COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Street address: 1111 E. Main Street, Suite 1400, Richmond, Virginia 23219
Mailing address: P.O. Box 1105, Richmond, Virginia 23218
www.deq.virginia.gov

Matthew J. Strickler
Secretary of Natural Resources

David K. Paylor
Director

September 27, 2018

Mr. Brian Clauto
Senior Environmental Coordinator
EQT Corporation
555 Southpointe Blvd, Suite 200
Canonsburg, PA 15317

Transmitted electronically to: BClauto@eqt.com

Re: Mountain Valley Pipeline LLC
Project Location: MVP LY-035 Plans (Supportive Ancillary Areas)
DEQ SWM #: MVP-18-04
Erosion and Sediment Control (ESC) and Stormwater Management (SWM) Plans

Dear Mr. Clauto:

The Department of Environmental Quality (DEQ) received combined Stormwater Management and Erosion & Sediment Control Plans for supportive ancillary areas identified as MVP LY-035 on July 31, 2018 and revised plans received on September 21, 2018.

The plans received September 21, 2018 are found to be in accordance with the *Virginia Stormwater Management Act and Regulations* and the *Virginia Erosion and Sediment Control Law and Regulations* and are approved. This approval authorizes MVP to begin land disturbing activities consistent with these plans. **No modifications, updates or additions may be made to the approved Plans without obtaining prior approval from DEQ. Additionally, approval of the ESC and SWM Plans does not relieve the owner and/or operator of complying with all other federal, state, or local laws and regulations.**

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty (30) days from the date you received this decision within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court of Virginia with the Director, Virginia Department of Environmental Quality.

It is the responsibility of the owner and/or operator to ensure that the project is constructed in accordance with the approved Plans and accompanying specifications. Upon completion of the project, the owner and/or operator will be required to submit construction record drawings for all permanent stormwater management facilities (i.e., post-development best management practices) constructed in accordance with the approved Plans.

Please contact Mr. Benjamin Leach at 804-698-4037 or Benjamin.leach@deq.virginia.gov if you have any questions about this letter.

Sincerely,

Jaime B. Robb

Jaime B. Robb, Manager
Office of Stormwater Management

Cc: Benjamin Leach, DEQ-CO
Jerome Brooks, Water Compliance Manager

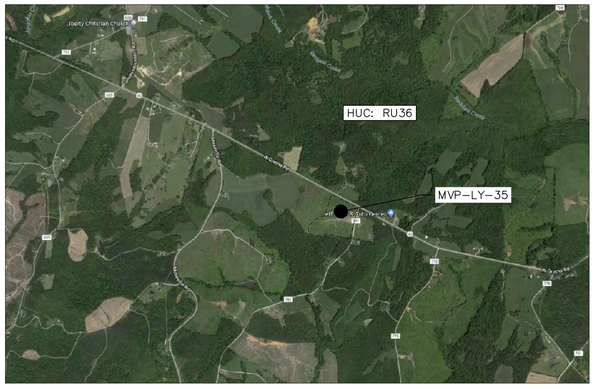
Enclosure

MOUNTAIN VALLEY PIPELINE

EROSION AND SEDIMENT CONTROL PLAN

MOUNTAIN VALLEY PIPELINE
MVP-LY-035 PITTSYLVANIA

JULY 30, 2018



LOCATION MAP

0 200 400

SCALE IN FEET
1" = 200'

Sheet List Table

Sheet Number	Sheet Title
LY-035-001	COVER SHEET
LY-035-002	EROSION CONTROL DETAILS
LY-035-003	EROSION CONTROL DETAILS
LY-035-004	RESTORATION DETAILS
LY-035-005	RESTORATION DETAILS
LY-035-006	GENERAL DETAILS
LY-035-007	ESC NARRATIVE
LY-035-008	ESC NARRITIVE
LY-035-009	EXISTING CONDITIONS PLAN
LY-035-010	SITE PLAN

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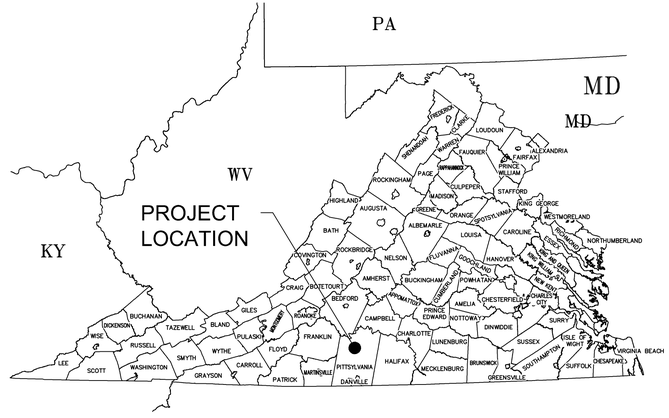
CONTRACTOR IS RESPONSIBLE TO IDENTIFY ALL UTILITIES. THE UTILITY LINES SHOWN ON THE PLAN ARE FOR INFORMATIONAL PURPOSES ONLY AND DO NOT REPRESENT SURVEYED LINE INFORMATION.



VICINITY MAP

NOT TO SCALE

NOTE: ALL SHEETS RELATED TO THE ORIGINAL SITE PLANS MAY APPLY FOR THIS LAY-DOWN YARD.

Mountain Valley
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
PITTSYLVANIA COUNTY, VIRGINIA

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

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

REVISIONS:

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

CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
7-30-18
PROFESSIONAL ENGINEER

COVER SHEET

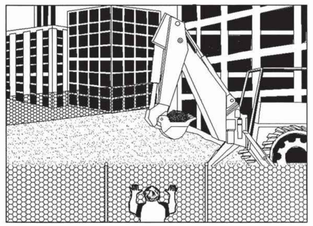
DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO. LY-035-001	OF 10

REVISION

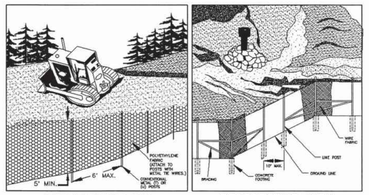
TETRA TECH CAD FILE PATH: P:\B14\100\B14188B\B14188B-15\CAD\SDI-LY035-Pittsylvannia\B14188B-15_COVER.dwg PLOTTED ON: 7/31/2018 7:41 AM PLOTTED BY: Laura Ayers PLOT FILE: DAA.stb

1992 3.01

SAFETY FENCE



PERSPECTIVE VIEW



PERSPECTIVE VIEW
PLASTIC FENCE

PERSPECTIVE VIEW
METAL FENCE

Source: Adapted from Conwed Plastics and VDOT Road and Bridge Standards

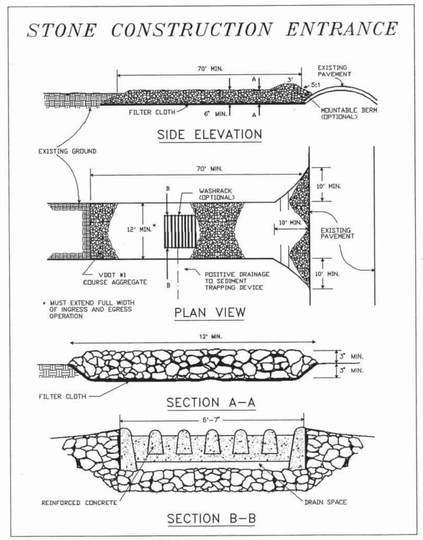
Plate 3.01-1

III - 5

SAFETY FENCE
TAKEN FROM VADEQ 1992 MANUAL

1992 3.02

STONE CONSTRUCTION ENTRANCE



Source: Adapted from 1983 Maryland Standards for Soil Erosion and Sediment Control, and Va. DSWC

Plate 3.02-1

III - 9

STONE CONSTRUCTION ENTRANCE
TAKEN FROM VADEQ 1992 MANUAL

WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.

WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.

A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.

MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

AT A MINIMUM, ROCK CONSTRUCTION ENTRANCES WITH WASH RACKS SHOULD BE CONSTRUCTED TO THE LENGTH, WIDTH, AND THICKNESS DIMENSIONS SHOWN ON STANDARD CONSTRUCTION DETAIL #3-2. A METAL WASH RACK OR LIVESTOCK GRATE IS AN ACCEPTABLE ALTERNATIVE TO THE REINFORCED CONCRETE ONE SHOWN IN THE STANDARD DETAIL. APPROACHES TO THE WASH RACK SHOULD BE LINED WITH AASHTO #1 AT A MINIMUM OF 25' ON BOTH SIDES. THE WASH RACK SHOULD DISCHARGE TO A SEDIMENT REMOVAL FACILITY, SUCH AS A CHANNEL LEADING TO A SEDIMENT REMOVAL DEVICE (E.G. A SEDIMENT TRAP OR SEDIMENT BASIN). ROCK CONSTRUCTION ENTRANCES WITH WASH RACKS SHOULD BE MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK WHEN NECESSARY AT THE END OF EACH WORKDAY. A STOCKPILE OF ROCK MATERIAL SHOULD BE MAINTAINED ON SITE FOR THIS PURPOSE.
SEDIMENT DEPOSITED ON PAVED ROADWAYS SHOULD BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE.
NOTE: WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.
DAMAGED WASH RACKS SHOULD BE REPAIRED AS NECESSARY TO MAINTAIN THEIR EFFECTIVENESS.

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

REVISIONS:

Mountain Valley
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
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PITTSYLVANIA COUNTY, VIRGINIA

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CONSTRUCTION PLANS

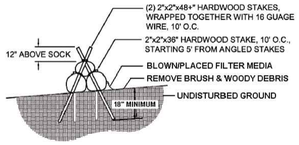
COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
PROFESSIONAL ENGINEER
7-30-18

EROSION CONTROL DETAILS

DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO.	LY-035-002 OF 10

REVISION

NOTE: NOT ALL OF THE FOLLOWING DETAILS APPLY TO THE MVP–LY–035 LAYDOWN YARD.



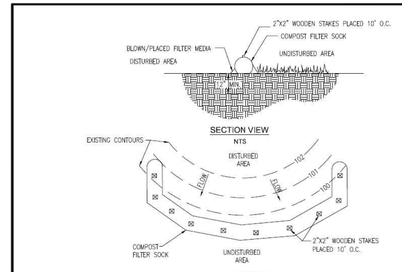
NOTE:
THE TYPE OF REINFORCED FILTRATION DEVICE (PRIORITY 1 OR PRIORITY 2) WILL BE SELECTED BASED ON FIELD CONDITIONS DURING CONSTRUCTION

DRAWN	DATE
CHECKED	DATE
APP'D	DATE 08/11/17
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID:	MVP – VA PORTION

Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
STACKED COMPOST FILTER SOCK DETAIL CROSS SECTION VIEW

DRAWING NO. MVP–ES9.3 REV. 0



SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2.

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED MAXIMUM PERMISSIBLE SLOPE LENGTH ABOVE COMPOST FILTER SOCKS. STAKES MAY BE INSTALLED IMMEDIATELY DOWNSLOPE OF THE SOCK IF SO SPECIFIED BY THE MANUFACTURER.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.

ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

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Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
COMPOST FILTER SOCK

DRAWING NO. MVP–ES3 REV. 0

TABLE 4.1
Compost Sock Fabric Minimum Specifications

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	12"	12"	12"	12"	12"
	18"	18"	18"	18"	18"
	24"	24"	24"	24"	24"
	32"	32"	32"	32"	32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years
Two-ply systems					
Inner Containment Netting				HDPE biaxial net	
				Continuously wound	
				Fusion-welded junctures	
				3/4" X 3/4" Max. aperture size	
Outer Filtration Mesh				Composite Polypropylene Fabric (Woven layer and non-woven fleece mechanically fused via needle punch)	
				3/16" Max. aperture size	
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.					

TABLE 4.2
Compost Standards

Organic Matter Content	80% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5 - 8.0
Moisture Content	35% - 55%
Particle Size	98% pass through 1" screen
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) Maximum

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Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
COMPOST FILTER SOCK TABLES

DRAWING NO. MVP–ES3.1 REV. 0

Slope Percent	Maximum Slope Length for Compost Filter Sock in Feet. Note: Table developed from Filtrexx Sediment Control product cut sheet by Filtrexx International, LLC. As a general reference. Refer to manufacturers specifications for brand of compost filter sock used.				
	8 in	12 in	18 in	24 in	32 in
2 (or less)	600	750	1000	1300	1650
5	400	500	550	650	750
10	200	250	300	400	500
15	140	170	200	325	450
20	100	125	140	260	400
25	80	100	110	200	275
30	60	75	90	130	200
35	60	75	80	115	150
40	60	75	80	100	125
45	40	50	60	80	100
50	40	50	55	65	75

MAXIMUM SLOPE LENGTH ABOVE COMPOST FILTER SOCK AND RECOMMENDED DIAMETER

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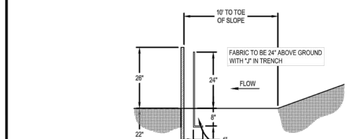
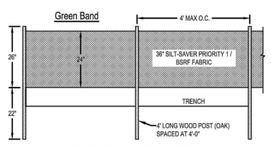
JOB NO.	
PROJECT ID:	MVP – VA PORTION

Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
COMPOST FILTER SOCK TABLES

DRAWING NO. MVP–ES3.2 REV. 0





PRIORITY 1
TAKEN FROM SILT-SAVER, INC OR EQUAL

NOTES:
THE TYPE OF REINFORCED FILTRATION DEVICE (PRIORITY 1 OR PRIORITY 2) WILL BE SELECTED BASED ON FIELD CONDITIONS DURING CONSTRUCTION

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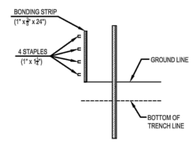
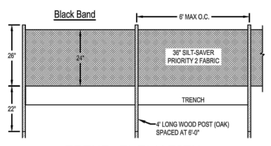
JOB NO.	
PROJECT ID:	MVP – VA PORTION

Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
BELTED SILT RETENTION FENCE (BSRF)

DRAWING NO. MVP–ES9 REV. 0





PRIORITY 2
TAKEN FROM SILT-SAVER, INC OR EQUAL

NOTES:
THE TYPE OF REINFORCED FILTRATION DEVICE (PRIORITY 1 OR PRIORITY 2) WILL BE SELECTED BASED ON FIELD CONDITIONS DURING CONSTRUCTION

DRAWN	DATE
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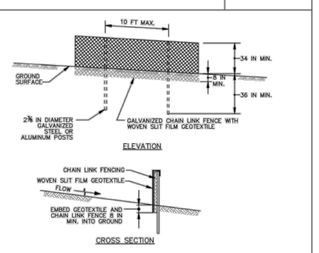
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID:	MVP – VA PORTION

Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
BELTED SILT RETENTION FENCE (BSRF)

DRAWING NO. MVP–ES9.1 REV. 0

DETAIL E-3 SUPER SILT FENCE — STANDARD SYMBOL: SSF



CONSTRUCTION SPECIFICATIONS

1. INSTALL 2" INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2" INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HOG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H–1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE CONE TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H–1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DRAWN	DATE
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Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
SUPER SILT FENCE

DRAWING NO. MVP–ES9.2 REV. 0

Table E.3: Super Silt Fence Design Constraints

Average Slope Steepness	Maximum Slope Length	Maximum Super Silt Fence Length
Flatter than 10:1 (0 - <10%)	Unlimited	Unlimited
10:1 to 5:1 (10 - 20%)	200 feet	1,500 feet
<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. 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 must be replaced if torn. If undermining occurs, reinstall chain link fencing and geotextile.

Table H.1: Geotextile Fabrics

		WOVEN SLIT FILM GEOTEXTILE		WOVEN MONOFILAMENT GEOTEXTILE		NONWOVEN GEOTEXTILE	
		MINIMUM AVERAGE ROLL VALUES[1]					
PROPERTY	TEST METHOD	MD	CD	MD	CD	MD	CD
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%	15%	50%	50%
Trapezoidal Tear Strength	ASTM D-4533	75 lb	75 lb	100 lb	60 lb	80 lb	80 lb
Puncture Strength	ASTM D-6241	450 lb		900 lb		450 lb	
Apparent Opening Size[2]	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^{-1}		0.28 sec^{-1}		1.1 sec^{-1}	
Ultraviolet Resistance Retained at 500 hours	ASTM D-4355	70% strength		70% strength		70% strength	

[1] 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.

[2] Values for AOS represent the average maximum opening.

DRAWN	DATE
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SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID:	MVP – VA PORTION

Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL
SUPER SILT FENCE

DRAWING NO. MVP–ES9.2A REV. 0

REVISIONS:

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

Mountain Valley PIPELINE
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
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PITTSYLVANIA COUNTY, VIRGINIA

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CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
PROFESSIONAL ENGINEER
7-30-18

EROSION CONTROL DETAILS

DRAWN BY:	LAA
CHECKED BY:	CH
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DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO. LY–035–003	OF 10

REVISION

TETRA TECH CAD FILE PATH: P:\B14\100\B14188B\B14188B–15\CAD\SDI–LY035–Pittsylvannia\B14188B–15_ESC_DETAILS.dwg PLOTTED ON: 7/31/2018 7:31 AM PLOTTED BY: Laura Ayers PLOT FILE: DAA.stb

NOTE: NOT ALL OF THE FOLLOWING DETAILS APPLY TO THE MVP–LY–035 LAYDOWN YARD.

Forest Regeneration Woody Seed Mix and Application Rates.

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

a\| Oak and hickory species to be planted as bare root seedlings in addition to this mix. Refer to Section 5.9 Bare Roost Seedling 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.

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Mountain Valley PIPELINE — DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

FOREST REGENERATION WOODY SEED MIX AND APPLICATION RATES

DRAWING NO.	REV.
MVP–ES11.1	0

Upland Meadow Seed Mix and Application Rates in Virginia.

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

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Senna hebecarpa	Wild Senna	0.60	6.0 - 7.0	May to July
Solidago juncea	Early Goldenrod	0.10		July to August
Solidago nemoralis	Gray Goldenrod	0.04		June to July
Tradescantia ohiensis	Ohio Spiderwort	0.04	6.5 - 7.5	August to September
Tradescantia virginiana	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) (50 LBS/AC)

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Mountain Valley PIPELINE — DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

UPLAND MEADOW SEED MIX AND APPLICATION RATES

DRAWING NO.	REV.
MVP–ES11.2	0

Upland Steep Slope Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	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 September
Tradescantia ohiensis	Ohio Spiderwort	0.05		late April to mid-July
		45.00		

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Mountain Valley PIPELINE — DESIGN ENGINEERING

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UPLAND STEEP SLOPE SEED MIX AND APPLICATION RATES

DRAWING NO.	REV.
MVP–ES11.3	0

Wetlands Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (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 (lbs/acre)	pH	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
Eupatorium coelestinum	Mistflower	0.10	5.0 - 8.0	June to July
Eupatorium fistulosum	Joe Pye Weed	0.14	5.5 - 7.5	July to October
Eupatorium perfoliatum	Boneset	0.20	4.5 - 7.0	July to September
Helenium autumnale	Common Sneezeweed	0.10		July to October
Heliopsis helianthoides	Oxeye Sunflower	0.40	4.0 - 7.5	August to September
Ludwigia alternifolia	Seedbox	0.10		July to August
Mimulus ringens	Square Stemmed Monkeyflower	0.10		August to September
Verbena hastata	Blue Vervain	0.72		June to September
Vernonia noveboracensis	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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Mountain Valley PIPELINE — DESIGN ENGINEERING

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WETLAND SEED MIX AND APPLICATION RATES

DRAWING NO.	REV.
MVP–ES11.4	0

Riparian Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
Agrostis perennans	Autumn Bentgrass	0.04	5.0 - 7.0	Midsummer
Andropogon gerardii	Big Bluestem	0.10		May to June
Elymus virginicus	Virginia Wildrye	1.00	6.2 - 7.0	June to October
Juncus effusus	Soft Rush	3.00	4.9 - 6.8	June to July
Juncus tenuis	Path Rush	1.00	4.6 - 6.9	July to August
Panicum clandestinum	Deertongue	6.90	6.8 - 8.9	June to August
Sorghastrum nutans	Indiangrass	0.40	4.0 - 8.5	August to September
Asclepias incarnata	Swamp Milkweed	4.00	5.0 - 7.4	June to October
Chamaecrista fasciculata	Partridge Pea	0.60	5.5 - 7.0	May to June
Eupatorium coelestinum	Mistflower	0.20		June to October
Eupatorium fistulosum	Joe Pye Weed	0.20	4.8 - 7.2	July to September
Eupatorium perfoliatum	Boneset	0.20		July to August
Geum canadense	White Avens	0.40	5.0 - 8.0	June to July
Helenium autumnale	Common Sneezeweed	0.10	5.5 - 7.5	July to October
Heliopsis helianthoides	Oxeye Sunflower	0.14	4.5 - 7.0	July to September
Monarda fistulosa	Wild Bergamot	0.20		July to October
Pycnanthemum tenuifolium	Slender Mountainmint	0.10	4.9 - 7.5	August to September
Rudbeckia hirta	Blackeyed Susan	0.40		July to August
Senna hebecarpa	Wild Senna	0.10		August to September
Verbena hastata	Blue Vervain	0.10		June to September
Vernonia noveboracensis	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) (50 LBS/AC)

Revised 1/24/18

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Mountain Valley PIPELINE — DESIGN ENGINEERING

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RIPARIAN SEED MIX AND APPLICATION RATES

DRAWING NO.	REV.
MVP–ES11.5	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				
Acer rubrum	Red Maple	FAC	X	X
Acer saccharinum	Silver Maple	FACW	X	X
Betula nigra	River Birch	FACW	X	X
Carpinus caroliniana	American Hornbeam	FAC	X	X
Carya glabra	Pignut Hickory	FACU	X	
Carya ovata	Shagbark Hickory	FACU	X	
Chionanthus virginicus	White Fringe Tree	FAC+	X	
Diospyros virginiana	Common Persimmon	FAC-	X	
Fraxinus pennsylvanica	Green Ash	FACW	X	X
Juniperus virginiana	Eastern Red Cedar	FACU	X	X
Liquidambar styraciflua	Sweet Gum	FAC	X	X
Liriodendron tulipifera	Tuliptree	FACU	X	X
Nyssa sylvatica	Black Gum	FAC	X	
Platanus occidentalis	American Sycamore	FACW-	X	X
Populus deltoids	Eastern Cottonwood	FAC	X	
Quercus bicolor	Swamp White Oak	FACW+	X	X
Quercus falcata	Cherrybark Red Oak	FACW	X	X
Quercus phellos	Willow Oak	FAC+	X	X
Quercus nigra	Water Oak	FAC	X	
Quercus palustris	Pin Oak	FACW	X	X
Salix nigra	Black Willow	FACW	X	X
Ulmus americana	American Elm	FACW-	X	X

NOTE:

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

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Mountain Valley PIPELINE — DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

NATIVE TREE AND SHRUB SPECIES FOR BARE ROOT PLANTINGS WITHIN RIPARIAN AREAS AND FORESTED WETLANDS

DRAWING NO.	REV.
MVP–ES11.6	0

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

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Mountain Valley PIPELINE — DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

NATIVE TREE AND SHRUB SPECIES FOR BARE ROOT PLANTINGS WITHIN RIPARIAN AREAS AND FORESTED WETLANDS

DRAWING NO.	REV.
MVP–ES11.7	0

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

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 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
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

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Mountain Valley PIPELINE — DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

STREAM CROSSINGS PROPOSED FOR BARE ROOT SEEDING PLANTINGS

DRAWING NO.	REV.
MVP–ES11.9	0

NO.	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

REVISIONS:

Mountain Valley PIPELINE, LLC
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
PITTSYLVANIA 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

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
PROFESSIONAL ENGINEER
4-30-18

RESTORATION DETAILS

DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO.	LY–035–004 OF 10

REVISION

TETRA TECH CAD FILE PATH: P:\B14\100\B14188B\B14188B–15\CAD\SDI–LY035–Pittsylvannia\B14188B–15_ESC_DETAILS.dwg PLOTTED ON: 7/31/2018 7:31 AM PLOTTED BY: Laura Ayers PLOT FILE: DAA.stb

NOTE: NOT ALL OF THE FOLLOWING DETAILS APPLY TO THE MVP–LY–035 LAYDOWN YARD.

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
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 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
Maggodee Creek	269.4	Franklin	VA	Roanoke logperch suitable habitat
Blackwater River	269.7	Franklin	VA	Roanoke logperch present, non-listed mussels present
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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

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Mountain Valley PIPELINE
DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

STREAM CROSSINGS PROPOSED FOR BARE ROOT SEEDING PLANTINGS

DRAWING NO.	REV.
MVP–ES11.9	0

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 3H:1V THE BFM SHOULD BE APPLIED AT A RATE OF 3,000 LB/ACRE. STEEPER SLOPES MAT NEED AS MUCH AS 4,000 LB/ACRE.

BFMs SHOULD ONLY BE USED WHEN NO RAIN IS FORECASTED FOR AT LEAST 48 HOURS FOLLOWING HE APPLICATION. THIS IS TO ALLOW THE TACKIFIER SUFFICIENT TIME TO CURE **PROPERLY.** ONCE PROPERLY APPLIED, A BFM IS TYPICALLY 90% EFFECTIVE IN PREVENTING ACCELERATED EROSION. BFMs 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 PROPERTY. 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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ENVIRONMENTAL DETAIL

BONDED FIBER MATRIX

DRAWING NO.	REV.
MVP–ES40	P

Typical Polymer Stabilized Fiber Matrix Application Rates

Maximum Rainfall of ≤ 20" and for Site Winterization							
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 (lb/acre)	1,500	1,500	1,500	1,800	2,000	2,500	3,000

Maximum Rainfall of > 20" and for Site Winterization			
SLOPE	≤5:1	4:1	≥3:1
Soil Stabilizer (gals/acre)	6	8	10
Fiber (lb/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 PSFM 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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DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

BONDED FIBER MATRIX

DRAWING NO.	REV.
MVP–ES40.1	P

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 MVP-ES11.1 through ES12.3) 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 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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MULCHING

DRAWING NO.	REV.
MVP–ES45	P

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 liberally in mid-summer 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.

Corn 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 tacking. 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 hydroseeding 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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MULCHING

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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.

Lime 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 hydroseeder slurry containing fiber mulch.

b. Where seed is to be applied following a straw mulch spread during winter months.

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MULCHING

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MVP–ES45.2	P

TABLE 3.35-A

ORGANIC MULCH MATERIALS AND APPLICATION RATES

MULCHES:	RATES: Per Acre	RATES: 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.

* 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. (n 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-drawn implement designed to punch mulch into the soil 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./1000 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. Avoid 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.

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MULCHING

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NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

REVISIONS:

Mountain Valley PIPELINE
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
PITTSYLVANIA 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

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
PROFESSIONAL ENGINEER
4-30-18

RESTORATION DETAILS

DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO.	LY–035–005 OF 10

REVISION

NOTE: NOT ALL OF THE FOLLOWING DETAILS APPLY TO THE MVP–LY–035 LAYDOWN YARD.

Chemical Mulches

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

a. Where no other mulching material is available.

b. In conjunction with temporary seeding during the times when mulch is not required for that practice.

c. From March 15 to May 1 and August 15 to September 30, provided that they are used on areas with slopes no steeper than 4:1, which have been roughened in accordance with SURFACE ROUGHENING, Std. & Spec. 3.29. If rill erosion occurs, another mulch material shall be applied immediately.

*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.

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TOPSOILING & SOIL HANDLING FOR M.V.P.

Definition

Methods of preserving and using the surface layer of undisturbed soil, often enriched in organic matter, in order to obtain a more desirable planting and growth medium.

Purposes

To provide a suitable growth medium for final site stabilization with vegetation and promote successful reforestation.

Conditions Where Practice Applies

1. Where the preservation or importation of topsoil is determined to be the most effective method of providing a suitable growth medium.
2. Where the subsoil or existing soil presents the following problems:
   a. The texture, pH, or nutrient balance of the available soil cannot be modified by reasonable means to provide an adequate growth medium.
   b. The soil material is too shallow to provide an adequate root zone and to supply necessary moisture and nutrients for plant growth.
   c. The soil contains substances potentially toxic to plant growth.
3. Only on slopes that are 2:1 or flatter unless other measures are taken to prevent erosion and sloughing.

Planning Considerations

Topsoil is the surface layer of the soil profile, generally characterized as being darker than the subsoil due to the presence of organic matter. It is the major zone of root development, carrying much of the nutrients available to plants, and supplying a large share of the water used by plants.

Although topsoil provides an excellent growth medium, there are disadvantages to its use. Stripping, stockpiling, and reapplying topsoil, or importing topsoil, may not always be cost-effective. Topsoiling can delay seeding or sodding operations, increasing the exposure time of denuded areas. Most topsoil contains weed seeds, and weeds may compete with desirable species.

Advantages of topsoil include its high organic matter content and friable consistence, water-holding capacity, and nutrient content.

In site planning, the option of topsoiling should be compared with that of preparing a seedbed in subsoil. The clay content of subsoils does provide high moisture availability and deter leaching of nutrients and, when properly limed and fertilized, subsoils may provide a good growth medium which is generally free

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of weed seeds. In many cases topsoiling may not be required for the establishment of less demanding, lower maintenance plant material. Topsoiling is strongly recommended where ornamental plants or high-maintenance turf will be grown. Topsoiling is a required procedure when establishing vegetation on shallow soils, soils containing potentially toxic materials, and soils of critically low pH (high acid) levels.

If topsoiling is to be done, the following items should be considered:

1. Whether an adequate volume of topsoil exists on the site. Topsoil will be spread at a compacted depth of 2 to 4 inches (depths closer to 4 inches are preferred).
2. Location of the topsoil stockpile so that it meets specifications and does not interfere with work on the site.
3. Allow sufficient time in scheduling for topsoil to be spread and bonded prior to seeding or planting.
4. Care must be taken not to apply topsoil to subsoil if the two soils have contrasting textures. Clayey topsoil over sandy subsoil is a particularly poor combination, as water may creep along the junction between the soil layers, causing the topsoil to slough. Sandy topsoil over a clay subsoil is equally as likely to fail.
5. If topsoil and subsoil are not properly bonded, water will not infiltrate the soil profile evenly and it will be difficult to establish vegetation. Topsoiling of steep slopes should be discouraged unless good bonding of soils can be achieved.

Specifications

Materials

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

In areas where revegetation is of concern based on existing soil conditions and determined by the MVP Environmental Inspector (EI), topsoil samples shall be taken for analysis. Samples will be collected by the MVP EI and sent to a recognized laboratory for analysis of the following criteria:

Organic matter content shall be not less than 1.5% by weight.

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

Soluble salts shall not exceed 500 ppm.

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

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Topsoil Importing

Topsoil would be imported as needed in residential areas only. If additional off-site topsoil is needed, it must meet the standards stated above.

Stripping

Topsoil operations should not be performed when the soil is wet or frozen. Stripping shall be confined to the immediate construction area. A 4-to 6-inch stripping depth is common, but depth may vary depending on the particular soil. All perimeter dikes, basins, and other sediment controls shall be in place prior to stripping.

Stockpiling

Topsoil shall be stockpiled in such a manner that natural drainage is not obstructed and no off-site sediment damage shall result. Stabilize or protect stockpiles in accordance with MS #2.

Excavated subsoil shall be stockpiled separately from topsoil.

Side slopes of the stockpile shall not exceed 2:1.

Perimeter controls must be placed around the stockpile immediately; seeding of stockpiles shall be completed within 7 days of the formation of the stockpile, in accordance with Std. & Spec. 3.31, TEMPORARY SEEDING if it is to remain dormant for longer than 14 days (refer to MS #1 and MS #2).

Site Preparation Prior to and Maintenance During Topsoiling and Excavation

Before topsoiling or excavation, establish needed erosion and sediment control practices such as diversions, grade stabilization structures, berms, dikes, level spreaders, waterways, sediment basins, etc. These practices must be maintained during topsoiling and excavation.

Grading: Previously established grades on the areas to be topsoiled shall be maintained according to the approved plan.

Liming: Where the pH of the subsoil is 6.0 or less, or the soil is composed of heavy clays, agricultural limestone shall be spread in accordance with the soil test or the vegetative establishment practice being used.

Bonding: After the areas to be topsoiled have been brought to grade, and immediately prior to dumping and spreading the topsoil, the subgrade shall be loosened by disking or scarifying to a depth of at least 4-6 inches to ensure bonding of the topsoil and subsoil. Refer to 2.8.3 Soil Compaction Mitigation within the Project Standards and Specifications for additional information.

Applying Topsoil

Topsoil shall not be placed while in a frozen or muddy condition, when topsoil or subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or seeding. The topsoil shall be uniformly distributed to a minimum compacted depth of 2 inches on 3:1 or steeper slopes and 4 inches on flatter slopes or to mimic existing conditions present in the adjacent undisturbed areas. (See Table 3.30-A to determine volume of topsoil required for application to various depths). Any irregularities in the surface, resulting from topsoiling or other operations, shall be corrected in order to prevent the formation of depressions or water pockets.

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ENVIRONMENTAL DETAIL: TOPSOILING & SOIL HANDLING

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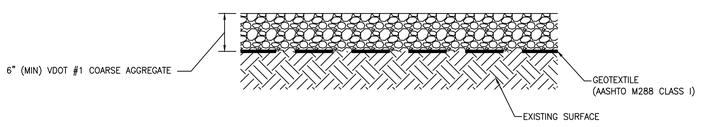


TEMPORARY GRAVEL SURFACE SPECIFICATIONS

- NO LAND DISTURBANCE WILL OCCUR AND THE GRAVEL WILL BE PLACED ON EXISTING GRADE.
- THE EXISTING SURFACE SHALL BE CLEARED OF ALL VEGETATION AND OTHER OBJECTIONABLE MATERIAL.
- A 6–INCH COURSE OF VDOT #1 COARSE AGGREGATE (AS PEER SECTION 203 OF VDOT'S ROAD AND BRIDGE SPECIFICATIONS) SHALL BE PROVIDED AS SOON AS VEGETATION REMOVAL IS COMPLETE.
- IN "HEAVY DUTY" TRAFFIC SITUATIONS THE AGGREGATE SHOULD INSTEAD BE PLACED AT AN 8– TO 10–INCH DEPTH TO AVOID EXCESSIVE DISSIPATION OR MAINTENANCE NEEDS.
- IF THE GRAVEL SURFACE BECOMES CLOGGED WITH SEDIMENT AND OTHER DEBRIS, A TOP DRESSING OF NEW GRAVEL SHOULD BE APPLIED.
- GEOTEXTILE SHALL BE NON–WOVEN WITH AASHTO M288 SURVIVABILITY CLASS (1) AND A MIN. PERMITIVITY OF 90 GAL/MIN/FT².

TYPICAL GRAVEL SURFACE DETAIL
N.T.S.

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

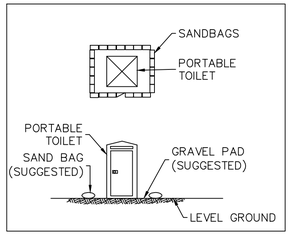
Sanitary discharge from portable toilets is harmful to the environment and should never be discharged to surface waters.

- ⦸ 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.

3.7 Fueling Areas

Recommended Practices

Onsite storage of fuel should be avoided, whenever possible. If onsite storage and handling of fuel is necessary, a designated, secure fueling area should be established away from heavily trafficked areas. Always keep a functional spill kit available at the fueling area.

- ✓ Always leave original labels on fuel containers.
- ✓ Always provide secondary containment for all fuel storage containers.
- ✓ Always store fuel in accordance with manufacturers' recommendations and Safety Data Sheets (SDS).
- ✓ Post emergency phone numbers in the fueling area to aid in a quick response in the event of a spill.
- ✓ Provide berms around the fueling area to prevent stormwater runoff from entering.
- ✓ Do not leave the fueling area unattended when in use. The area should be secured at all times.
- ✓ Do not utilize a mobile fueling operation within 100 feet of any gutter\storm drain, conveyance channel, or surface waters.

Locations

- ✓ Locate the fueling area a minimum of 100 feet from gutters, storm drains, conveyance channels, or surface waters.
- ✓ Locate the fueling area on level ground.
- ✓ Secure the fueling area with fencing or similar perimeter controls to discourage vandalism.
- ✓ Place a sign at the location identifying it as the fuel storage and handling area.
- ✓ The location of the fuel handling and storage area should be identified in the SWPPP, preferably on the record Set of Plans or on a site map.

Prohibitions

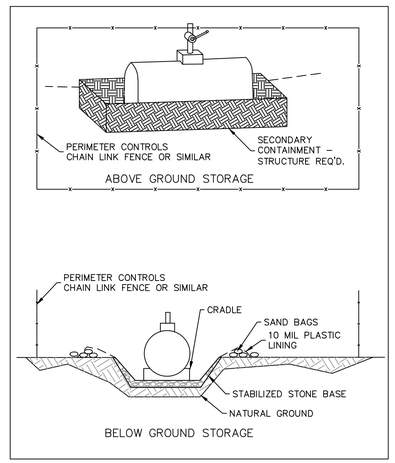
- ⦸ Do not "top off" fuel tanks when fueling equipment or vehicles.

Inspections and Maintenance

- ✓ Inspect the facility daily to detect leaks or spills.
- ✓ Use spill kit supplies to immediately clean up any leaks and spills and dispose of used materials properly.
- ✓ Inspect spill kit regularly to ensure that all supplies are readily available and functional in the event of a leak or spill.

A Spill Prevention Control and Countermeasure (SPCC) Plan conforming to 40 CFR 112 is required if the aggregated volume of Oil stored within the project limits at any one time is greater than 1320 gallons (see Road and Bridge Specification 107.16(e)3 for additional information).

Figure 3-7: Typical Detail for Fuel Storage Area



FUEL STORAGE DETAIL
N.T.S.

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:
					REVISIONS:

Mountain Valley PIPELINE — ANCILLARY SITE

EROSION AND SEDIMENT CONTROL PLANS

MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE

PITTSYLVANIA 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

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
PROFESSIONAL ENGINEER
7-30-18

GENERAL DETAILS

DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO.	LY–035–006 OF 10

REVISION

EROSION AND SEDIMENT CONTROL NARRATIVE

1. PROJECT DESCRIPTION:

THE MOUNTAIN VALLEY PIPELINE PROJECT (PROJECT) WILL EXTEND FROM THE EXISTING EQUITRANS, L.P TRANSMISSION SYSTEM AND OTHER NATURAL GAS FACILITIES IN WETZEL COUNTY, WEST VIRGINIA TO TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC'S ZONE 5 COMPRESSOR STATION 165 IN PITTSYLVANIA COUNTY, VIRGINIA. IN ADDITION, THE PROJECT WILL INCLUDE APPROXIMATELY 171,600 HORSEPOWER OF COMPRESSION AT THREE COMPRESSOR STATIONS CURRENTLY PLANNED ALONG THE ROUTE, AS WELL AS MEASUREMENT, REGULATION, AND OTHER ANCILLARY FACILITIES REQUIRED FOR THE SAFE AND RELIABLE OPERATION OF THE PIPELINE. THE PIPELINE IS DESIGNED TO TRANSPORT UP TO 2.0 MILLION DEKATHERMS PER DAY OF NATURAL GAS.

LAYDOWN YARD 035 (MVP-LY-035) CONSISTS OF AGRICULTURAL LAND IN PITTSYLVANIA COUNTY TO BE CONVERTED TO A TEMPORARY LAYDOWN AREA. TEMPORARY ACCESS TO MVP-LY-035 WILL BE PROVIDED BY EXISTING ROADS. ROAD WIDENING IS REQUIRED BY VDOT FOR ROCK CREEK ROAD AND IS BEING DONE AS A SEPARATE PROJECT. DISTURBED LAND FOR THE LAYDOWN YARD WILL BE RETURNED TO APPROXIMATE PRE-EXISTING CONTOURS AND COVER CONDITIONS. THE TOTAL MVP-LY-035 LOD AREA IS APPROXIMATELY 15.67 AC.

2. EXISTING SITE CONDITIONS:

EXISTING TOPOGRAPHY IS VARIABLE WITH GRADES RANGING FROM 3% TO 20%. THE SITE SLOPES IN A SOUTHERN DIRECTION. EXISTING GROUND COVER INCLUDES AGRICULTURAL ACTIVITY AREAS.

3. ADJACENT AREAS:

ADJACENT AREAS INCLUDE: FORESTED AREAS, AGRICULTURAL ACTIVITY AREAS, AND ROADS.

4. OFF-SITE AREAS:

NO OFF-SITE LAND DISTURBING ACTIVITIES ARE PROPOSED. ANY OFF-SITE LAND-DISTURBING ACTIVITY ASSOCIATED WITH THE PROJECT MUST HAVE AN APPROVED ESC PLAN.

5. SOILS:

THE SOILS LOCATED WITHIN THE LOD INCLUDE:

PITTSYLVANIA COUNTY:

CULLEN LOAM (10B) – 2 TO 7% SLOPES, GROUP B
CULLEN LOAM (11C3) – 7 TO 15% SLOPES, GROUP B
ENOTT FINE SANDY LOAM (12B) – 2 TO 7% SLOPES, GROUP B
HIWASSEE LOAM (17B) – 2 TO 7% SLOPES, GROUP B
MADISON FINE SANDY LOAM (21D) – 15 TO 25% SLOPES, GROUP B

6. CRITICAL AREAS:

THERE ARE NO STREAMS AND WETLANDS WITHIN THE LOD. PRIOR TO CONSTRUCTION ACTIVITIES, SEDIMENT BARRIERS WILL BE INSTALLED DOWNGRADIENT OF THE CONSTRUCTION WORK AREA AS NEEDED TO PREVENT THE FLOW OF SOIL OFF-SITE. SEDIMENT BARRIERS WILL BE PROPERLY MAINTAINED THROUGHOUT CONSTRUCTION AND REINSTALLED AS NECESSARY UNTIL REPLACED BY PERMANENT EROSION CONTROLS OR RESTORATION OF DISTURBED ADJACENT UPLAND AREAS IS COMPLETE.

7. EROSION AND SEDIMENT CONTROL MEASURES:

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992, AS WELL AS ANY ADDITIONAL MEASURES REQUIRED BY APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

1. STRUCTURAL PRACTICES
   - 3.01 – SAFETY FENCE
   - 3.02 – CONSTRUCTION ENTRANCE
   - MVP-ES3 – COMPOST FILTER SOCK
   - MVP-ES9 – BELTED SILT RETENTION FENCE
   - MVP-ES9.2 – SUPER SILT FENCE
   - MVP-ES9.3 – STACKED COMPOST FILTER SOCK

2. VEGETATIVE PRACTICES
   - 3.30 – TOPSOIL (STOCKPILE)
   - 3.31 – TEMPORARY SEEDING
   - 3.32 – PERMANENT SEEDING
   - 3.35 – MULCHING
   - 3.36 – SOIL STABILIZATION BLANKETS AND MATTING
   - MVP-ES11.0 – TEMPORARY EROSION CONTROL SEEDING MIX
   - MVP-ES11.1 – FOREST REGENERATION WOODY SEED MIX AND APPLICATION RATES
   - MVP-ES11.2 – UPLAND MEADOW SEED MIX AND APPLICATION RATES
   - MVP-ES11.3 – UPLAND STEEP SLOPE SEED MIX AND APPLICATION RATES
   - MVP-ES11.4 – WETLAND SEED MIX AND APPLICATION RATES
   - MVP-ES11.5 – RIPARIAN SEED MIX AND APPLICATION RATES
   - MVP-ES11.6 – NATIVE TREE AND SHRUB SPECIES FOR BARE ROOT PLANTINGS WITHIN RIPARIAN AREAS AND FORESTED WETLANDS
   - MVP-ES11.7 – NATIVE TREE AND SHRUB SPECIES FOR BARE ROOT PLANTINGS WITHIN RIPARIAN AREAS AND FORESTED WETLANDS
   - MVP-ES11.8 – STREAM CROSSINGS PROPOSED FOR BARE ROOT SEEDING PLANTINGS
   - MVP-ES11.9 – STREAM CROSSING FOR BARE ROOT SEEDING PLANTING
   - MVP-ES46 – 46.2 – TOPSOILING & SOIL HANDLING

8. PERMANENT STABILIZATION:

ALL DISTURBED AREAS SHALL BE STABILIZED WITH PERMANENT SEEDING WITHIN SEVEN WORKING DAYS OF FINAL GRADING, WEATHER AND SOIL CONDITIONS PERMITTING, AS SPECIFIED IN THE PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS FOR VIRGINIA.

9. STORMWATER RUNOFF CONSIDERATIONS:

THE PROJECT SITE WILL BE USED FOR PARKING AND STORING VEHICLES AND EQUIPMENT DURING PIPELINE CONSTRUCTION. THIS ACTIVITY WILL REQUIRE THAT TEMPORARY GRAVEL BE PLACED OVER A LARGE PORTION OF THE SITE. HOWEVER, THE GRAVEL WILL BE PLACED OVER A NON-WOVEN GEOTEXTILE WITH A PERMITIVITY OF 90 GALLONS PER MINUTE PER SQUARE FOOT TO MAINTAIN INFILTRATION RATES OF THE EXISTING SOIL SURFACE BELOW. SINCE THERE IS NO PROPOSED GRADING OR LAND DISTURBANCE, AND THE INFILTRATION RATES OF THE EXISTING SOIL SURFACE ARE BEING MAINTAINED, NO ADDITIONAL STORMWATER CONTROLS ARE REQUIRED.

10. 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 PROJECT SPECIFIC 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.

CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS ON AT LEAST THE FOLLOWING FREQUENCIES:

- AT LEAST ONCE EVERY FOUR BUSINESS DAYS

REPAIR OF ALL INEFFECTIVE TEMPORARY ESC MEASURES SHALL OCCUR WITHIN 24 HOURS OF IDENTIFICATION, OR AS SOON AS CONDITIONS ALLOW IF COMPLIANCE WITH THIS TIME FRAME WOULD RESULT IN GREATER ENVIRONMENTAL IMPACTS.

TEMPORARY BMPS WILL BE REMOVED UPON ACHIEVING VEGETATIVE STABILIZATION. DISTURBED AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RE-SEEDED AS NEEDED UNTIL STABILIZATION IS ACHIEVED.

TEMPORARY ESC 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.

11. CALCULATIONS:

BMP SIZING AND INSTALLATION HAS BEEN BASED ON THE FOLLOWING CRITERIA INCLUDED BY REFERENCE IN BOTH THE ANNUAL STANDARDS AND SPECIFICATIONS AND THE GENERAL DETAILS INCLUDED WITH THE EROSION AND SEDIMENT CONTROL PLANS:

COMPOST FILTER SOCK – MVP-ES3.0, MVP-ES3.1, MVP-ES3.3

STACKED COMPOST FILTER SOCK – MVP-ES9.3

11. GENERAL EROSION AND SEDIMENT CONTROL NOTES:

ES-1: UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS 9VAC25-840 EROSION AND SEDIMENT CONTROL REGULATIONS.

ES-2: THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.

ES-3: ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.

ES-4: A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.

ES-5: PRIOR TO COMMENCING LAND-DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.

ES-6: THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.

ES-7: ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.

ES-8: DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

ES-9: THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES PERIODICALLY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

13. MINIMUM STANDARDS (MS):

ALL LAND-DISTURBING ACTIVITIES UNDERTAKEN ON PRIVATE AND PUBLIC LANDS IN THE COMMONWEALTH OF VIRGINIA MUST MEET THE 19 "MINIMUM STANDARDS" FOR ESC IN SECTION 4VAC50-30-40 OF THE VIRGINIA ESC REGULATIONS. THE APPLICANT WHO SUBMITS THE ESC PLAN TO THE PROGRAM AUTHORITY FOR APPROVAL IS RESPONSIBLE FOR ENSURING COMPLIANCE WITH THE MINIMUM STANDARDS THAT APPLY TO HIS/HER ACTIVITIES.

MS-1 SOIL STABILIZATION. PERMANENT OR TEMPORARY STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN 7 DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

MS-2 SOIL STOCKPILE STABILIZATION. DURING CONSTRUCTION, SOIL STOCKPILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. TEMPORARY PROTECTION AND PERMANENT STABILIZATION SHALL BE APPLIED TO ALL SOIL STOCKPILES ON THE SITE AND BORROW AREAS OR SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.

MS-3 PERMANENT STABILIZATION. PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE, AND WILL INHIBIT EROSION.

MS-4 SEDIMENT BASINS & TRAPS. SEDIMENT BASINS, SEDIMENT TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS, AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.

MS-5 STABILIZATION OF EARTHEN STRUCTURES. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKE'S AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

MS-6 SEDIMENT TRAPS & SEDIMENT BASINS. SEDIMENT TRAPS AND BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN AS FOLLOWS:

1. SEDIMENT TRAPS:
   - 1.1. ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES.
   - 1.2. MINIMUM STORAGE CAPACITY OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA.
2. SEDIMENT BASINS:
   - 2.1. CONTROL DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES.
   - 2.2. MINIMUM STORAGE CAPACITY OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA.
   - 2.3. THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A TWENTY-FIVE YEAR STORM OF 24-HOUR DURATION.

MS-7 CUT AND FILL SLOPES DESIGN & CONSTRUCTION. CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.

MS-8 CONCENTRATED RUNOFF DOWN SLOPES. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME, OR SLOPE DRAIN STRUCTURE.

MS-9 SLOPE MAINTENANCE. WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.

MS-10 STORM SEWER INLET PROTECTION. ALL STORM SEWER INLETS MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE STORMWATER CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED/ TREATED TO REMOVE SEDIMENT.

MS-11 STORMWATER CONVEYANCE PROTECTION. BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.

MS-12 WORK IN LIVE WATERCOURSE. WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.

MS-13 CROSSING LIVE WATERCOURSE. WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY VEHICULAR STREAM CROSSING CONSTRUCTED OF NONERODIBLE MATERIAL SHALL BE PROVIDED.

MS-14 REGULATION OF WATERCOURSE CROSSING. ALL APPLICABLE FEDERAL STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.

MS-15 STABILIZING OF WATERCOURSE. THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.

MS-16 UNDERGROUND UTILITY LINE INSTALLATION. UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:

a. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.
b. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
c. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.
d. MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION.
e. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE REGULATIONS.
f. COMPLY WITH APPLICABLE SAFETY REGULATIONS.

MS-17 VEHICULAR SEDIMENT TRACKING. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS:

a. PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE.
b. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY.
c. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.

MS-18 REMOVAL OF TEMPORARY MEASURES. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE LOCAL PROGRAM AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

MS-19 STORMWATER MANAGEMENT. PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND CRITERIA. STREAM RESTORATION AND RELOCATION PROJECTS THAT INCORPORATE NATURAL CHANNEL DESIGN CONCEPTS ARE NOT MAN-MADE CHANNELS AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS:

a. CONCENTRATED STORMWATER RUNOFF LEAVING A DEVELOPMENT SITE SHALL BE DISCHARGED DIRECTLY INTO AN ADEQUATE NATURAL OR MAN-MADE RECEIVING CHANNEL, PIPE OR STORM SEWER SYSTEM. FOR THOSE SITES WHERE RUNOFF IS DISCHARGED INTO A PIPE OR PIPE SYSTEM, DOWNSTREAM STABILITY ANALYSES AT THE OUTFALL OF THE PIPE OR PIPE SYSTEM SHALL BE PERFORMED.
b. ADEQUACY OF ALL CHANNELS AND PIPES SHALL BE VERIFIED IN THE FOLLOWING MANNER:

1. THE APPLICANT SHALL DEMONSTRATE THAT THE TOTAL DRAINAGE AREA TO THE POINT OF ANALYSIS WITHIN THE CHANNEL IS ONE HUNDRED TIMES GREATER THAN THE CONTRIBUTING DRAINAGE AREA OF THE PROJECT IN QUESTION; OR
2. (a) NATURAL CHANNELS SHALL BE ANALYZED BY THE USE OF A TWO-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP CHANNEL BANKS NOR CAUSE EROSION OF CHANNEL BED OR BANKS.
   (b) ALL PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS SHALL BE ANALYZED BY THE USE OF A 10-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP ITS BANKS AND BY THE USE OF A TWO-YEAR STORM TO DEMONSTRATE THAT STORMWATER WILL NOT CAUSE EROSION OF CHANNEL BED OR BANKS; AND
   (c) PIPES AND STORM SEWER SYSTEMS SHALL BE ANALYZED BY THE USE OF A 10-YEAR STORM TO VERIFY THAT STORMWATER WILL BE CONTAINED WITHIN THE PIPE OR SYSTEM.

c. IF EXISTING NATURAL RECEIVING CHANNELS OR PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS OR PIPES ARE NOT ADEQUATE, THE APPLICANT SHALL:

1. IMPROVE THE CHANNELS TO A CONDITION WHERE A 10-YEAR STORM WILL NOT OVERTOP THE BANKS AND A TWO-YEAR STORM WILL NOT CAUSE EROSION TO THE CHANNEL, THE BED, OR THE BANKS; OR
2. IMPROVE THE PIPE OR PIPE SYSTEM TO A CONDITION WHERE THE 10-YEAR STORM IS CONTAINED WITHIN THE APPURTENANCES;
3. DEVELOP A SITE DESIGN THAT WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A TWO-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A NATURAL CHANNEL OR WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A 10-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A MAN-MADE CHANNEL; OR
4. PROVIDE A COMBINATION OF CHANNEL IMPROVEMENT, STORMWATER DETENTION OR OTHER MEASURES WHICH IS SATISFACTORY TO THE VESCP AUTHORITY TO PREVENT DOWNSTREAM EROSION.

d. THE APPLICANT SHALL PROVIDE EVIDENCE OF PERMISSION TO MAKE THE IMPROVEMENTS.
e. ALL HYDROLOGIC ANALYSES SHALL BE BASED ON THE EXISTING WATERSHED CHARACTERISTICS AND THE ULTIMATE DEVELOPMENT CONDITION OF THE SUBJECT PROJECT.
f. IF THE APPLICANT CHOOSES AN OPTION THAT INCLUDES STORMWATER DETENTION, HE SHALL OBTAIN APPROVAL FROM THE VESCP OF A PLAN FOR MAINTENANCE OF THE DETENTION FACILITIES. THE PLAN SHALL SET FORTH THE MAINTENANCE REQUIREMENTS OF THE FACILITY AND THE PERSON RESPONSIBLE FOR PERFORMING THE MAINTENANCE.
g. OUTFALL FROM A DETENTION FACILITY SHALL BE DISCHARGED TO A RECEIVING CHANNEL, AND ENERGY DISSIPATORS SHALL BE PLACED AT THE OUTFALL OF ALL DETENTION FACILITIES AS NECESSARY TO PROVIDE A STABILIZED TRANSITION FROM THE FACILITY TO THE RECEIVING CHANNEL.
h. ALL ON-SITE CHANNELS MUST BE VERIFIED TO BE ADEQUATE.
i. INCREASED VOLUMES OF SHEET FLOWS THAT MAY CAUSE EROSION OR SEDIMENTATION ON ADJACENT PROPERTY SHALL BE DIVERTED TO A STABLE OUTLET, ADEQUATE CHANNEL, PIPE OR PIPE SYSTEM, OR TO A DETENTION FACILITY.
j. IN APPLYING THESE STORMWATER MANAGEMENT CRITERIA, INDIVIDUAL LOTS OR PARCELS IN A RESIDENTIAL, COMMERCIAL OR INDUSTRIAL DEVELOPMENT SHALL NOT BE CONSIDERED TO BE SEPARATE DEVELOPMENT PROJECTS. INSTEAD, THE DEVELOPMENT, AS A WHOLE, SHALL BE CONSIDERED TO BE A SINGLE DEVELOPMENT PROJECT. HYDROLOGIC PARAMETERS THAT REFLECT THE ULTIMATE DEVELOPMENT CONDITION SHALL BE USED IN ALL ENGINEERING CALCULATIONS.
k. ALL MEASURES USED TO PROTECT PROPERTIES AND WATERWAYS SHALL BE EMPLOYED IN A MANNER WHICH MINIMIZES IMPACTS ON THE PHYSICAL, CHEMICAL AND BIOLOGICAL INTEGRITY OF RIVERS, STREAMS AND OTHER WATERS OF THE STATE.
l. ANY PLAN APPROVED PRIOR TO JULY 1, 2014, THAT PROVIDES FOR STORMWATER MANAGEMENT THAT ADDRESSES ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS SHALL SATISFY THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS IF THE PRACTICES ARE DESIGNED TO (I) DETAIN THE WATER QUALITY VOLUME AND TO RELEASE IT OVER 48 HOURS; (II) DETAIN AND RELEASE OVER A 24-HOUR PERIOD THE EXPECTED RAINFALL RESULTING FROM THE ONE YEAR, 24-HOUR STORM; AND (III) REDUCE THE ALLOWABLE PEAK FLOW RATE RESULTING FROM THE 1.5, 2, AND 10-YEAR, 24-HOUR STORMS TO A LEVEL THAT IS LESS THAN OR EQUAL TO THE PEAK FLOW RATE FROM THE SITE ASSUMING IT WAS IN A GOOD FORESTED CONDITION, ACHIEVED THROUGH MULTIPLICATION OF THE FORESTED PEAK FLOW RATE BY A REDUCTION FACTOR THAT IS EQUAL TO THE RUNOFF VOLUME FROM THE SITE WHEN IT WAS IN A GOOD FORESTED CONDITION DIVIDED BY THE RUNOFF VOLUME FROM THE SITE IN ITS PROPOSED CONDITION, AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS AS DEFINED IN ANY REGULATIONS PROMULGATED PURSUANT TO § 62.1-44.15:54 OR 62.1-44.15:65 OF THE ACT.
m. FOR PLANS APPROVED ON AND AFTER JULY 1, 2014, THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS OF § 62.1-44.15:52 A OF THE ACT AND THIS SUBSECTION SHALL BE SATISFIED BY COMPLIANCE WITH WATER QUANTITY REQUIREMENTS IN THE STORMWATER MANAGEMENT ACT (§ 62.1-44.15:24 ET SEQ. OF THE CODE OF VIRGINIA) AND ATTENDANT REGULATIONS, UNLESS SUCH LAND-DISTURBING ACTIVITIES ARE IN ACCORDANCE WITH 9VAC25-870-48 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) REGULATION OR ARE EXEMPT PURSUANT TO SUBDIVISION C 7 OF § 62.1-44.15:34 OF THE ACT.
n. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 9VAC25-870-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) REGULATION SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF THIS SUBDIVISION 19.

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

REVISIONS:

Mountain Valley PIPELINE
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
PITTSYLVANIA COUNTY, VIRGINIA

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

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CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
1-30-18
PROFESSIONAL ENGINEER

ESC NARRATIVE

DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO.	LY-035-007 OF 10

REVISION

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MS-19 COMPLIANCE DURING CONSTRUCTION

A. INTRODUCTION

THE PRIMARY INTENT OF MS-19 IS TO ENSURE THAT DOWN GRADIENT PROPERTIES ARE PROTECTED FROM ADVERSE IMPACTS RESULTING FROM INCREASES IN STORMWATER RUNOFF FROM DEVELOPMENT ACTIVITIES. IN ACCORDANCE WITH 9VAC25-870-66, WATER QUANTITY, COMPLIANCE WITH THE WATER QUALITY REQUIREMENTS CONTAINED IN THAT SECTION SATISFIES THE REQUIREMENTS OF M.S. 19:

"COMPLIANCE WITH THE MINIMUM STANDARDS SET OUT IN THIS SECTION SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF SUBDIVISION 19 OF 9VAC25-840-40 (MINIMUM STANDARDS; VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS)."

THERE IS ONE PRIMARY FLOW REGIME ASSOCIATED WITH THE CONSTRUCTION PHASE OF THE PROJECT THAT WILL NEED TO BE ASSESSED FOR COMPLIANCE WITH MS-19. THIS FLOW REGIME INCLUDE FLOWS GENERATED DIRECTLY WITHIN THE PROJECT LIMIT OF DISTURBANCE (LOD) THAT ARE CONTROLLED BY PERIMETER CONTROLS CONSISTING OF COMPOST FILTER SOCKS (CFS) OR SILT FENCE AS WELL AS FLOWS ROUTED TO SEDIMENT TRAPS AND/OR SEDIMENT BASINS.

REGARDLESS OF THE SPECIFIC LOCATION AND/OR FLOW REGIME, ALL EROSION AND SEDIMENT CONTROL MEASURES INCLUDED IN THE DESIGN PLANS FOR THE PROJECT HAVE BEEN DEVELOPED AND DESIGNED TO BE IN FULL COMPLIANCE WITH STATE REQUIREMENTS, AS CONTAINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH), AS WELL AS THE APPROVED PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS. AS A RESULT, ALL IMPLEMENTED PRACTICES (SILT FENCE, CFS, SOIL STABILIZATION, ETC.) WILL MEET ALL STATE REQUIREMENTS.

IN ALL INSTANCES OF OFFSITE STORMWATER FLOW DURING THE CONSTRUCTION PHASE OF THE PROJECT, COMPLIANCE WITH MS-19 IS PROVIDED THROUGH THE PROVISION OF SHEETFLOW BELOW THE RESPECTIVE EROSION AND SEDIMENT CONTROL PRACTICES ALONG THE PERIMETER (CFS OR SILT FENCE); SITE-SPECIFIC ANALYSES WILL BE COMPLETED WHEN SITING SEDIMENT TRAPS/BASINS AND LEVEL SPREADERS TO DEMONSTRATE COMPLIANCE WITH MS-19. A DESCRIPTION OF THE FLOW REGIME FOR DIRECT RUNOFF FROM DISTURBED AREAS OF THE PROJECT IS PROVIDED BELOW, FOLLOWED BY AN ANALYSIS THAT DEMONSTRATES THAT FLOW FROM THE PROPOSED PRACTICES WILL PROVIDE FOR NON-EROSIVE SHEET FLOW AND IS THEREFORE IN FULL COMPLIANCE WITH MS-19.

B. RUNOFF FROM PROJECT SITE

PROPERLY DESIGNED AND IMPLEMENTED EROSION AND SEDIMENT CONTROLS IN THE FORM OF SOIL STABILIZATION, STAND-ALONE CFS, AND/OR SILT FENCE WILL ENSURE DISTURBED AREAS WITHIN THE PROJECT SITE ARE PROTECTED IN ACCORDANCE WITH VESCH SPECIFICATIONS. PERIMETER CONTROLS (CFS AND/OR SILT FENCE, DEPENDING ON THE SPECIFIC LOCATION) WILL FILTER RUNOFF AND PROVIDE SHEETFLOW TO DOWNGRADIENT AREAS IN A NON-EROSIVE MANNER. THIS WILL RESULT IN RUNOFF FROM THE PROJECT SITE MEETING MS-19 REQUIREMENTS.

1. SHEETFLOW DISCHARGES

THE RELEVANT STANDARD REFERRED TO IN 9VAC25-870-66 IS IN SECTION D THAT CONTAINS THE REQUIREMENTS WHEN DISCHARGING STORMWATER IN THE FORM OF SHEETFLOW:

"A. INCREASED VOLUMES OF SHEET FLOW RESULTING FROM PERVIOUS OR DISCONNECTED IMPERVIOUS AREAS, OR FROM PHYSICAL SPREADING OF CONCENTRATED FLOW THROUGH LEVEL SPREADERS, MUST BE IDENTIFIED AND EVALUATED FOR POTENTIAL IMPACTS ON DOWN-GRADIENT PROPERTIES OR RESOURCES. INCREASED VOLUMES OF SHEET FLOW THAT WILL CAUSE OR CONTRIBUTE TO EROSION, SEDIMENTATION, OR FLOODING OF DOWN GRADIENT PROPERTIES OR RESOURCES SHALL BE DIVERTED TO A STORMWATER MANAGEMENT FACILITY OR A STORMWATER CONVEYANCE SYSTEM THAT CONVEYS THE RUNOFF WITHOUT CAUSING DOWN-GRADIENT EROSION, SEDIMENTATION, OR FLOODING. IF ALL RUNOFF FROM THE SITE IS SHEET FLOW AND THE CONDITIONS OF THIS SUBSECTION ARE MET, NO FURTHER WATER QUANTITY CONTROLS ARE REQUIRED."

SHEETFLOW DOWN GRADIENT OF THE LOD DURING THE CONSTRUCTION PHASE WILL BE PROVIDED BY PERIMETER CONTROLS THAT HAVE BEEN DESIGNED IN ACCORDANCE WITH THE APPROVED PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS, AS WELL AS THE RELEVANT SPECIFICATIONS CONTAINED IN THE VESCH (AS NOTED ABOVE). EACH PRACTICE (SILT FENCE AND CFS) HAS BEEN SELECTED BASED ON THE SITE SPECIFIC CONDITIONS TO MAKE CERTAIN THAT THEY WILL FUNCTION PROPERLY AND AS INTENDED. CONFIRMATION THAT SHEETFLOW WILL BE PROVIDED DOWNGRADIENT OF EACH PRACTICE IS PROVIDE BELOW.

a) SILT FENCE

BY DEFINITION, SILT FENCE IS A FILTERING PRACTICE THAT HAS A STATED PERMEABILITY OF 0.3 GAL/MIN/SF (VESCH TABLE 3.05-A). ASSUMING A MAXIMUM PONDING DEPTH OF 24-IN, THIS WILL RESULT IN A FLOW RATE THROUGH THE FENCING OF 0.6 GAL/MIN/LF OF FENCING. CONVERTING, THIS EQUATES TO APPROXIMATELY 0.00134 CFS/LF (448.83 GPM = 1 CFS). THIS FLOW RATE CAN BE INSERTED INTO MANNING'S EQUATION TO SOLVE FOR THE CORRESPONDING DEPTH OF FLOW:

Q = (1.49/N) A R 2/3 S 1/2

WHERE:

Q = OVERLAND FLOW RATE, CFS

A = CROSS-SECTIONAL FLOW AREA PER LF OF FENCE (I.E. DEPTH X 1), FT2

N = MANNING'S COEFFICIENT:

THIS PARAMETER WAS ASSUMED TO BE 0.24 FOR SHEETFLOW IN "DENSE GRASSES" (TR-55, TABLE 3-1. AREAS BELOW THE END TREATMENTS WILL BE SEEDED WITH A NATIVE GRASSES AND WOODY SPECIES, SO THE "DENSE GRASSES" N VALUE WAS DEEMED TO BE THE MOST APPROPRIATE VS THE "SHORT PRAIRIE GRASS" (N = 0.15) OR "BERMUDA GRASS" (N = 0.41) ALTERNATIVES).

R = HYDRAULIC RADIUS, FT:

THIS TERM IS DEFINED AS THE CROSS-SECTIONAL FLOW AREA DIVIDED BY THE WETTED PERIMETER. HOWEVER, FOR SHALLOW, WIDE FLOW THIS CAN BE ASSUMED TO BE EQUAL TO THE FLOW DEPTH. TO ILLUSTRATE, ASSUME A FLOW DEPTH OF 0.10 FT OVER A LENGTH OF 10 FT:

R = A / WP
= (0.1 FT * 10 FT) / (0.1 FT + 10 FT + 0.1 FT)
= 1.0 FT2 / 10.2 FT
= 0.098 FT

DEPTH = 0.10 FT IS A VALID ASSUMPTION

S = DOWN-GRADIENT OVERLAND SLOPE, FT/FT:

ASSUMING AN OVERLAND SLOPE OF 0.5 FT/FT AND AN "N" VALUE OF 0.24 (MEADOW), RESULTS IS A NOMINAL FLOW DEPTH OF 0.0078 FT:

0.00134 = (1.49/0.24) (DEPTH X 1) DEPTH 2/3 0.5 1/2

REARRANGING,

DEPTH 5/3 = 0.000305

DEPTH = 0.0078 FT

THIS FLOW DEPTH CAN THEN BE USED TO COMPUTE THE VELOCITY IN ACCORDANCE WITH:

V = Q/A

= 0.00134 / 0.0078

= 0.17 FPS

THIS VALUE IS AN ORDER OF MAGNITUDE LOWER THAN THE CONSERVATIVELY ASSUMED ALLOWABLE VELOCITY OF 2 FPS (BARE EARTH). THIS RESULT IS NOT UNEXPECTED AS THE PURPOSE OF SILT FENCE IS TO SLOWLY FILTER STORMWATER RUNOFF.

b) CFS

THE OTHER PERIMETER CONTROL THAT WILL BE IMPLEMENTED, DEPENDING ON THE SPECIFIC LOCATION, WILL BE CFS. THE COMPOST FILTER SOCKS ARE RATED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) IN THE DOCUMENT "FILTER BERMS AND FILTER SOCKS: STANDARD SPECIFICATIONS FOR COMPOST FOR EROSION/SEDIMENT CONTROL" TO PASS A RANGE OF FLOWS, FROM 4 TO OVER 10 GPM/LF (TABLE 2). A PRODUCT SPECIFIC CITATION OBTAINED FROM FILTREXX® STIPULATES A FLOW THROUGH RATE OF 22.5 GAL/MIN/LF FOR A 24-IN DIAMETER CFS (THE EFFECTIVE SIZE THAT WILL BE USED FOR THIS PROJECT). IN ORDER TO ENSURE A SHEETFLOW DEPTH OF NOT MORE THAN 0.10 FT BELOW THE CFS, AN EVEN HIGHER FLOW RATE OF 43 GPM WAS ASSUMED (VERY CONSERVATIVE).

ASSUMING A WORST CASE OF 43 GPM, THIS EQUATES TO A FLOW RATE OF 0.095 CFS/LF. USING MANNING'S EQUATION TO SOLVE FOR THE DEPTH OF FLOW USING THE SAME ASSUMPTIONS AND METHODOLOGY NOTED ABOVE RESULTS IN AN OVERLAND FLOW DEPTH OF 0.10 FT:

0.095= (1.49/0.24) (DEPTH X 1) DEPTH 2/3 0.5 1/2

REARRANGING,

DEPTH 5/3 = 0.022 FT

DEPTH = 0.10 FT

THIS FLOW DEPTH CAN THEN BE USED TO COMPUTE THE VELOCITY IN ACCORDANCE WITH:

V = Q/A

= 0.095 / 0.10

= 0.95 FPS

THUS, THE CFS WILL ALSO PRODUCE SHEETFLOW IN A NON-EROSIVE MANNER THAT WILL NOT IMPACT DOWN GRADIENT PROPERTIES. AS A RESULT, SHEETFLOW DOWNGRADIENT FROM THE CFS PERIMETER CONTROL IMMEDIATELY FOLLOWING CONSTRUCTION IS ALSO IN FULL COMPLIANCE WITH M.S. 19.

c) FLOODING

BECAUSE SHEETFLOW HAS BEEN DEMONSTRATED FOR DOWNGRADIENT FLOWS DURING THE CONSTRUCTION PROCESS, COMPLIANCE WITH THE FLOODING PROVISION OF THE REGULATIONS (9VAC25-870-66 C. FLOOD PROTECTION) IS NOT REQUIRED. HOWEVER, THE SHEETFLOW PROVISION CITED IN THIS NARRATIVE DOES REQUIRE THAT "FLOODING" OF DOWNGRADIENT PROPERTIES OR RESOURCES" DOES NOT OCCUR. THE DEFINITION OF "FLOODING" PROVIDED IN THE REGULATIONS IS:

"FLOODING" MEANS A VOLUME OF WATER THAT IS TOO GREAT TO BE CONFINED WITHIN THE BANKS OR WALLS OF A STREAM, WATER BODY, OR CONVEYANCE SYSTEM AND THAT OVERFLOWS ONTO ADJACENT LANDS, THEREBY CAUSING OR THREATENING DAMAGE."

IN THIS INSTANCE, THERE ARE NO CONVEYANCES (I.E. SHEETFLOW), THEREFORE THE APPLICABLE PORTION OF THE DEFINITION IS RELATED TO OVERLAND FLOW THAT CAUSES OR THREATENS TO CAUSE DAMAGE. THIS ANALYSIS HAS DEMONSTRATED THAT THE SHEETFLOW FROM EITHER THE SILT FENCE OR CFS IS NON-EROSIVE. THEREFORE, THE TEMPORARY, NOMINAL INCREASES IN DOWN GRADIENT FLOW RATES THAT MAY OCCUR IN SOME SITUATIONS (NOTE – IN MANY INSTANCES THE FLOW RATES WILL ACTUALLY BE REDUCED AS A RESULT OF PONDING BEHIND THE SILT FENCE AND/OR CFS) WILL NOT RESULT IN DAMAGE AND THEREFORE COMPLIES WITH THE REQUIREMENTS OF MS-19.

2. DISCHARGE TO A CONVEYANCE SYSTEM

SEDIMENT TRAPS/BASINS WILL BE DESIGNED IN ACCORDANCE WITH THE VESCH AND TO CONTROL THE 2-YEAR STORM EVENT TO ENSURE THAT THERE IS NO INCREASE IN THE PEAK RATE OF RUNOFF AT THE DOWNSTREAM POINT OF DISCHARGE.

C. SUMMARY

SINCE IT HAS BEEN DEMONSTRATED THAT UNDER THE MOST CONSERVATIVE ASSUMPTIONS THAT SHEETFLOW DOWN GRADIENT OF THE PERIMETER CONTROLS WILL NOT "CAUSE OR CONTRIBUTE TO EROSION, SEDIMENTATION, OR FLOODING OF DOWN GRADIENT PROPERTIES" DURING AND IMMEDIATELY FOLLOWING CONSTRUCTION, THE CONSTRUCTION PHASE OF THE PROJECT WILL BE IN FULL COMPLIANCE WITH MS-19.

14. BEST MANAGEMENT PRACTICES INSTALLATION AND REMOVAL NOTES:

TEMPORARY AND PERMANENT BMPS WILL BE USED DURING CONSTRUCTION ACTIVITIES TO AVOID AND/OR MINIMIZE ADVERSE ENVIRONMENTAL EFFECTS OF CONSTRUCTION ACTIVITIES.

THE FOLLOWING ARE GENERAL BMP INSTALLATION NOTES FOR PIPEYARD AND LAYDOWN AREA CONSTRUCTION ACTIVITIES.

- A STONE CONSTRUCTION ENTRANCE, SHOWN ON DETAIL SHEET, SHALL BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC WILL BE ACCESSING A PAVED ROAD DIRECTLY FROM A DISTURBED AREA.
- VEGETATION WILL BE REMOVED BY BRUSH HOGGING THE AREA; ANY TREES TO BE REMOVED WILL BE CONDUCTED BY HAND FELLING/CUTTING OF STUMPS AT THE GROUND SURFACE. TEMPORARY GRAVEL OVER GEOTEXTILE (SEE DETAIL) WILL BE INSTALLED AFTER ALL VEGETATION/TREES ARE REMOVED.
- WETLANDS (IF PRESENT) WILL BE PROTECTED WITH SILT FENCE OR BELTED SILT RETENTION FENCE (BSRF). IN ADDITIONAL, ORANGE CONSTRUCTION SAFETY FENCE WILL BE INSTALLED TO PROTECT WETLANDS FROM DISTURBANCE. STREAM CROSSINGS (IF PRESENT) WILL EITHER UTILIZE EXISTING CULVERTS OR BE SPANNED USING TIMBER MAT BRIDGES.
- 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.
- ALL DISTURBED AREAS WILL BE GRADED IN PREPARATION FOR SEEDING AND MULCHING. 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.
- 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.

GENERAL CONSTRUCTION SEQUENCE

THE FOLLOWING IS A GENERAL SEQUENCE OF ACTIVITIES ASSOCIATED WITH CONSTRUCTION OF THE PIPEYARDS AND LAYDOWN AREAS:

1. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS PRIOR TO EARTH DISTURBANCE. APPROPRIATE BMPS SHOULD BE PLACED AROUND SENSITIVE AREAS PRIOR TO EARTH DISTURBANCE. STONE CONSTRUCTION ENTRANCES (SCE) ARE TO BE PROVIDED AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC WILL BE ACCESSING A PAVED ROAD DIRECTLY FROM A DISTURBED AREA.
2. INSTALL PERIMETER CONTROLS PRIOR TO VEGETATION REMOVAL.
3. REMOVE VEGETATION BY BRUSH HOGGING THE AREA; REMOVE TREES (IF NECESSARY) BY HAND FELLING/CUTTING STUMPS AT THE GROUND SURFACE.
4. INSTALL TEMPORARY GRAVEL OVER GEOTEXTILE.
5. FOLLOWING PROJECT USE, ALL GRAVEL AND UNDERLYING GEOTEXTILE WILL BE REMOVED.
6. PRIOR TO SEEDING MVP WILL DISC AREAS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION.
7. REVEGETATE DISTURBED AREA PER THE TABLES ON DETAILS MVP-ES11.1 TO 11.9 OR PER LANDOWNER REQUEST.
8. 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". AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RESEEDED AS NEEDED UNTIL THE ENDPOINT IS ACHIEVED.
9. 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.

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.
- CONDUCTING INSPECTIONS OF TEMPORARY ESC CONTROLS AND SWM BMPS AT LEAST ONCE EVERY FOUR BUSINESS DAYS.
- TEMPORARY BMPS 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.
- 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 PIPEYARD / LAYDOWN AREA AND FINAL CLOSURE OF THE PROJECT DEFINED AS "ACHIEVING VEGETATIVE STABILIZATION". THE SEQUENCE IS:

1. REMOVE TEMPORARY GRAVEL AND UNDERLYING GEOTEXTILE.
2. DISC/AERATE SOILS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION.
3. APPLY SPECIALTY SEEDS AS REQUIRED THAT WILL NOT BE HANDLED IN THE MULCH PHASE (STEP 4), SEED THE AREA USING THE SEED MIXES AND RATES SPECIFIED IN MVP-ES11.1 TO MVP-ES11.9 OR PER LANDOWNER REQUEST.
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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ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
PITTSYLVANIA COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC
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CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
7-30-18
PROFESSIONAL ENGINEER

ESC NARRITIVE

DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
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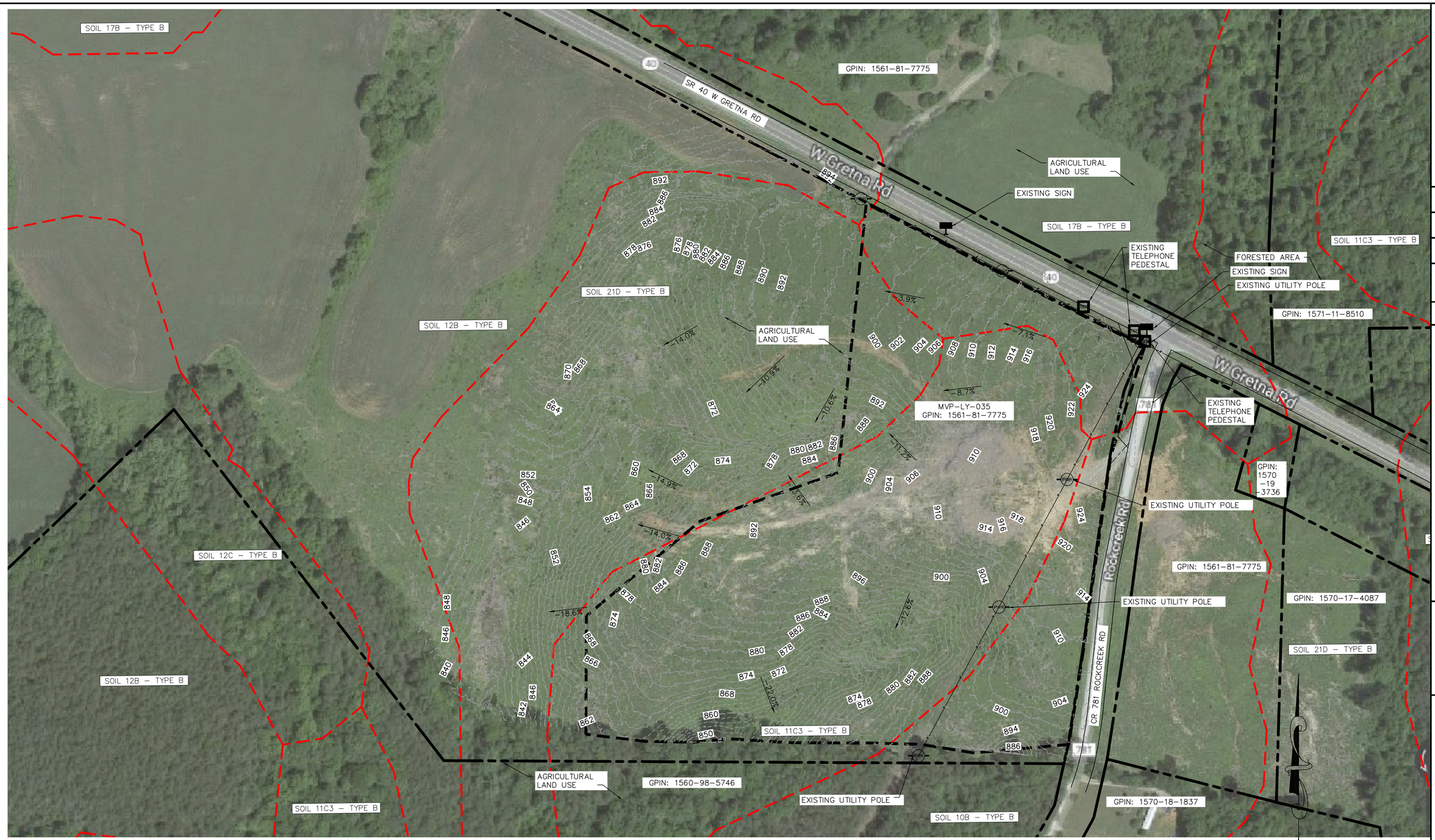
SHT. NO.	LY-035-008 OF 10

REVISION



TOPO DATA SOURCE:

2.0' CONTOURS WERE CERTIFIED & PROVIDED BY HOLLAND ENGINEERING AND WERE GENERATED USING PHOTOGRAMMETRIC METHODS WITH A DRONE.

LEGEND

- 1760 EXISTING CONTOUR (MAJOR)
- 1756 EXISTING CONTOUR (MINOR)
- EXISTING SOIL DIVIDE
- PROPOSED LIMIT OF DISTURBANCE
- EDGE OF ROAD/ASPHALT
- EXISTING UTILITY POLE
- EXISTING ROAD SIGN
- EXISTING TELEPHONE PEDESTAL
- P EXISTING POWER LINE
- EXISTING PROPERTY LINE

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.

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

TETRA TECH CAD FILE PATH: P:\B14\100\B14188B\B14188B-15\CAD\SDI-LY035-Pittsylvania\B14188B-15_EXIST_CONDITIONS.dwg PLOTTED ON: 7/31/2018 7:33 AM PLOTTED BY: Laura Ayers PLOT FILE: DAA.stb

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

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MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
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CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
Lic. No. 042775
PROFESSIONAL ENGINEER
1-30-18

EXISTING CONDITIONS PLAN

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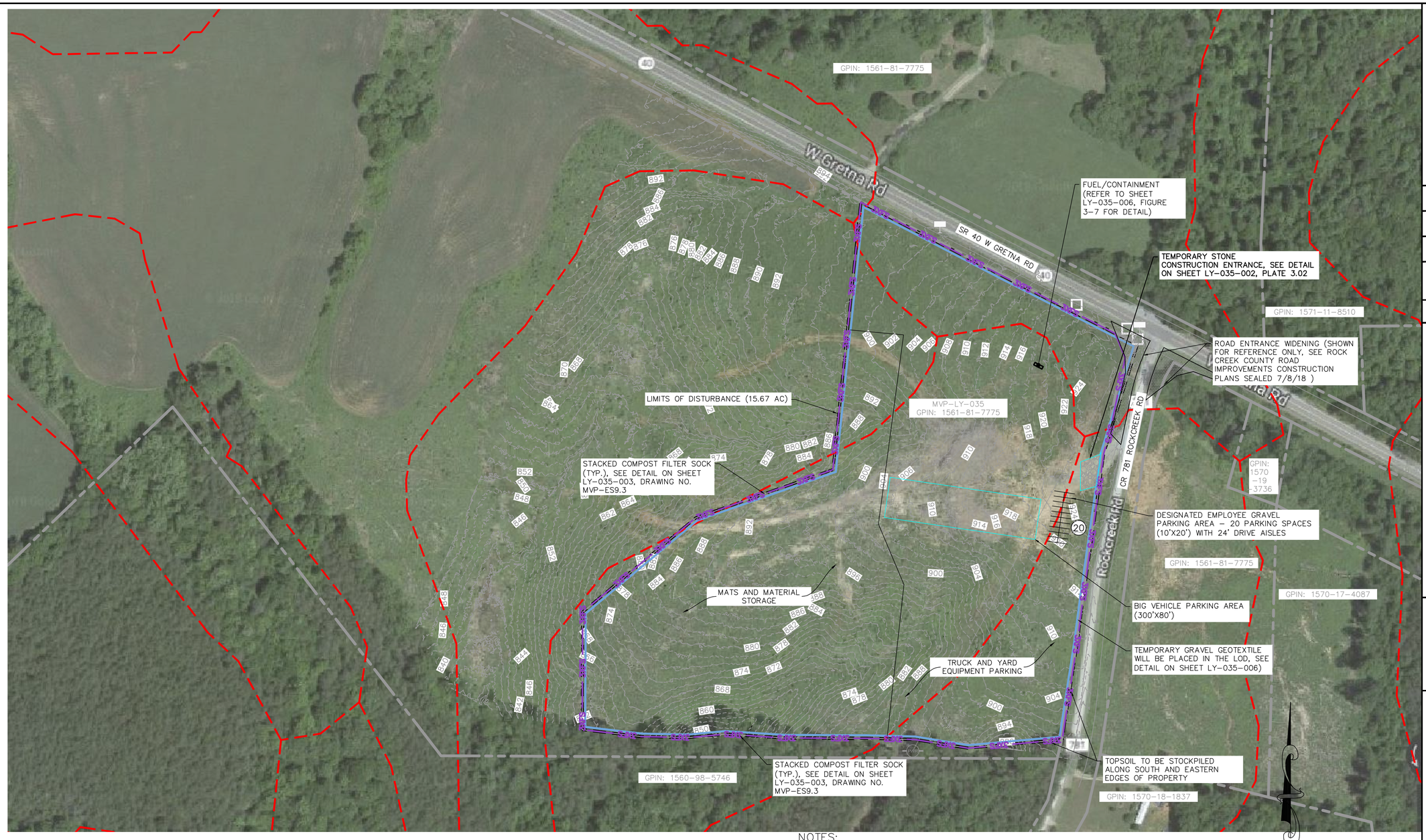


TOPO DATA SOURCE:

2.0' CONTOURS WERE CERTIFIED & PROVIDED BY HOLLAND ENGINEERING AND WERE GENERATED USING PHOTOGRAMMETRIC METHODS WITH A DRONE.

LEGEND

- 1760 — EXISTING CONTOUR (MAJOR)
- 1756 — EXISTING CONTOUR (MINOR)
- EXISTING SOIL DIVIDE
- PROPOSED LIMIT OF DISTURBANCE
- 3XFS — PROPOSED STACKED COMPOST FILTER SOCK (REFER TO SHEET LY-035-003, DRAWING NO. MVP-ES9.3 FOR DETAIL)
- PROPOSED STONE CONSTRUCTION ENTRANCE (REFER TO SHEET LY-035-002, PLATE 3.02 FOR DETAIL)
- LIMITS OF TEMPORARY GRAVEL (REFER TO SHEET LY-035-006 FOR TYPICAL GRAVEL SURFACE DETAIL)

NOTES:

1. 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.
2. FUEL CONTAINMENT METHODS ARE DISCUSSED IN THE LY-035 STORMWATER POLLUTION PREVENTION PLAN (SWPPP). REFER TO SHEET LY-035-006, FIGURE 3-7 FOR TYPICAL DETAIL FOR FUEL STORAGE AREA.
3. VEGETATION WILL BE REMOVED BY BRUSH HOGGING THE AREA WHERE APPLICABLE AND TREE STUMP REMOVAL WHERE NECESSARY. NO GRADING ACTIVITY OTHER THAN NECESSARY FOR TREE STUMP REMOVAL WILL OCCUR AS PART OF THIS PROJECT. TEMPORARY GRAVEL OVER GEOTEXTILE (SEE DETAIL) WILL BE INSTALLED AFTER ALL VEGETATION/TREES ARE REMOVED.
4. ALL FACILITIES ARE TEMPORARY AND WILL BE REMOVED FOLLOWING CONSTRUCTION. ALL GRAVEL WILL BE REMOVED AND THE LOD WILL BE REVEGETATED PER THE TABLES ON DETAILS MVP-ES11.1 TO MVP-ES11.9 OR PER LANDOWNER REQUEST.
5. LIGHT SOURCES SHALL NOT CASE EXCESS LIGHT (GLARE) UPON ADJACENT PROPERTIES OR STREETS. THE INTENSITY OF LIGHT SHALL NOT EXCEED 0.25 FOOT CANDLES MEASURED AT THE BOUNDARY OF ANY COMMERCIAL OR INDUSTRIAL USE ABUTTING ANY RESIDENT USE OR AT THE LOT LINE WITH ANY RESIDENTIAL DISTRICT, OR, IN RESIDENTIAL OR AGRICULTURAL DISTRICTS, AT THE LOT LINE OF ANY ADJACENT LOT.
6. ALL MOBILE EQUIPMENT WILL HAVE SPILL KITS. IN ADDITION, SPILL KITS WILL BE STAGED AT THE FUELING STATION. ADDITIONAL SPILL KIT MATERIALS WILL BE STORED IN THE STORAGE TRAILERS.
7. NO WASH RACKS PROPOSED AT THIS AREA, IF USED – WILL BE IN ACCORDANCE WITH RCE.
8. NO EQUIPMENT OR TEMPORARY TRAILERS WILL BE STORED IN THE FLOODWAY.
9. A TEMPORARY SCREEN SAFETY FENCE (SEE DETAIL ON SHEET LY-035-002) WILL BE PLACED ALONG THE LIMITS OF DISTURBANCE.

NO.:	DATE:	DWN.:	CHKD.:	APPD.:	DESCRIPTION:

REVISIONS:

Mountain Valley PIPELINE
ANCILLARY SITE
EROSION AND SEDIMENT CONTROL PLANS
MOUNTAIN VALLEY PIPELINE PROJECT – H600 LINE
PITTSYLVANIA 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

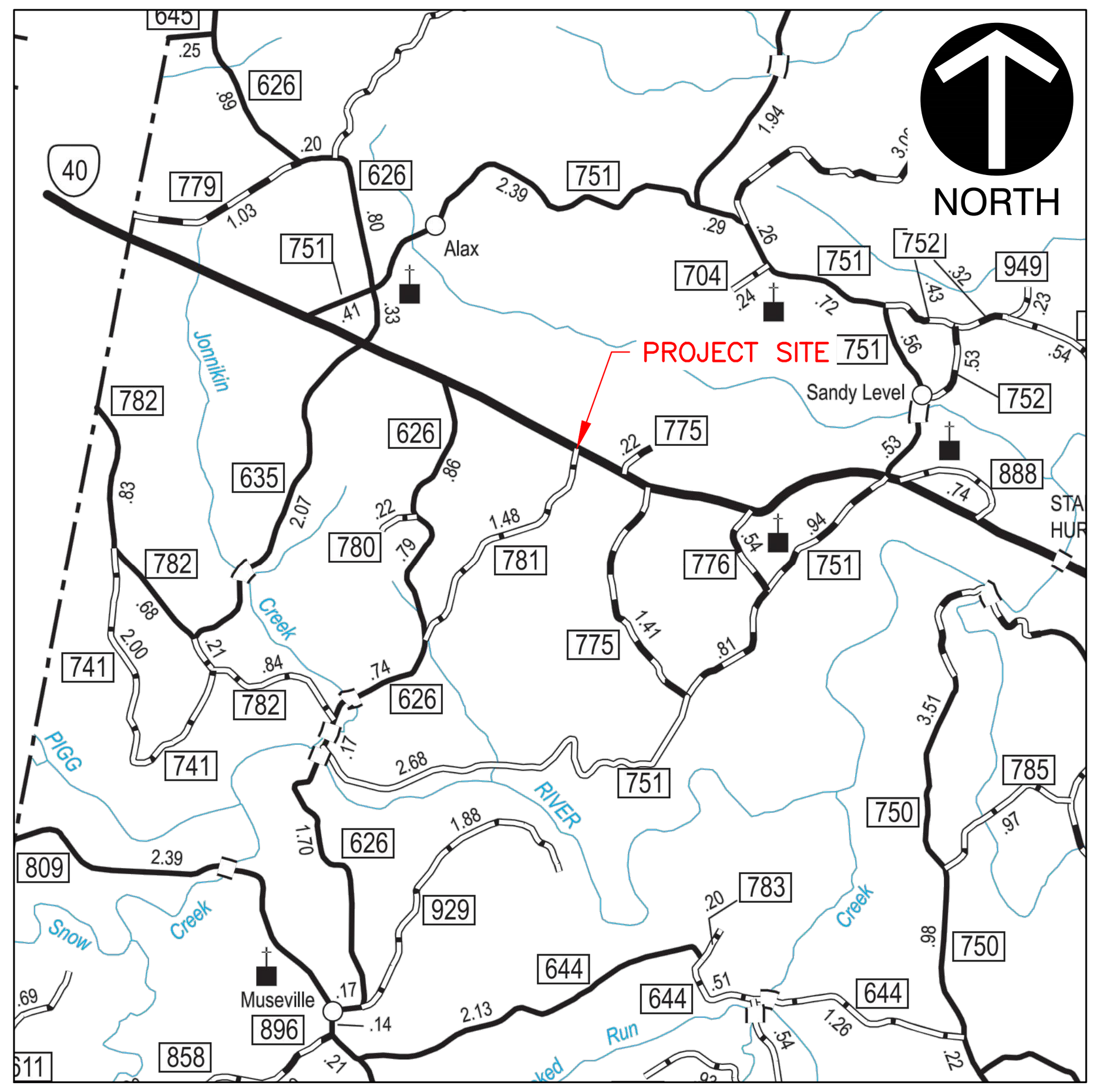
CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA
CAROLYN A. HOWARD
lic. No. 042775
PROFESSIONAL ENGINEER
1-30-18

SITE PLAN

DRAWN BY:	LAA
CHECKED BY:	CH
APPROVED BY:	CH
DATE:	07/30/2018
SCALE:	AS SHOWN
SHT. NO. LY-035-010	OF 10

REVISION

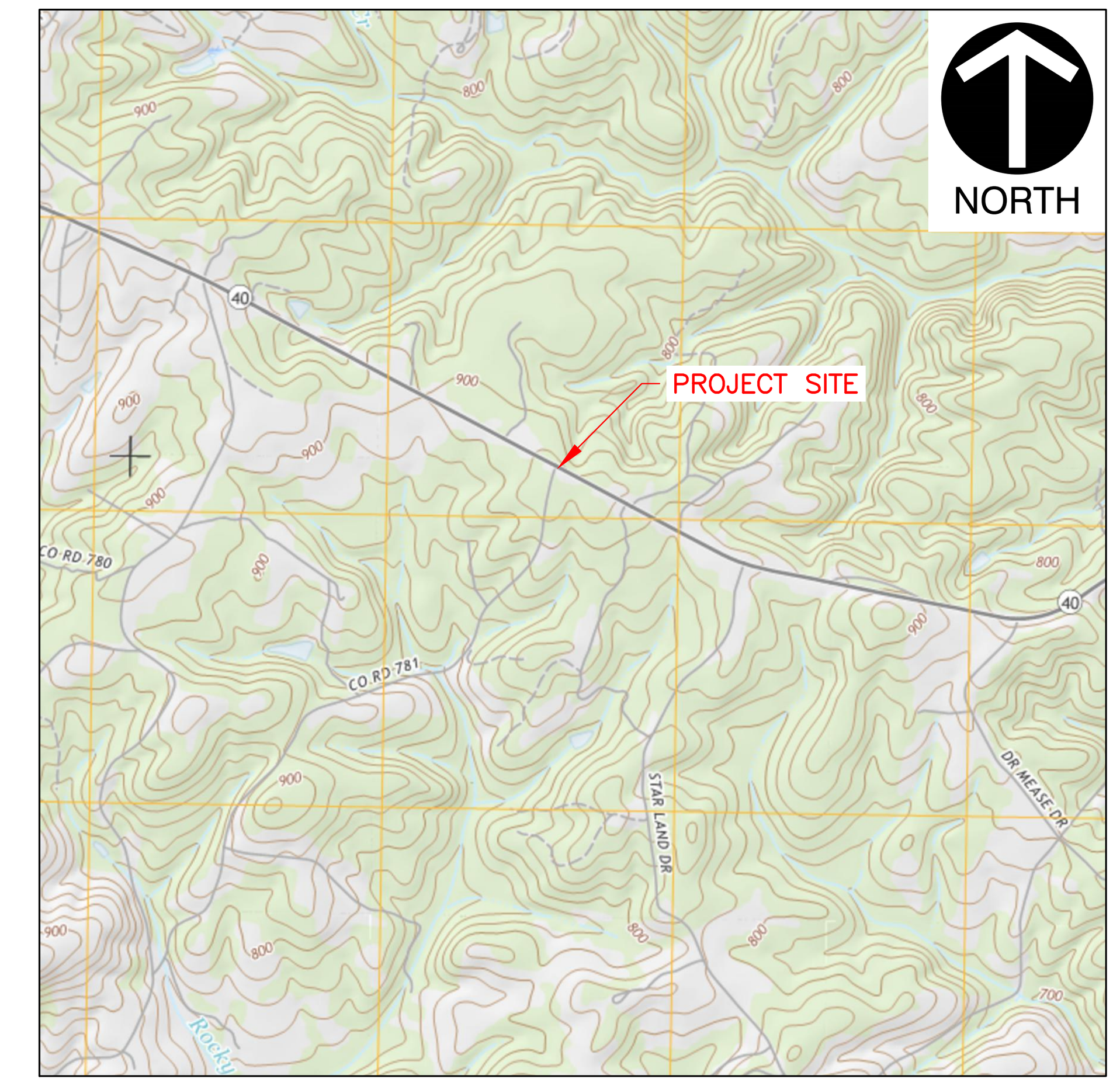


VICINITY MAP

SCALE: 1 INCH = 1 MILE

ROCK CREEK ROAD
COUNTY ROUTE IMPROVEMENT
CONSTRUCTION PLANS

COUNTY ROUTE 781 (ROCKCREEK ROAD) &
STATE ROUTE 40 (WEST GRETNA ROAD)
PITTSYLVANIA COUNTY, VIRGINIA



LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

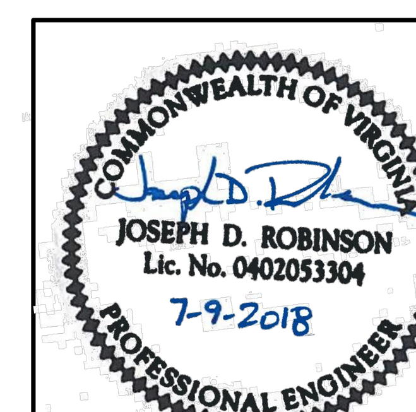
UTILITY CONTACTS

INDEX TO SHEETS

NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	TYPICAL SECTION
4	DETAILS
5	PHASE 1 PLAN & PROFILE
5	PHASE 2 PLAN & PROFILE
7	EROSION AND SEDIMENT CONTROL PLAN
8	EROSION AND SEDIMENT CONTROL DETAILS
9	TEMPORARY TRAFFIC CONTROL PLAN
10	SIGNING AND MARKING PLAN
11	SIGNING AND MARKING DETAILS

va811.com Dig With CARE

CONTRACTOR SHALL CONTACT
MISS UTILITY OF VIRGINIA
AT 800-552-7001
AT LEAST 48 HOURS
PRIOR TO BEGINNING WORK.



REVISION RECORD

NO	DATE	DESCRIPTION
1	07/09/2018	SIGNING AND MARKING REVISIONS PER VDOT COMMENTS

Civil & Environmental Consultants, Inc.
600 Marketplace Avenue, Suite 200 · Bridgeport, WV 26330
Ph: 304.933.3119 · 855.488.9539 · Fax: 304.933.3327
www.cecinc.com

MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

TITLE SHEET

DATE:	
DRAWN BY:	MAS
DWG SCALE:	AS SHOWN
CHECKED BY:	GSL
PROJECT NO:	180-426
APPROVED BY:	JDR

DRAWING NO.: 1

SHEET 1 OF 11

GENERAL NOTES

1. TRIP GENERATION DATA:

USE:	TOTAL DAILY TRIPS: 200 VPD
GROSS SQ. FT.	AM PEAK HOUR TRIPS: 9 VPH
ITE CODE.	PM PEAK HOUR TRIPS: 9 VPH

2. ALL CONSTRUCTION METHODS AND MATERIALS WITHIN STATE MAINTAINED RIGHT OF WAY SHALL BE IN ACCORDANCE WITH CURRENT VDOT STANDARDS, SPECIFICATIONS, CURRENT "WORK AREA PROTECTION MANUAL", AND ALL APPLICABLE LOCATION AND DESIGN INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM. INSPECTION DOCUMENTATION SHALL BE PROVIDED CONSISTENT WITH THE VDOT INSPECTION DOCUMENTATION BEST PRACTICES MANUAL.

3. A LAND USE PERMIT SHALL BE OBTAINED FROM VDOT BEFORE ANY CONSTRUCTION IS STARTED WITHIN STATE MAINTAINED RIGHT OF WAY LIMITS, INCLUDING ACCESS. ALL LAND USE PERMIT APPLICATIONS MUST HAVE APPROVED PLANS, A COPY OF THE PLAN APPROVAL LETTER, A CHECK FOR THE PROCESSING FEE MADE PAYABLE TO TREASURER OF VIRGINIA, AND SURETY OR BOND IN THE REQUIRED AMOUNT.

4. IN ACCORDANCE WITH THE PROVISIONS OF THE INSPECTION DOCUMENTATION BEST PRACTICES MANUAL, VDOT SHALL BE NOTIFIED PRIOR TO THE START OF ANY WORK WITHIN STATE MAINTAINED RIGHT OF WAY. THE CONTRACTOR WILL COORDINATE WITH THE VDOT POINT OF CONTACT AT SIGNIFICANT STAGES OF THE PROJECT.

5. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL CONSULT THE ENGINEER WHO SEALED THE PLANS TO VERIFY THE APPROVAL OF THE PLANS BY ALL APPLICABLE FEDERAL, STATE, AND LOCAL AGENCIES.

6. THE CONTRACTOR SHALL HAVE AVAILABLE A COPY OF THE LAND USE PERMIT(S), FINAL APPROVED PLANS, ANY APPROVED REVISIONS, AND A COPY OF THE APPROVAL LETTER ON SITE.

7. THE CONTRACTOR SHALL VERIFY THE ELEVATIONS OF ALL POINTS OF CONNECTION OR PROPOSED WORK TO EXISTING CURBS, SANITARY LINES, WATERLINES, ETC., PRIOR TO CONSTRUCTION.

8. ANY ERRORS, CONFLICTS, OR DISCREPANCIES FOUND ON THE APPROVED PLANS SHALL BE REPORTED TO THE ENGINEER WHO SEALED AND SIGNED THE PLANS. VDOT SHALL BE NOTIFIED FOR RESOLUTION BEFORE PROCEEDING FURTHER WITH THE WORK, IF THE STATE MAINTAINED RIGHT OF WAY IS AFFECTED.

9. DESIGN CHANGES, SPECIFIED MATERIAL CHANGES, AND /OR FIELD CHANGES FROM THE APPROVED PLANS SHALL BE RE-SUBMITTED TO VDOT FOR REVIEW AND APPROVAL, PRIOR TO PROCEEDING WITH THE WORK.

10. ALL ENTRANCES SHALL BE CONSTRUCTED IN ACCORDANCE WITH CURRENT VDOT STANDARDS.

11. SIGHT DISTANCES AT ENTRANCES AND INTERSECTIONS SHALL BE MAINTAINED AT ALL TIMES DURING AND AFTER CONSTRUCTION. ANY OBJECT OR LANDSCAPING THAT OBSTRUCTS DRIVER VIEW SHALL BE RELOCATED AT THE DEVELOPER'S EXPENSE OR THE ENTRANCE MAYBE CLOSED AT VDOT'S DISCRETION.

12. THE DEVELOPER IS RESPONSIBLE FOR ANY DAMAGE TO EXISTING ROADS, UTILITIES, AND ANY OTHER INSTALLATIONS ALREADY IN PLACE WHICH OCCUR AS A RESULT OF PROJECT CONSTRUCTION WITHIN OR CONTIGUOUS TO STATE RIGHT OF WAY LIMITS.

13. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR IN ACCORDANCE WITH THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK AND VIRGINIA STORMWATER MANAGEMENT PROGRAM. AN INDIVIDUAL CERTIFIED BY THE VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION, HOLDING A RESPONSIBLE LAND DISTURBER CERTIFICATION, SHALL BE IN CHARGE OF THE LAND DISTURBING ACTIVITY AND ON THE WORK SITE AT ALL TIMES.

14. FAILURE TO FOLLOW MS-17 CAN RESULT IN CLOSURE OF THE CONSTRUCTION ENTRANCE AND TERMINATION OF THE LUP.

15. NO STRUCTURE SHALL BE CONSTRUCTED ON VDOT RIGHTS OF WAY UNLESS SHOWN ON VDOT APPROVED CONSTRUCTION PLANS OR COVERED BY A VDOT LAND USE PERMIT. ALL FIXED OBJECTS SUCH AS SIGNS, UTILITY CABINETS, PEDESTALS, AND STREETLIGHTS SHALL BE LOCATED IN ACCORDANCE WITH CLEAR ZONE REQUIREMENTS, AS NOTED IN THE ROAD DESIGN MANUAL. THERE SHALL NOT BE ANY CABINETS, PEDESTALS, OR FIRE HYDRANTS LOCATED ON THE SHOULDER.

16. THE DEVELOPER IS RESPONSIBLE FOR FURNISHING AND INSTALLING ALL SIGNS FOR THE PROPOSED DEVELOPMENT. THE CONTRACTOR SHALL CONTACT VDOT TO ESTABLISH LOCATIONS FOR STOP SIGNS AND STOP BARS.

17. ALL CONSTRUCTION DEBRIS, MATERIALS, DUMPSTERS, ETC. SHALL BE LOCATED OUTSIDE THE RIGHT OF WAY.

18. VDOT SHALL NOT BE RESPONSIBLE FOR THE MAINTENANCE OF ANY STORMWATER MANAGEMENT FACILITY OR OUTFALL STRUCTURE LOCATED OUTSIDE OF STATE MAINTAINED RIGHT OF WAY LIMITS AND SHALL BE ABSOLVED FROM ALL RESPONSIBILITIES, DAMAGES AND LIABILITIES AS A RESULT OF SUCH.

19. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL UNDERGROUND AND OVERHEAD UTILITIES, WHETHER OR NOT THEY ARE SHOWN ON THE PLANS, PRIOR TO STARTING WORK. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPAIRS, AT HIS OWN EXPENSE, OF ANY UTILITIES DAMAGED BY HIS CONSTRUCTION METHODS. MISS UTILITY MUST BE CONTACTED AT 811 AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE RELOCATION OF ANY UTILITY WITHIN EXISTING OR PROPOSED RIGHT OF WAY.

20. THE PERMITTEE IS RESPONSIBLE FOR PURSUING AND OBTAINING ANY AND ALL ENVIRONMENTAL PERMITS INCLUDING, BUT NOT LIMITED TO, WETLANDS, WATERS OF THE US, WATER QUALITY, THREATENED AND ENDANGERED SPECIES, HAZARDOUS MATERIALS, AND CULTURAL RESOURCES, REQUIRED TO PURSUE THE PROPOSED ACTIVITY BEFORE ANY CONSTRUCTION IS STARTED WITHIN STATE MAINTAINED RIGHT OF WAY LIMITS. DOCUMENTS RELATED TO THESE ACTIVITIES SHALL BE SUBMITTED WITH THE LAND USE PERMIT APPLICATION.

21. THE COMMONWEALTH TRANSPORTATION BOARD, MEMBERS OF THE BOARD, THE COMMONWEALTH AND ALL COMMONWEALTH EMPLOYEES, AGENTS, AND OFFICES, SHALL BE ABSOLVED FROM ALL RESPONSIBILITIES, DAMAGES AND LIABILITIES AS A RESULT OF WORK ARISING FROM THE EXERCISE OF THE PRIVILEGES GRANTED BY PLAN AND/OR PERMIT APPROVAL.

22. ONE (1) SET OF AS-BUILT CONSTRUCTION PLANS SHALL BE SUBMITTED PRIOR TO RELEASE OF SURETY.

23. VDOT AND COUNTY APPROVAL OF CONSTRUCTION PLANS DOES NOT PRECLUDE THE RIGHT TO REQUIRE ADDITIONAL FACILITIES AS DEEMED NECESSARY IN THE FIELD PRIOR TO RELEASE OF SURETY.

UTILITIES

24. INSTALLATION OF PIPE CULVERTS AND STORM SEWERS SHALL CONFORM TO VDOT STANDARD PB-1.

25. ALL STORM SEWER SHALL BE A MINIMUM DIAMETER OF 15".

26. ALL PRE-CAST UNITS SHALL BE VDOT APPROVED. CERTIFICATION AND VDOT STAMP WILL BE REQUIRED ON ALL UNITS. SHOP DRAWINGS, GEOTECHNICAL DATA, SOIL BEARING CAPACITY, AND PLAN VIEW SHALL BE SUBMITTED AS A PACKAGE FOR VDOT REVIEW AND APPROVAL.

27. AUTHORIZED UNDERGROUND UTILITY INSTALLATIONS SHALL MAINTAIN A MINIMUM OF 36 INCHES OF COVER, INCLUDING UNDER DITCHES.

PAVEMENT

28. ASPHALT PAVEMENT WIDENING AND/OR CONNECTION SHALL CONFORM TO VDOT STANDARD WP-2.

29. ALL PAVEMENT MARKINGS ERADICATED DURING CONSTRUCTION MUST BE OVERLAID WITH SURFACE MIX OR SLURRY SEAL #4.

30. ALL VEGETATION AND ORGANIC MATERIAL SHALL BE REMOVED FROM THE RIGHT OF WAY LIMITS PRIOR TO CONDITIONING OF THE SUB-GRADE.

31. WHEN UNSUITABLE MATERIALS FOR SUB-GRADES AND OTHER ROADWAY CONSTRUCTION ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL CONTACT A GEOTECHNICAL ENGINEER AND VDOT. SUCH MATERIALS SHALL BE UNDERCUT AND BACKFILLED AS DIRECTED BY A GEOTECHNICAL ENGINEER, ACCORDING TO VDOT SPECIFICATIONS.

32. THE NECESSITY FOR ADDITIONAL VDOT STANDARD UNDER DRAINS SHALL BE DETERMINED AT TIME OF SUB-GRADE INSPECTION.

33. THE SCHEDULING OF AGGREGATE BASE INSTALLATION AND SUBSEQUENT PAVING ACTIVITIES SHALL ACCOMMODATE FORECAST WEATHER CONDITIONS ACCORDING TO VDOT "ROAD AND BRIDGE SPECIFICATIONS".

34. A PRIME COAT SEAL BETWEEN THE AGGREGATE BASE AND BITUMINOUS CONCRETE SHALL BE REQUIRED PER VDOT STANDARDS AND SPECIFICATIONS.

35. VDOT SHALL HAVE APPROVED ALL BASE COURSES FOR DEPTH AND TEMPLATE AND PERFORMED THE REQUIRED VISUAL, PROOF ROLL, COMPACTION, AND ANY ADDITIONAL INSPECTIONS AS DETERMINED BY THE VDOT INSPECTOR PRIOR TO PLACEMENT OF ANY SURFACE COURSES.

36. VDOT SHALL BE PROVIDED DOCUMENTATION BY A LICENSED GEOTECHNICAL ENGINEER, CERTIFYING THAT ALL IN-PLACE PAVEMENTS MEET OR EXCEED THE APPROVED PAVEMENT DESIGN THICKNESS PRIOR TO RELEASE OF PERMIT SURETY. THE CERTIFYING DOCUMENTATION SHALL CONFORM TO VDOT SPECIFICATIONS AND THE APPROVED PLANS.

37. A LICENSED GEOTECHNICAL ENGINEER SHALL ASCERTAIN THE CAUSE AND CERTIFY A RECOMMENDED METHOD OF REPAIR FOR ALL PAVEMENT STRUCTURAL FAILURES PRIOR TO VDOT ACCEPTANCE FOR MAINTENANCE..

MISCELLANEOUS

38. OVERHEAD UTILITY INSTALLATIONS WITHIN LIMITED ACCESS AND NON LIMITED ACCESS RIGHT OF WAY SHALL BE INSTALLED IN ACCORDANCE WITH VDOT LAND USE PERMIT REGULATIONS.

39. ALL ROADWAY LIGHTING SHALL BE INSTALLED IN ACCORDANCE WITH IESNA LIGHTING CRITERIA AND IN ACCORDANCE WITH VDOT ROAD AND BRIDGE SPECIFICATIONS. ALL ROADWAY LIGHTING SHALL ADHERE TO THE VIRGINIA LIGHTING LAW.

40. CONTACT TRAFFIC ENGINEERING OPERATIONS A MINIMUM OF 48 HOURS IN ADVANCE WHENEVER EXCAVATION IS WITHIN 500 FEET OF A TRAFFIC SIGNAL, SO THE LINES CAN BE MARKED.

REVISION RECORD

NO	DATE	DESCRIPTION
1	07/09/2018	SIGNING AND MARKING REVISIONS PER VDOT COMMENTS

Civil & Environmental Consultants, Inc.
600 Marketplace Avenue, Suite 200 · Bridgeport, WV 26330
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www.cecinc.com

MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

GENERAL NOTES

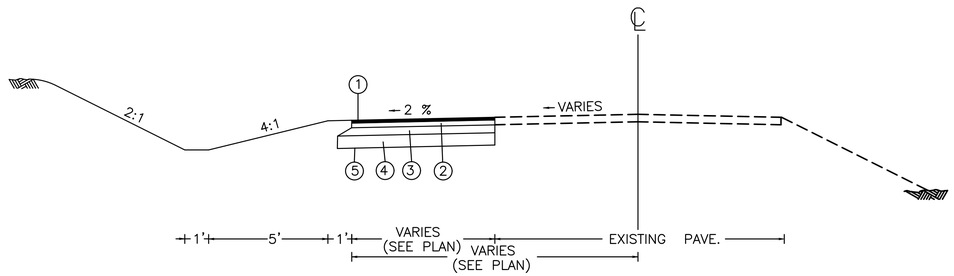
DATE:		DRAWN BY:	MAS
DWG SCALE:	AS SHOWN	CHECKED BY:	GSL
PROJECT NO:			180-426
APPROVED BY:			JDR

COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

DRAWING NO.: 2

SHEET 2 OF 11

RTE. 781



RTE. 781/VA. RTE 40 WIDENING TYPICAL SECTION

PAVEMENT DESIGN

1. 2" ASPHALT CONCRETE SURFACE COURSE TYPE SM-12.5A
2. 3" ASPHALT CONCRETE SURFACE COURSE TYPE IM-19.0
3. 3" ASPHALT CONCRETE SURFACE COURSE TYPE BM-25.0
4. 8" AGGREGATE BASE MATERIAL TYPE II NO. 21A
5. GEOTEXTILE PAVING FABRIC

COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

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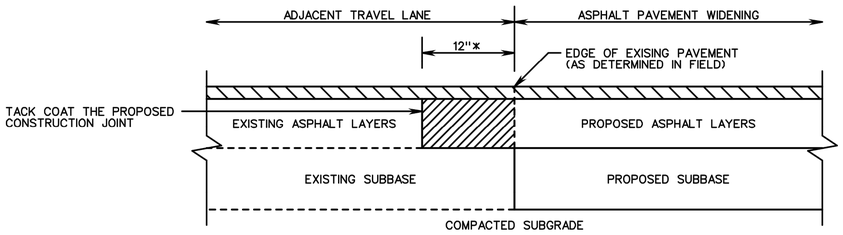
MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

TYPICAL SECTION

DRAWN BY:	MAS
CHECKED BY:	GSL
DWG SCALE:	AS SHOWN
PROJECT NO:	180-426
APPROVED BY:	JDR
DATE:	

DRAWING NO.: 3

SHEET 3 OF 11



CONSTRUCTION JOINT DETAIL

REMOVE EXISTING ASPHALT LAYERS TO EXISTING SUBBASE AND REPLACE WITH PROPOSED ASPHALT WIDENING LAYERS

PROPOSED MINIMUM 1½ INCH THICK ASPHALT SURFACE COURSE (SEE NOTE 5)

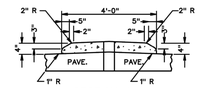
* MINIMUM 12 INCHES, OR GREATER AS NECESSARY TO ABUT THE FULL THICKNESS OF EXISTING ASPHALT LAYERS AS DETERMINED BY CORES (SEE NOTE 3)

NOTES:

1. ASPHALT PAVEMENT WIDENING SHALL HAVE A PAVEMENT DESIGN IN ACCORDANCE WITH CURRENT VDOT PROCEDURES AND BE APPROVED BY THE ENGINEER.
2. THE PAVEMENT DESIGN FOR ASPHALT PAVEMENT WIDENING SHALL MEET OR EXCEED THE DEPTHS AND TYPES OF THE LAYERS OF EXISTING PAVEMENT. SUBSURFACE DRAINAGE OF THE EXISTING AND PROPOSED PAVEMENT SHALL BE ADDRESSED IN THE PAVEMENT DESIGN.
3. A MINIMUM OF THREE CORES SHALL BE TAKEN ALONG THE CENTER OF THE ADJACENT TRAVEL LANE TO DETERMINE THE TYPE AND THICKNESS OF EXISTING PAVEMENT LAYERS. THESE CORES SHALL BE SPACED NO MORE THAN 500 FEET APART.
4. THE ADJACENT TRAVEL LANE SHALL BE MILLED A MINIMUM DEPTH OF 1½ INCHES AND REPLACED WITH AN ASPHALT SURFACE COURSE TO MATCH THE PROPOSED PAVEMENT WIDENING SURFACE COURSE, UNLESS WAIVED BY THE ENGINEER.
5. THE ENGINEER MAY REQUIRE THE MILLING DEPTH OF THE EXISTING PAVEMENT TO BE ADJUSTED TO ACHIEVE AN ACCEPTABLE PAVEMENT CROSS-SLOPE AND EFFECTIVE SURFACE DRAINAGE.
6. EXISTING PAVEMENT MARKINGS AND MARKERS WITHIN THE PROJECT LIMITS SHALL BE RESTORED SUBJECT TO THE APPROVAL OF THE ENGINEER.
7. FINAL TRANSVERSE PAVEMENT TIE-IN SHALL CONFORM TO THE REQUIREMENTS OF SECTION 315.05(c) OF THE SPECIFICATIONS EXCEPT THAT ALL JOINTS AT TIE-IN LOCATIONS SHALL BE TESTED USING A 10 FOOT STRAIGHTEDGE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 315.07(a) OF THE SPECIFICATIONS.

ASPHALT PAVEMENT WIDENING
FOR WIDENING SUBJECT TO TRAFFIC
N.T.S.

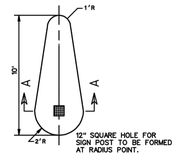
NOTE:
℄ OF ISLAND IS TO BE PERPENDICULAR TO ℄ OF MAJOR ROUTE REGARDLESS OF THE ANGLE OF INTERSECTION.



SECTION A-A
BASIS OF PAYMENT - EACH

0.5 CU. YDS CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.

NOTE:
SIZE OF ISLAND IS TO BE GOVERNED BY OFFSETS FROM PAVEMENT EDGES & ℄ AS SHOWN ON PLANS.



WHEN SIGN ISLAND IS INSTALLED OVER EXISTING PAVEMENT A HOLE FOR SIGN POST IS TO BE EXTENDED TO THE SUBBASE.

DETAIL OF STANDARD
SIGN ISLAND
N.T.S.

COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

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MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

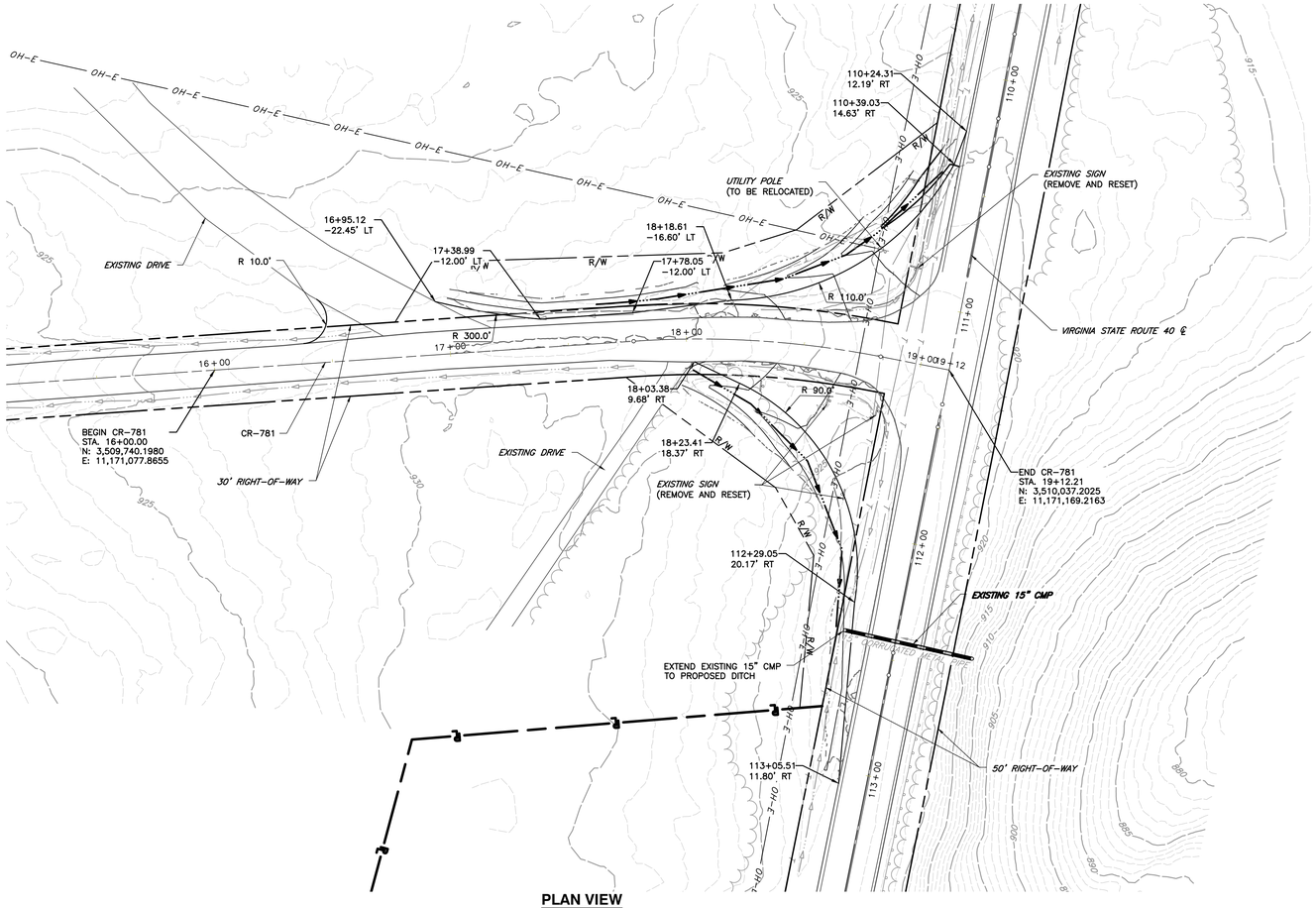
DETAILS

DRAWN BY:	MAS
CHECKED BY:	GSL
DWG SCALE:	AS SHOWN
PROJECT NO:	180-426
APPROVED BY:	JDR
DATE:	

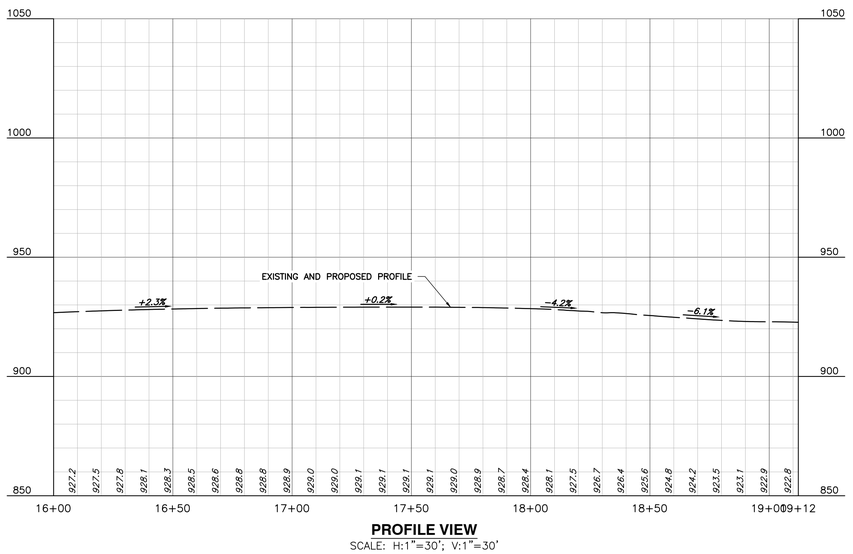
DRAWING NO.: 4

SHEET 4 OF 11

NORTH



PLAN VIEW
SCALE: 1"=30'



PROFILE VIEW
SCALE: H:1"=30'; V:1"=30'

NOTES:

- DUE TO TRUCK TURNING MOVEMENTS THE STOP SIGN FOR CR-781 HAS BEEN PLACED ACROSS VIRGINIA ROUTE 40 WITH ADVANCE WARNING SIGNAGE PLACED ON CR-781, A STANDARD SIGN ISLAND AND STOP SIGN SHALL BE INSTALLED IN PHASE 2.

LEGEND

- 850 — EXISTING INDEX CONTOUR
- EXISTING CONTOUR (INTER)
- EXISTING TREE LINE
- EXISTING FENCE
- EXISTING ROADS (PAVED)
- EXISTING ROADS (UNPAVED)
- EXISTING TREE
- EXISTING GUARDRAIL
- EXISTING UTILITY POLE
- EXISTING STREET SIGN
- OH-E — EXISTING OVERHEAD UTILITY
- W — EXISTING WATERLINE
- BORING
- T — EXISTING TELEPHONE

REVISION RECORD

NO	DATE	DESCRIPTION
1	07/06/2018	SIGNING AND MARKING REVISIONS PER VDOT COMMENTS

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Civil & Environmental Consultants, Inc.
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MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

PROPOSED COUNTY ROAD WIDENING
PHASE 1 PLAN AND PROFILE

DRAWN BY:	MAS
CHECKED BY:	GSL
DWG SCALE:	1"=30'
PROJECT NO:	180-426
APPROVED BY:	JDR
DATE:	

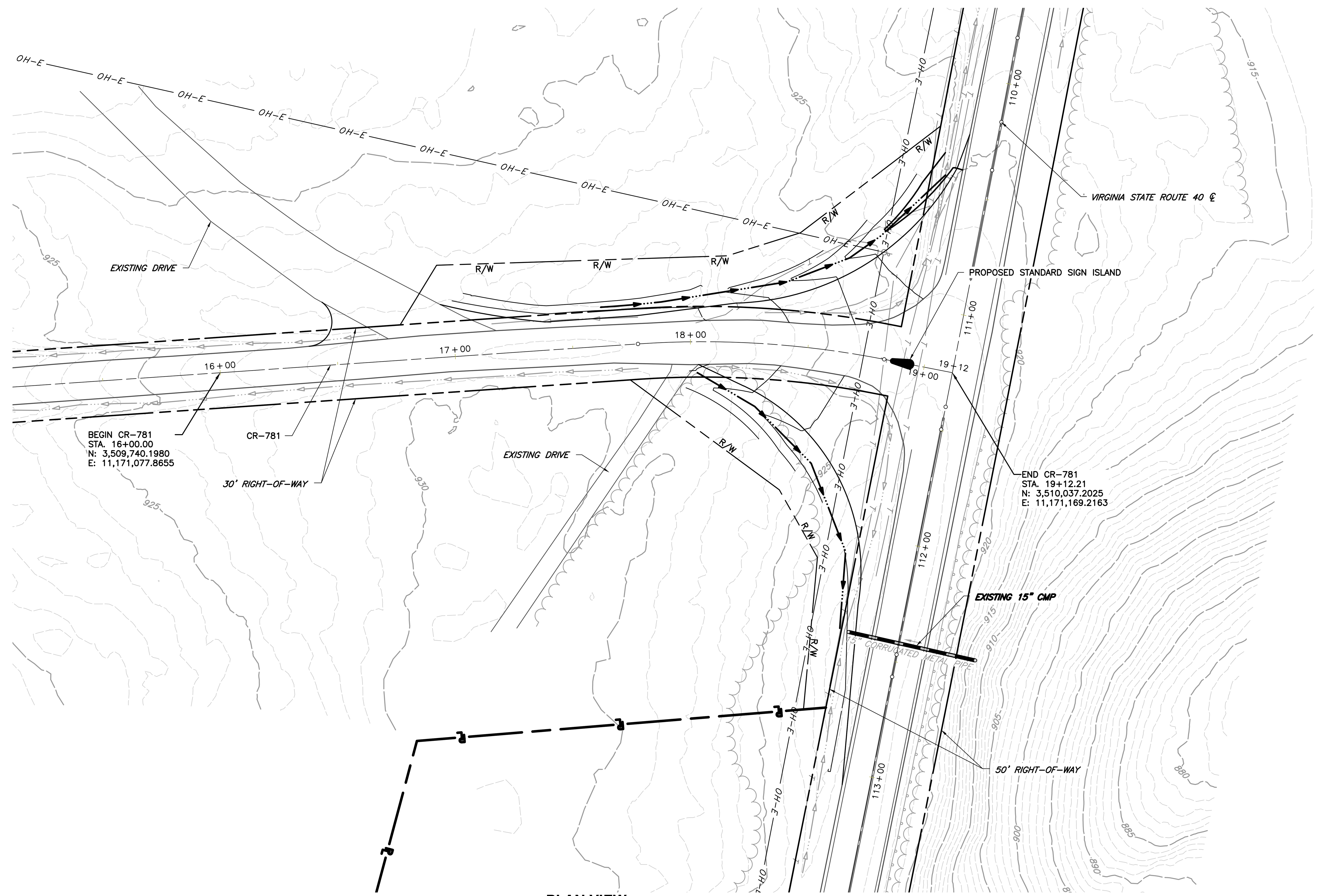
COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

DRAWING NO.: 5

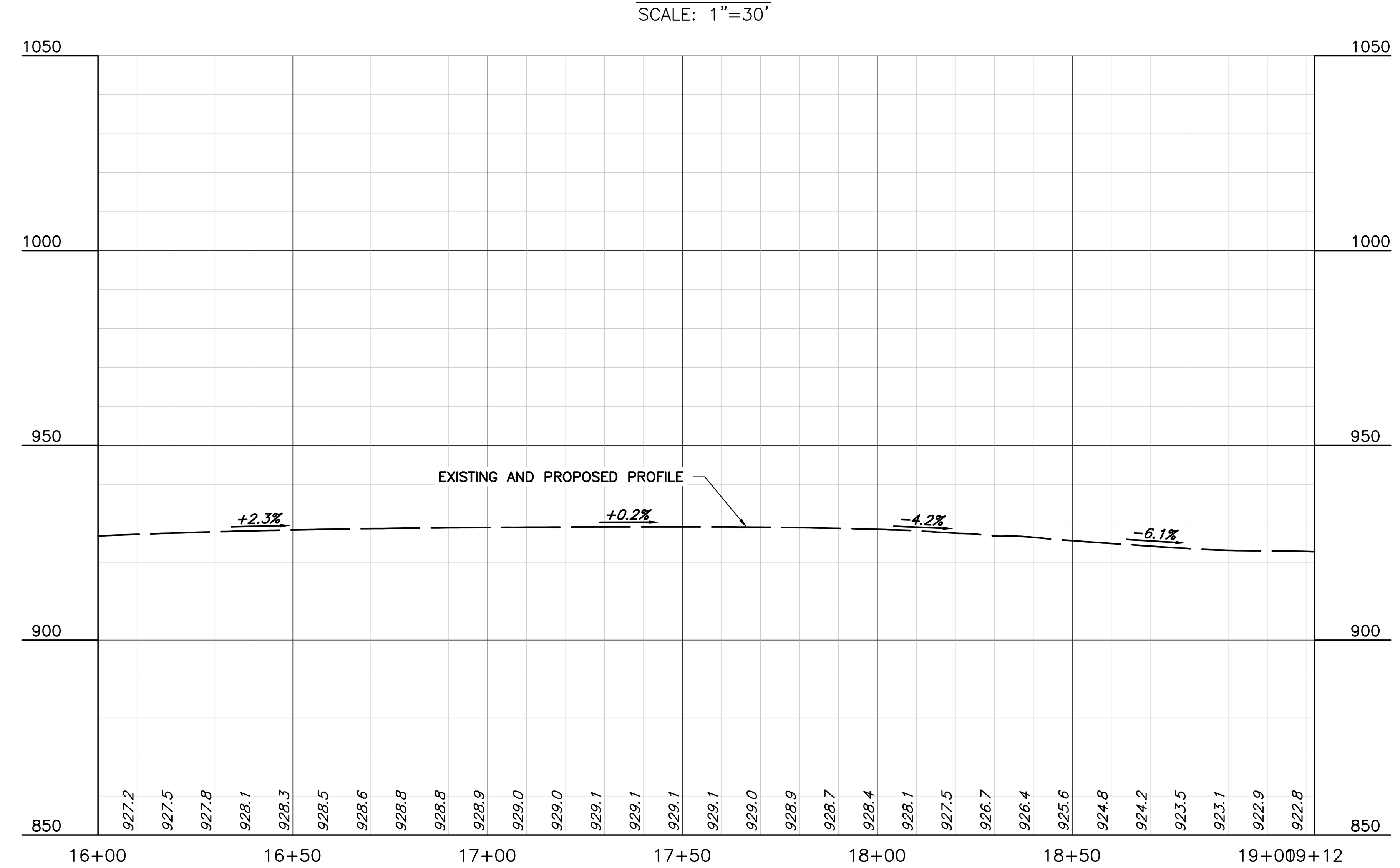
SHEET 5 OF 11

P:\2018\180-426\1-CAD\Dwg\Wk01\180426-1R01-R&P.dwg[SHEET - (1)] LS(7/9/2018 - jcarpenter) - LP: 7/9/2018 4:51 PM

NORTH



PLAN VIEW
SCALE: 1"=30'



PROFILE VIEW
SCALE: H:1"=30'; V:1"=30'

NOTES:

- DUE TO TRUCK TURNING MOVEMENTS, THE PROPOSED STANDARD SIGN ISLAND CAN'T BE INSTALLED IN PHASE 1. THE PROPOSED STANDARD SIGN ISLAND SHALL BE INSTALLED UPON COMPLETION OF MOUNTAIN VALLEY PIPELINE, LLC CONSTRUCTION ACTIVITIES.
- STANDARD SIGN ISLAND TO BE CONSTRUCTED ACCORDING TO VDOT STANDARD SI-1 FOUND ON PAGE 602.01 OF THE 2016 VDOT ROAD AND BRIDGE STANDARDS.

LEGEND

- 850 — EXISTING INDEX CONTOUR
- EXISTING CONTOUR (INTER)
- EXISTING TREE LINE
- EXISTING FENCE
- EXISTING ROADS (PAVED)
- EXISTING ROADS (UNPAVED)
- EXISTING TREE
- EXISTING GUARDRAIL
- EXISTING UTILITY POLE
- EXISTING STREET SIGN
- OH-E — EXISTING OVERHEAD UTILITY
- W — EXISTING WATERLINE
- BORING
- T — EXISTING TELEPHONE

REVISION RECORD

NO	DATE	DESCRIPTION
1	07/09/2018	SIGNING AND MARKING REVISIONS PER VDOT COMMENTS

Civil & Environmental Consultants, Inc.
600 Marketplace Avenue, Suite 200 · Bridgeport, WV 26330
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MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

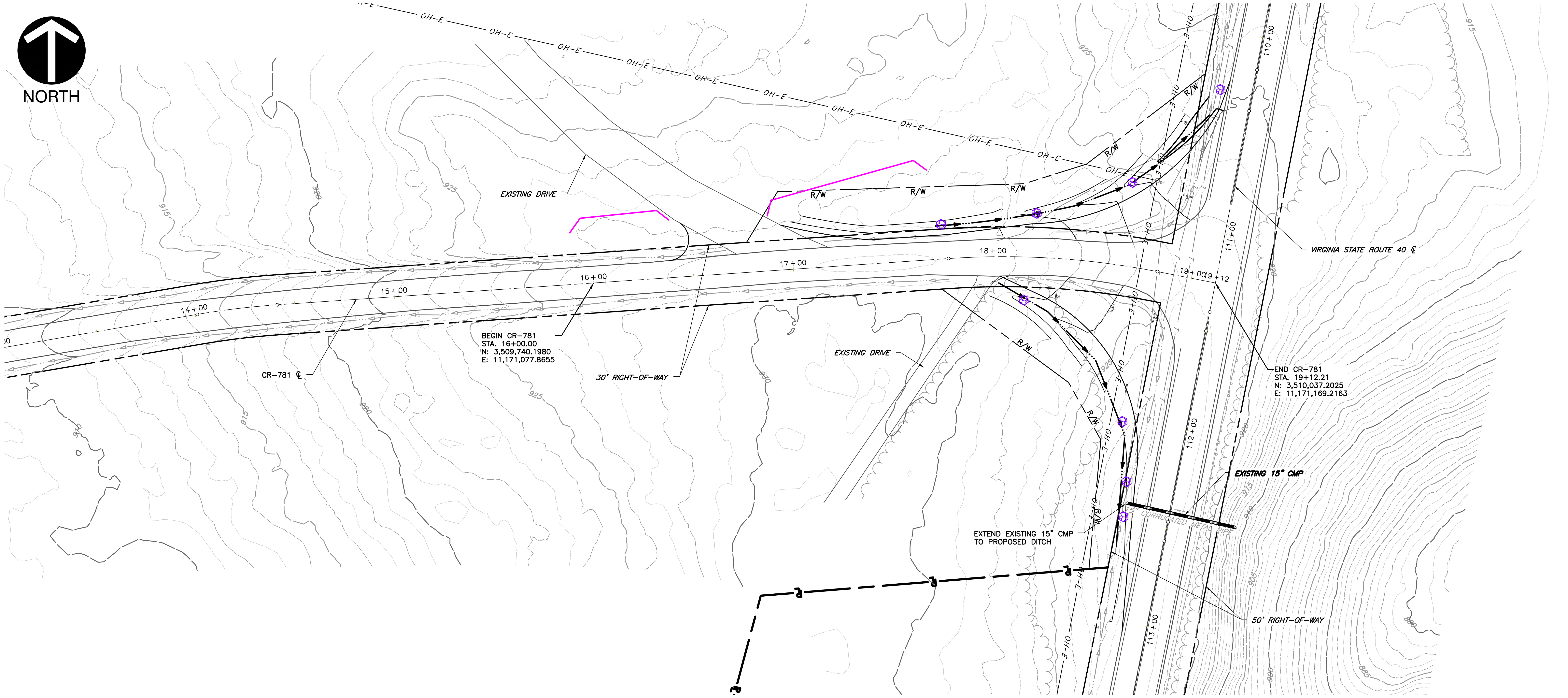
PROPOSED COUNTY ROAD WIDENING
PHASE 2 PLAN AND PROFILE

DATE:		DRAWN BY:	MAS
DWG SCALE:	1"=30'	CHECKED BY:	GSL
PROJECT NO:	180-426		
APPROVED BY:	JDR		

COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

DRAWING NO.: 6

SHEET 6 OF 11



PLAN VIEW
SCALE: 1"=30'

LEGEND

850	EXISTING INDEX CONTOUR
	EXISTING CONTOUR (INTER)
	EXISTING TREE LINE
	EXISTING FENCE
	EXISTING ROADS (PAVED)
	EXISTING ROADS (UNPAVED)
	EXISTING TREE
	EXISTING GUARDRAIL
	EXISTING UTILITY POLE
	EXISTING STREET SIGN
OH-E	EXISTING OVERHEAD UTILITY
W	EXISTING WATERLINE
	BORING
T	EXISTING TELEPHONE
	SILT FENCE
	ROCK CHECK DAM

SCALE IN FEET
0 30 60

REVISION RECORD

NO	DATE	DESCRIPTION
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MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

PROPOSED COUNTY ROAD WIDENING
EROSION AND SEDIMENT CONTROL PLAN

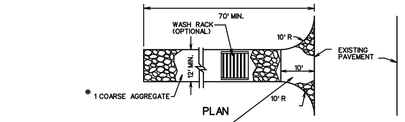
DATE:	
DRAWN BY:	MAS
DWG SCALE:	1"=30'
CHECKED BY:	GSL
PROJECT NO:	180-426
APPROVED BY:	JDR

COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

DRAWING NO.: 7
SHEET 7 OF 11

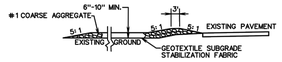
EC-11

MINIMUM REQUIREMENTS FOR STABILIZED CONSTRUCTION ENTRANCE



PLAN

6" MINIMUM DEPTH #1 COARSE AGGREGATE, WITH MINIMUM 10' CLOSEST TO ROADWAY CAPPED WITH 4" MINIMUM DEPTH #68 OR #78 AGGREGATE, AS DIRECTED BY THE ENGINEER.



PROFILE

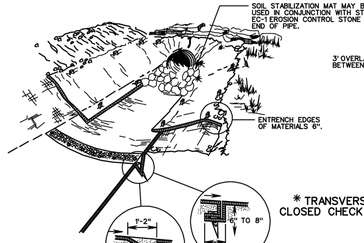
1. SURFACE WATER SHALL BE PIPED UNDER THE CONSTRUCTION ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT OF WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT OF WAY SHALL BE REMOVED IMMEDIATELY.
3. WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
4. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER HEAVY USE AND EACH RAIN.

SPECIFICATION REFERENCE	STABILIZED CONSTRUCTION ENTRANCE	VDOT ROAD AND BRIDGE STANDARDS
107 303	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: — SHEET 1 OF 1 113.15

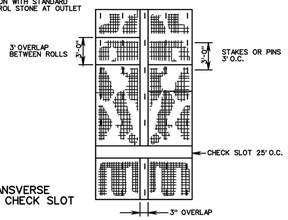
STABILIZED CONSTRUCTION ENTRANCE
N.T.S.

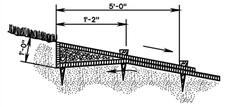
EC-3

TYPICAL INSTALLATION AT END OF PIPE



STAKING DETAIL





UPSTREAM AND DOWNSTREAM TERMINAL

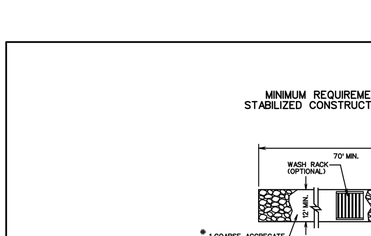
NOTES:
1. STAKES SHALL BE WOOD OR METAL AS RECOMMENDED BY THE MANUFACTURER AND SHALL BE A MINIMUM OF 12" IN LENGTH. IN SANDY SOILS METAL STAKES A MINIMUM OF 18" IN LENGTH SHALL BE USED.
2. SOIL STABILIZATION MAT TYPE A AND B ARE TO BE IN ACCORDANCE WITH THE APPROVED PRODUCTS LIST.
3. SOIL STABILIZATION MAT SHOULD BE INSTALLED TO THE SHOULDER BREAK POINT OR EXISTING GROUND THEN EMBEDDED 6", MATERIAL ON BOTH SIDES OF THE DITCH SHALL BE INSTALLED TO THE SAME ELEVATIONS.
4. IF MORE THAN 3 LINES OF MATERIAL ARE REQUIRED PARALLEL TO THE ℄ OF THE DITCH, MATERIAL SHALL BE INSTALLED PERPENDICULAR TO THE CENTER LINE OF THE DITCH, STARTING AT THE LOWEST ℄ ELEVATION OF THE DITCH.
5. FOR SOURCES OF APPROVED MATERIALS SEE VDOT'S APPROVED PRODUCTS LIST FOR ST'D. EC-3, TYPE A OR B.

SPECIFICATION REFERENCE	SOIL STABILIZATION MAT DITCH INSTALLATION TYPE A OR B	VDOT ROAD AND BRIDGE STANDARDS
244 606	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE: — SHEET 1 OF 3 113.03

SOIL STABILIZATION MATTING
N.T.S.

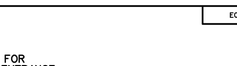
EC-4

TYPICAL DETAIL FOR ROCK CHECK DAM TYPE I



SECTION A-A

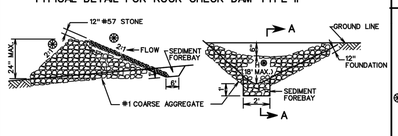
SUGGESTED ROCK CHECK DAM SPACING



L = H/S WHERE:
H = HEIGHT OF DAM CREST IN FEET
S = CHANNEL SLOPE IN FT./FT.
L = CHECK DAM SPACING IN FEET: THE DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION

CHECK DAM SPACING , L TO BE DETERMINED FROM THE EQUATION. IN STEEP SLOPE AREAS THE CHECK DAM SPACING IS NOT TO BE LESS THAN 25'.

TYPICAL DETAIL FOR ROCK CHECK DAM TYPE II



SECTION A-A FRONT ELEVATION

NOTES:
1. ROCK CHECK DAMS THAT ARE DESIGNATED ON THE PLANS AS A STORMWATER MANAGEMENT (SWM) ITEM ARE TO BE LEFT IN PLACE AS A PERMANENT INSTALLATION.
2. WHERE DRAINAGE AREAS EXCEED 1 ACRE OR DITCH GRADE EXCEEDS 5%, A TEMPORARY SEDIMENT FOREBAY SHALL BE INSTALLED WITH MINIMUM DIMENSIONS OF 12" DEPTH, 2' WIDTH AND 6' LENGTH.
3. ⊛ IF CHECK DAMS IS LOCATED INSIDE CLEAR ZONE AND ADJACENT TO A TRAVELWAY, SLOPE FACING ON COMING TRAFFIC IS TO BE 6:1 AND MAXIMUM H IS TO BE 12".
4. ALTERNATIVE MATERIALS ON VDOT'S SPEL LIST MAY BE SUBSTITUTED AT NO ADDITIONAL COST TO THE DEPARTMENT.
5. SEE STANDARD EC-5 FOR DETAILS FOR ROCK CHECK DAMS IN ROADSIDE DITCHES
6. CHECK DAM SHALL NOT BE USED FOR LOCATIONS IN LIVE STREAM.

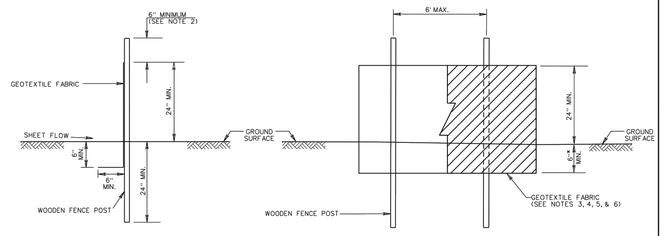
VDOT ROAD AND BRIDGE STANDARDS	ROCK CHECK DAMS TYPE I & II	SPECIFICATION REFERENCE
SHEET 1 OF 1 — REVISION DATE 113.06	VIRGINIA DEPARTMENT OF TRANSPORTATION	107 303

ROCK CHECK DAM
N.T.S.

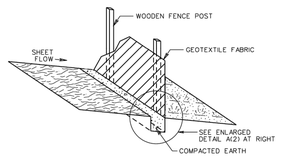
EC-5

SILT FENCE TYPE A

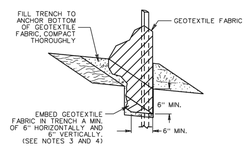
SEE SHEET 1 FOR NOTES



SECTION VIEW PROFILE VIEW



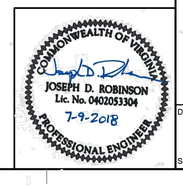
DETAIL A(1)



DETAIL A(2)

VDOT ROAD AND BRIDGE STANDARDS	A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE. TEMPORARY SILT BARRIERS SILT FENCE (TYPE A & B) AND BRUSH BARRIER VIRGINIA DEPARTMENT OF TRANSPORTATION	SPECIFICATION REFERENCE
SHEET 2 OF 4 — REVISION DATE 113.07A — 08/14		107 242 245 303

SILT FENCE
N.T.S.



REVISION RECORD

NO	DATE	DESCRIPTION
1.	07/09/2018	SIGNING AND MARKING REVISIONS PER VDOT COMMENTS

CEC
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MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

EROSION AND SEDIMENT CONTROL DETAILS

DRAWN BY:	MAS
CHECKED BY:	GSL
DATE:	
DWG SCALE:	N.T.S
PROJECT NO:	180-426
APPROVED BY:	JDR

DRAWING NO.: 8

SHEET 8 OF 11

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Typical Traffic Control

Shoulder Operation with Minor Encroachment

(Figure TTC-5.1)

NOTES

Standard

1. For required sign assemblies for multi-lane roadways see Note 1, TTC-4.[1]

Guidance

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*
3. *When work takes up part of a lane on a high volume roadway; vehicular traffic volumes, vehicle mix, speed and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment analysis permits a remaining lane width of 10 feet, the lane should be closed. If the closure operation is on a Limited Access highway, the minimum lane width is 11 feet.*

Option:

4. The ROAD WORK AHEAD (W20-1) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.

Standard:

5. A shadow vehicle with either an arrow board operating in the caution mode, or at least one high-intensity amber rotating, flashing, or[1] oscillating light shall be parked 80' - 120' in advance of the first work crew.

6. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, or[1] oscillating lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, or[1] oscillating lights.

7. Taper length (L) and channelizing device spacing shall be at the following:

Taper Length (L)				
Speed Limit (mph)	Lane Width (Feet)			
	9	10	11	12
25	95	105	115	125
30	135	150	165	180
35	185	205	225	245
40	240	270	295	320
45	405	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840
Minimum taper lengths for Limited Access highways shall be 1000 feet.				
Shoulder Taper = ⅓ L Minimum				

Channelizing Device Spacing		
Location	Speed Limit (mph)	
	0 - 35	36 +
Transition Spacing	20'	40'
Travelway Spacing	40'	80'
Construction Access*	80'	120'
* Spacing may be increased to this distance, but shall not exceed one access per ¼ mile.		

On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.

8. The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.

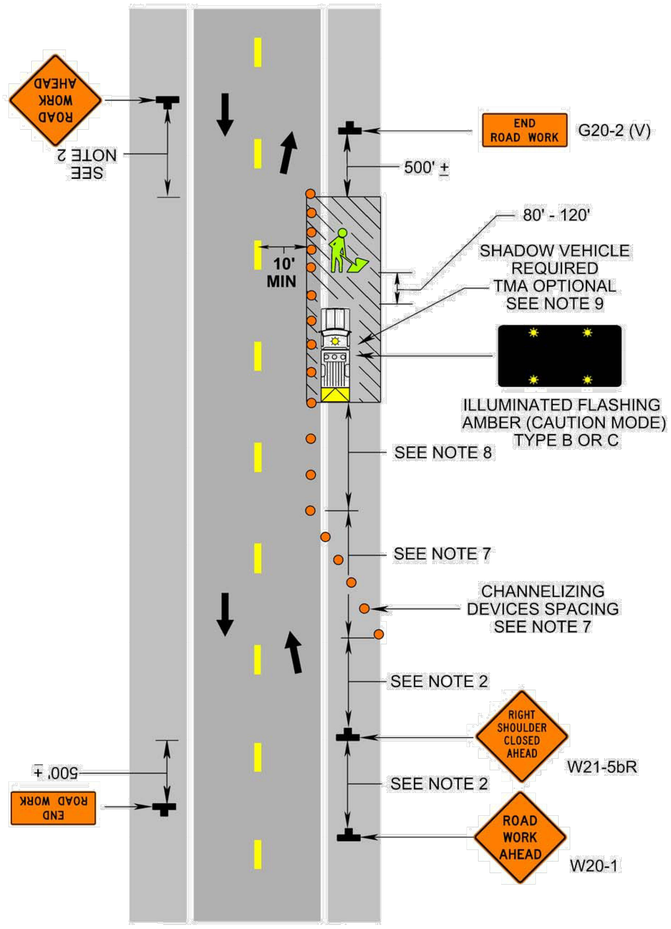
9. A truck-mounted attenuator (TMA) shall be used on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.

10. When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.

1: Revision 1 – 4/1/2015

Shoulder Operation with Minor Encroachment

(Figure TTC-5.1)



TEMPORARY TRAFFIC CONTROL NOTES

1. TEMPORARY TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH SECTION 512 OF THE 2016 VDOT ROAD AND BRIDGE SPECIFICATIONS AND THE VIRGINIA WORK AREA PROTECTION MANUAL ADOPTED 2011 AND REVISED JANUARY 2015 WHICH IS MADE A PART OF THIS CONTRACT AND THE TEMPORARY TRAFFIC CONTROL PLAN FOR INDIVIDUAL SEGMENTS AS DESCRIBED BELOW.
2. REFLECTIVE SHEETING ON TEMPORARY TRAFFIC CONTROL DEVICES SHALL BE OF NEW CONDITION AT BEGINNING OF THE PROJECT LIFE. NIGHT VISIBILITY AND LEGIBILITY SHALL BE MAINTAINED.
3. ACCESS TO ALL HOUSES, CHURCHES AND BUSINESSES SHALL BE MAINTAINED AT ALL TIMES.
4. EXISTING SIGNS AND DELINEATORS: ANY SUCH EXISTING FACILITY RELOCATED, REMOVED, OR DAMAGED BY THE CONTRACTOR SHALL BE REPLACED TO ITS ORIGINAL CONDITION BY THE CONTRACTOR AT HIS EXPENSE.
5. WHEN COVERING EXISTING SIGNS, THE CONTRACTOR HAS THE OPTIONS OF USING:
   A. HEAVY DUTY BLACK OVERLAY (PLASTIC OR BURLAP TYPE).
   B. THIN WOOD OVERLAY (E.G. PLYWOOD).
   C. TAKING SIGNS DOWN AND REINSTALLING WHEN APPROPRIATE.
   D. ANY DAMAGES CAUSED BY ABOVE–NAMED SHALL BE REPAIRED/REPLACED TO ORIGINAL CONDITION AT CONTRACTOR'S EXPENSE.

SEQUENCE OF CONSTRUCTION

1. INSTALL TEMPORARY TRAFFIC CONTROL.
2. INSTALL TTC–5.1 FOR ALL CONSTRUCTION ACTIVITIES ON COUNTY ROUTE 781.
3. INSTALL TTC–5.1 FOR INTERSECTION TURN WIDENING AND DRIVEWAY ENTRANCE CONSTRUCTION ON STATE ROUTE 40.
4. REMOVE ALL TEMPORARY TRAFFIC CONTROL WHEN ALL WORK HAS BEEN COMPLETED.

REVISION RECORD

NO	DATE	DESCRIPTION
1	07/09/2018	DRAWING AND MARKING REVISIONS PER VDOT COMMENTS

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MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

TEMPORARY TRAFFIC CONTROL PLAN

DRAWN BY:	MAS
CHECKED BY:	GSL
DWG SCALE:	AS SHOWN
PROJECT NO:	180-426
APPROVED BY:	JDR
DATE:	

COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

DRAWING NO.: 9

SHEET 9 OF 11

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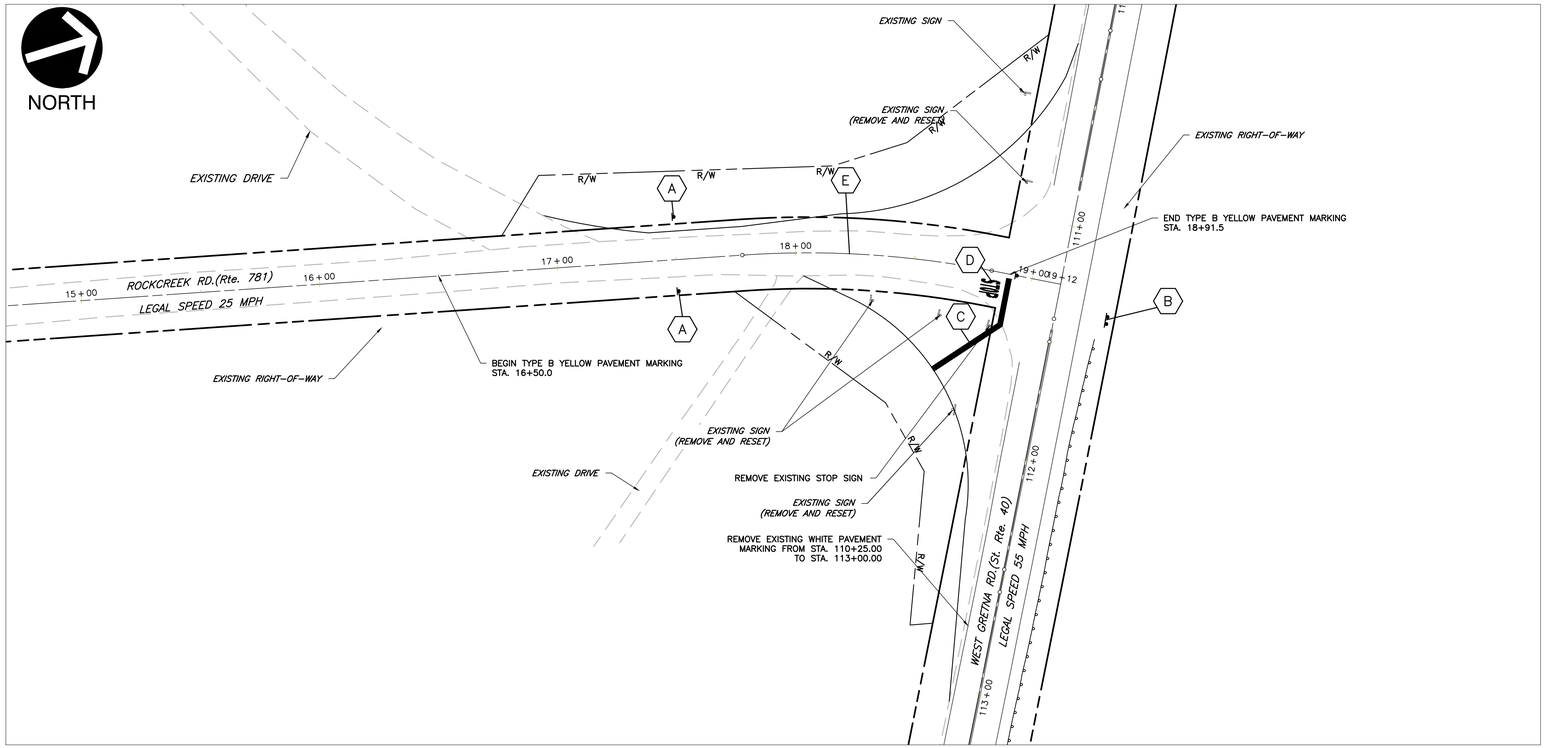
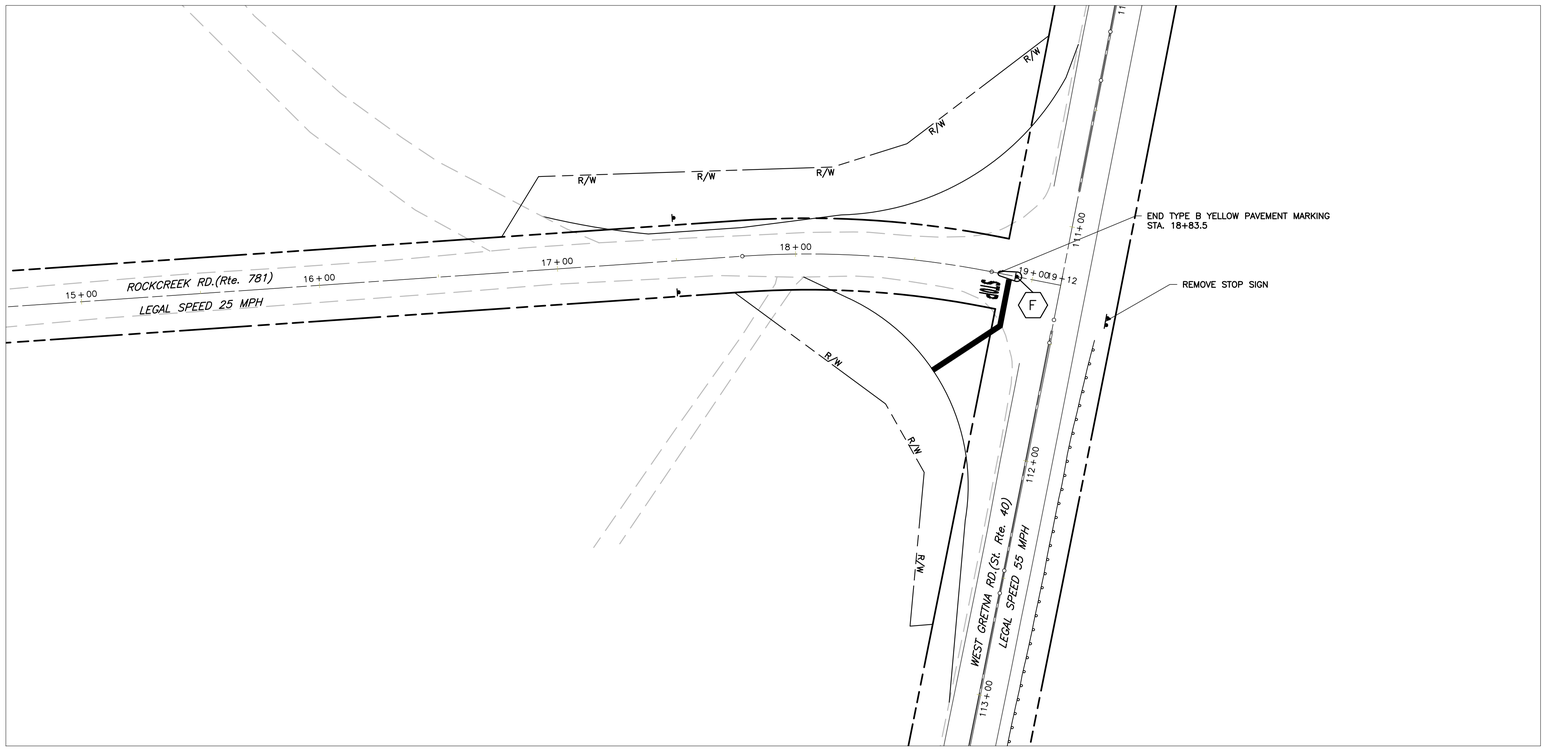


PHASE 1 SIGNING AND MARKING PLAN
SCALE: 1"=30'



PHASE 2 SIGNING AND MARKING PLAN
SCALE: 1"=30'

C 24" WIDE STOP BAR @ 10' FROM LT. EDGE OF SR 40

D 8' "STOP" PAVEMENT MESSAGE MARKING

E TYPE B, CLASS I, YELLOW PAVEMENT LINE MARKING, 4" WIDTH

NOTES:

- ALL WORK ON THIS PROJECT SHALL CONFORM TO THE 2009 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), THE 2016 ROAD AND BRIDGE SPECIFICATIONS, THE 2011 VIRGINIA SUPPLEMENT TO THE MUTCD, AND THE 2011 VDOT WORK AREA PROTECTION MANUAL (WAPM) AND ALL SUBSEQUENT REVISIONS.
- ALL SIGNS SHALL BE INSTALLED ON STP-1 POSTS AND TYPE A FOUNDATIONS.
- CONTRACTOR SHALL MAINTAIN ALL ROADWAY SIGNAGE THROUGHOUT THE PROJECT AREA.
- CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH LOCAL MUNICIPALITIES AND EMERGENCY RESPONDERS
- CONTRACTOR SHALL MAINTAIN ACCESS TO ALL HOMES AND BUSINESSES THROUGH OUT THE DURATION OF THE DETOUR.
- ALL SIGNAGE EQUIPMENT SHALL BE INSTALLED WITHIN EXISTING RIGHT-OF-WAY

SCALE IN FEET
0 30 60

COMMONWEALTH OF VIRGINIA
JOSEPH D. ROBINSON
Lic. No. 0402053304
7-9-2018
PROFESSIONAL ENGINEER

REVISION RECORD

NO	DATE	DESCRIPTION
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MOUNTAIN VALLEY PIPELINE LLC,
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COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

PROPOSED COUNTY ROAD WIDENING
SIGNING AND MARKING PLAN

DRAWN BY:	MAS
CHECKED BY:	GSL
DWG SCALE:	1"=30'
PROJECT NO:	180-426
APPROVED BY:	JDR
DATE:	

DRAWING NO.: 10
SHEET 10 OF 11

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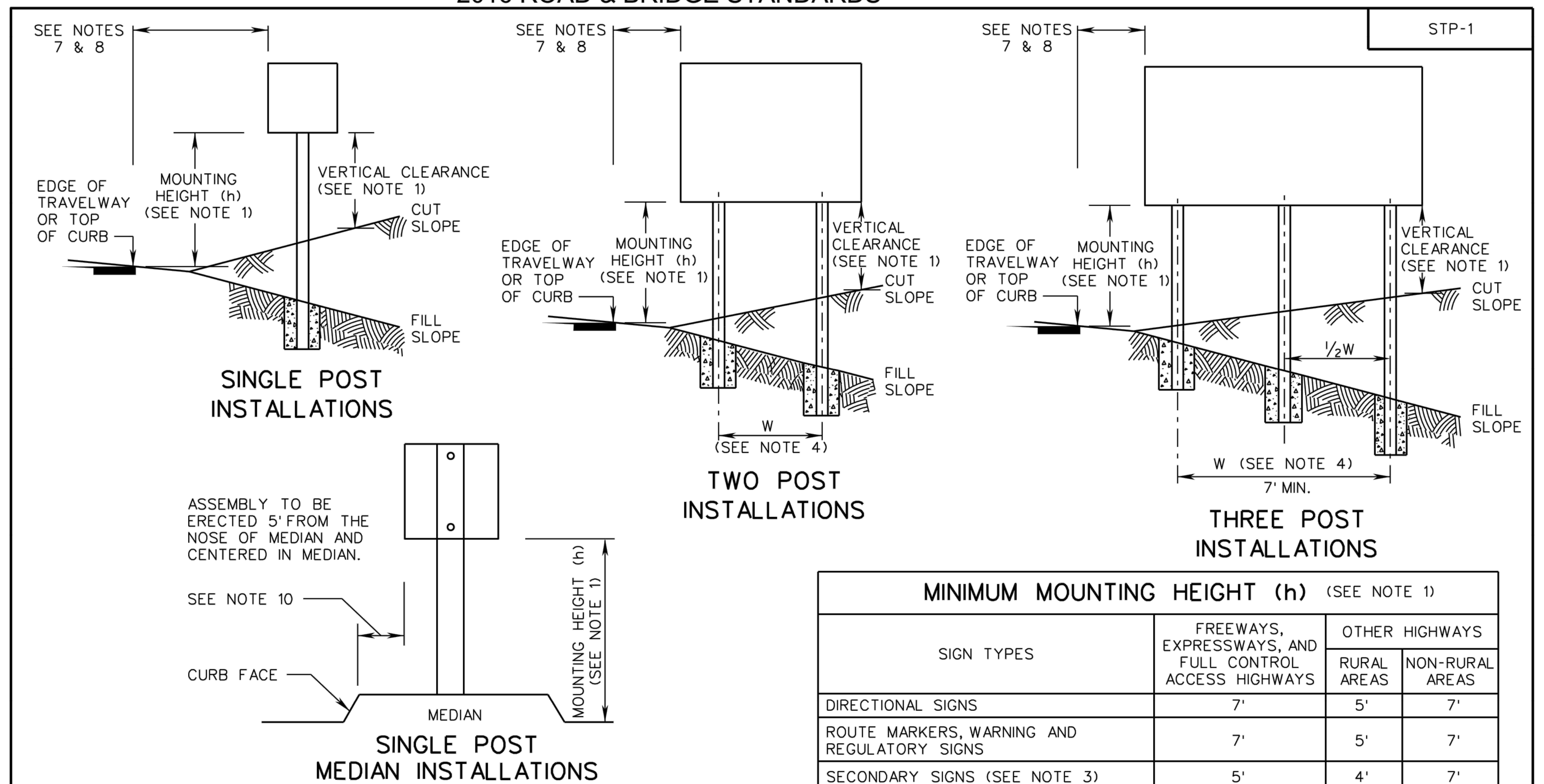
2016 ROAD & BRIDGE STANDARDS

STP-1



MINIMUM MOUNTING HEIGHT (h) (SEE NOTE 1)			
SIGN TYPES	FREEWAYS, EXPRESSWAYS, AND FULL CONTROL ACCESS HIGHWAYS	OTHER HIGHWAYS	
		RURAL AREAS	NON-RURAL AREAS
DIRECTIONAL SIGNS	7'	5'	7'
ROUTE MARKERS, WARNING AND REGULATORY SIGNS	7'	5'	7'
SECONDARY SIGNS (SEE NOTE 3)	5'	4'	7'

NOTES:

1. FOR ALL SIGNS EXCEPT STREET NAME SIGNS:
   A. MINIMUM MOUNTING HEIGHT (h) SHALL BE IN ACCORDANCE WITH THE "MINIMUM MOUNTING HEIGHT" TABLE ON THIS SHEET. MOUNTING HEIGHT IS MEASURED FROM THE ROADWAY ELEVATION AT THE EDGE OF THE TRAVEL WAY TO THE BOTTOM OF THE SIGN PANEL.
   B. MAXIMUM MOUNTING HEIGHT (h) FOR THE BOTTOM-MOST SIGN PANEL(S) SHALL BE 8 FEET, EXCEPT WHEN NECESSARY TO ACHIEVE MINIMUM VERTICAL CLEARANCE BENEATH SIGN PANEL AS PER NOTE 1C.
   C. MINIMUM VERTICAL CLEARANCE (DISTANCE BETWEEN BOTTOM OF SIGN PANEL AND FINISHED GRADE BENEATH THE PANEL) SHALL BE 7 FEET FOR ANY PORTION OF THE SIGN WITHIN THE CLEAR ZONE. THIS MINIMUM VERTICAL CLEARANCE MAY BE REDUCED TO 5 FEET FOR EITHER OF THE FOLLOWING CONDITIONS:
      - WHEN SIGNS OR PORTIONS OF SIGNS ARE LOCATED MORE THAN 10 FEET UP A CUT SLOPE GREATER THAN 3:1, OR
      - WHEN THE SIGN IS LOCATED AT LEAST THE MINIMUM DISTANCE BEHIND CURB, BARRIER, OR GUARDRAIL AS PER NOTES 7 AND 8.
2. MOUNTING HEIGHT (h) FOR STREET NAME SIGNS SHALL BE BETWEEN 8'-6" AND 9'-0".
3. A SECONDARY SIGN IS CONSIDERED TO BE A SIGN MOUNTED BELOW ANOTHER SIGN, EXCEPT A ROUTE MARKER WITH AN AUXILIARY PLATE IS CONSIDERED TO BE A SINGLE SIGN. A SECONDARY SIGN SHALL NOT BE MOUNTED LOWER THAN 7 FEET ABOVE A PEDESTRIAN SIDEWALK OR PATHWAY IF IT WILL PROJECT INTO THE PEDESTRIAN FACILITY.
4. W = (0.60) X (SIGN PANEL WIDTH)
5. SQUARE TUBE SIGN POSTS REQUIRING A BREAKAWAY SUPPORT SYSTEM SHALL BE AN FHWA APPROVED BREAKAWAY SUPPORT SYSTEM CONFORMING TO AASHTO'S STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINIARIES AND TRAFFIC SIGNALS.
6. FOR SIGNS LOCATED IN AREAS WHERE PEDESTRIAN MOVEMENTS ARE LIKELY TO OCCUR OR ON-STREET PARKING IS PERMITTED, THE HEIGHT FROM THE LOWEST PORTION OF THE SIGN PANEL TO THE FINISHED SURFACE SHALL HAVE A MINIMUM CLEARANCE OF 7 FEET.
7. THE LATERAL CLEARANCE TO THE SIGN PANEL SHALL BE A MINIMUM OF 2 FEET FROM THE FACE OF CURB OR 4 FEET FROM FACE OF BARRIER, IF PRESENT.
8. UNLESS OTHERWISE APPROVED BY THE ENGINEER, SIGNS PLACED BEHIND GUARDRAIL SHALL BE LOCATED SUCH THAT THE NEAR SIDE EDGE OF THE SIGN PANEL IS OUTSIDE OF THE GUARDRAIL DEFLECTION DISTANCE.
9. FOR SIGNS AT INTERCHANGE EXIT RAMPS, REFER TO STANDARD ISD-1.
10. 2' MINIMUM FOR MEDIANS OVER 10' IN WIDTH. 12" MINIMUM FOR MEDIANS 10' OR LESS IN WIDTH UNLESS SHOWN OTHERWISE IN THE CONTRACT DOCUMENTS.

SPECIFICATION REFERENCE 700

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SQUARE TUBE SIGN POST

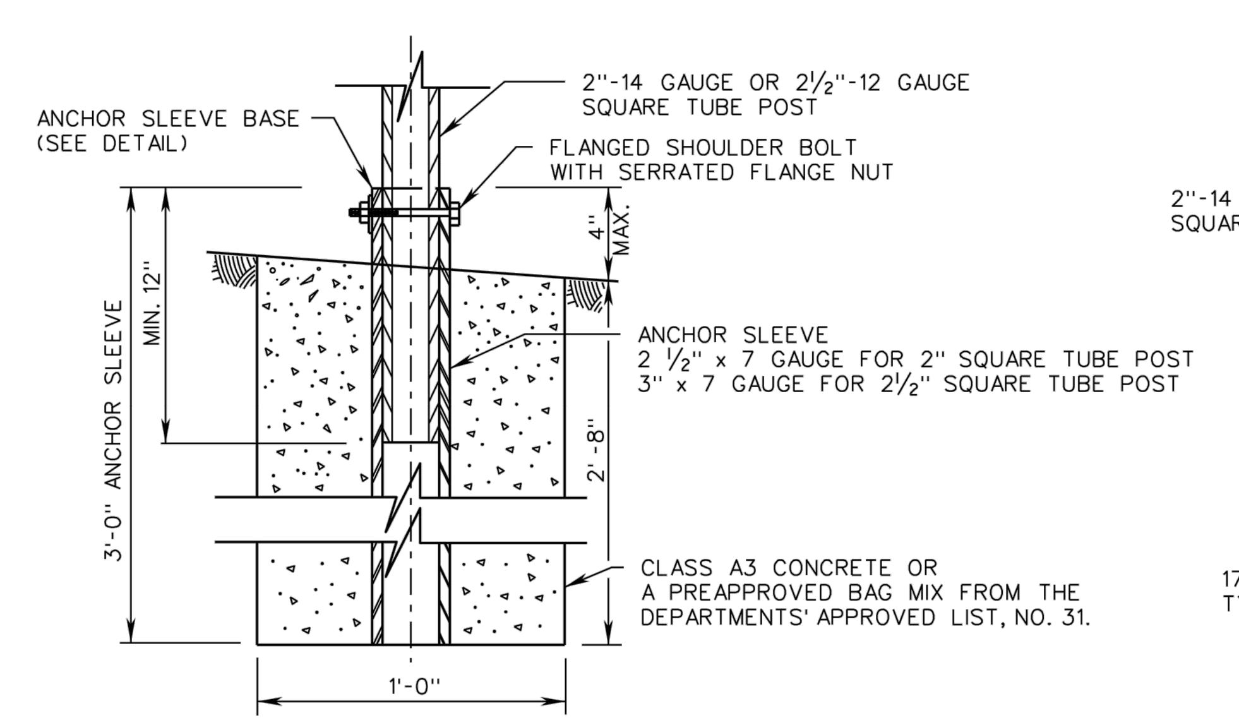
VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS — REVISION DATE 08/17 — SHEET 1 OF 12 — 1321.10

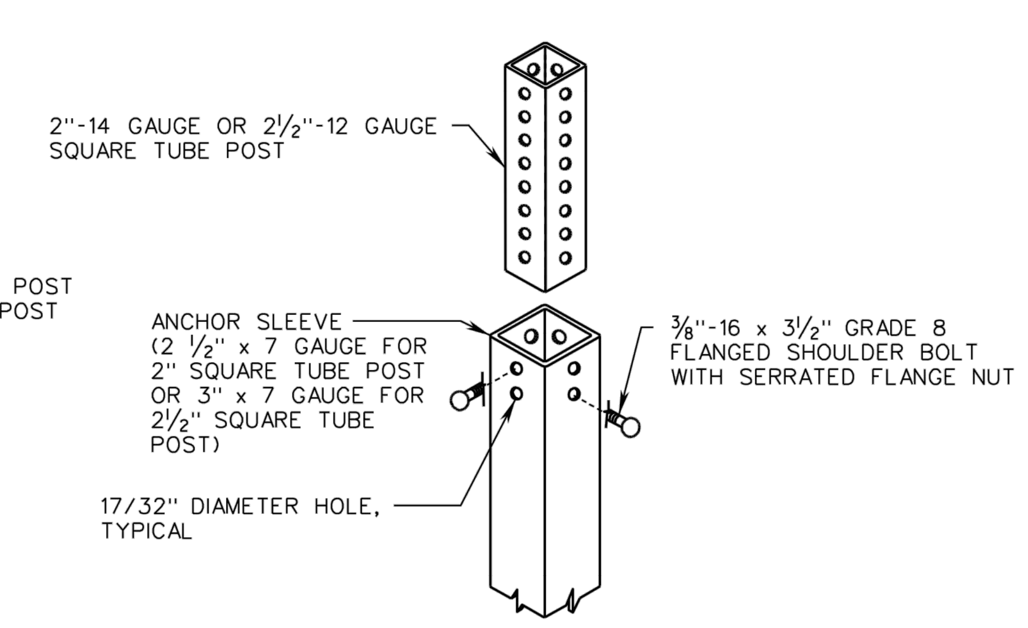
2016 ROAD & BRIDGE STANDARDS

2016 ROAD & BRIDGE STANDARDS

STP-1



FOUNDATION TYPE A



ANCHOR SLEEVE BASE DETAIL

VDOT ROAD AND BRIDGE STANDARDS — SHEET 4 OF 12 — 1321.13 — REVISION DATE NEW 01/15

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

SQUARE TUBE SIGN POST

FOUNDATION TYPE A DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE 700

2016 ROAD & BRIDGE STANDARDS

2016 ROAD & BRIDGE STANDARDS

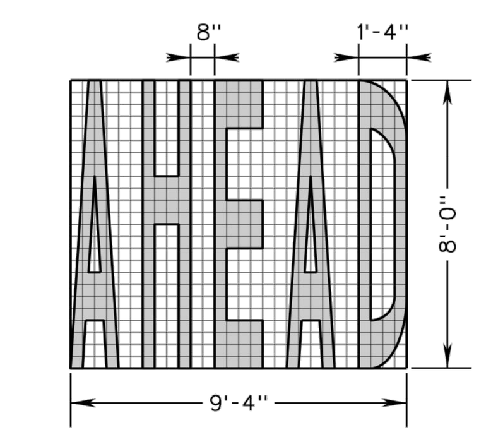
PM-10

SQUARE FOOT AREAS OF PAVEMENT WORD MARKINGS				
LEGEND	PAINT APPLICATION		ERADICATION	
	6' HIGH	8' HIGH	6' HIGH	8' HIGH
AHEAD	17.5	30.5	42.0	75.0
AREA	14.0	24.5	33.0	59.0
BIKE	13.0	23.0	28.5	51.0
BUMP	15.0	26.5	33.0	59.0
EAST	13.0	22.5	33.0	59.0
ENDS	15.0	27.0	33.0	59.0
FT	5.0	9.0	15.0	27.0
HUMP	14.5	25.5	33.0	59.0
LANE	13.5	23.5	33.0	59.0
LEFT	11.0	20.0	33.0	59.0
MERGE	19.0	34.0	42.0	75.0
MPH	11.0	19.5	24.0	43.0
NO	8.0	13.5	15.0	27.0
NORTH	17.5	30.5	42.0	75.0

SQUARE FOOT AREAS OF PAVEMENT WORD MARKINGS				
LEGEND	PAINT APPLICATION		ERADICATION	
	6' HIGH	8' HIGH	6' HIGH	8' HIGH
ONLY	12.0	21.5	30.5	53.5
PED	11.0	19.0	24.0	43.0
RIGHT	14.5	26.0	37.5	67.0
SCHOOL	(SEE NOTES 1 AND 2)	34.5 (ONE LANE)	(SEE NOTES 1 AND 2)	91.0 (ONE LANE)
SIGNAL	15.5	28.0	46.5	83.0
SLOW	13.5	24.0	33.0	59.0
SOUTH	16.5	29.0	42.0	75.0
STOP	12.5	22.5	33.0	59.0
TO	6.0	10.5	15.0	27.0
TURN	13.5	24.0	33.0	59.0
US	7.0	12.5	15.0	27.0
WEST	14.0	24.5	33.0	59.0
XING	12.0	21.0	28.5	51.0
YIELD	13.5	24.0	37.5	67.0

NOTES:

1. ONE-LANE APPLICATION OF "SCHOOL" SYMBOL IS 8' HIGH. WHEN INSTALLED IN A SINGLE LANE WITH A WIDTH LESS THAN 10.5', THE LETTERS SHALL BE SEPARATED BY THREE INCHES. WHEN INSTALLED IN A SINGLE LANE WITH A WIDTH GREATER THAN 10.5', THE LETTERS SHALL BE SEPARATED BY FOUR INCHES.
2. TWO-LANE APPLICATION OF "SCHOOL" SYMBOL IS 10' HIGH WITH PAINT APPLICATION AREA OF 53.5 SQ.FT. AND ERADICATION AREA OF 193.0 SQ.FT.
3. NON-LINEAR ERADICATION AREA IS BASED ON A "THEORETICAL BOX" DEFINED BY THE OUTERMOST LIMITS OF THE NON-LINEAR PAVEMENT MARKING THAT INCLUDES BOTH THE PAINTED AND NON-PAINTED AREAS THAT ENCOMPASS THE TOTAL WORD MESSAGE OR SYMBOL. SEE EXAMPLE.
4. ON UNDIVIDED ROADWAYS, SYMBOL AND MESSAGE PAVEMENT MARKINGS SHALL NOT EXTEND BEYOND THE CENTERLINE INTO OPPOSING TRAVEL LANES.



ERADICATION AREA = 8'-0" x 9'-4" ≈ 74.7 SQ.FT.

THEORETICAL BOX ERADICATION AREA EXAMPLE (8' LETTERS)

VDOT ROAD AND BRIDGE STANDARDS — SHEET 2 OF 15 — 1340.11 — REVISION DATE NEW 01/15

A COPY OF THE ORIGINAL SEALED AND SIGNED DRAWING IS ON FILE IN THE CENTRAL OFFICE.

PAVEMENT WORD, SYMBOL, AND ARROW MARKINGS

WORDS DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE 704

2016 ROAD & BRIDGE STANDARDS

2016 ROAD & BRIDGE STANDARDS

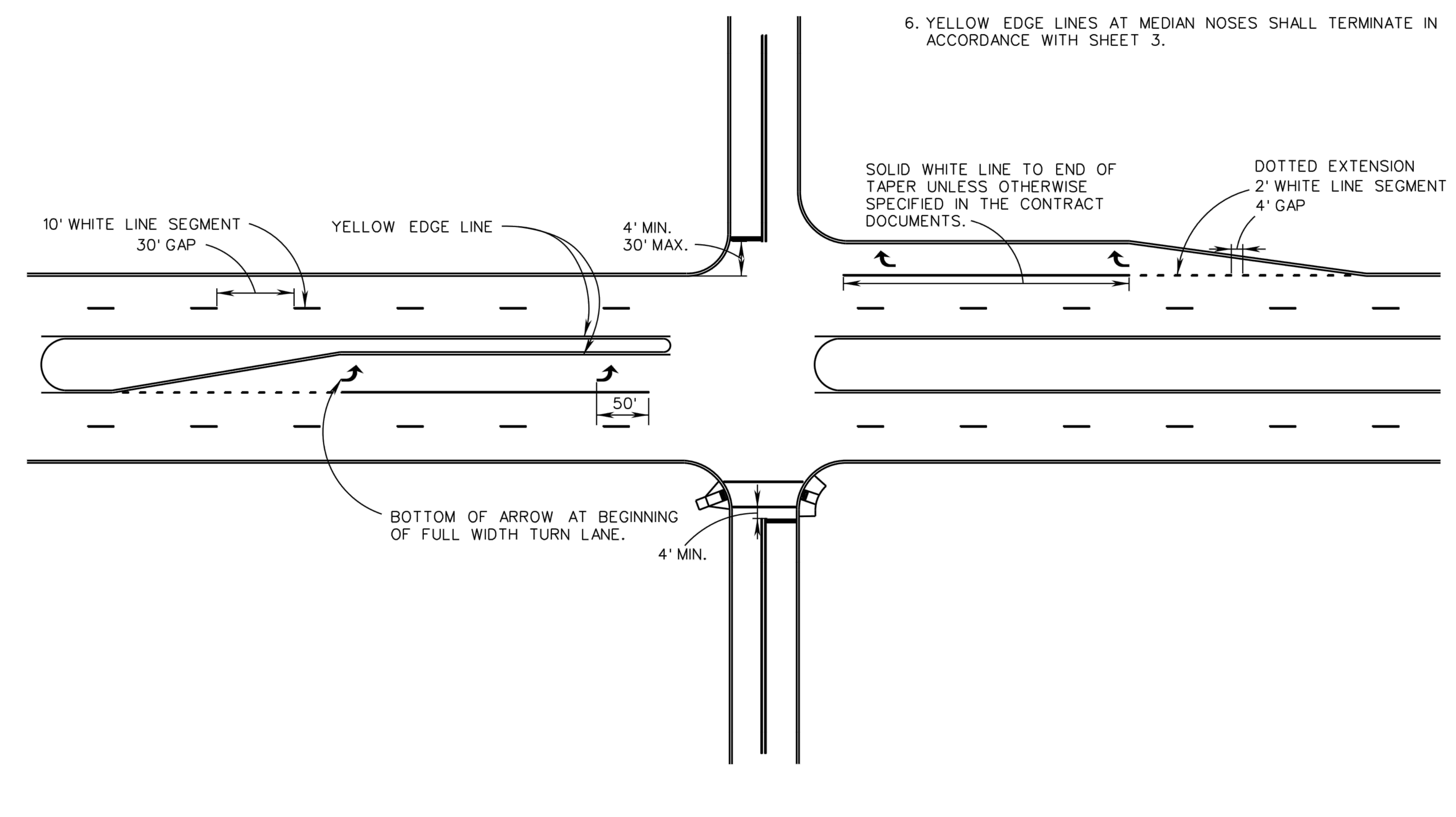
PM-3

PATTERNS OF LONGITUDINAL LINES

THRU LANES: USE BROKEN LINE (10' LINE SEGMENTS / 30' GAPS).
TAPERS MORE THAN 100': USE DOTTED EXTENSION (2' LINE SEGMENTS / 4' GAPS).
TAPERS 100' OR LESS: DO NOT USE DOTTED EXTENSION UNLESS SPECIFIED IN THE CONTRACT DOCUMENTS.

NOTES:

1. STOP LINES SHALL BE 24 INCHES IN WIDTH.
2. ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THESE STANDARDS, THE MUTCD, AND THE VIRGINIA SUPPLEMENT TO THE MUTCD, UNLESS OTHERWISE SPECIFIED IN THE CONTRACT DOCUMENTS.
3. THE LOCATION, WIDTH, AND TYPE OF THE PAVEMENT MARKINGS SHALL BE AS SPECIFIED IN THE CONTRACT DOCUMENTS.
4. TURN ARROWS SHALL BE IN ACCORDANCE WITH SHEET 3.
5. CROSSWALK MARKINGS, IF PROVIDED, SHALL BE IN ACCORDANCE WITH SHEET 4.
6. YELLOW EDGE LINES AT MEDIAN NOSES SHALL TERMINATE IN ACCORDANCE WITH SHEET 3.



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SPECIFICATION REFERENCE 704

TYPICAL PAVEMENT MARKING

UNSIGNALIZED INTERSECTIONS

VIRGINIA DEPARTMENT OF TRANSPORTATION

VDOT ROAD AND BRIDGE STANDARDS — REVISION DATE 07/16 — SHEET 1 OF 4 — 1330.30

2016 ROAD & BRIDGE STANDARDS

REVISION RECORD

NO	DATE	DESCRIPTION
1	07/09/2018	SIGNING AND MARKING REVISIONS PER VDOT COMMENTS

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MOUNTAIN VALLEY PIPELINE LLC,
ROCK CREEK ROAD
COUNTY ROUTE WIDENING
PITTSYLVANIA COUNTY, VIRGINIA

PROPOSED COUNTY ROAD WIDENING
SIGNING AND MARKING DETAILS

DRAWN BY:	MAS
CHECKED BY:	GSL
PROJECT NO:	180-426
APPROVED BY:	JDR
DATE:	
DWG SCALE:	

COMMONWEALTH OF VIRGINIA — JOSEPH D. ROBINSON — Lic. No. 0402053304 — 7-9-2018 — PROFESSIONAL ENGINEER

DRAWING NO.: 11

SHEET 11 OF 11