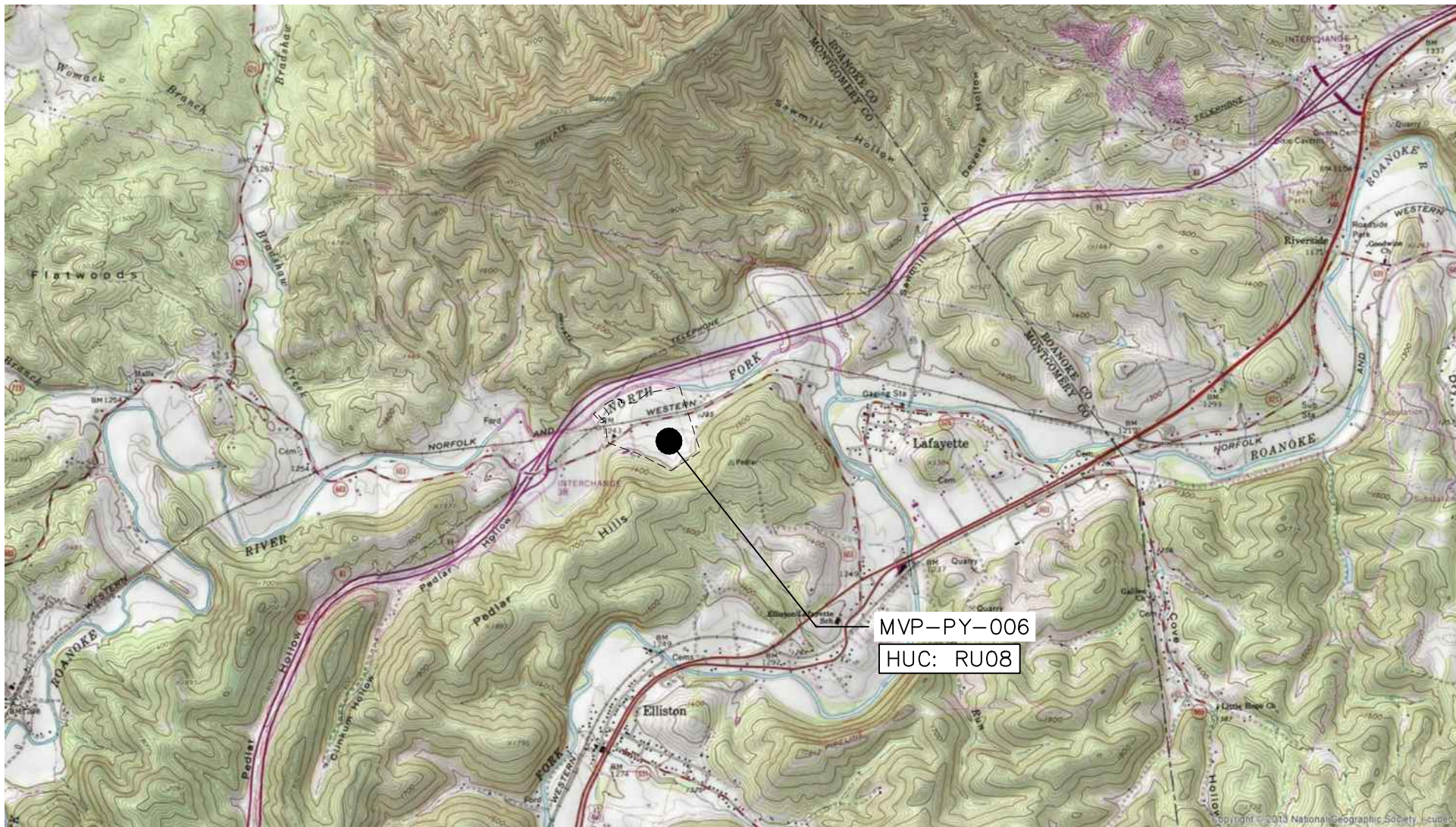
MOUNTAIN VALLEY PIPELINE
EROSION AND SEDIMENT CONTROL PLAN

MOUNTAIN VALLEY PIPELINE
MVP-PY-006 MONTGOMERY

APRIL 3, 2018

Sheet List Table

Table with 2 columns: Sheet Number, Sheet Title. Rows include PY-006-A through PY-006-010 with titles like VARIANCE AND DEVIATION REQUESTS, COVER SHEET, EROSION AND SEDIMENT CONTROL DETAILS, RESTORATION DETAILS, GENERAL DETAILS, ESC NARRATIVE, EXISTING CONDITIONS PLAN, and EROSION AND SEDIMENT CONTROL PLAN.



LOCATION MAP
0 2000 4000
SCALE IN FEET



THREE DAYS BEFORE YOU DIG

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

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.



VICINITY MAP
NOT TO SCALE

OWNER / DEVELOPER CERTIFICATION

I, _____, HEREBY ACKNOWLEDGE THE SITE IMPROVEMENTS
IMPOSED BY THIS PLAN AND MONTGOMERY COUNTY. I HEREBY AGREE TO
DEVELOP THE SUBJECT PROPERTY IN COMPLIANCE WITH THE PLAN AND WILL
SUBMIT ANY PLAN REVISIONS TO MONTGOMERY COUNTY FOR APPROVAL. I
AGREE TO POST ALL REQUIRED BONDS WITH MONTGOMERY COUNTY FOR
DEVELOPMENT AND ACKNOWLEDGE ALL IMPROVEMENTS MUST BE COMPLETED
TO THE COUNTY'S SATISFACTION PRIOR TO ISSUANCE OF THE CERTIFICATE OF
OCCUPANCY.

SIGNATURE _____ DATE _____

MONTGOMERY COUNTY APPROVAL

THE HEREON SHOWN SITE DEVELOPMENT PLAN HAS BEEN SUBMITTED TO AND
APPROVED FOR ACCEPTANCE BY MONTGOMERY COUNTY.

SIGNATURE _____ COUNTY ENGINEER _____ DATE _____

SIGNATURE _____ ZONING ADMINISTRATOR _____ DATE _____

Table with 4 columns: NO., DATE, CHKD., APPD. and 1 row for revisions.

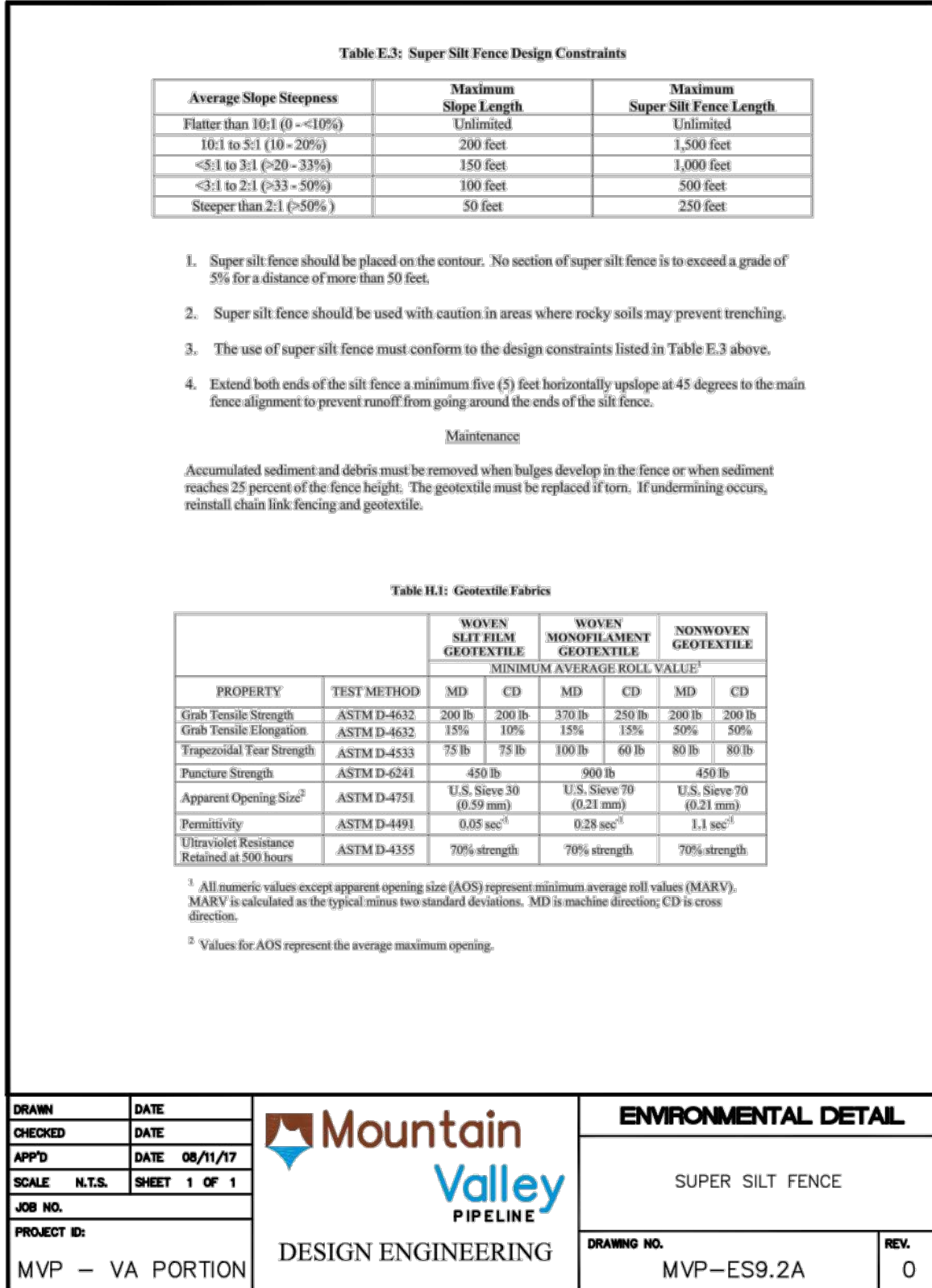
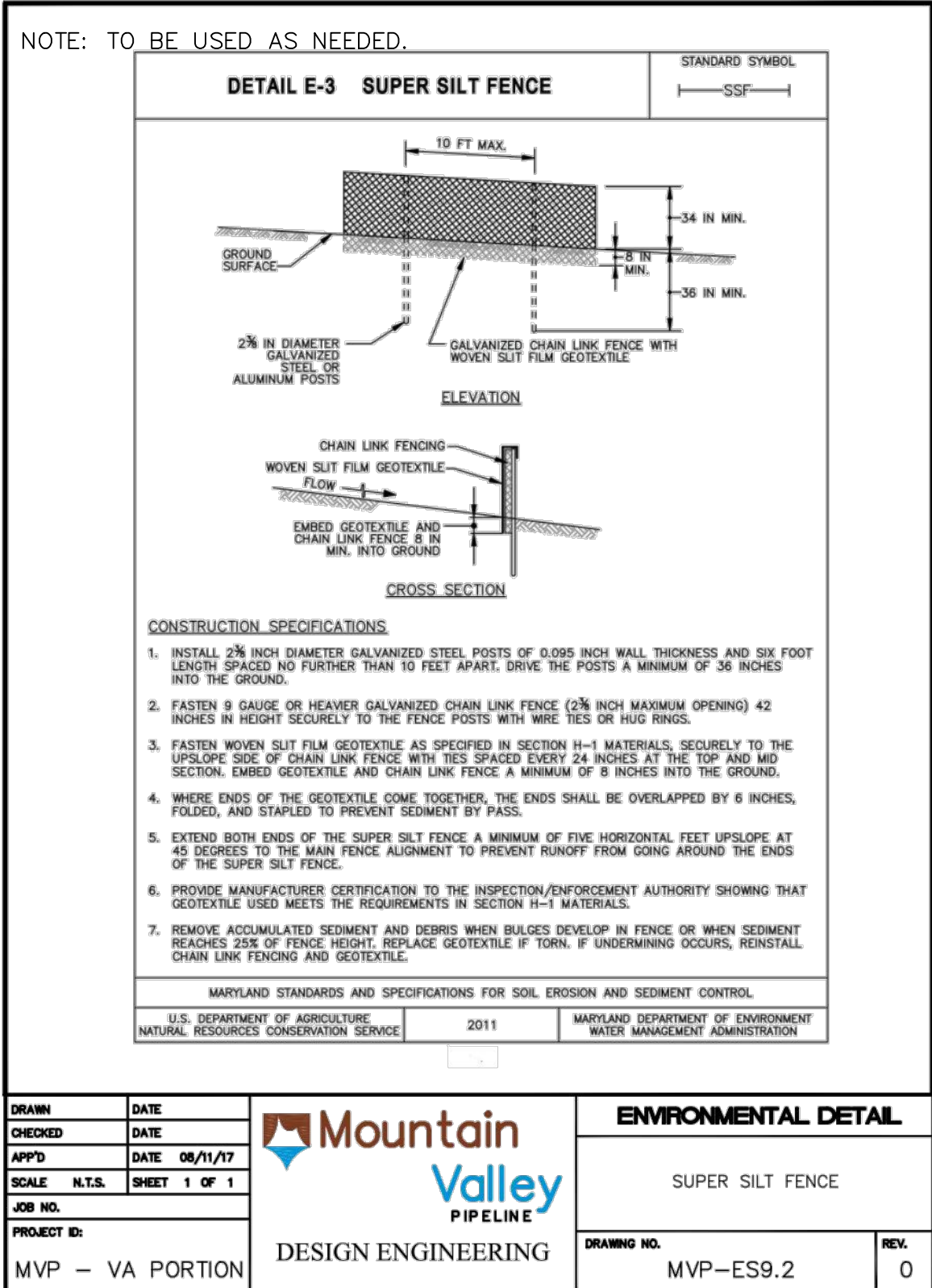
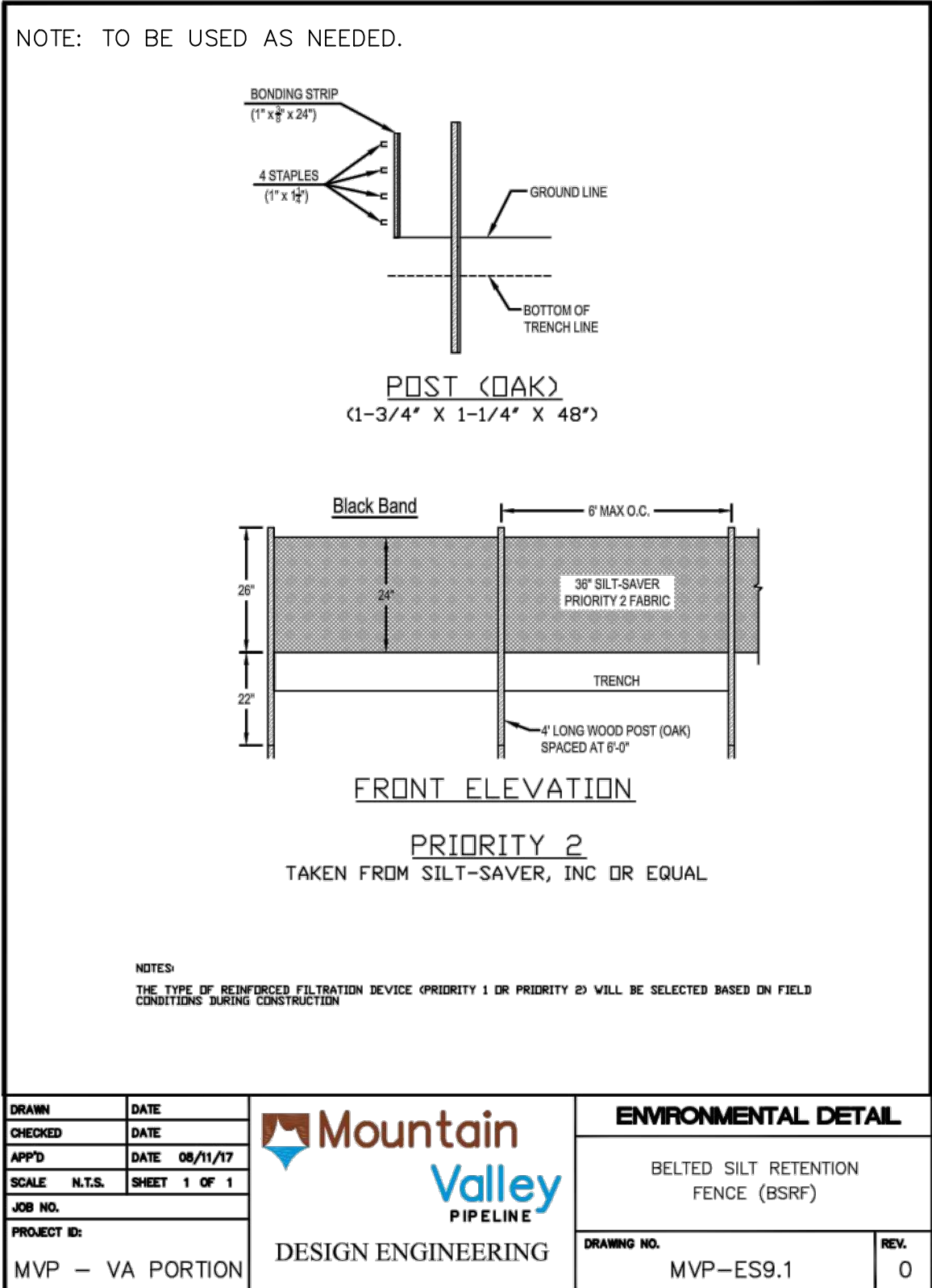
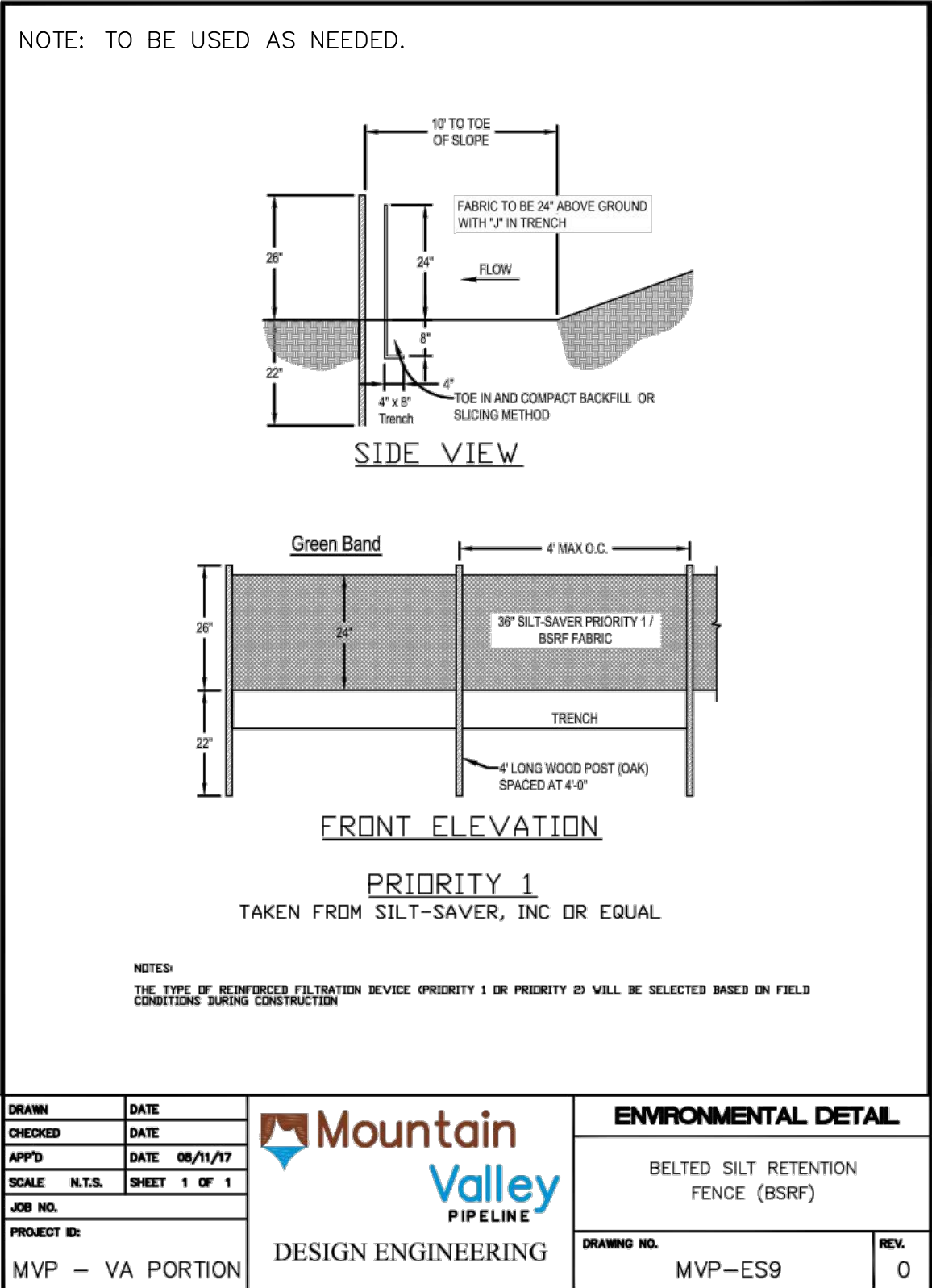
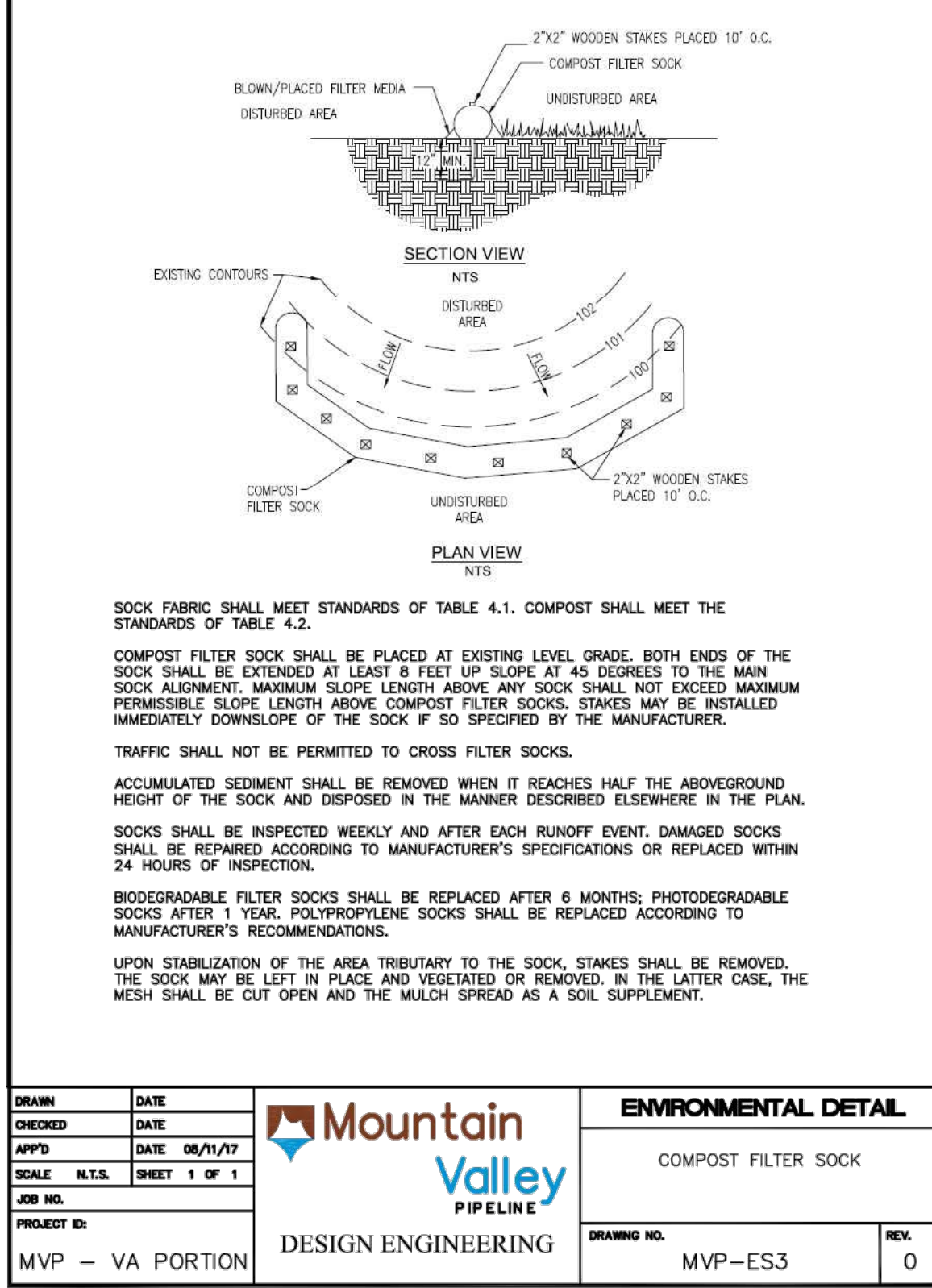
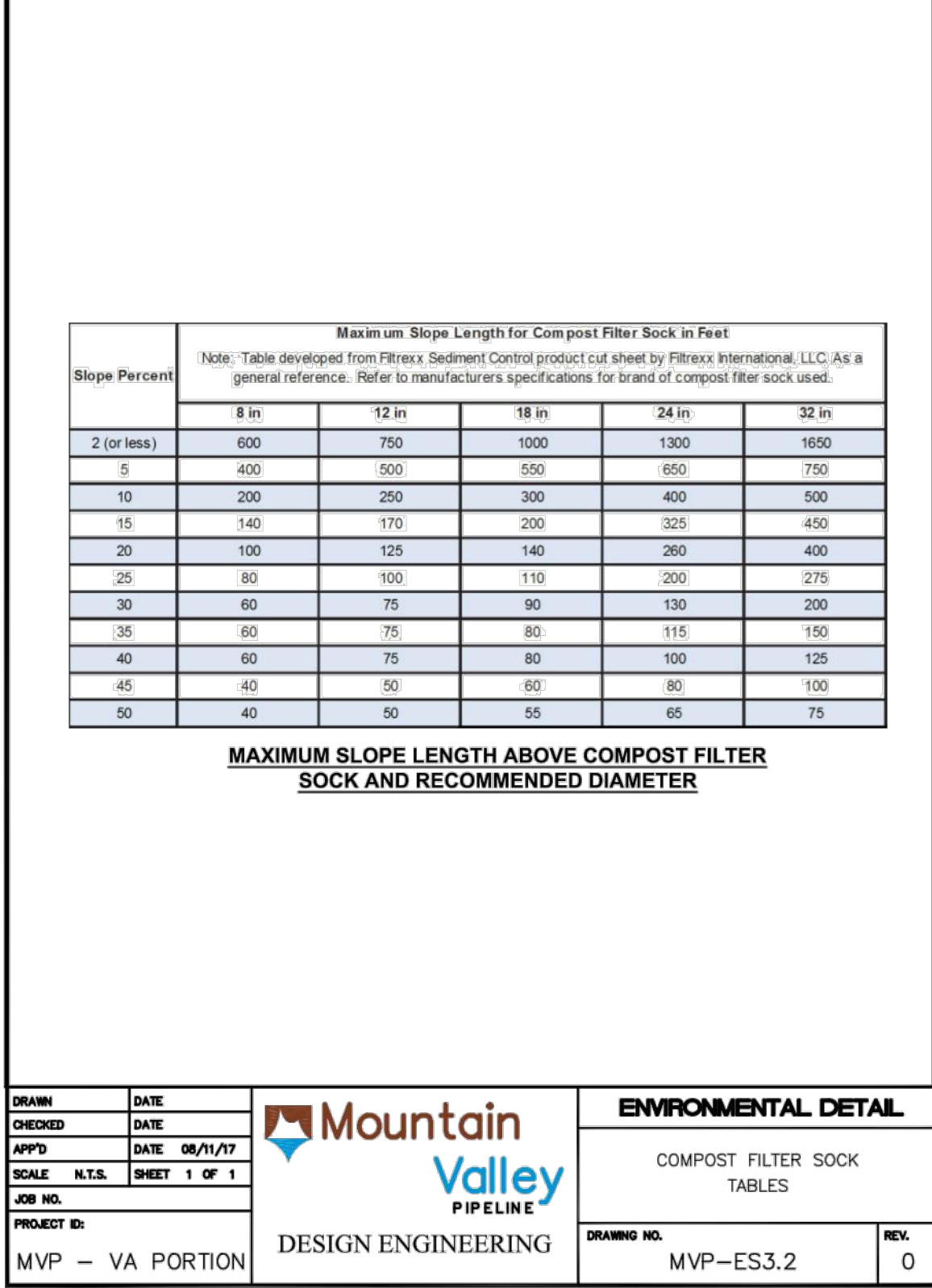
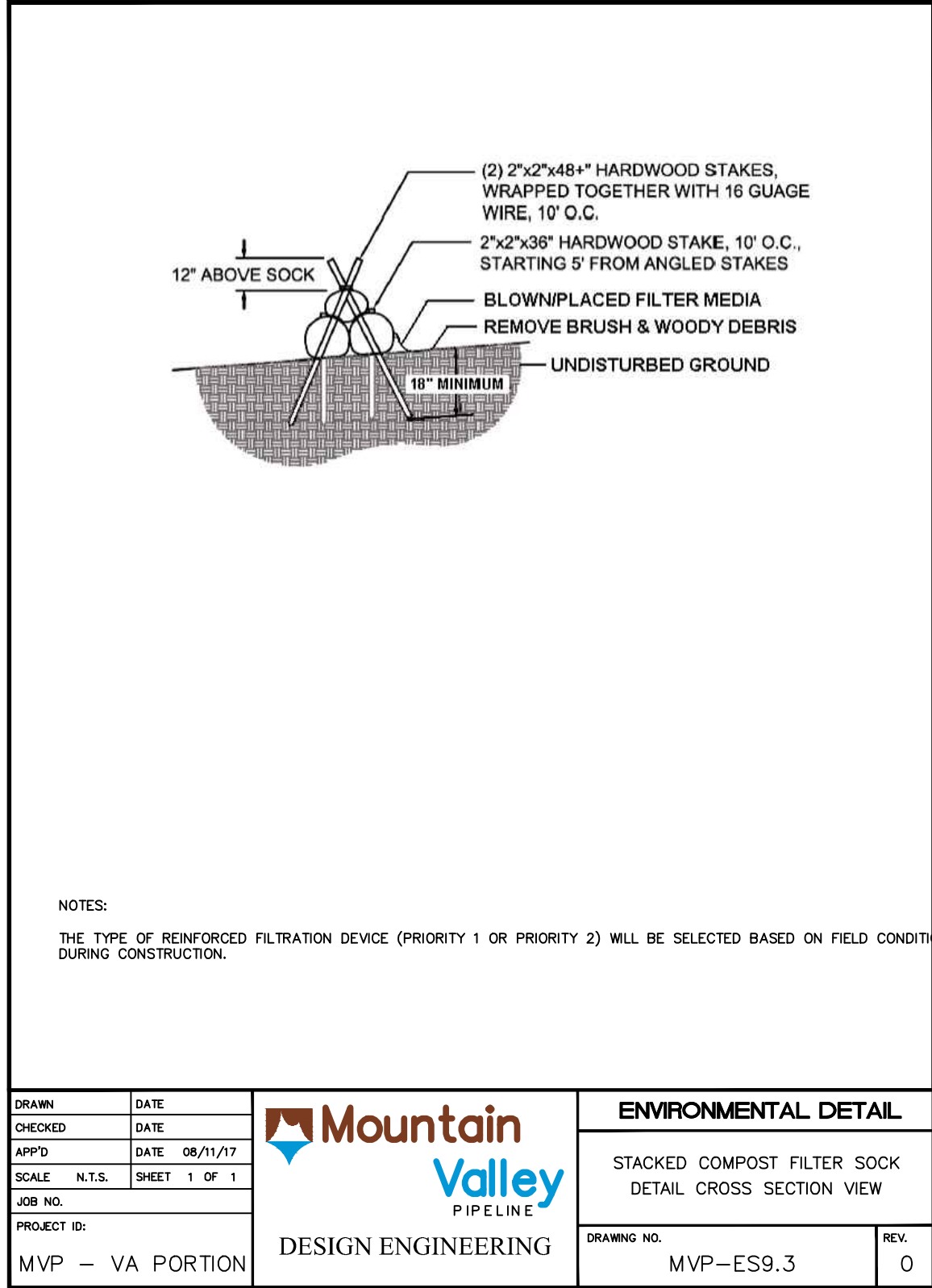
Mountain Valley Pipeline
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT - H600 LINE
MONTGOMERY COUNTY, VIRGINIA
MOUNTAIN VALLEY PIPELINE, LLC
555 SOUTHPOINTE BOULEVARD, SUITE 200
CANONSBURG, PA 15317

Draper Aden Associates
2206 South Main Street
Blacksburg, VA 24060
540-552-0444 www.daa.com

CONSTRUCTION PLANS

Professional Engineer Seal for Carolyn Howard, License No. 042775, dated 4-18-18.

Table with 2 columns: Field (DRAWN BY, CHECKED BY, APPROVED BY, DATE, SCALE, SHT. NO.) and Value (LAA/SWM, CAH, CAH, 04/03/2018, AS SHOWN, 10).



Mountain Valley PIPELINE

ANCILLARY SITE

EROSION AND SEDIMENT CONTROL PLANS

MOUNTAIN VALLEY PIPELINE PROJECT - H600 LINE

MONTGOMERY COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BOULEVARD, SUITE 200

CANONSBURG, PA 15317

CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA

CAROLYN A. HOWARD

Professional Engineer

License No. 042775

EROSION AND SEDIMENT CONTROL DETAILS

DRAWN BY: LAJ/SWM

CHECKED BY: CAH

APPROVED BY: CAH

DATE: 04/03/2018

SCALE: AS SHOWN

SHT. NO.PY-006-003Of 10


NOTE: NOT ALL OF THE FOLLOWING DETAILS APPLY TO THE MVP--PY--006 LAYDOWN YARD.

Forest Regeneration Woody Seed Mix and Application Rates.

Species	Common Name	Seeding Rate (lbs/acre)
Oak-Hickory Forest a1		
<i>Fagus grandifolia</i>	American Beech	0.3
<i>Liriodendron tulipifera</i>	Tulip Poplar	0.3
<i>Pinus strobus</i>	White Pine	0.3
<i>Pinus virginiana</i>	Virginia Pine	0.3
<i>Prunus serotina</i>	Black Cherry	0.3
<i>Amelanchier canadensis</i>	Canadian Serviceberry	0.3
<i>Cercis canadensis</i>	Eastern Redbud	0.3
<i>Cornus florida</i>	Flowering Dogwood	0.3
<i>Diostegia virginiana</i>	Perennim	0.3
<i>Ilex opaca</i>	American Holly	0.3
<i>Nyssa sylvatica</i>	Black Gum	0.3
<i>Sassafras albidum</i>	Sassafras	0.3
<i>Hamamelis virginiana</i>	Witch Hazel	0.3
<i>Lindera benzoin</i>	Spicebush	0.3
<i>Vaccinium angustifolium</i>	Lowbush Blueberry	0.3
<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	0.3
<i>Vitis aestivalis</i>	Grape	0.3

a1 Oak and hickory species to be planted as bare root seedlings in addition to this mix. Refer to Section 5.9 Bare Root Seeding Planting for more information. At minimum, 3 of the 5 overstory, 4 of the 7 understory, and 2 of the 4 shrub species will comprise the woody seed mix for Oak-Hickory Forests.

NOTE:
WOODY SEED MIX TO BE USED IN COMBINATION WITH MVP-ES11.2 UPLAND MEADOW SEED MIX.

DRAWN	DATE		ENVIRONMENTAL DETAIL	
CHECKED	DATE			
APP'D	DATE 08/11/17			
SCALE N.T.S. SHEET 1 OF 1				
JOB NO.				
PROJECT ID: MVP -- VA PORTION		DESIGN ENGINEERING	DRAWING NO. MVP--ES11.1	REV. 0

Riparian Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
<i>Agrostis perennans</i>	Autumn Bentgrass	0.04	5.0 - 7.0	Midsummer
<i>Andropogon gerardi</i>	Big Bluestem	0.10		May to June
<i>Elymus virginicus</i>	Virginia Wildrye	1.00	6.2 - 7.0	June to October
<i>Juncus effusus</i>	Soft Rush	3.00	4.9 - 6.8	June to July
<i>Juncus tenuis</i>	Path Rush	1.00	4.8 - 6.9	July to August
<i>Paricum clandestinum</i>	Deertongue	6.90	6.8 - 8.9	June to October
<i>Sorghastrum nutans</i>	Indiangrass	0.40	4.0 - 8.5	August to September
<i>Asclepias incarnata</i>	Swamp Milkweed	4.00	5.0 - 7.4	May to June
<i>Chamaecrista fasciculata</i>	Partridge Pea	0.60	5.5 - 7.0	June to October
<i>Eupatorium coelestinum</i>	Mistflower	0.20		July to September
<i>Eupatorium fistulosum</i>	Joe Pye Weed	0.20	4.8 - 7.2	July to September
<i>Eupatorium perfoliatum</i>	Boneset	0.20		July to August
<i>Geum canadense</i>	White Avena	0.40	5.0 - 8.0	June to July
<i>Helenium autumnale</i>	Common Sneezeweed	0.10	5.5 - 7.5	July to October
<i>Helopsis helianthoides</i>	Oxeye Sunflower	0.14	4.5 - 7.0	July to September
<i>Monarda fistulosa</i>	Wild Bergamot	0.20		July to October
<i>Pycnanthemum tenuifolium</i>	Slender Mountainmint	0.10	4.0 - 7.5	August to September
<i>Rudbeckia hirta</i>	Blackeyed Susan	0.40		July to August
<i>Senna hebecarpa</i>	Wild Senna	0.10		August to September
<i>Verbena hastata</i>	Blue Vervain	0.10		June to September
<i>Vernonia noveboracensis</i>	New York Ironweed	0.72		June to October
		20.00		

TEMPORARY SEED MIX:
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) (60 LBS/AC)

Revised 1/24/18


DRAWN	DATE		ENVIRONMENTAL DETAIL	
CHECKED	DATE			
APP'D	DATE 08/11/17			
SCALE N.T.S. SHEET 1 OF 1				
JOB NO.				
PROJECT ID: MVP -- VA PORTION		DESIGN ENGINEERING	DRAWING NO. MVP--ES11.5	REV. 0

Upland Meadow Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
<i>Elymus virginicus</i>	Virginia Wildrye	4.00	5.0 - 7.4	June to October
<i>Schizachyrium scoparium</i>	Little Bluestem	11.68	5.0 - 8.4	July to October
<i>Sorghastrum nutans</i>	Indiangrass	1.00	5.0 - 7.8	August to October
<i>Asclepias syriaca</i>	Common Milkweed	0.10		June to August
<i>Asclepias tuberosa</i>	Butterfly Milkweed	0.10	4.8 - 6.8	June to August
<i>Chamaecrista fasciculata</i>	Partridge Pea	0.60	5.5 - 7.5	July to September
<i>Chamaecrista nictitans</i>	Sensitive Partridge Pea	0.06		June to October
<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	0.44	6.0 - 7.0	April to July
<i>Eupatorium coelestinum</i>	Mistflower	0.04	5.5 - 7.5	July to October
<i>Helopsis helianthoides</i>	Oxeye Sunflower	0.40		July to August
<i>Lespedeza virginica</i>	Slender Bushclover	0.10		July to September
<i>Liatris graminifolia</i>	Grassleaf Blazing Star	0.10	5.8 - 6.8	August to October
<i>Monarda fistulosa</i>	Wild Bergamot	0.10	6.0 - 8.0	June to September
<i>Penstemon laevis</i>	Appalachian Beardtongue	0.10		late May to late August
<i>Pycnanthemum incanum</i>	Hoary Mountainmint	0.20		May to June
<i>Rudbeckia fulgida var. fulgida</i>	Orange Coneflower	0.02	< 6.8	summer
<i>Rudbeckia hirta</i>	Blackeyed Susan	0.04		July to October

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
<i>Senna hebecarpa</i>	Wild Senna	0.60	6.0 - 7.0	May to July
<i>Solidago juncea</i>	Early Goldenrod	0.10		July to August
<i>Solidago nemoralis</i>	Gray Goldenrod	0.04		June to July
<i>Tradescantia ohioensis</i>	Ohio Spiderwort	0.04	6.5 - 7.5	August to September
<i>Tradescantia virginiana</i>	Virginia Spiderwort	0.10		late April to mid-July
		20.00		

TEMPORARY SEED MIX:
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) (60 LBS/AC)


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CHECKED	DATE			
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SCALE N.T.S. SHEET 1 OF 1				
JOB NO.				
PROJECT ID: MVP -- VA PORTION		DESIGN ENGINEERING	DRAWING NO. MVP--ES11.2	REV. 0

Native tree and shrub species for bare root plantings within riparian areas and forested wetlands.

Species	Common Name	Indicator Status	Riparian Planting ¹	Forested Wetland Planting ²
Native Trees				
<i>Acer rubrum</i>	Red Maple	FAC	X	X
<i>Acer saccharinum</i>	Silver Maple	FACW	X	X
<i>Betula nigra</i>	River Birch	FACW	X	X
<i>Carpinus caroliniana</i>	American Hornbeam	FAC	X	X
<i>Carya glabra</i>	Pignut Hickory	FACU	X	
<i>Carya ovata</i>	Shagbark Hickory	FACU	X	
<i>Chionanthus virginicus</i>	White Fringe Tree	FAC+	X	
<i>Diospyros virginiana</i>	Common Persimmon	FAC-	X	


Species	Common Name	Indicator Status	Riparian Planting ¹	Forested Wetland Planting ²
<i>Fraxinus pennsylvanica</i>	Green Ash	FACW	X	
<i>Juniperus virginiana</i>	Eastern Red Cedar	FACU	X	X
<i>Liquidambar styraciflua</i>	Sweet Gum	FAC	X	X
<i>Liriodendron tulipifera</i>	Tuliptree	FACU	X	X
<i>Nyssa sylvatica</i>	Black Gum	FAC	X	
<i>Platanus occidentalis</i>	American Sycamore	FACW-	X	X
<i>Populus deltoides</i>	Eastern Cottonwood	FAC	X	
<i>Quercus imbricaria</i>	Swamp White Oak	FACW+	X	X
<i>Quercus falcata</i>	Cherrybark Red Oak	FACW	X	X
<i>Quercus phellos</i>	Willow Oak	FAC+	X	X
<i>Quercus nigra</i>	Water Oak	FAC	X	
<i>Quercus palustris</i>	Pin Oak	FACW	X	X
<i>Salix nigra</i>	Black Willow	FACW	X	X
<i>Ulmus americana</i>	American Elm	FACW-	X	X

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


DRAWN	DATE		ENVIRONMENTAL DETAIL	
CHECKED	DATE			
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SCALE N.T.S. SHEET 1 OF 1				
JOB NO.				
PROJECT ID: MVP -- VA PORTION		DESIGN ENGINEERING	DRAWING NO. MVP--ES11.6	REV. 0

Upland Steep Slope Seed Mix and Application Rates in Virginia.

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

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Native Shrubs				
<i>Alnus serrulata</i>	Brook-side Alder	OBL		X
<i>Amelanchier canadensis</i>	Canada Serviceberry	FAC	X	
<i>Aronia arbutifolia</i>	Red Chokecherry	FACW	X	X
<i>Baccharis halimifolia</i>	Groundsel Bush	FACW-	X	X
<i>Cephalanthus occidentalis</i>	Butterbush	OBL		X
<i>Cornus amomum</i>	Silky Dogwood	FACW	X	X
<i>Cornus stolonifera</i>	Red-osier Dogwood	FAC	X	X
<i>Hamamelis virginiana</i>	American Witchhazel	FAC-	X	
<i>Ilex verticillata</i>	Common Winterberry	FACW+	X	X
<i>Itea virginica</i>	Virginia Willow	OBL		X
<i>Iva frutescens</i>	Marsh Elder	FACW+	X	X
<i>Leucothoe racemosa</i>	Fetter-bush	FACW	X	X
<i>Lindera benzoin</i>	Spicebush	FACW-	X	X
<i>Lyonia ligustrina</i>	Maeberry	FACW	X	X
<i>Magnolia virginiana</i>	Sweetbay Magnolia	FACW+	X	X
<i>Physocarpus opulifolius</i>	Eastern Ninebark	FACW-	X	X
<i>Sambucus canadensis</i>	American Elder	FACW-	X	X
<i>Vaccinium corymbosum</i>	Highbush Blueberry	FACW-	X	X
<i>Viburnum dentatum</i>	Arrow-wood	FAC	X	
<i>Viburnum prunifolium</i>	Black-haw	FACU	X	


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Wetlands Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
<i>Alisma subcordatum</i>	Mud Plantain	0.04		
<i>Carex gymandra</i>	Fringed Sedge	0.10	5.0 - 7.0	Midsummer
<i>Carex lupulina</i>	Hop Sedge	1.00		May to June
<i>Carex lurida</i>	Shallow Sedge	3.00	6.2 - 7.0	June to October
<i>Carex scoparia</i>	Blunt Broom Sedge	1.00	4.9 - 6.8	June to July
<i>Carex vulpinoidea</i>	Fox Sedge	6.90	4.6 - 6.9	July to August
<i>Cinna arundinacea</i>	Wood Reedgrass	0.40	6.8 - 8.9	June to August
<i>Elymus virginicus</i>	Virginia Wildrye	4.00	4.0 - 8.5	August to September
<i>Juncus effusus</i>	Soft Rush	0.60	5.0 - 7.4	June to October
<i>Oenothera biennis</i>	Sensitive Fern	0.20	5.5 - 7.0	May to June
<i>Scirpus cespitosus</i>	Woolgrass	0.20		June to October


Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
<i>Scirpus polyphyllus</i>	Many Leaved Bulrush	0.20	4.8 - 7.2	July to September
<i>Asclepias incarnata</i>	Swamp Milkweed	0.40		July to August
<i>Eupatorium coelestinum</i>	Mistflower	0.10	5.0 - 8.0	June to July
<i>Eupatorium fistulosum</i>	Joe Pye Weed	0.14	5.5 - 7.5	July to October
<i>Eupatorium perfoliatum</i>	Boneset	0.20	4.5 - 7.0	July to September
<i>Helenium autumnale</i>	Common Sneezeweed	0.10		July to October
<i>Helopsis helianthoides</i>	Oxeye Sunflower	0.40	4.0 - 7.5	August to September
<i>Ludwigia alternifolia</i>	Seedbox	0.10		July to August
<i>Mimulus ringens</i>	Square Stemmed Monkeyflower	0.10		August to September
<i>Verbena hastata</i>	Blue Vervain	0.72		June to September
<i>Vernonia noveboracensis</i>	New York Ironweed	0.10		June to October
		20.00		

NOTE:
1. ANNUAL RYEGRASS WILL BE USED AT A RATE OF 40 LBS/AC FOR STABILIZATION OF WETLANDS DISTURBED BY THE PROJECT.
2. FOLLOWING RESTORATION AND TEMPORARY STABILIZATION WITH ANNUAL RYEGRASS SHOULD THE NATIVE SEEDBANK PRESENT IN THE TOPSOIL NOT REESTABLISH THE WETLAND, MVP WILL APPLY THIS SEED MIX TO SUPPLEMENT AND PERMANENTLY STABILIZE THE WETLAND.

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Stream crossings proposed for bare-root seedling plantings.

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 froglet, 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 froglet, coldwater stream, wild trout stream, non-listed mussels
UNT Craig Creek	219.2	Montgomery	VA	Headwaters of James springmussel occurrences, USFS lands area
UNT Craig Creek	219.3	Montgomery	VA	Headwaters of James springmussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James springmussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James springmussel occurrences, USFS lands area
UNT Craig Creek	219.8	Montgomery	VA	Headwaters of James springmussel occurrences, USFS lands area
UNT Craig Creek	220.0	Montgomery	VA	Headwaters of James springmussel occurrences, USFS lands area
Mill Creek	222.2	Montgomery	VA	Roanoke logperch present, non-listed mussels present, 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


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Mountain Valley Pipeline
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT -- H600 LINE
MONTGOMERY COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC
555 SOUTHPOINTE BOULEVARD, SUITE 200
CANONSBURG, PA 15317

Draper Aden Associates

Waterbody Name	MP	County	State	Valuable Resource
Mill Creek	245.1	Roanoke	VA	upstream of Bottom Creek Gorge, 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, wild trout
North Fork Blackwater River	249.7	Franklin	VA	Roanoke logperch suitable habitat, coldwater stream wild trout stream
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 crossings of Teels Creek
Teels Creek	261.0	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	261.8	Franklin	VA	upstream of Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek
Teels Creek	262.3	Franklin	VA	Roanoke logperch suitable habitat, one of numerous project crossings of Teels Creek contributing sediment impacts
Little Creek	262.6	Franklin	VA	Roanoke logperch suitable habitat, numerous crossings upstream contributing sediment impacts
Little Creek	263.3	Franklin	VA	Roanoke logperch suitable habitat, non-listed mussels present, numerous crossings upstream contributing sediment impacts
Maggojee 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
Plog River	289.1	Pittsylvania	VA	Roanoke logperch present, orangefin madtom, mussels present including yellow lampmussel (VA threatened)
Harpem Creek	289.9	Pittsylvania	VA	Roanoke logperch suitable habitat, orangefin madtom
Harpem Creek	292.0	Pittsylvania	VA	orangefin madtom

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NOTES:

A BONDED FIBER MATRIX (BMF) IS AN EFFECTIVE METHOD OF STABILIZING STEEP SLOPES WHEN USED PROPERLY. BMFs MAKE USE OF A CROSS-LINKED HYDROCOLLOID TACKIFIER TO BOND THERMALLY PROCESSED WOOD FIBERS. APPLICATION RATES VARY ACCORDING TO SITE CONDITIONS. FOR SLOPES UP TO 3:1 HV THE BMF SHOULD BE APPLIED AT A RATE OF 3,000 LB/ACRE. STEEPER SLOPES MAY NEED AS MUCH AS 4,000 LB/ACRE.

BMFs SHOULD ONLY BE USED WHEN NO RAIN IS FORECASTED FOR AT LEAST 48 HOURS FOLLOWING THE APPLICATION. THIS IS TO ALLOW THE TACKIFIER SUFFICIENT TIME TO CURE PROPERLY. ONCE PROPERLY APPLIED, A BMF IS TYPICALLY 90% EFFECTIVE IN PREVENTING ACCELERATED EROSION. BMFs SHOULD NOT BE APPLIED BETWEEN SEPTEMBER 30 AND APRIL 1.

A POLYMER STABILIZED FIBER MATRIX (PSFM) CAN ALSO BE AN EFFECTIVE METHOD OF STABILIZING STEEP SLOPES WHEN USED PROPERLY. PSFMs MAKE USE OF A LINEAR SOIL STABILIZING TACKIFIER THAT WORKS DIRECTLY ON SOIL TO MAINTAIN SOIL STRUCTURE, MAINTAIN PORE SPACE CAPACITY AND FLOCCULATE DISLODGED SEDIMENT THAT WILL SIGNIFICANTLY REDUCE RUNOFF TURBIDITY. PROPERLY APPLIED, A PSFM MAY BE AS MUCH AS 99% EFFECTIVE.

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Typical Polymer Stabilized Fiber Matrix Application Rates							
Maximum Rainfall of 5 20"							
SLOPE	6:1	5:1	4:1	3:1	2:1	1.5:1	1:1
Soil Stabilizer (gals/acre)	4	5	6	7	8	9	10
Fiber (lbs/acre)	1,500	1,500	1,500	1,800	2,000	2,500	3,000

Maximum Rainfall of > 20" and for Site Winterization			
SLOPE	3:1	4:1	≥3:1
Soil Stabilizer (gals/acre)	6	8	10
Fiber (lbs/acre)	2,000	2,500	3,000

NOTES:

UNLIKE ROLLED BLANKETS, THERE IS NO NEED TO SMOOTH THE SLOPE PRIOR TO APPLICATION OF HYDRAULICALLY APPLIED BLANKETS. IN FACT SOME ROUGHENING OF THE SURFACE, EITHER NATURAL OR MECHANICALLY INDUCED, IS PREFERABLE. HOWEVER, LARGE ROCKS, THOSE > 9 INCHES, AND EXISTING RILLS SHOULD BE REMOVED PRIOR TO APPLICATION. TRACKING OR GROOVING OF SLOPES SHOULD BE CONSIDERED TO SLOW WATER FLOWS DURING A STORM EVENT. SLOPE INTERRUPTION DEVICES SUCH AS STAIR STEP GRADING OR BENCHING SHOULD BE APPLIED PRIOR TO THE APPLICATION. MIXING AND APPLICATION RATES SHOULD FOLLOW MANUFACTURERS RECOMMENDATIONS.

HYDRAULICALLY APPLIED BLANKETS ARE TYPICALLY APPLIED IN TWO STAGES, UNLESS SPECIFICALLY RECOMMENDED TO BE APPLIED IN ONE APPLICATION. BY THE MANUFACTURER, THE SEED MIXTURE AND SOIL AMENDMENTS SHOULD BE APPLIED FIRST. IF THE SEED IS APPLIED AT THE SAME TIME AS THE HYDRAULICALLY APPLIED BLANKET, THE BONDED FIBERS MAY KEEP THE SEED FROM MAKING SUFFICIENT CONTACT WITH THE SOIL TO GERMINATE. AFTER THE SEED MIXTURE IS APPLIED, THE BFM, FGM, OR FISM SHOULD BE SPRAYED OVER THE AREA AT THE REQUIRED APPLICATION RATE. (SEE ABOVE TABLES).

HYDRAULIC EROSION CONTROL PRODUCTS (HEPC USED ON JNF LANDS MUST BE SUITABLE FOR WILDLIFE

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MULCHING

Definition

Application of plant residues or other suitable materials to the soil surface.

Purposes

1. To prevent erosion by protecting the soil surface from raindrop impact and reducing the velocity of overland flow.
2. To foster the growth of vegetation by increasing available moisture and providing insulation against extreme heat and cold.

Conditions Where Practice Applies


1. Areas which have been permanently seeded (see Appendix B – Typical Construction Details MTP-ESI1.1 through ESI2.3) should be mulched immediately following seeding.
2. Areas which cannot be seeded because of the season should be mulched to provide some protection to the soil surface. An organic mulch should be used, and the area then seeded as soon as weather or seasonal conditions permit. It is not recommended that fiber mulch be used alone for this practice; at normal application rates it just simply does not provide the protection that is achieved using other types of mulch.
3. Mulch may be used together with plantings of trees, shrubs, or certain ground covers which do not provide adequate soil stabilization by themselves.
4. Mulch shall be used in conjunction with temporary seeding operations as specified in TEMPORARY SEEDING, Std. & Spec. 3.31

Planning Considerations

Mulches are applied to the soil surface to conserve a desirable soil property or to promote plant growth. A surface mulch is one of the most effective means of controlling runoff and erosion on disturbed land.

Mulches can increase the infiltration rate of the soil, reduce soil moisture loss by evaporation, prevent crusting and sealing of the soil surface, modify soil temperatures, and provide a suitable microclimate for seed germination.

Organic mulch materials, such as straw, wood chips, bark, and fiber mulch have been found to be the most effective.

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Chemical soil stabilizers or soil binders should not be used alone for mulch. These materials are useful to bind organic mulches together to prevent displacement.

A variety of manufactured **SOIL STABILIZATION BLANKETS AND MATTING** (see Std. & Spec. 3.36) have been developed for erosion control in recent years. Some of these products can be used as mulches, particularly in critical areas such as waterways. They also may be used to hold other mulches to the soil surface.

The choice of materials for mulching will be based on the type of soil to be protected, site conditions, season and economics. It is especially important to mulch lightly in mid-season and prior to winter, and on cut slopes and southern slope exposures.

Organic Mulches

Straw – The mulch most commonly used in conjunction with seeding. The straw should come from wheat or oats (free of troublesome weed seeds) and may be spread by hand or machine. Straw can be windblown and must be anchored down by an acceptable method.

Hay – Hay shall not be used as mulch for Project activities.

Com Stalks – These should be shredded into 4- to 6-inch lengths. Stalks decompose slowly and are resistant to displacement.

Wood Chips – Suitable for areas that will not be closely mowed, and around ornamental plantings. Chips decompose slowly and do not require watering. They must be treated with 12 pounds of nitrogen per ton to prevent nutrient deficiency in plants; however, can be a very inexpensive mulch if chips are obtained from trees cleared on the site.

Bark Chips, Shredded Bark – These are by-products of timber processing which are used in landscaped plantings. Bark is also a suitable mulch for areas planted to grasses and not closely mowed. It may be applied by hand or mechanically and is not usually toxic to grasses or legumes; additional nitrogen fertilizer is not required.

Fiber Mulch – Used in hydroseding operations and applied as part of the slurry. It creates the best seed-soil contact when applied over top of (as a separate operation) newly seeded areas. These fibers do not require tacking, although tacking agents or binders are sometimes used in conjunction with the application of fiber mulch. This form of mulch does not provide sufficient protection to highly erodible soils. Additionally, fiber mulch will not be considered adequate mulch when used during the dry summer months or when used for late fall mulch cover. Use straw mulch during these periods. Fiber mulch may be used to tack (anchor) straw mulch. This treatment is well suited for steep slopes, critical areas, and areas susceptible to displacement.

There are other organic materials which make excellent mulches but are only available locally or seasonally. Creative use of these materials can reduce costs.

Chemical Mulches and Soil Binders

A wide range of synthetic, spray-on materials are marketed to stabilize and protect the soil surface. These are emulsions or dispersions of vinyl compounds, rubber or other substances which are mixed with water and applied to the soil. They may be used alone in some cases as temporary stabilizers, or in conjunction with fiber mulches or straw.

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When used alone, chemical mulches do not have the capability to insulate the soil or retain soil moisture that organic mulches have. This soil protection is also easily damaged by traffic. Application of these mulches is usually more expensive than organic mulching, and the mulches decompose in 60-90 days.

Blankets and Matting

Field experience has shown that plastic netting, when used alone, does not retain soil moisture or modify soil temperature. In some cases it may stabilize the soil surface while grasses are being established, but is primarily used in grassed waterways and on slopes to hold straw or similar mulch in place.

Jute mesh and other soil stabilization blankets are good choices for mulching on difficult slopes and in minor drainage swales. Most of the soil stabilization mattings (used to create a permanent matrix for root growth within the soil) must receive mulching in order to properly stabilize an area. Notably, some manufacturers have recently developed permanent mattings which include self-contained, temporary mulching materials; however, these measures will have to meet the requirements noted in Std. & Spec. 3.36, SOIL STABILIZATION BLANKETS AND MATTING, before they can be recommended for use on steep slopes and in channel flow situations.

The most critical aspect of installing blankets and mats is obtaining firm, continuous contact between the material and the soil. Without such contact, the material may fail and thereby allow erosion to occur. It is important to use an adequate number of staples and make sure the material is installed properly in order to maximize soil protection. These products are discussed in more detail in Std. & Spec. 3.36, SOIL STABILIZATION BLANKETS & MATTING.

MVP will utilize hydraulically applied soil stabilization blankets and matting (i.e. Earthguard, Flexterra, or equivalent) as an alternate to the rolled ESC blanket material identified under STD & SPEC 3.36. Information regarding the hydraulically applied blankets is provided under Appendix B MVP-ES40 and MVP-ES40.1.

Specifications

Organic Mulches

Organic mulches may be used in any area where mulch is required, subject to the restrictions noted in Table 3.35-A.

Materials: Select mulch material based on site requirements, availability of materials, and availability of labor and equipment. Table 3.35-A lists the most commonly used organic mulches. Other materials, such as peanut hulls and cotton burs, may be used with the permission of the local Plan-Approving Authority.

Prior to mulching: Complete the required grading and install needed sediment control practices.


Limn and fertilizer should be incorporated and surface roughening accomplished as needed. Seed should be applied prior to mulching except in the following cases:

- a. Where seed is to be applied as part of a hydroseeded slurry containing fiber mulch.
- b. Where seed is to be applied following a straw mulch spread during winter months.

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MULCHES:	RATES:		NOTES:
	Per Acre	Per 1000 sq. ft.	
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.
* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. Or 45 lbs./1000 sq. ft.			

Source: Va. DSWC

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Application: Mulch materials shall be spread uniformly, by hand or machine.

When spreading straw mulch by hand, divide the area to be mulched into approximately 1,000 sq. ft. sections and place 70-90 lbs. (to 2 bales) of straw in each section to facilitate uniform distribution.

Mulch Anchoring: Straw mulch must be anchored immediately after spreading to prevent displacement. Other organic mulches listed in Table 3.35-A do not require anchoring. The following methods of anchoring straw may be used:

1. **Mulch anchoring tool** (often referred to as a Krimper or Krimper Tool): This is a tractor-driven implement designed to punch mulch into the surface. This method provides good erosion control with straw. It is limited to use on slopes no steeper than 3:1, where equipment can operate safely. Machinery shall be operated on the contour.
2. **Fiber Mulch:** A very common practice with widespread use today. Apply fiber mulch by means of a hydroseeder at a rate of 500-750 lbs/acre over top of straw mulch. It has an added benefit of providing additional mulch to the newly seeded area.
3. **Liquid mulch binders:** Application of liquid mulch binders and tackifiers should be heaviest at edges of areas and at crests of ridges and banks, to prevent displacement. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread or may be sprayed into the mulch as it is being blown onto the soil.

The following types of binders may be used:

- a. **Synthetic binders** - Formulated binders or organically formulated products may be used as recommended by the manufacturer to anchor mulch.
- b. **Asphalt** - Any type of asphalt thin enough to be blown from spray equipment is satisfactory. Recommended for use are rapid curing (RC-70, RC-250, RC-800), medium curing (MC-250, MC-800) and emulsified asphalt (SS-1, CSS-1, CMS-2, MS-2, RS-1, RS-2, CRS-1, and CRS-2).




Apply asphalt at 0.10 gallon per square yard (10 gal./1,000 sq. ft. or 430 gal./acre). Do not use heavier applications as it may cause the straw to "perch" over rills. All asphalt designations are from the Asphalt Institute Specifications.

*Note: This particular method is not used as commonly today as it once was in the past. The development of hydraulic seeding equipment promoted the industry to turn to synthetic or organically based binders and tackifiers. When this method is used, environmental concerns should be addressed to ensure that petroleum-based products do not enter valuable water supplies. Apply applications into waterways or channels.

4. **Mulch nettings:** Lightweight plastic, cotton, or paper nets may be stapled over the mulch according to manufacturer's recommendations.
5. **Peg and twine:** Because it is labor-intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8- to 10-inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine 2 or more times around each peg.

DRAWN	DATE		ENVIRONMENTAL DETAIL	
CHECKED	DATE		MULCHING	
APP'D	DATE			
SCALE	SHEET 1 OF 1			
JOB NO.			DRAWING NO.	
PROJECT ID:	PXXXX	DESIGN ENGINEERING	MVP-ES45.4	

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 <h2 style="margin: 0;">Draper Aden Associates</h2> <p style="margin: 0;">2206 South Main Street Blacksburg, VA 24060</p> <p style="margin: 0;">540-552-0444 www.daa.com</p>	
<div style="border: 1px solid black; padding: 10px; width: 100%;"> <h1 style="margin: 0; transform: rotate(-90deg); transform-origin: center;">CONSTRUCTION PLANS</h1> </div>	
	
<h3 style="margin: 0;">RESTORATION DETAILS</h3>	
DRAWN BY:	LAA/SWM
CHECKED BY:	CAH
APPROVED BY:	CAH
DATE: 04/03/2018	
SCALE: AS SHOWN	
SHT. NO. PY-006-005 OF	<div style="border: 1px solid black; padding: 2px; display: inline-block;">REVISION</div>

Chemical mulches* may be used alone only in the following situations:

- *Note:** Chemical mulches may be used to bind other mulches or with fiber mulch in a hydroseeded slurry at any time. Manufacturer's recommendations for application of chemical mulches shall be followed.

Maintenance

All mulches and soil coverings should be inspected periodically (particularly after rainstorms) to check for erosion. Where erosion is observed in mulched areas, additional mulch should be applied. Nets and mats should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, re-install netting or matting as necessary after repairing damage to the slope or ditch. Inspections should take place up until grasses are firmly established. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.

DRAWN	DATE
CHECKED	DATE
APP'D	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID:	
PXXXX	



ENVIRONMENTAL DETAIL

MULCHING

DRAWING NO.
MVP-ES45.5

REV.
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3.10 Sanitary Waste Facilities

Recommended Practices

Portable toilets should be conveniently located conducive to use. Anchor portable toilets to prevent tipping, and provide secondary containment in the form of berms or other containment to prevent pollutants from discharging into streets, gutters, storm drains, or surface waters due to accidental spills or discharges. Inspect portable toilets daily for cleanliness and proper operation, and arrange for regular service by a licensed service provider for proper maintenance and waste collection.

- ✓ Provide a convenient and safe location.
- ✓ Place on level ground or gravel pad.
- ✓ Anchor to prevent tipping.
- ✓ Inspect and maintain daily and service regularly.

Locations

- ✓ Conveniently locate portable toilets throughout the project site (for large projects).
- ✓ Place portable toilets on level ground to prevent accidental tipping or spills.
- ✓ Ensure that portable toilets are accessible for regular maintenance and service.
- ✓ The locations of the portable toilets should be identified in the SWPPP, preferably on the record Set of Plans or on a site map.

Prohibitions

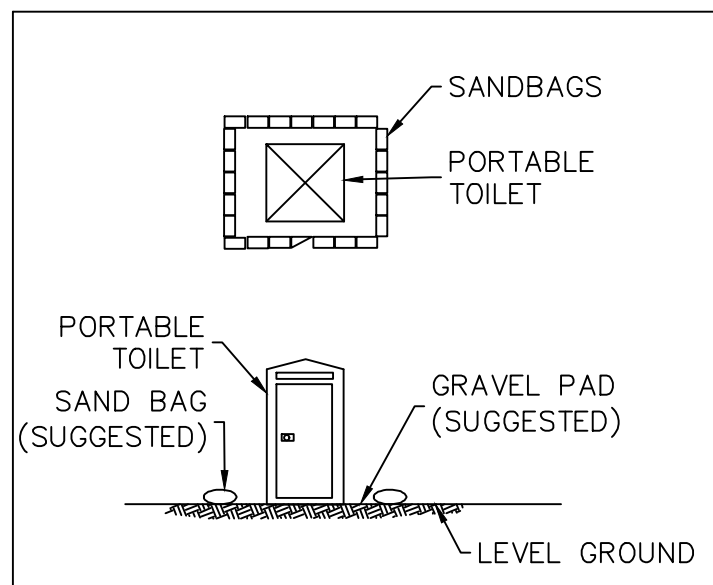
Sanitary discharge from portable toilets is harmful to the environment and should never be discharged to surface waters.

- ⊗ Never locate portable toilets over storm drains or gutters or near conveyance channels.
- ⊗ Never allow discharge from portable toilets to leak or spill into streets, gutters, storm drains, or surface waters.

Inspections and Maintenance

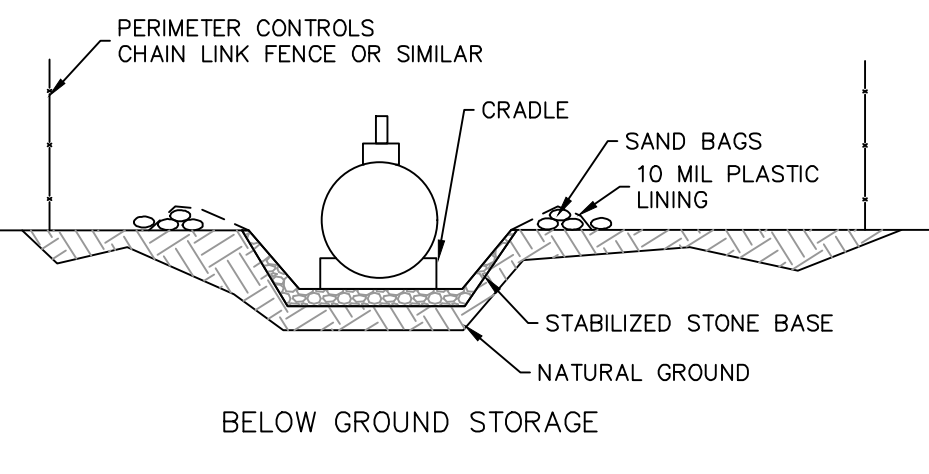
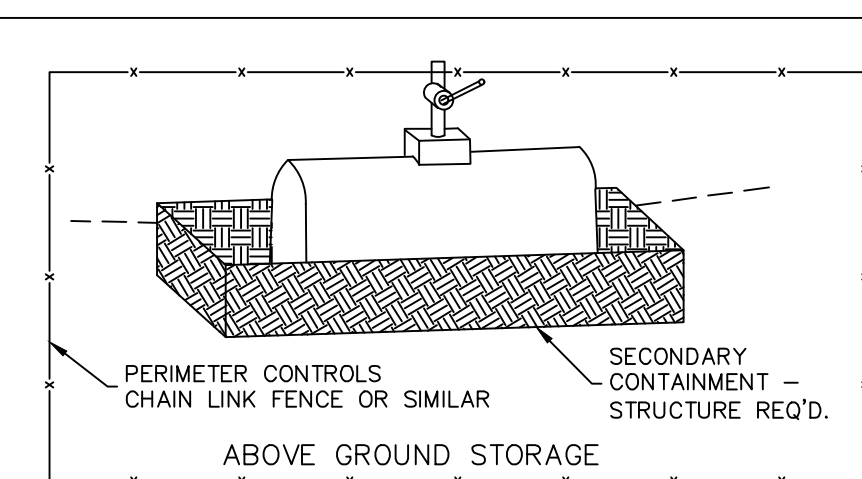
- ✓ Inspect portable toilets daily to detect leaks.
- ✓ Keep facilities safe and clean.
- ✓ Provide regular maintenance and waste collection by a licensed service provider to ensure proper disposal of waste into a sanitary sewer system for treatment.

Figure 3-10: Typical Detail for Sanitary Facilities

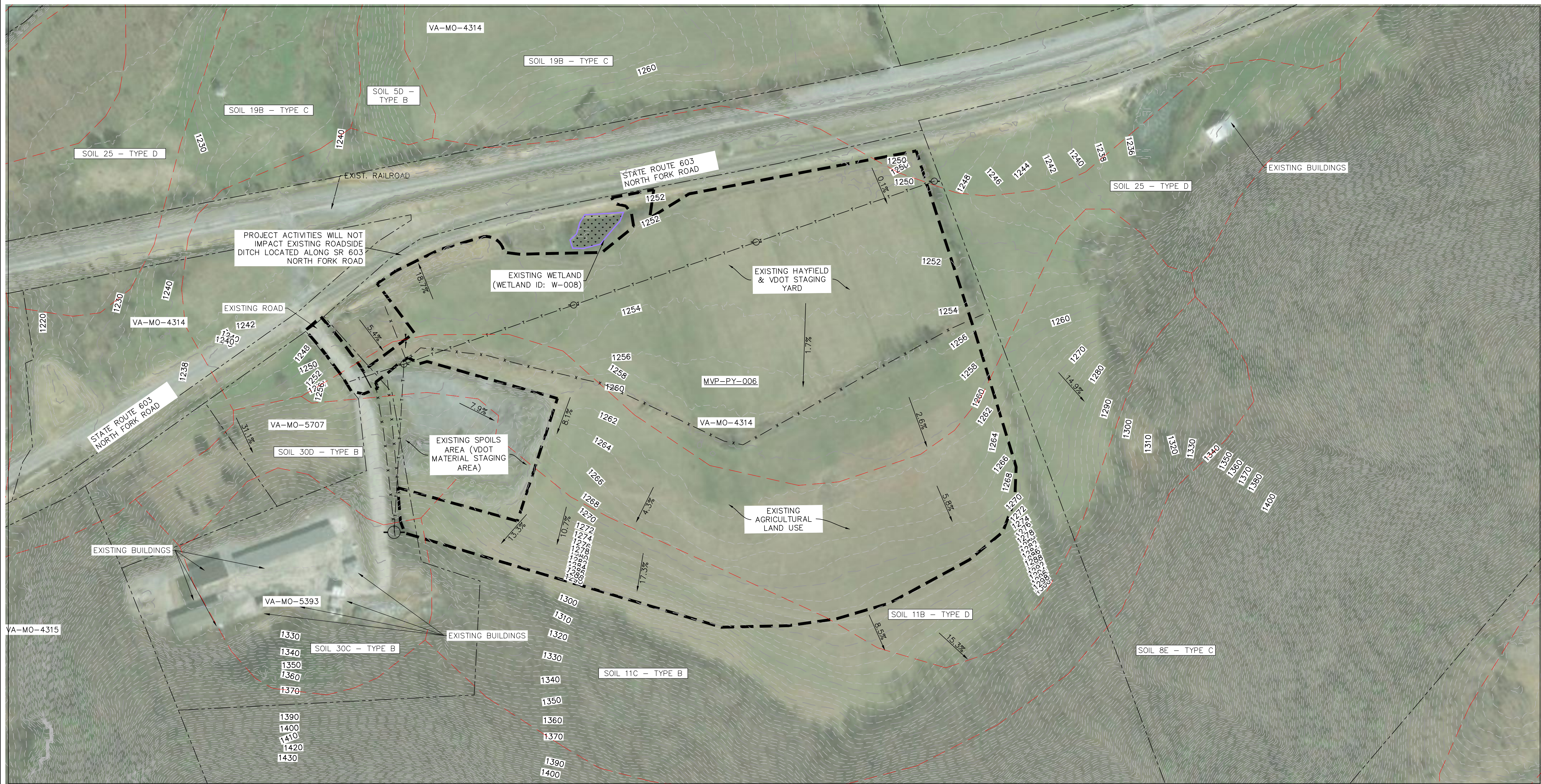


PORTA-JOHN DETAIL
N.T.S.

Figure 3-7: Typical Detail for Fuel Storage Area



FUEL STORAGE DETAIL
N.T.S.

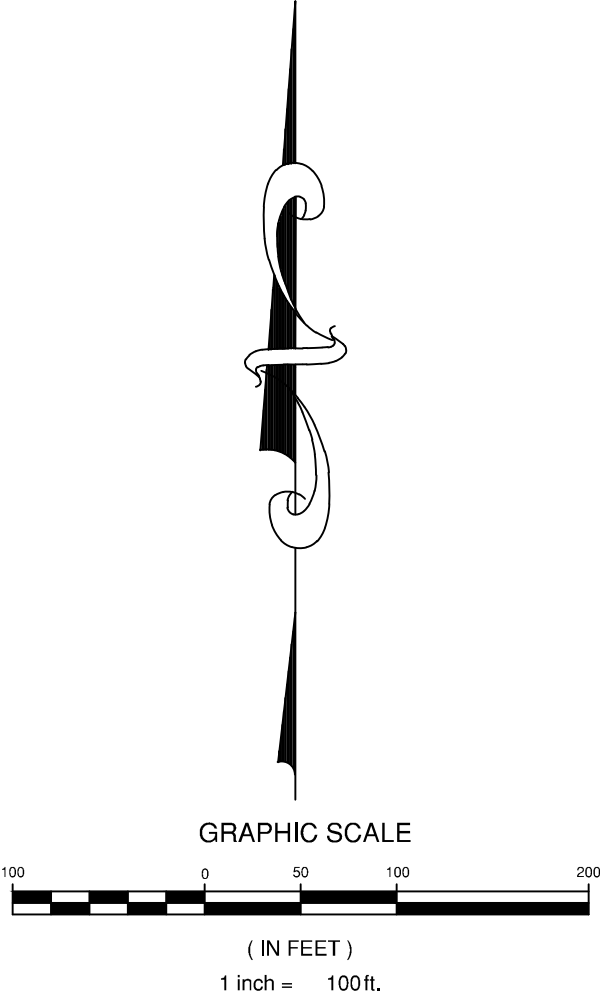


TOPO DATA SOURCE:
TERRAIN SURFACE: 2015 LIDAR DERIVED DEM FOR PULASKI, MONTGOMERY (PARTS), AND ROANOKE COUNTIES. SANBORN MAP CO. FOR VGIN.
2-FT CONTOURS DERIVED FROM 2015 LIDAR AND ARE FOR PLANNING AND VISUALIZATION PURPOSES ONLY.


LEGEND

- 1760--- EXISTING CONTOUR (MAJOR)
- 1756--- EXISTING CONTOUR (MINOR)
- EXISTING SOIL DIVIDE
- PROPOSED LIMIT OF DISTURBANCE
- PROPERTY LINE
- WETLAND LIMITS
- UTILITY POLE
- TELECOMMUNICATIONS UTILITY
- FENCE

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



NO.	DATE	BY	CHKD.	APPD.	DESCRIPTION
1	04/18/18	LAA	CAH	CAH	REVISIONS PER DEC COMMENTS

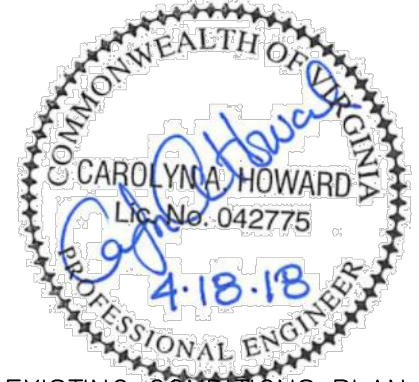
**Mountain Valley**
ANCILLARY SITE

EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT - H600 LINE
MONTGOMERY COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC
555 SOUTHPOINTE BOULEVARD, SUITE 200
CANONSBURG, PA 15317

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Blacksburg, VA 24060
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CONSTRUCTION PLANS



EXISTING CONDITIONS PLAN

DRAWN BY:	LAA/SWM
CHECKED BY:	CAH
APPROVED BY:	CAH
DATE:	04/03/2018
SCALE:	AS SHOWN
SHT. NO	PY-006-009 OF 10

