

MOUNTAIN VALLEY PIPELINE - TRANSCO

INTERCONNECT PROJECT

VARIANCE AND DEVIATION REQUESTS

PURSUANT OF VIRGINIA CODE 9VAC25-840-40 ET SEQ, MVP RESPECTFULLY REQUESTS VARIANCES AS OUTLINED BELOW:

THESE VARIANCE REQUESTS HAVE BEEN PREPARED IN ACCORDANCE WITH VADEQ AND VIRGINIA DEPARTMENT OF CONSERVATION AND RECREATION (VADOR) GUIDANCE DOCUMENTS. INFORMATION INCLUDED IN THESE VARIANCE REQUESTS IS INTENDED TO SUPPLY VADEQ WITH PROJECT INFORMATION, PERTINENT TO ESC, INCLUDING BUT NOT LIMITED TO: SITE CHARACTERIZATION, SOIL TYPES, CRITICAL AREAS, SOIL ERODIBILITY, AND WATERBODY/WETLAND IDENTIFICATION.

MVP IS REQUESTING THESE VARIANCES DUE TO THE LENGTH OF THE PROJECT, THE DIAMETER OF THE PIPE INVOLVED, THE EQUIPMENT REQUIRED, CONSTRUCTION TECHNIQUES UTILIZED AND THE DESIRE TO CREATE SAFE WORKING CONDITIONS FOR ALL EMPLOYEES INVOLVED IN THE PROJECT. THE VARIANCES RELATED TO THE LENGTH OF TRENCH OPEN DURING PIPELINE INSTALLATION AND THE USE OF SILT FENCE TO PREVENT "RUN-ON" OF STORMWATER FROM UPGRADIENT UNDISTURBED AREAS WHERE STEEP SIDE SLOPES ARE PRESENT AND ARE DESCRIBED BELOW.

IN ORDER TO ENSURE ALL VARIANCE STIPULATIONS ARE MET, MVP WILL HAVE ONE VADEQ CERTIFIED ESC INSPECTOR PER SPREAD (TOTAL OF FOUR) ON DUTY DURING DAYS OF ACTIVE CONSTRUCTION. ALL OTHER MVP ENVIRONMENTAL INSPECTORS WILL HAVE A VADEQ RESPONSIBLE LAND DISTURBER (RLD) CERTIFICATION.

MVP ENVIRONMENTAL INSPECTORS WILL SUBMIT REPORTS DOCUMENTING ESC-RELATED ACTIVITIES ON A WEEKLY BASIS VIA VADEQ'S E-REPORTING SYSTEM. EDUCATING CONTRACTORS ON VARIANCE AND OTHER PERMIT REQUIREMENTS WILL BE ACCOMPLISHED BY ASSIMILATING ALL RELEVANT INFORMATION INTO MVP'S PRE-CONSTRUCTION WORKER ENVIRONMENTAL AWARENESS PROGRAM (WEAP) TRAINING.

THE DESIGNATION OF MVP'S VADEQ-CERTIFIED INSPECTORS FOR THE PROJECT IS PENDING, AND WILL BE PROVIDED TO VADEQ WHEN AVAILABLE. MVP WILL BE UTILIZING TWO FERC 3RD PARTY MONITORS DURING CONSTRUCTION IN ADDITION TO THE VADEQ CERTIFIED INSPECTORS AND RLDs.

VARIANCE REQUEST MS-16-A LENGTH OF TRENCH

THIS VARIANCE IS REQUESTED DUE TO THE LENGTH OF THE PROJECT, THE DIAMETER OF THE PIPE INVOLVED, THE EQUIPMENT REQUIRED TO FACILITATE INSTALLATION, CONSTRUCTION TECHNIQUES UTILIZED AND THE DESIRE TO CREATE SAFE WORKING CONDITIONS FOR ALL EMPLOYEES INVOLVED IN THE PROJECT. A PROJECT OF THIS TYPE REQUIRES MULTIPLE OVERLAPPING AND SEQUENTIAL ACTIVITIES SUCH AS TREE FELLING, CLEARING, INSTALLATION OF ESC DEVICES, GRUBBING, GRADING, TRENCH EXCAVATION, PIPE STRINGING, PIPE BENDING, PIPE WELDING, PIPE INSPECTION, PIPE INSTALLATION IN THE TRENCH, TRENCH BREAKER INSTALLATION, BACKFILLING OF THE TRENCH, HYDROSTATIC TESTING OF THE PIPELINE AND RECLAMATION/FINAL CLEANUP. SINCE ALL OF THESE TASKS ARE DEPENDENT ON THE TASK BEFORE IT, A SIGNIFICANT LENGTH OF WORK AREA IS REQUIRED TO ELIMINATE THE CONFLICTS THAT OCCUR WITH WORKING IN CLOSE PROXIMITY IN ORDER TO ENSURE THE SAFE AND TIMELY COMPLETION OF THE WORK.

THE PHASE OF CONSTRUCTION THAT BEGINS THE HEART OF THE CONSTRUCTION ACTIVITIES IS THE TRENCHING PHASE. IN ORDER TO MAINTAIN THE PRODUCTION LEVELS NECESSARY TO COMPLETE THE PROJECT IN A SAFE AND TIMELY MANNER, TRENCHING NEEDS TO BE A NON-STOP ACTIVITY. ONCE TRENCHING STARTS, THE CONTRACTOR WILL FOLLOW DIRECTLY BEHIND THE EXCAVATIONS TO BEGIN THE STRINGING AND BENDING (ENGINEERING) THE PIPE. THE NEXT PHASE, WELDING, IS THE KEY COMPONENT TO THE ENTIRE CONSTRUCTION PROCESS TO MEET TIMELY COMPLETION OF THE PROJECT. THE CONTRACTORS CAN WELD UP TO 1800 FEET PER DAY. THEREFORE, IT IS NECESSARY TO HAVE ENOUGH TRENCH OPEN TO BE ABLE TO CONTINUE TO STRING, BEND AND WELD PIPE WITHOUT ANY DELAYS OR DOWN TIME TO FACILITATE IMPLEMENTATION OF THE PROJECT IN AN EFFICIENT AND SAFE MANNER. MVP PROPOSES TO HAVE A MAXIMUM OF FIVE MILES OF TRENCH OPEN AT ANY TIME DURING SPREAD 8 CONSTRUCTION. MVP WOULD ALIGN THE TRENCH EXCAVATION TO MEET THE CONDITIONS OUTLINED BELOW. THIS WILL NOT INCLUDE AREAS OF ROW PREPARATION INCLUDING CLEARING, GRUBBING, TOP-SOILING, STRINGING OF PIPE, BACKFILLING OR OTHER RESTORATION ACTIVITIES THAT ARE ONGOING ONCE THE PIPE HAS BEEN PLACED IN THE TRENCH.

SPECIALIZED CONSTRUCTION ACTIVITIES / CREWS WILL BE UTILIZED TO INSTALL THE PIPELINE AT SPECIFIC LOCATIONS SUCH AS WATERBODIES AND WETLANDS, PUBLIC ROADS, RAILROADS AND STEEP SLOPE AREAS (I.E. TYPICALLY INCLUDES SLOPES APPROACHING 30 DEGREES OR MORE AND WOULD REQUIRE WINCH TRACTORS). INSTALLATION OF THE PIPELINE AT THESE SPECIFIC LOCATIONS WILL BE CONDUCTED AS A SEPARATE AND COMPLETE CROSSING ACTIVITY AND ARE NOT INCLUDED AS PART OF THE CONSTRUCTION DISCUSSED ABOVE. THIS IS NECESSARY TO FACILITATE USE OF SPECIALIZED CONSTRUCTION METHODS REQUIRED TO COMPLETE INSTALLATION AT THESE LOCATIONS OR TO COMPLY WITH PERMITTING RESTRICTIONS THAT APPLY TO THESE CROSSINGS (I.E. TIMING RESTRICTIONS, ETC.).

MVP PROPOSES A TOTAL LENGTH OF TRENCH OPEN AT ANY ONE TIME FOR SPREAD 8 WOULD BE FIVE (5) MILES (CUMULATIVE) FOR MAINLINE CONSTRUCTION AND ONE (1) ADDITIONAL MILE (CUMULATIVE) OF TRENCH OPEN ASSOCIATED WITH AREAS OF SPECIALIZED CONSTRUCTION ACTIVITIES. AREAS OF SPECIALIZED CONSTRUCTION ACTIVITIES INCLUDE:

- ROAD CROSSINGS - CONVENTIONAL BORE METHODS,
- STREAM/WETLAND CROSSINGS
- EXISTING BURIED UTILITY CROSSINGS
- STEEP SLOPE (WINCH HILL) CONSTRUCTION
- OTHER AREAS DETERMINED BY MVP AS REQUIRING SPECIALIZED CONSTRUCTION ACTIVITIES (BIOLOGICAL OR CULTURAL RESOURCE MONITORS, ETC.).

IN ADDITION, MVP PROPOSES TO IMPLEMENT THIS VARIANCE REQUEST BASED ON A TIERED APPROACH THAT WILL LIMIT CONTIGUOUS TRENCH LENGTH BASED ON SLOPE CONDITIONS. MVP PROPOSES TO LIMIT THE CONTIGUOUS LENGTH OF TRENCH OPEN WITHIN THE CUMULATIVE 5 MILE SPREAD LIMIT BASED ON A THREE-TIER SYSTEM , SO THAT AS THE STEEPNESS OF THE SLOPE INCREASES, THE ALLOWABLE LENGTH OF CONTINUOUS TRENCH OPEN DECREASES. MVP PROPOSES THE FOLLOWING:

MVP Proposed Tier Structure	Slope Conditions ¹	Continuous trench length not to exceed (ft) ^{2,3}
Tier I	0 to <10%	7,000
Tier II	10% to <33%	5,000
Tier III	>33%	2,500

- SLOPE PERCENT IS DETERMINED BASED ON THE PRE-EXISTING SITE CONDITIONS.
- ANY BREAK IN CONTINUOUS TRENCH LENGTH WILL CONSTITUTE RESET OF THE CONTINUOUS TRENCH FOOTAGE.
- CONTINUOUS TRENCH LENGTH MAY BE EXCEEDED WHERE SAFETY CONCERNS ARE IDENTIFIED FOLLOWING CONSULTATION WITH THE ONSITE DEQ, FERC AND MVP (ENVIRONMENTAL AND SAFETY) INSPECTORS.

ACTIVITIES THAT WILL BE CONSIDERED AS A BREAK IN CONTINUOUS TRENCH LENGTH INCLUDE BUT NOT LIMITED TO THE FOLLOWING:

- ROAD CROSSINGS (CONVENTIONAL BORE METHODS)
- STREAM AND/OR WETLAND CROSSINGS
- STOVEPIPE CONSTRUCTION ACTIVITIES
- NATIVE (UNDISTURBED) SOIL PLUG TO REMAIN IN PLACE UNTIL IMMEDIATELY BEFORE PIPE INSTALLATION
- EXISTING UTILITY LINE CROSSINGS THAT WILL UTILIZE SPECIALIZED CONSTRUCTION CREW OR BE CONDUCTED SEPARATE FROM THE MAIN CONSTRUCTION EFFORT
- WINCH HILL CONSTRUCTION (I.E. WHERE EQUIPMENT IS REQUIRED TO BE ANCHORED TO ANOTHER STATIONARY OBJECT DUE TO STEEPNESS OF SLOPE)
- BREAK IN SLOPE CATEGORIES IDENTIFIED IN THIS REQUEST
- TRANSITION OF TRENCH LINE ACROSS RIDGELINES BREAKING THE DIRECTION OF CONTINUOUS FLOW

MVP WILL ADHERE TO THE TIERS IDENTIFIED ABOVE. IN THE EVENT DURING CONSTRUCTION SAFETY CONCERNS ARISE DUE TO SITE CONDITIONS (SLOPE, ADJACENT RESOURCES OR OTHER UTILITY INFRASTRUCTURE) THAT WOULD BE ALLEVIATED BY A MINOR EXCEEDANCE OF THE TRENCH LIMITATIONS, MVP WOULD COORDINATE ANY EXCEEDANCE WITH THE APPLICABLE AGENCY REPRESENTATIVES. INSTANCES WHERE THIS CONDITION MAY APPLY WOULD BE BUT NOT LIMITED TO THE FOLLOWING:

- AREAS OF WINCH HILL CONSTRUCTION
- AREAS THAT WOULD REQUIRE PIPELINE TO BE DEAD MANNED (ANCHORED) DURING WELDING OF PIPE SEGMENTS ON STEEP SLOPE AREAS PRIOR TO BACKFILLING OF THE TRENCH. EXCEEDING THE TRENCH LENGTH IN THESE CONDITIONS WOULD ALLEVIATE THE NEED FOR PERSONNEL TO BE WORKING IN THE DITCH AND RESULT IN REDUCED SAFETY CONCERN FOR WORKERS.

EXCEEDANCE OF THE TRENCH LENGTH IN THESE CONDITIONS WILL BE DISCUSSED WITH APPROPRIATE ONSITE REPRESENTATIVES FROM DEQ, FERC AND MVP (I.E. CONSTRUCTION, ENVIRONMENTAL AND SAFETY STAFF) PRIOR TO IMPLEMENTING ANY INCREASE IN THE TIER TO THE TRENCH LENGTH. EACH INSTANCE WILL BE REVIEWED ON A CASE BY CASE BASIS AND REPORTED IN THE WEEKLY INSPECTION REPORT.

FOLLOWING INSTALLATION OF THE PIPELINE WITHIN THE TRENCH AND ONCE PERSONNEL CAN SAFELY ENTER THE TRENCH, MVP CONTRACTORS WILL INSTALL PERMANENT TRENCH BREAKERS IN ACCORDANCE WITH MVP TYPICAL CONSTRUCTION DETAIL MVP-20 (TYPICAL TRENCH BREAKER DETAIL). FOLLOWING INSTALLATION OF THE PERMANENT TRENCH BREAKERS, A SEPARATE CONSTRUCTION CREW WILL BEGIN PADDING AND BACKFILLING OF THE PIPELINE. TRENCH EXCAVATION WILL CONTINUE AS BACKFILLING ACTIVITIES PROGRESS. AT NO TIME, SHALL TOTAL TRENCH EXCAVATION EXCEED 5 CUMULATIVE MILES FOR MAIN CONSTRUCTION ACTIVITIES ON SPREAD 8.

DEVIATION REQUEST 24-IN SLOPE DRAIN PIPE SIZE FOR CLEAN WATER DIVERSIONS

THIS DEVIATION REQUEST IS REQUIRED FOR THE USE OF 24-INCH CLEAN WATER DIVERSION PIPE FOR DRAINAGE AREAS UP TO 5 ACRES WHERE TABLE 3.15-A IN VESCH STD & SPEC 3.15 SPECIFIES A 30-INCH DIAMETER. MVP COMPLETED PEAK FLOW CALCULATIONS FOR THE 10-YEAR EVENT USING THE RATIONAL METHOD ASSUMING A DRAINAGE AREA OF 5-ACRES (I.E., THE MAXIMUM ALLOWABLE DRAINAGE AREA FOR TEMPORARY DIVERSION DIKES PER VESCH STD & SPEC 3.09) AND A CONSERVATIVE RUNOFF COEFFICIENT (C=0.35 FOR "LAWNS, HILLY" LAND USE CONDITION). RAINFALL INTENSITIES CORRESPONDING TO TRAVEL TIMES FOR SLOPES RANGING FROM 10-40% WERE USED TO CALCULATE A RANGE OF PEAK FLOWS REPRESENTATIVE OF THE VARIABLE SLOPES ACROSS THE PIPELINE. TO DETERMINE THE MOST CONSERVATIVE RANGE OF PEAK FLOWS, THE I-D-F CURVE FOR PITTSYLVANIA COUNTY WHICH HAS THE HIGHEST RAINFALL INTENSITY ACROSS THE PROJECT FROM THE VA SWM HANDBOOK VOLUME II HAS BEEN APPLIED ACROSS THE PROJECT. PIPE FLOW CAPACITY WAS THEN EVALUATED FOR THE SAME RANGE OF SLOPES. ASSUMING A PIPE FLOW CAPACITY OF 0.5 TIMES THE CAPACITY CALCULATED WHEN FLOWING HALF-FULL, TO ENSURE NO BUILDUP OF WATER BEHIND THE DIVERSION DIKE, IT WAS DETERMINED THAT ONE (1) 24-IN DIAMETER PIPE COULD PASS THE 10-YEAR PEAK FLOW FOR THE SLOPE CONDITIONS. THE SUMMARY TABLE SPECIFYING NUMBER OF SIZED PIPES REQUIRED TO PASS THE DESIGN STORM PER 5 ACRE AREA IS INCLUDED BELOW.

	12" PIPE	18" PIPE	24" PIPE
10%	4	2	1
20%	3	1	1
30%	3	1	1
40%	2	1	1

¹ MAXIMUM ALLOWABLE DRAINAGE AREA OF 5-ACRES ASSUMED FOR SIZING PURPOSES PER VESCH STD & SPEC 3.15 - TEMPORARY SLOPE DRAIN.

² TEMPORARY SLOPE DRAINS DESIGNED FOR THE 10-YR STORM USING THE RATIONAL METHOD IN LIEU OF THE VESCH STD & SPEC 3.15 SLOPE DRAIN SIZING TABLE (TABLE 3.15-A).

³ PIPE FLOW CAPACITY TAKEN AS 1/2 OF THE CAPACITY WHEN FLOWING HALF FULL TO ENSURE NO BUILDUP OF WATER WITHIN DIVERSION DIKE.

DEVIATION REQUEST CLEAN WATER PIPE PLUNGE POOL OUTLET DESIGN

THIS DEVIATION REQUEST IS TO REQUEST USE OF COMBINED TECHNIQUES TO PROVIDE ADEQUATE ENERGY MANAGEMENT OF STORMWATER EXITING THE CLEAN WATER DIVERSION. THIS DEVIATION REQUEST IS PRESENTED DUE TO THE LIMITED AREA AVAILABLE AND STEEP SLOPE CONDITIONS AT THE OUTLET THAT INHIBIT THE ABILITY TO UTILIZE TYPICAL TECHNIQUES (I.E. RIPRAP OUTLET PROTECTION). MVP CALCULATED THE MAXIMUM 10-YEAR PEAK FLOW DURING DESIGN OF THE CLEAN WATER PIPES, USING THE METHODS DESCRIBED IN THE SLOPE DRAIN PIPE SIZE FOR CLEAN WATER DIVERSIONS DEVIATION REQUEST, AND ASSUMED A CONSERVATIVE PIPE SIZE OF 24-IN. USING THESE PARAMETERS, A STANDARD PLUNGE POOL OUTLET WAS DESIGNED IN ACCORDANCE WITH NRCS DESIGN GUIDE MD #6. A STANDARD SPREADSHEET DEVELOPED BY THE NRCS THAT IS AVAILABLE FOR DOWNLOAD ONLINE (HTTPS://WWW.NRCS.USDA.GOV/INTERNET/FSE_DOCUMENTS/NRCS142P2_007673.XLS) WAS USED TO SIZE THE PLUNGE POOL APPROPRIATELY BASED ON THE DESIGN DISCHARGE (I.E., THE MAXIMUM 10-YEAR PEAK FLOW), PIPE DIAMETER (24-IN), AND SLOPE OF THE PIPE OUTLET (AGAIN, SLOPES RANGING FROM 10-40% WERE EVALUATED). ADDITIONAL CALCULATIONS WERE ALSO COMPLETED TO SUPPORT THAT DISCHARGE FROM THE PLUNGE POOL WEIR OUTLET IS NON-EROSIVE WITH A 0.1-FOOT HEAD ON THE WEIR AT THE OUTLET OF THE PLUNGE POOL. MVP PLANS TO UTILIZE THE SINGLE PLUNGE POOL OUTLET DESIGN FOR ALL PIPE SIZES, WHICH IS DESIGNED FOR THE CONSERVATIVE CONDITIONS OF 40% SLOPE, MAXIMUM OF 5 ACRES AND 24-INCH CLEAN WATER DIVERSION PIPE DIAMETER. THE PLUNGE POOL OUTLET DIMENSIONS ARE SHOWN ON GENERAL DETAILS MVP-ES51 AND MVP-ES51.1.

DEVIATION REQUEST STD & SPEC 3.11 TEMPORARY RIGHT-OF-WAY DIVERSIONS

MVP PROPOSES TO UTILIZE BOTH TEMPORARY AND PERMANENT RIGHT-OF-WAY DIVERSIONS (ROW DIVERSIONS) ON THIS PROJECT. AS THE VESCH DOES NOT HAVE A STANDARD FOR PERMANENT RIGHT-OF-WAY DIVERSIONS (ROW DIVERSIONS), MVP REQUESTS APPROVAL TO IMPLEMENT THE MVP STANDARD SPECIFICATIONS FOR BOTH TEMPORARY AND PERMANENT ROW DIVERSIONS INSTALLATIONS. MVP DEVELOPED THE DIVERSION SPECIFICATIONS (PRESENTED ON MVP TYPICAL CONSTRUCTION DETAIL MVP-17 INCLUDED IN APPENDIX B OF THE PSS&S) BASED ON EXPERIENCE FROM CONSTRUCTING AND OPERATING PROJECTS IN SIMILAR TERRAIN IN NEIGHBORING STATES IN THE APPALACHIAN MOUNTAINS REGION. WHILE THE SPACING AND SLOPE REQUIREMENTS DIFFER FROM THE VESCH STANDARD 3.11, TEMPORARY ROW DIVERSIONS WILL BE SUPPLEMENTED WITH ADDITIONAL BMPS (I.E. TEMPORARY DIVERSION DIKES, TEMPORARY CLEAN WATER SLOPE DRAINS, ETC.) DURING CONSTRUCTION IN ORDER TO INCREASE SEDIMENT REMOVAL EFFICIENCY. ROW DIVERSIONS WILL BE CONSTRUCTED WITH A MAXIMUM CROSS-SLOPE NOT TO EXCEED 5% TO MINIMIZE POTENTIAL FOR EROSION VELOCITIES AS RUNOFF LEAVES THE ROW. DURING TRENCH EXCAVATION, TOPSOIL AND SUBSOIL SPOIL PILES WILL BE LOCATED ALONG THE ROW TO SLOW RUNOFF VELOCITY FROM ADJACENT AREAS. SPOIL PILES WILL BE TEMPORARILY SEEDED AND MULCHED IN ACCORDANCE WITH MS-1. TRENCH BREAKERS WILL BE INSTALLED TO SLOW RUNOFF FROM THE TRENCH. PERIMETER (DOWNSLOPE) ESC MEASURES (I.E. TEMPORARY SEED AND MULCH, SILT FENCE, SUPER SILT FENCE, COMPOST FILTER SOCK, BELTED SILT RETENTION FENCE, ETC.) WILL BE INSTALLED TO COLLECT AND FILTER RUNOFF AS NECESSARY. THE MVP SPACING WILL FUNCTION AS INTENDED BY VESCH STANDARD 3.11 AND WILL PROVIDE ADEQUATE PROTECTION TO ADJACENT AREAS DURING CONSTRUCTION. MVP WILL MONITOR THE INSTALLATION OF ALL ESC BMPS IN ACCORDANCE WITH MVP'S APPROVED PSS&S INSPECTION FREQUENCIES FOR NON-TMDL AND TMDL WATERSHEDS.

IF DURING CONSTRUCTION MVP'S LEI/EI OR AN AGENCY REPRESENTATIVE DETERMINES THE TEMPORARY ROW DIVERSION SPACING IS NOT FUNCTIONING AS INTENDED AT A SPECIFIC LOCATION, INSTALLATIONS WILL BE FIELD ADJUSTED AS NECESSARY TO ADDRESS SITE-SPECIFIC CONDITIONS AND CONCERNS. ALL CHANGES WILL BE NOTED ON THE SPREAD 8 RED-LINE ESC PLAN SET AND ASSOCIATED RED-LINE LOG DESCRIBED IN THE PSS&S (PAGE 6).

RECOMMENDED MINIMUM SPACING FOR PERMANENT SLOPE BREAKERS	
PIPELINE GRADE	DISTANCE (FEET)
<2%	1-2
2-5%	400
6-15%	200
16-30%	100
>31%	50 ³

- PERMANENT SLOPE BREAKERS WILL BE INSTALLED AS NEEDED BASED ON FIELD CONDITIONS.
- PERMANENT SLOPE BREAKERS WILL BE INSTALLED 25 FEET FROM EACH WATERBODY BOUNDARY REGARDLESS OF SLOPE CONDITIONS.
- SLOPES GREATER THAN 65% MAY REQUIRE SITE SPECIFIC STABILIZATION MEASURES BASED ON FIELD CONDITIONS AS APPROVED BY MVP DESIGN ENGINEERING AND MVP ENVIRONMENTAL INSPECTOR.

AS NOTED ABOVE, ALL OTHER SPECIFICATIONS FOR STD & SPEC 3.11 WILL BE IMPLEMENTED IN ACCORDANCE WITH THIS VADEQ STANDARD.

DEVIATION TO STD AND SPEC 3.31 TEMPORARY SEEDING AND 3.32 PERMANENT SEEDING

THIS DEVIATION IS NECESSARY TO COMPLY WITH PROJECT MITIGATION ACTIVITIES THAT ARE BEING PREPARED IN COORDINATION WITH THE US FISH AND WILDLIFE SERVICE, US FOREST SERVICE AND WILDLIFE HABITAT COUNCIL, TO MINIMIZE PROJECT IMPACTS TO SENSITIVE SPECIES. THIS WILL INCLUDE USE OF POLLINATOR SEED MIXES FOR THE PERMANENT ROW AREAS AND WOODLAND HABITAT SEED MIXES / PLANTINGS IN DESIGNATED AREAS. MVP WILL IMPLEMENT THE SEED MIXES SPECIFIED IN THE USFWS MITIGATION PLAN FOR ALL AREAS OF THE PROJECT UNLESS OTHER REQUIREMENTS ARE SPECIFIED BY THE AFFECTED LANDOWNER. MVP REQUESTS A DEVIATION IN REGARD TO STD & SPEC 3.31 (TEMPORARY SEEDING) AND 3.32 (PERMANENT SEEDING) TO ALIGN THESE REQUIREMENTS WITH THE PROJECT'S VEGETATION AND HABITAT MITIGATION PLAN.

AS NOTED IN THE APPROVED PSS&S, MVP DEVELOPED THE PROJECT-SPECIFIC SEED MIXES IN COORDINATION WITH THE US FISH AND WILDLIFE SERVICE (USFWS), US FOREST SERVICE, VA DEPARTMENT OF CONSERVATION AND RECREATION, WILDLIFE HABITAT COUNCIL AND MVP'S THREATENED AND ENDANGERED SPECIES CONSULTANT. MVP DEVELOPED SEED MIXES PROPOSED FOR PERMANENT STABILIZATION TO INCLUDE NATIVE SPECIES. SEED MIXES ARE PRESENTED IN THE PSS&S APPENDIX B, MVP TYPICAL CONSTRUCTION DETAILS MVP-ES11.1 THROUGH MVP-ES11.9. MVP REVIEWED THE DCR'S VIRGINIA INVASIVE PLANT SPECIES LIST DURING DEVELOPMENT OF THE PROJECT SPECIFIC PERMANENT STABILIZATION SEED MIXES. NO SPECIES LISTED ON THE DCR'S VIRGINIA INVASIVE PLANT SPECIES LIST ARE INCLUDED IN MVP'S PROPOSED PERMANENT STABILIZATION MIXES TO BE USED DURING PROJECT ACTIVITIES IN VIRGINIA.

MVP ALSO REVIEWED THE DCR'S NATIVE PLANTS FOR CONSERVATION, RESTORATION AND LANDSCAPING BROCHURES (MOUNTAIN NATIVE PLANTS AND RIPARIAN NATIVE PLANTS) DURING DEVELOPMENT OF THE PERMANENT STABILIZATION MIXES. MVP INCORPORATED MANY OF THE SPECIES INCLUDED IN THE DCR BROCHURES NOTED ABOVE TO THE PROJECT SPECIFIC PERMANENT STABILIZATION SEED MIXES.

FOR PROJECT ACTIVITIES ON JNF LANDS, THE USFS DEVELOPED SPECIFIC SEED MIXES FOR ACTIVITIES OCCURRING ON JNF AND GEORGE WASHINGTON NATIONAL FOREST LANDS. THESE MIXES ARE PRESENTED IN THE PSS&S APPENDIX B, MVP TYPICAL CONSTRUCTION DETAIL MVP-ES12.1 THROUGH ES12.4 AND INCLUDES THE TEMPORARY AND PERMANENT SEED MIXES SPECIFIED BY THE USFS GUIDANCE.

MVP PROPOSES TO UTILIZE THE VESCH STANDARD 3.31 TEMPORARY SEEDING MIX DURING PROJECT ACTIVITIES WITH THE ADDITION OF BROWNTOP MILLET (PANICUM RAMOSUM) TO MATCH THE TEMPORARY SEED MIX REQUIRED BY THE USFS FOR USE ON JEFFERSON NATIONAL FOREST LANDS. WHILE THESE ARE NON-NATIVE ANNUAL SPECIES, THEY ARE NOT LISTED ON THE DCR'S INVASIVE SPECIES LIST REFERENCED ABOVE. MVP PROPOSES TO UTILIZE NON-NATIVE, NON-INVASIVE SPECIES FOR TEMPORARY EROSION CONTROL BASED ON RECOMMENDATIONS OF THE USFS AND DEQ PROVIDED IN VARIOUS GUIDANCE DOCUMENTS. NATIVE PLANTS THAT PROVIDE DIVERSE WILDLIFE BENEFITS AND STRUCTURAL DIVERSITY ON THE LANDSCAPE OFTEN DO NOT GERMINATE OR GROW FAST ENOUGH TO PROVIDE INITIAL EROSION CONTROL. THEREFORE, FAST-GERMINATING, NON-INVASIVE, ANNUAL COVER CROPS ARE RECOMMENDED FOR THE FIRST ROUND OF SEEDING TO STABILIZE EXPOSED SOIL. THE TEMPORARY SEEDING PROPOSED FOR USE ON THE PROJECT ARE PRESENTED IN PSS&S APPENDIX B, MVP TYPICAL CONSTRUCTION DETAIL MVP-ES11.10 AND PROVIDED ON THE GENERAL DETAIL PLAN DRAWINGS INCLUDED WITH THE SPREAD 8 SUBMISSION.

DEVIATION REQUEST STD AND SPEC 3.05 SILT FENCE

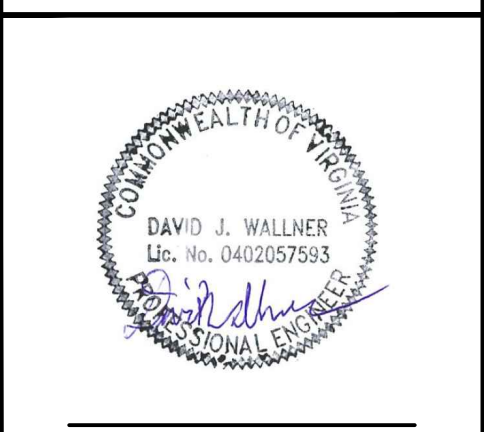
DUE TO THE NATURE OF CONSTRUCTION AND THE STEEP SLOPES EXPECTED ON THE PROJECT, MVP IS REQUESTING A VARIANCE TO INCLUDE SUPER SILT FENCE AS A BEST MANAGEMENT PRACTICE FOR EROSION AND SEDIMENT CONTROL. FOLLOWING DISCUSSIONS WITH THE VADEQ, MVP PROPOSES TO ADOPT THE E-3 STANDARDS AND SPECIFICATIONS FOR SUPER SILT FENCE INCLUDED IN THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. THE MATERIAL SPECIFICATIONS AND CONSTRUCTION SEQUENCE FROM THIS SPECIFICATION HAS BEEN INCLUDED IN THE SPREAD 8 GENERAL DETAILS AS DETAIL MVP-ES9.2 AND MVP-ES9.2A.

ADDRESS VADEQ COMMENTS	DW	HT	MVP	11/21/17	NO.	DATE:	CHKD.:	APPD.:	REVISIONS:
ADDRESS VADEQ COMMENTS	DW	HT	JMK	02/28/18					
ADDRESS VADEQ COMMENTS	DW	HT	KAL	04/10/18					
ADDRESS VADEQ COMMENTS	DW	HT	KAL	05/11/18					
ADDRESS VADEQ COMMENTS	DW	HT	KAL	05/23/18					

Mountain Valley Pipeline		VARIANCE AND EXEMPTION REQUESTS		MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT		PITTSYLVANIA COUNTY, VIRGINIA		MOUNTAIN VALLEY PIPELINE, LLC	
								555 SOUTHPOINTE BLVD., SUITE 200	
								CANONSBURG, PA 15317	

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CONSTRUCTION PLANS

	
DRAWN BY:	KAL
CHECKED BY:	HT
APPROVED BY:	DWJ
DATE:	06/04/2018
SCALE:	AS SHOWN
SHT. NO.	000A OF 25

STEEP SLOPE EROSION CONTROL PRODUCTS

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

ROLLED EROSION CONTROL BLANKET

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

BONDED FIBER MATRIX

BONDED FIBER MATRIX (BFM) IS A HYDRAULICALLY APPLIED SOIL STABILIZER THAT IS EFFECTIVE IN STABILIZING STEEP SLOPES. AS PER MANUFACTURER SPECIFICATIONS, BFM APPLICATION RATES VARY DEPENDING ON SLOPE AND SOIL CONDITIONS, BUT APPLICATION RATES ARE TYPICALLY BETWEEN 1,500 TO 4,000 LBS/ACRE. SOME MANUFACTURERS OFFER BFM PRODUCTS IN PELLETIZED FORM FOR APPLICATION VIA BROADCAST SPREADER AND INTENDED FOR USE IN REMOTE AREAS WHERE WATER SUPPLIES ARE LIMITED, WHERE ACCESS VIA HYDROSEEDER IS DIFFICULT OR WHERE SMALL AREA COVERAGE IS NECESSARY. ONCE APPLIED, THE PELLETIZED BFM IS ACTIVATED BY PRECIPITATION EVENT FOLLOWING APPLICATION. BFM SHOULD NOT BE APPLIED WHEN RAIN IS FORECAST WITHIN 24 – 48 HOURS OF APPLICATION. APPLICATION OF BFM IS TYPICALLY 90% EFFECTIVE IN PREVENTING ACCELERATED EROSION FROM OCCURRING WITHIN THE AREA OF APPLICATION. WHEN APPLICATION OF THESE PRODUCTS INCLUDES A POLYMER (ANIONIC) STABILIZER, BFM CAN BE UP TO 99% EFFECTIVE IN REDUCING TURBIDITY AND SEDIMENT RUNOFF FROM DISTURBED AREAS. INFORMATION ON THE USE OF BFM IS PROVIDED UNDER TYPICAL CONSTRUCTION DETAIL MVP-ES40 (BONDED FIBER MATRIX).

HYDRAULIC EROSION CONTROL PRODUCTS

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

HECP TYPE 4

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

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

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

TABLE II-22A

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

1 ALL PRODUCTS MUST MEET THE REQUIREMENTS OF THIS SPECIFICATION TO BE LISTED ON THE MATERIALS DIVISION'S APPROVED LIST FOR HECPs.
2 ASTM TEST METHODS DEVELOPED FOR ROLLED EROSION CONTROL PRODUCTS (RECPS) THAT HAVE BEEN MODIFIED TO ACCOMMODATE HYDRAULIC EROSION CONTROL PRODUCTS (HECPs).
3 FUNCTIONAL LONGEVITY PERFORMED AT A VDOT TEST FACILITY OR TEST FACILITY APPROVED BY VDOT.

WOOD CELLULOSE FIBER MULCH FOR HYDRAULIC SEEDING MANUFACTURER'S CERTIFICATIONS

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

DEVIATION REQUEST FOR MS-19 WATER QUANTITY EVALUATION OF TRANSCO SEDIMENT TRAPS 3&4

DUE TO THE FLAT TOPOGRAPHY IN THE NORTHERN PORTION OF THE TRANSCO INTERCONNECT SITE THAT RESTRICTS THE AREA AVAILABLE FOR CONSTRUCTION AND THE ABILITY TO SITE A BMP THAT PROVIDES ADEQUATE STORMWATER QUANTITY CONTROL PER MS-19, MVP REQUESTS A DEVIATION TO APPLY THE CALCULATED WET STORAGE VOLUME AS PART OF THE AVAILABLE TOTAL STORAGE WHEN EVALUATING PROPOSED SEDIMENT TRAPS 3&4 (ST-3 AND ST-4) IN THIS PORTION OF THE SITE. MVP WILL MAINTAIN ST-3 AND ST-4 BY REMOVING WATER FROM EACH SEDIMENT TRAP WITHIN 24-HOURS FOLLOWING ANY RAINFALL EVENT THAT LEAVES WATER IN THE TRAP, AND BY REMOVING ANY ACCUMULATED SEDIMENT TO ENSURE THAT DESIGN STORAGE VOLUMES ARE MAINTAINED. ALL WATER REMOVED FROM THE TRAPS WILL BE FILTERED THROUGH FILTER BAGS LOCATED IN AN UNDISTURBED AREA PROTECTED WITH A FILTERING BMP (I.E. SILT FENCE, COMPOST FILTER SOCK) LOCATED IMMEDIATELY DOWN GRADIENT OF THE FILTER BAG.

MOUNTAIN VALLEY PIPELINE
CONSTRUCTION PLANS

MOUNTAIN VALLEY PIPELINE - TRANSCO
INTERCONNECT PROJECT

JUNE 2018

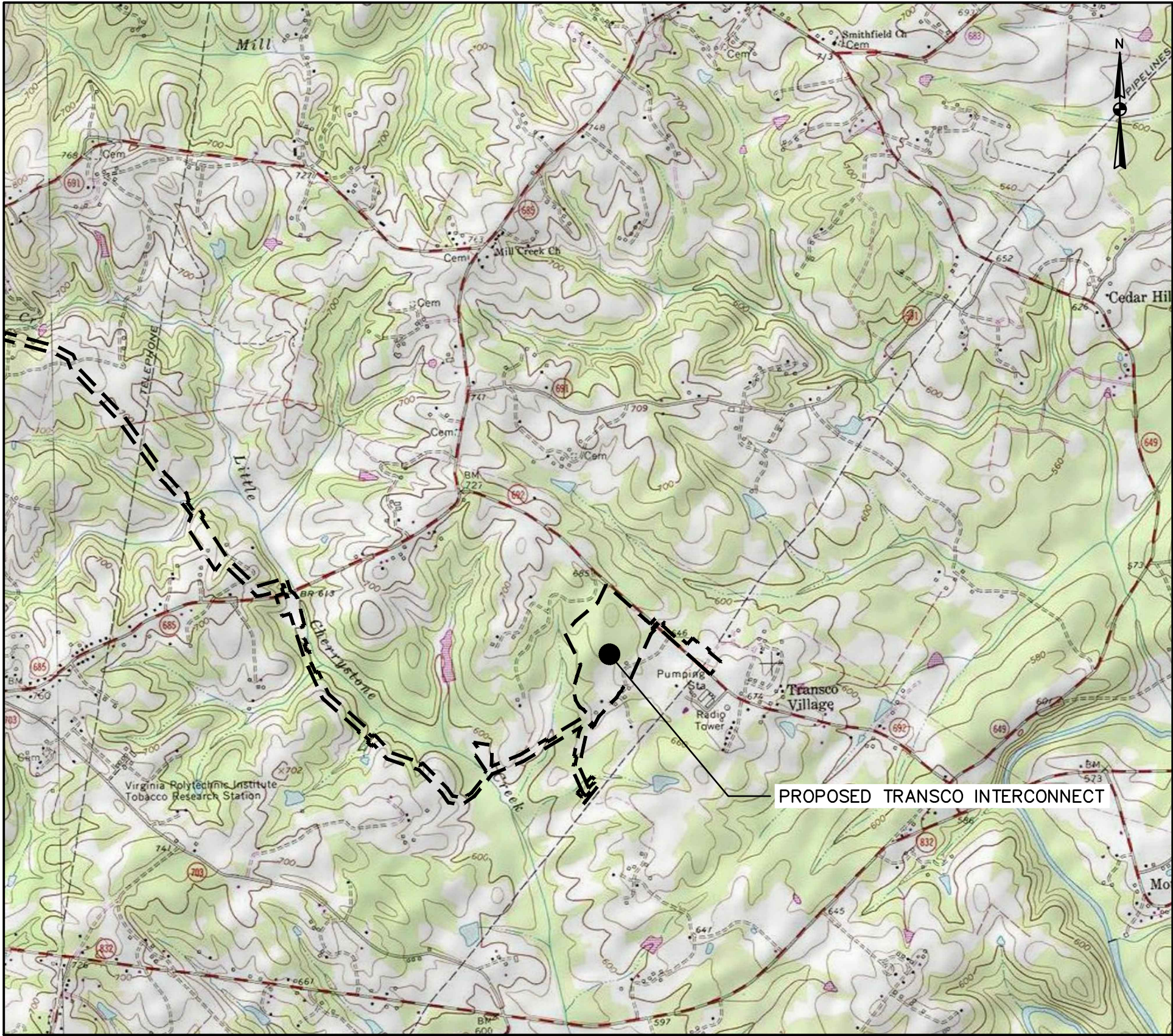
DRAWING INDEX	
SHEET No.	DRAWING TITLE
TRA-1	COVER SHEET
TRA-2	EROSION AND SEDIMENT CONTROL DETAILS
TRA-3	EROSION AND SEDIMENT CONTROL DETAILS
TRA-4	EROSION AND SEDIMENT CONTROL DETAILS
TRA-5	EROSION AND SEDIMENT CONTROL DETAILS
TRA-6	EROSION AND SEDIMENT CONTROL DETAILS
TRA-7	EROSION AND SEDIMENT CONTROL DETAILS
TRA-8	EROSION AND SEDIMENT CONTROL DETAILS
TRA-9	EROSION AND SEDIMENT CONTROL DETAILS
TRA-10	CONSTRUCTION DETAILS
TRA-10A	CONSTRUCTION DETAILS
TRA-11	SITE RESTORATION DETAILS
TRA-12	SITE RESTORATION DETAILS
TRA-13	SITE RESTORATION DETAILS
TRA-14	ESC NARRATIVE
TRA-15	ESC NARRATIVE
TRA-16	ESC NARRATIVE
TRA-17	SWM NARRATIVE
TRA-18	EXISTING CONDITIONS PLAN
TRA-19	EROSION AND SEDIMENT CONTROL PLAN
TRA-20	ACCESS ROAD PROFILES AND PERMANENT PAD SECTIONS
TRA-21	ACCESS ROAD SECTIONS
TRA-22	TEMPORARY PAD AND SEDIMENT TRAP SECTIONS
TRA-23	SEDIMENT BASIN SECTIONS
TRA-24	FINAL SITE RESTORATION PLAN
TRA-25	PERMANENT STORMWATER POND SECTIONS



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811
OR
1-800-552-7001

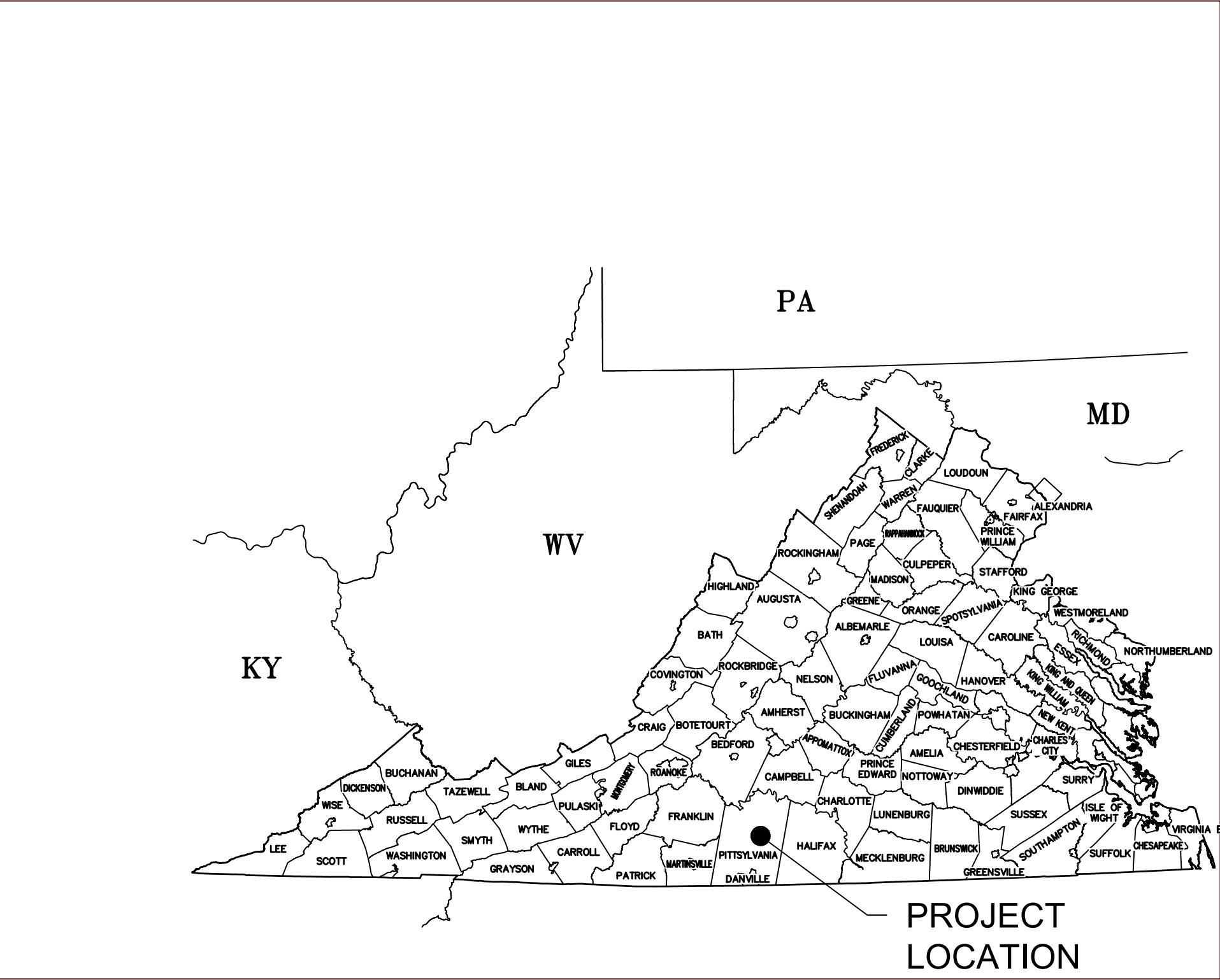
CONTRACTOR IS RESPONSIBLE TO
IDENTIFY ALL UTILITIES. THE UTILITY
LINES SHOWN ON THE PLAN ARE FOR
INFORMATIONAL PURPOSES ONLY
AND DO NOT REPRESENT SURVEYED
LINE INFORMATION.



LOCATION MAP



TETRA TECH CAD FILE PATH: X:\CADD\Pittsburgh\EQTV\00285 - Transco\E&S\00285ES001.dwg PLOTTED ON: 6/15/2018 4:48 PM PLOTTED BY: Kusowski, Jim PLOT FILE: ENVIRONMENTAL_COLOR.ctb



VICINITY MAP

NOT TO SCALE

RESPONSIBLE LAND DISTURBER CERTIFICATION/INFORMATION

CERTIFICATE/
LICENSE HOLDER NAME: _____

ADDRESS: _____

TYPE OF CERTIFICATE: _____

APPLICANT/AGENT SIGNATURE: _____

RESPONSIBLE LAND DISTURBER NOTE:
FOLLOWING THE EXECUTION OF A CONTRACT WITH THE SITE CONTRACTOR FOR THIS
PROJECT AND PRIOR TO THE INITIATION OF ANY LAND DISTURBANCE, A NEW
RESPONSIBLE LAND DISTURBER CERTIFICATION SHALL BE SUBMITTED TO THE COUNTY
BY THE CONTRACTOR NAMING A CERTIFIED INDIVIDUAL EMPLOYED BY THE
CONTRACTOR AS THE DESIGNATED RESPONSIBLE LAND DISTURBER FOR THE PROJECT
TO REPLACE THE INDIVIDUAL NAMED IN THE ABOVE CERTIFICATE.

2	11/21/17	MAP	HT	DW	ADDRESS VADEQ COMMENTS
3	02/28/18	JWK	HT	DW	ADDRESS VADEQ COMMENTS
4	04/10/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
5	05/11/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
6	05/23/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
7	06/04/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
NO:	DATE:	DWN:	CHKD:	APPD:	DESCRIPTION:
					REVISIONS:

COVER SHEET

MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT

PITTSBURGH COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

CANONSBURG, PA 15317

complex world | CLEAR SOLUTIONS™

661 ANDERSEN DRIVE

FOSTER PLAZA 7

PITTSBURGH, PA 15220

CONSTRUCTION PLANS

DRAWN BY: KAL

CHECKED BY: HT

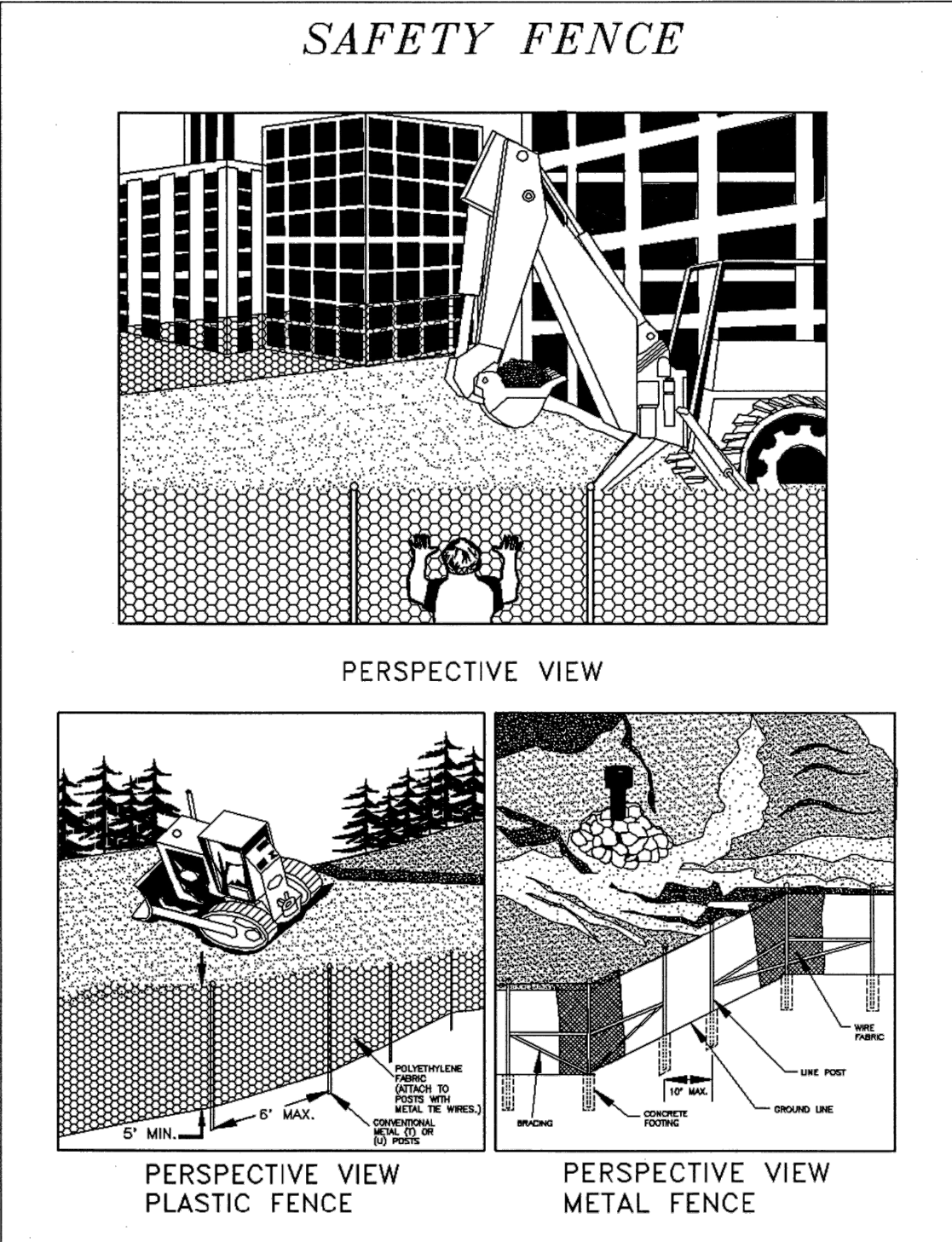
APPROVED BY: DWJ

DATE: 06/04/2018

SCALE: AS SHOWN

SHT. NO. TRA-1 OF 25

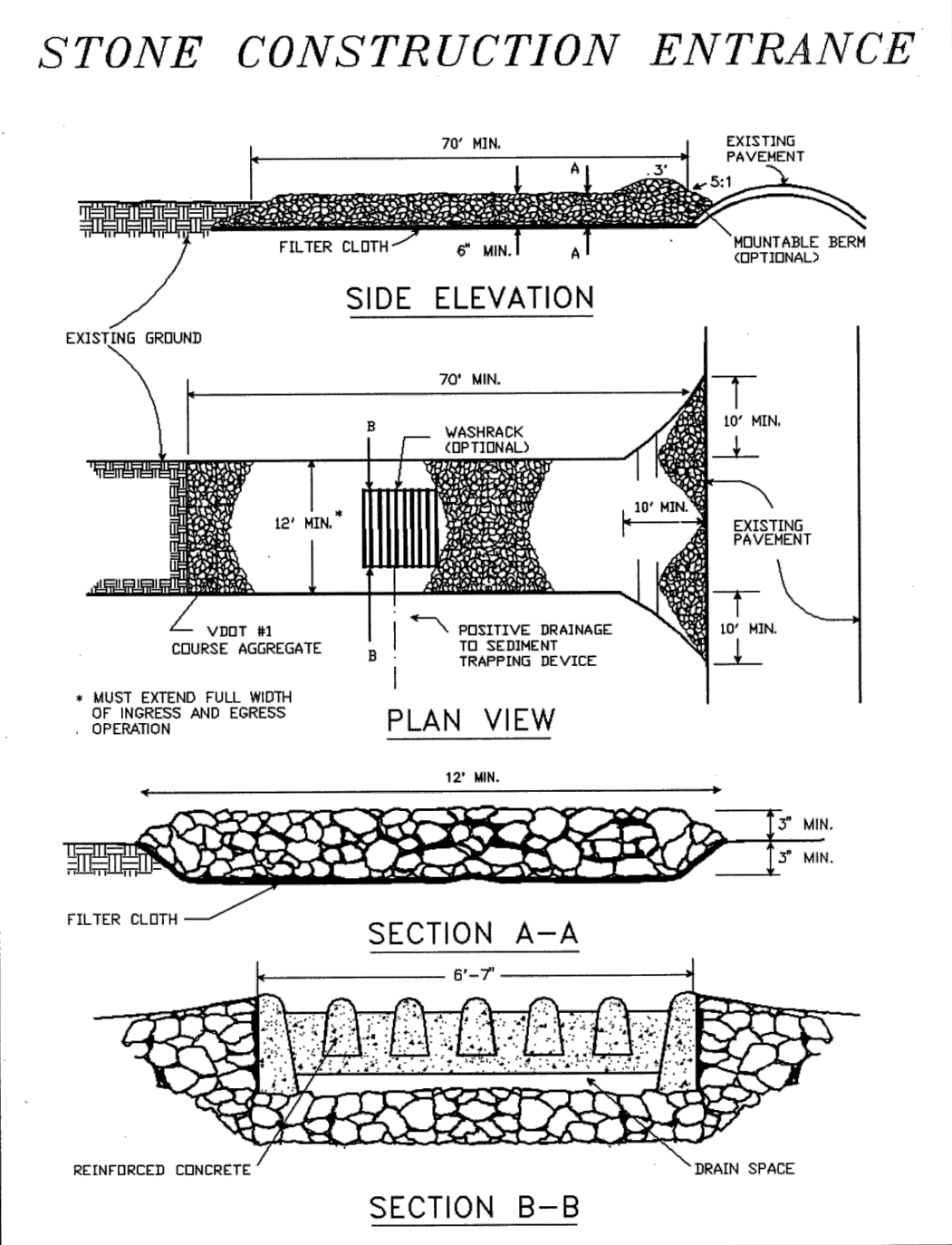
REVISION



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

Plate 3.01-1

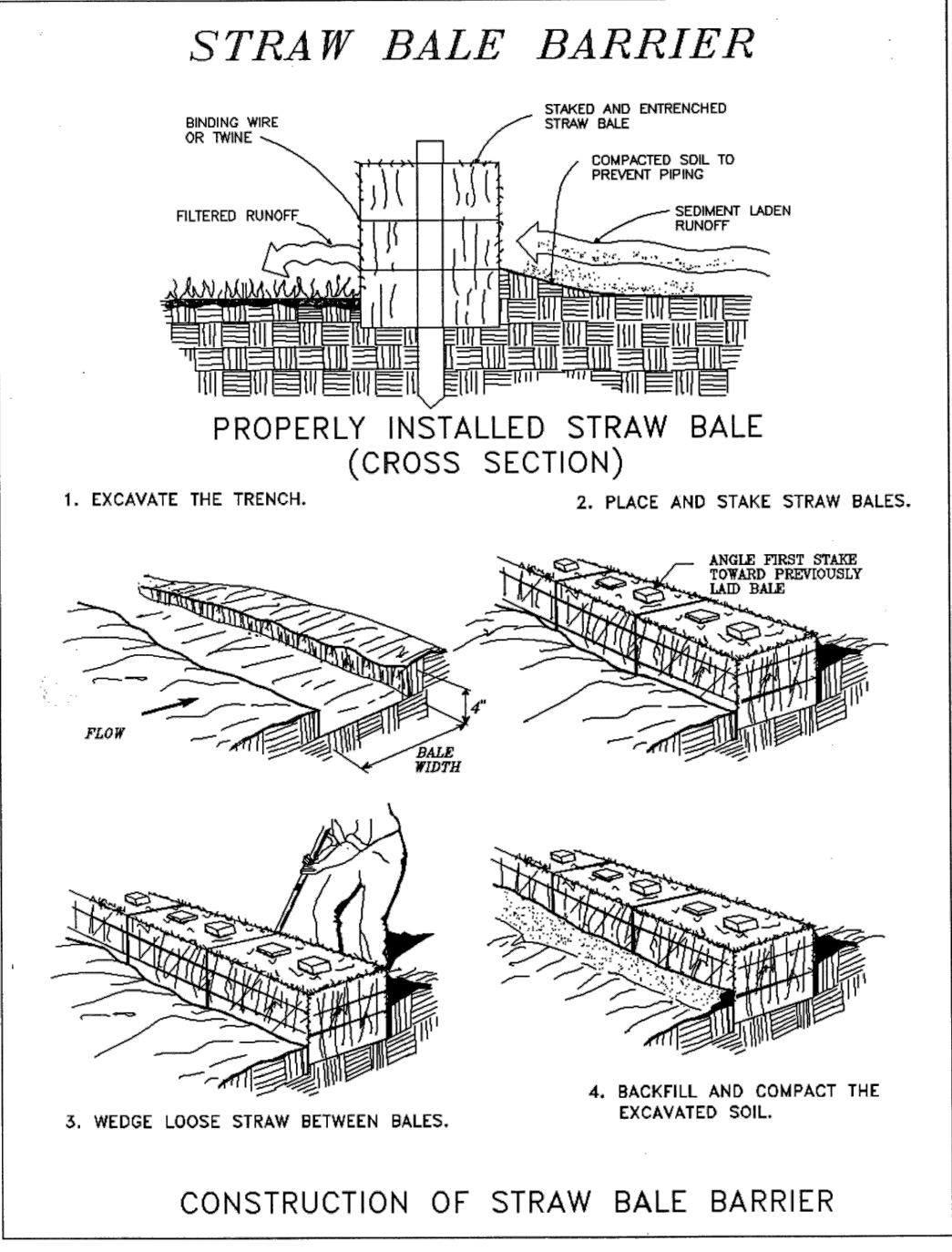
SAFETY FENCE
TAKEN FROM VADEQ 1992 MANUAL



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

Plate 3.02-1

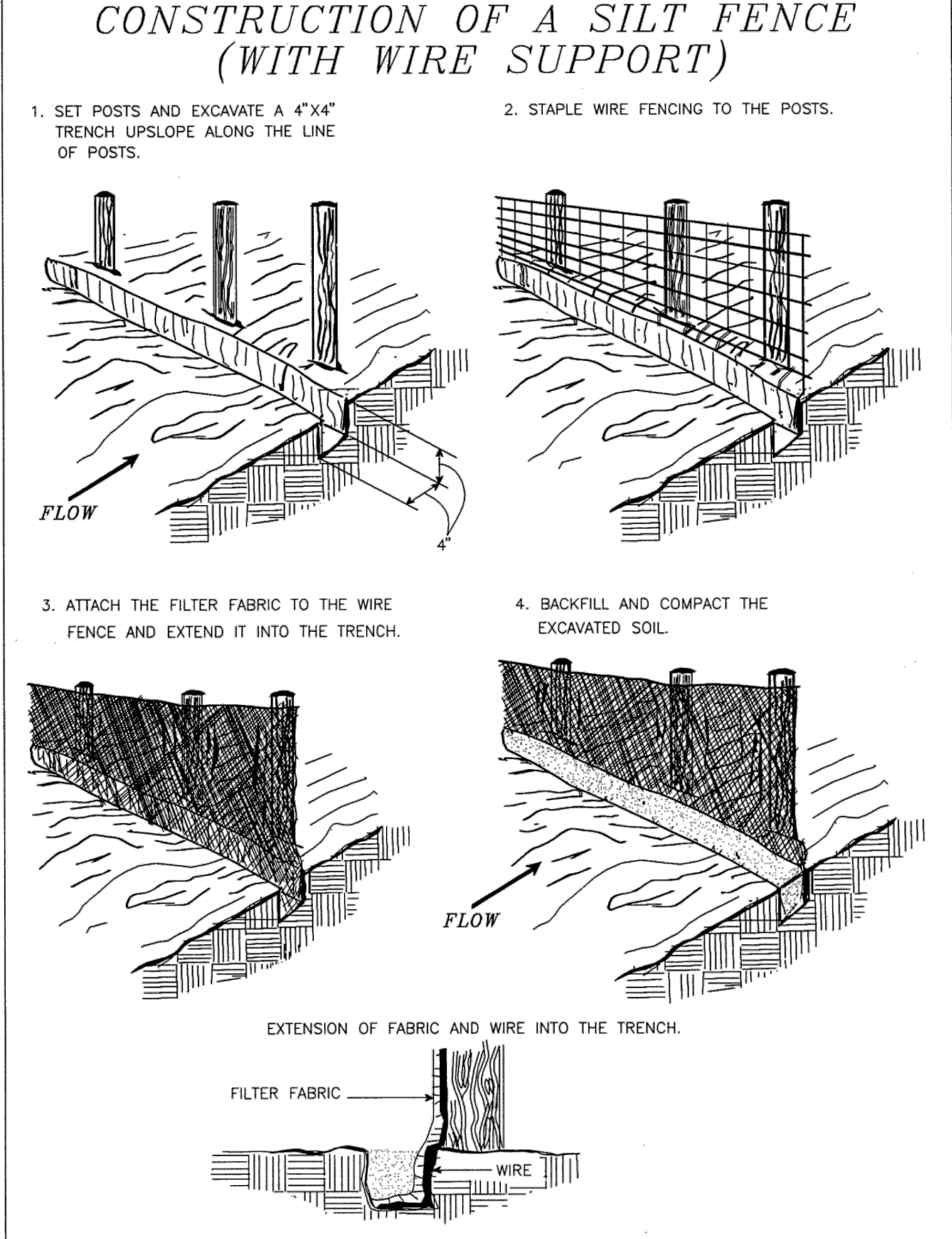
STONE CONSTRUCTION ENTRANCE
TAKEN FROM VADEQ 1992 MANUAL



Source: Va. DSWC

Plate 3.04-1

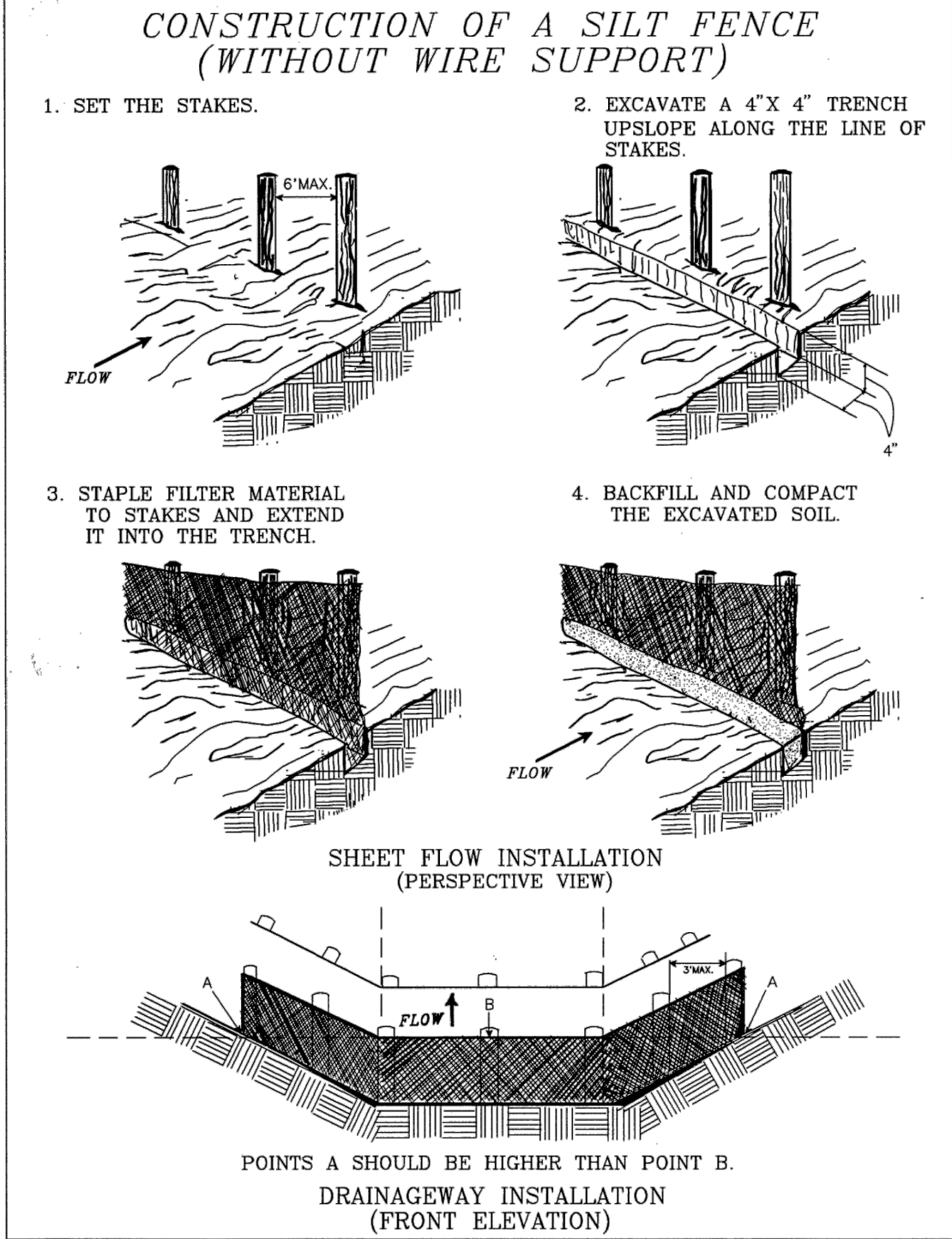
STRAW BALE BARRIER
TAKEN FROM VADEQ 1992 MANUAL



Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyant

Plate 3.05-1

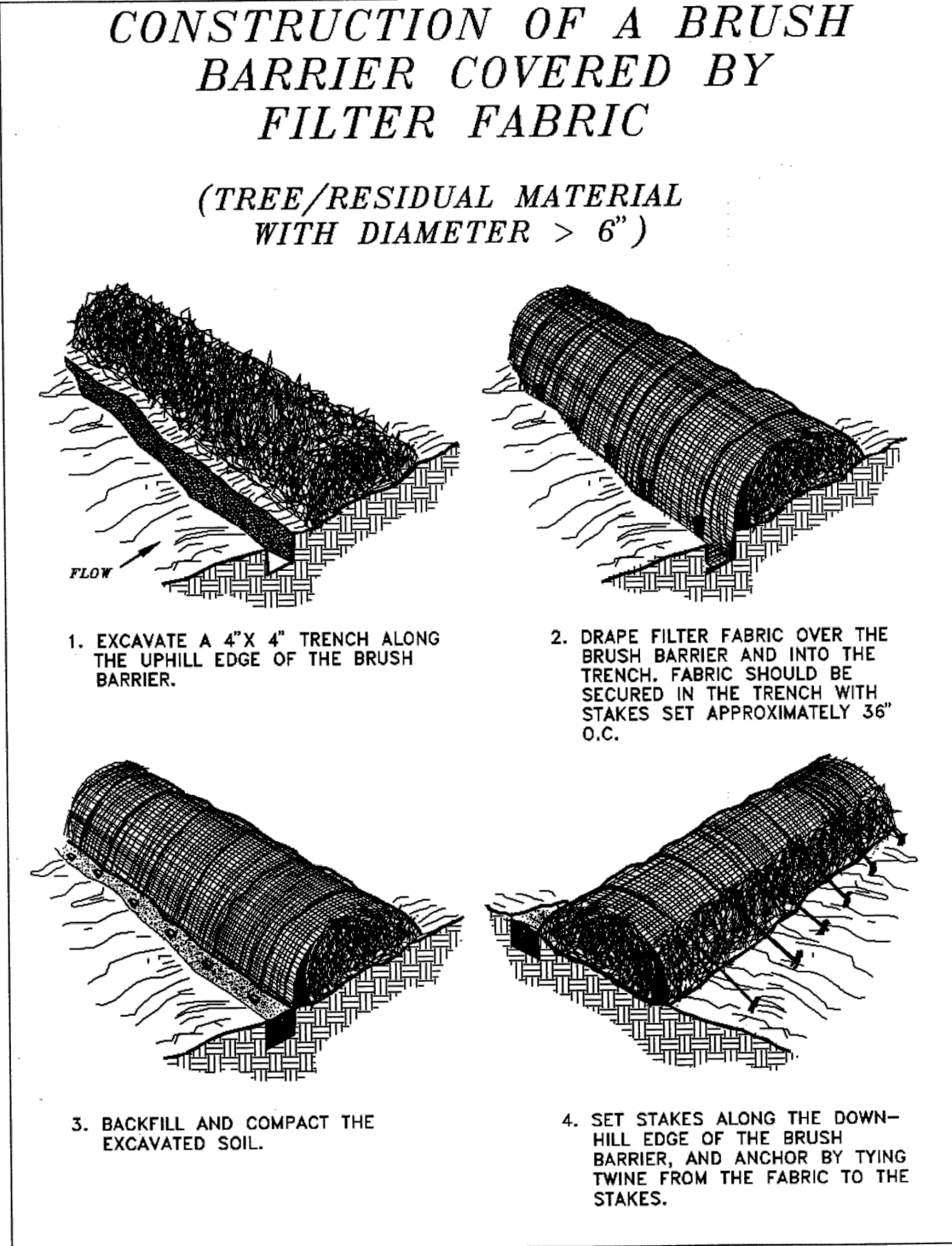
CONSTRUCTION OF SILT FENCE (WITH WIRE SUPPORT)
TAKEN FROM VADEQ 1992 MANUAL



Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyant

Plate 3.05-2

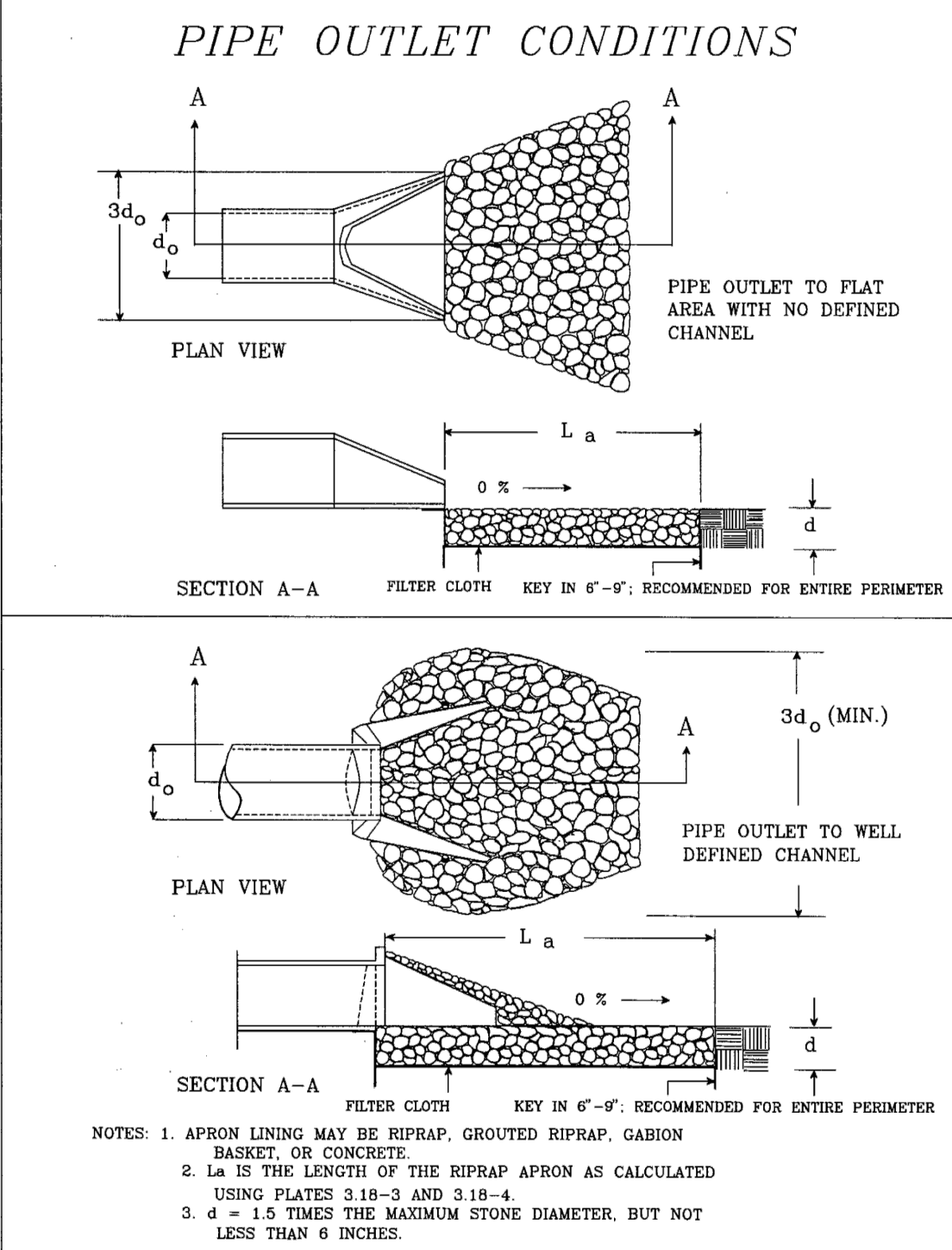
CONSTRUCTION OF SILT FENCE (WITHOUT WIRE SUPPORT)
TAKEN FROM VADEQ 1992 MANUAL



Source: Va. DSWC

Plate 3.06-1

CONSTRUCTION OF A BRUSH BARRIER
TAKEN FROM VADEQ 1992 MANUAL



Source: Va. DSWC

Plate 3.18-1

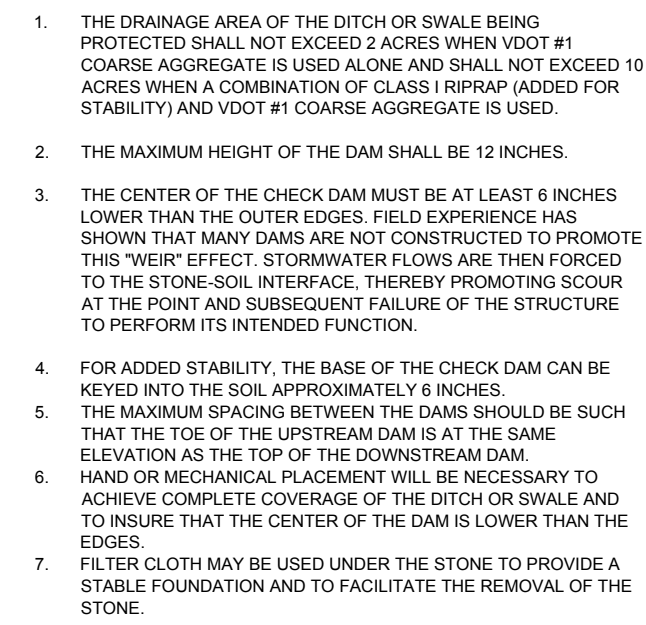
PIPE OUTLET CONDITIONS
TAKEN FROM VADEQ 1992 MANUAL

Outlet No.	Culvert Design			Riprap Apron Outlet Protection Design						
	Culvert Diameter, d _c (in)	Pipe Slope (ft/ft)	Q (cfs)	d ₅₀ Riprap Size, d ₅₀ (in)	AASHTO Riprap Class	Placement Thickness per NSA Riprap Gradation, d (in)	Placement Thickness per AASHTO Riprap Gradation, d (in)	Apron Length, L _a (ft)	Apron Initial Width, W _i (ft)	Apron Terminal Width, W (ft)
⁴ Outlet CC-1	24	0.0077	5.747	6	A	18	23.4	10	6	10
Outlet CC-2	18	0.0099	3.290	6	A	18	23.4	6	11.2	11.2
³ Outlet CC-3	18	0.0241	1.440	6	A	18	23.4	16.4	8	11
Outlet CC-4 (Temporary)	18	0.0212	4.730	6	A	18	23.4	9	4.5	10.5
Outlet CC-5	18	0.0170	1.170	6	A	18	23.4	6	4.5	7.5
² Outlet CH-H	N/A	0.0352	4.730	6	A	18	23.4	9	11.0	20.0
Outlet CH-A	N/A	N/A	7.180	6	A	18	23.4	9	2	12.0
⁵ Outlet SB-1	18	2.5000	1.564	6	A	18	23.4	10	4.5	14.5
Outlet SB-2	18	2.5000	7.470	6	A	18	23.4	10	4.5	14.5
Outlet CC-6	18	0.0064	1.708	6	A	18	23.4	10	4.5	14.5

- ¹Designed in accordance with VESCH Std & Spec 3.18 assuming minimum tailwater condition ($T_w < 0.5d_o$).
- ²Dimensions adapted from VESCH Std & Spec 3.18 assuming minimum tailwater condition ($T_w < 0.5d_o$). Initial Apron Width to match channel width at depth associated with design storm.
- ³Outlet CC-3 will follow the channel taper
- ⁴Designed in accordance with VESCH Std & Spec 3.18 assuming maximum tailwater condition ($T_w \geq 0.5d_o$).
- ⁵In addition to the riprap apron, a plunge pool section and a spreader weir section are also proposed at Outlet SB-1. See detail on sheet TRA-8.

OUTLET PROTECTION SCHEDULE
TAKEN FROM VADEQ 1992 MANUAL

ADDRESS VADEQ COMMENTS	DW	HT	MJP	2	11/21/17
ADDRESS VADEQ COMMENTS	DW	HT	JMK	3	02/28/18
ADDRESS VADEQ COMMENTS	DW	HT	KAL	4	04/10/18
ADDRESS VADEQ COMMENTS	DW	HT	KAL	5	05/11/18
ADDRESS VADEQ COMMENTS	DW	HT	KAL	6	05/23/18
ADDRESS VADEQ COMMENTS	DW	HT	KAL	7	06/04/18
NO.	DATE:	CHKD.:	DWN.:	APPD.:	
DESCRIPTION:					
REVISIONS:					
MOUNTAIN VALLEY PIPELINE, LLC					
555 SOUTHPOINTE BLVD, SUITE 200					
CANONSBURG, PA 15317					
MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT					
PITTSBURGH COUNTY, VIRGINIA					
EROSION AND SEDIMENT CONTROL DETAILS					
MOUNTAIN VALLEY PIPELINE					
TETRA TECH					
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661 ANDERSEN DRIVE					
FOSTER PLAZA 7					
PITTSBURGH, PA 15220					
CONSTRUCTION PLANS					
DAVID J. WALLNER					
Lic. No. 0402057593					
Professional Engineer					
DRAWN BY: KAL					
CHECKED BY: HT					
APPROVED BY: DJW					
DATE: 06/04/2018					
SCALE: AS SHOWN					
SHT. NO. TRA-2 OF 25					



Source: Va. DSWC

ROCK CHECK DAM

DEVELOPED FROM VADEQ 1992 MANUAL

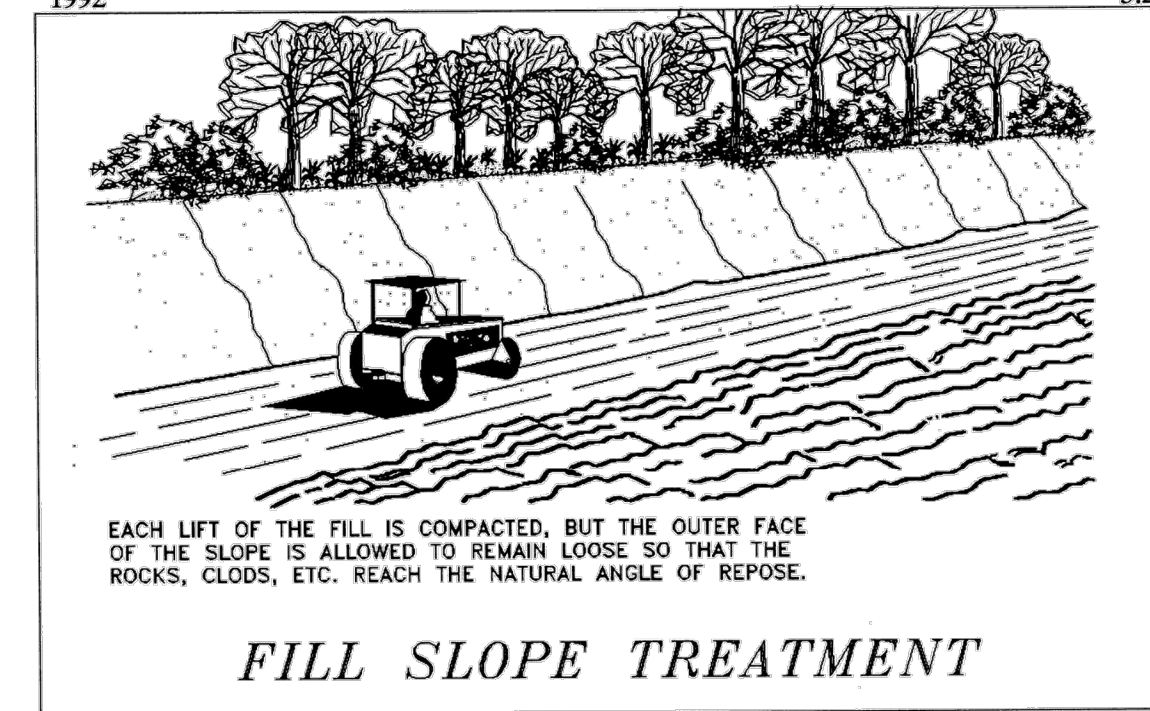
Plate 3.20-1

Drainage Area (Acres)	Average Slope of Watershed			
	1%	4%	8%	16%
1 - 25	24	24	30	30
26 - 50	24	30	36	36
51 - 100	30	36	42	48
101 - 150	30	42	48	48
151 - 200	36	42	48	54
301 - 350	42	48	60	60
351 - 400	42	54	60	60
451 - 500	42	54	60	72
501 - 550	48	60	60	72
551 - 600	48	60	60	72
601 - 640	48	60	72	72

^a Note: Table is based on USDA-SCS Graphical Peak Discharge Method for 2-year frequency storm event, CN = 65; Rainfall depth = 3.5 inches (average for Virginia).

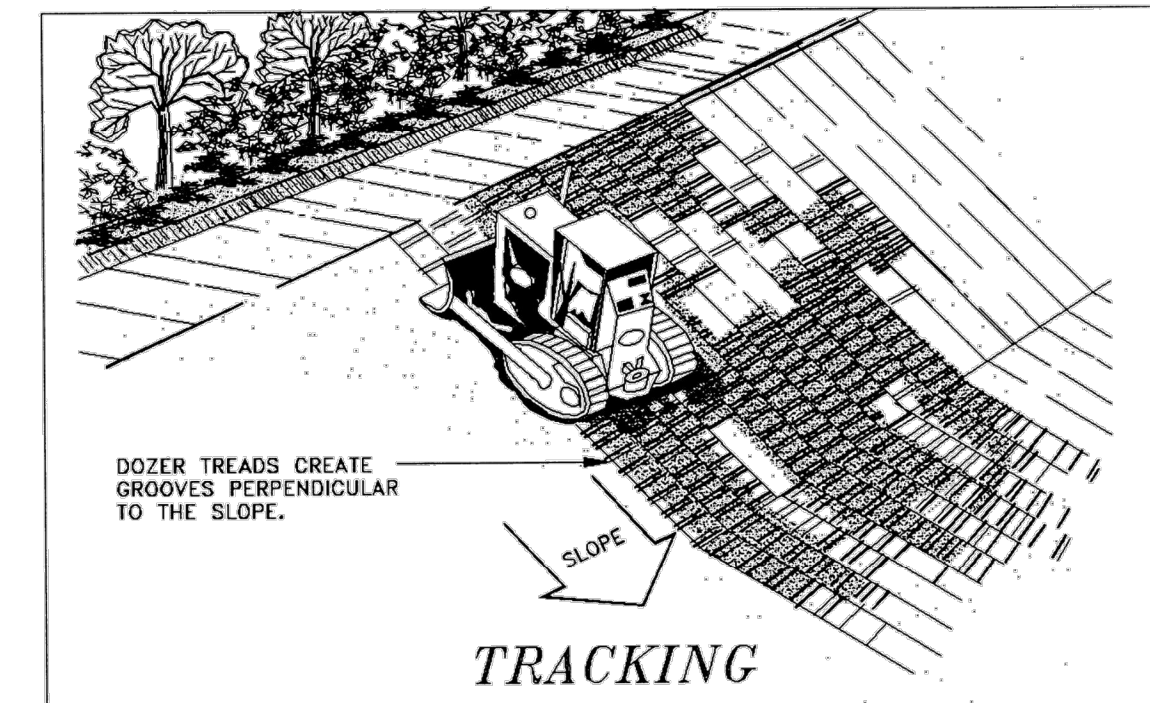
Source: Va. DSWC

PIPE DIAMETER CHART
TAKEN FROM VADEQ 1992 MANUAL



Source: Va. DSWC

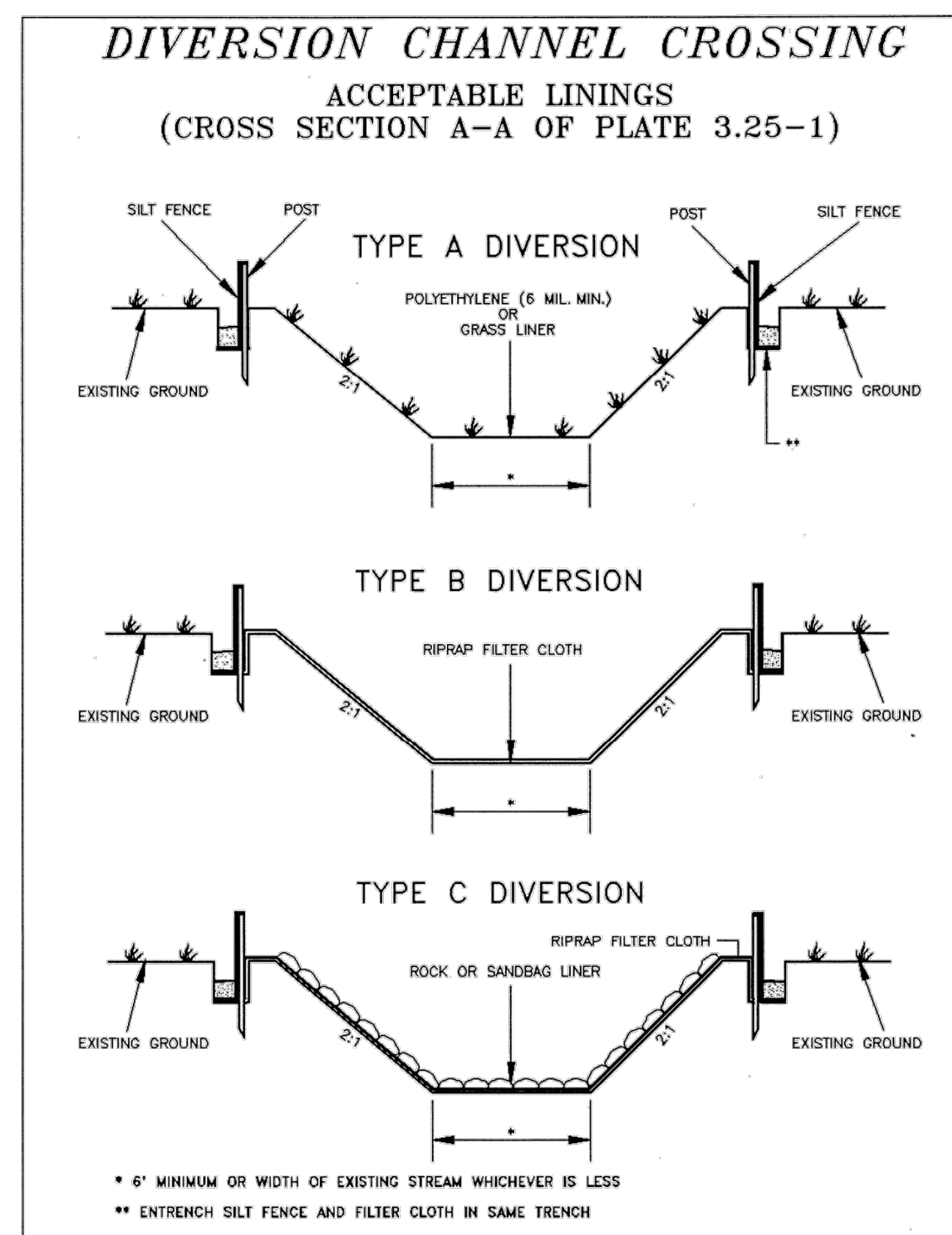
Plate 3.29-3



Source: Michigan Soil Erosion and Sedimentation Guide

Plate 3.29-4

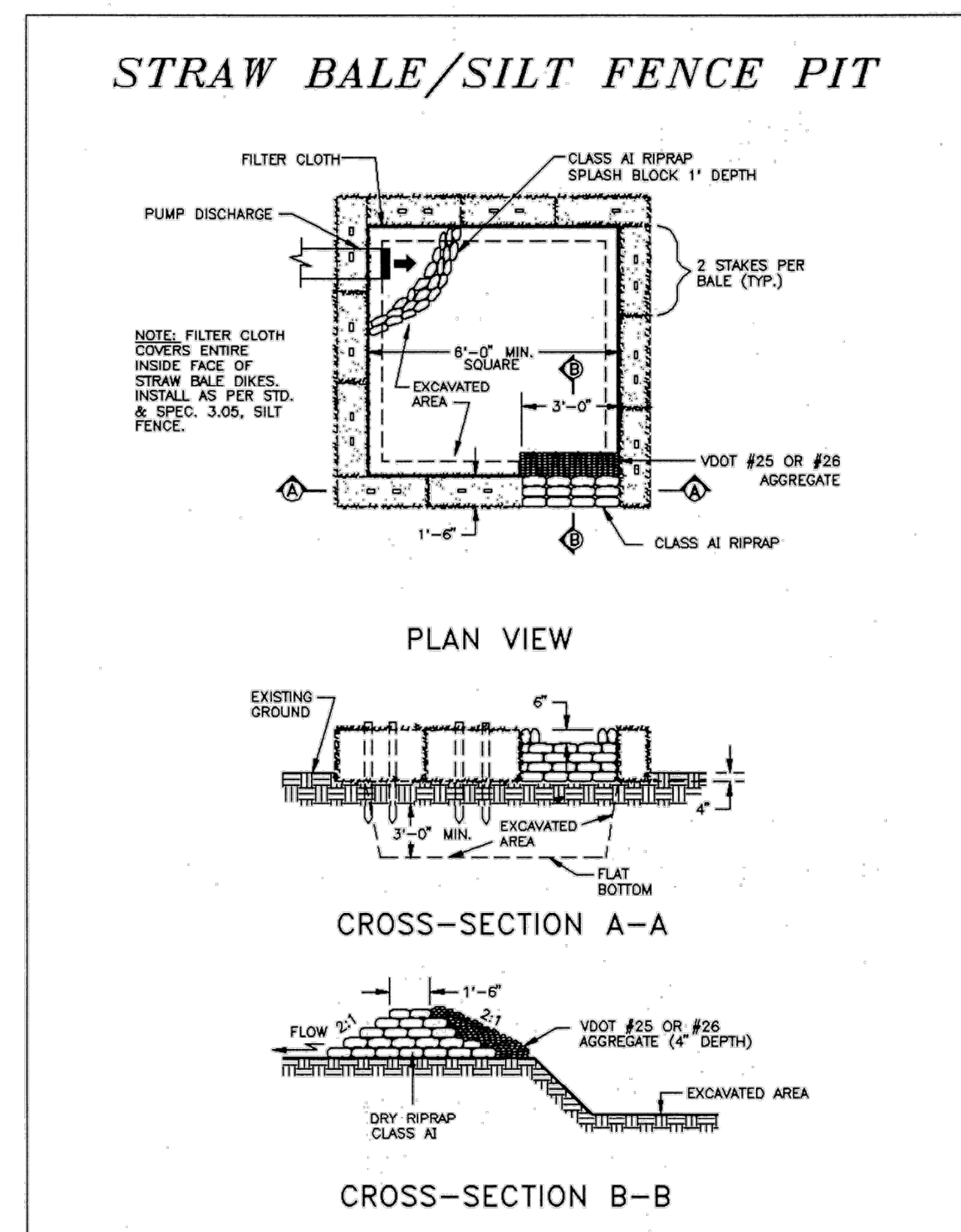
FILL SLOPE TREATMENT & TRACKING
TAKEN FROM VADEQ 1992 MANUAL



Source: Adapted from VDOT Standard Sheets

Plate 3.25-2

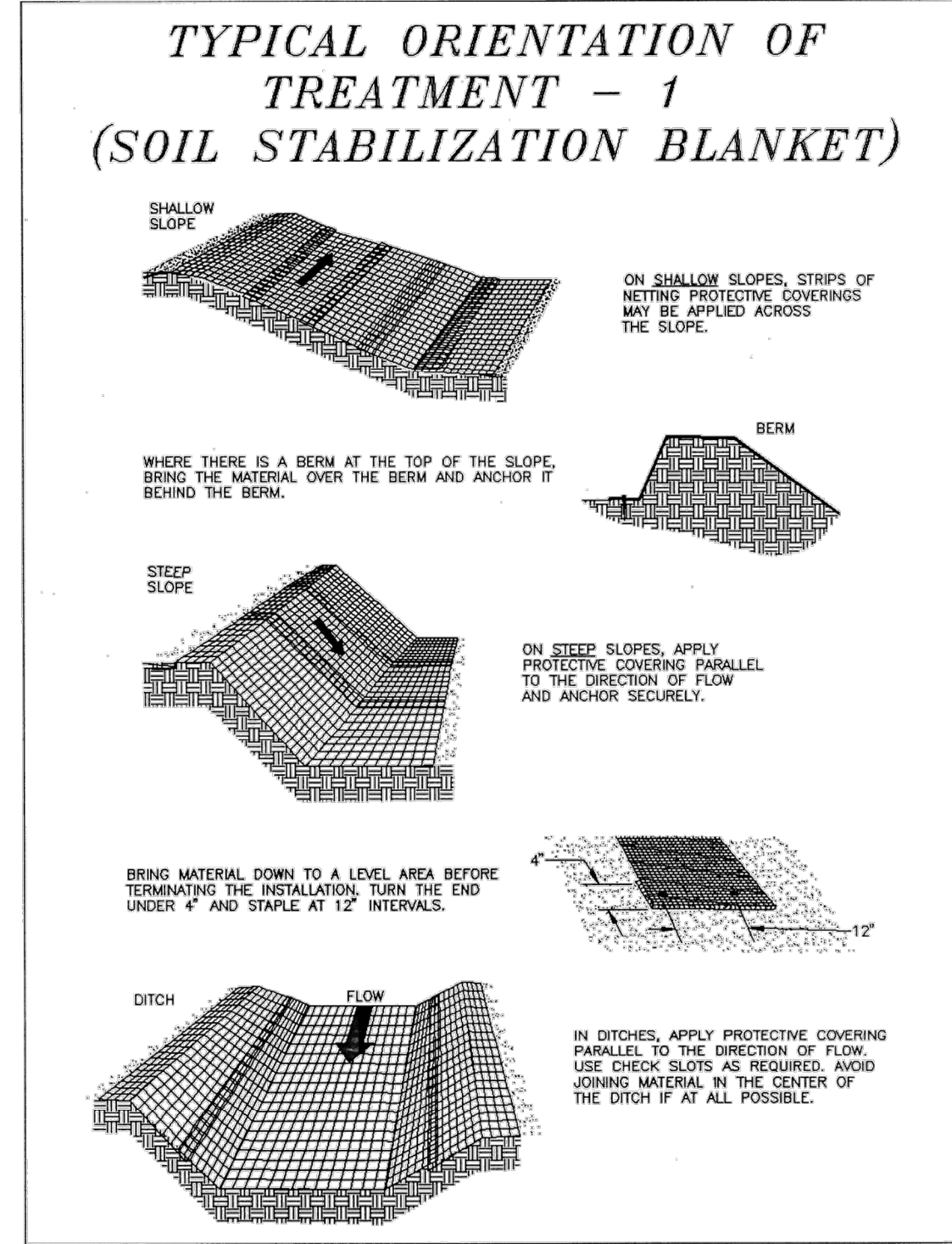
DIVERSION CHANNEL CROSSING DEVELOPED FROM VADEQ 1992 MANUAL



Source: Va. DSWC

Plate 3.26-3

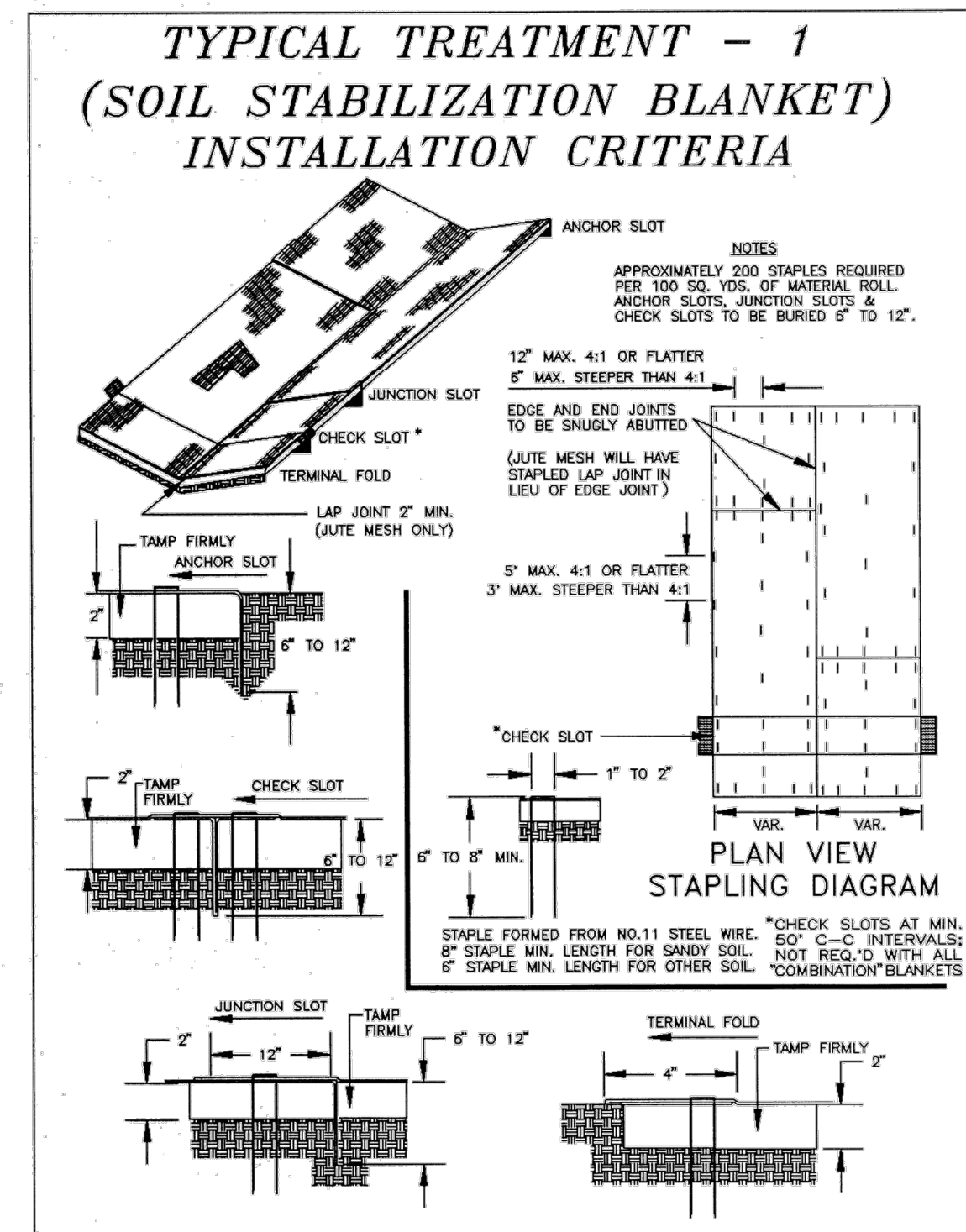
STRAW BALE/SILT FENCE PIT
DEVELOPED FROM VADEQ 1992 MANUAL



Source: Adapted from Ludlow Products Brochure

Plate 3.36-1










TYPICAL ORIENTATION OF TREATMENT SOIL STABILIZATION BLANKET DEVELOPED FROM VADEQ 1992 MANUAL



Source: VDOT Road and Bridge Standards

Plate 3.36-2

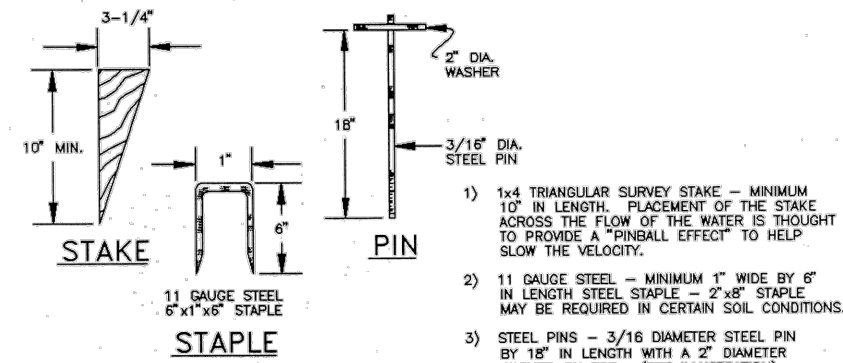
SOIL STABILIZATION BLANKET INSTALLATION CRITERIA DEVELOPED FROM VADEQ 1992 MANUAL

<div><div><div>Mountain Valley PIPELINE</div></div><div><div>EROSION AND SEDIMENT CONTROL DETAILS</div><div>MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT</div><div>PITTSBURGH COUNTY, VIRGINIA</div></div></div>										<div><div><div>TETRA TECH</div></div><div>complex world CLEAR SOLUTIONS™</div><div>661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220</div></div>										<div><div>CONSTRUCTION PLANS</div></div>										<div><div></div></div>										<div><div>DRAWN BY: KAL</div><div>CHECKED BY: HT</div><div>APPROVED BY: DJW</div><div>DATE: 06/04/2018</div><div>SCALE: AS SHOWN</div><div>SHT. NO. TRA-3 OF 25</div></div>										<div><div>REVISION</div></div>									
<div><div><div>Mountain Valley PIPELINE</div></div><div><div>EROSION AND SEDIMENT CONTROL DETAILS</div><div>MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT</div><div>PITTSBURGH COUNTY, VIRGINIA</div></div></div>										<div><div><div>TETRA TECH</div></div><div>complex world CLEAR SOLUTIONS™</div><div>661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220</div></div>										<div><div>CONSTRUCTION PLANS</div></div>										<div><div></div></div>										<div><div>DRAWN BY: KAL</div><div>CHECKED BY: HT</div><div>APPROVED BY: DJW</div><div>DATE: 06/04/2018</div><div>SCALE: AS SHOWN</div><div>SHT. NO. TRA-3 OF 25</div></div>										<div><div>REVISION</div></div>									
<div><div><div>Mountain Valley PIPELINE</div></div><div><div>EROSION AND SEDIMENT CONTROL DETAILS</div><div>MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT</div><div>PITTSBURGH COUNTY, VIRGINIA</div></div></div>										<div><div><div>TETRA TECH</div></div><div>complex world CLEAR SOLUTIONS™</div><div>661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220</div></div>										<div><div>CONSTRUCTION PLANS</div></div>										<div><div></div></div>										<div><div>DRAWN BY: KAL</div><div>CHECKED BY: HT</div><div>APPROVED BY: DJW</div><div>DATE: 06/04/2018</div><div>SCALE: AS SHOWN</div><div>SHT. NO. TRA-3 OF 25</div></div>										<div><div>REVISION</div></div>									

evaluation of performance data to ensure proper selection of a soil stabilization matting are also essential. Although many manufacturers claim their products may inhibit erosion associated with channel velocities of up to 20 ft./sec., it is recommended that any velocities that exceed 10 ft./sec. be properly protected with some form of structural lining (see Std. & Spec. 3.17, STORMWATER CONVEYANCE CHANNEL).

Staples - Staples or anchoring methods and recommendations vary by manufacturers. The expectation of high velocities should dictate the use of more substantial anchoring. Some of the typically recommended stakes, staples and pins are depicted in Plate 3.36-3

STAKES, STAPLES, & PINS
FOR
INSTALLATION OF
TREATMENT - 2
SOIL STABILIZATION MATTING



Source: Product literature from Greenstreak, Inc.

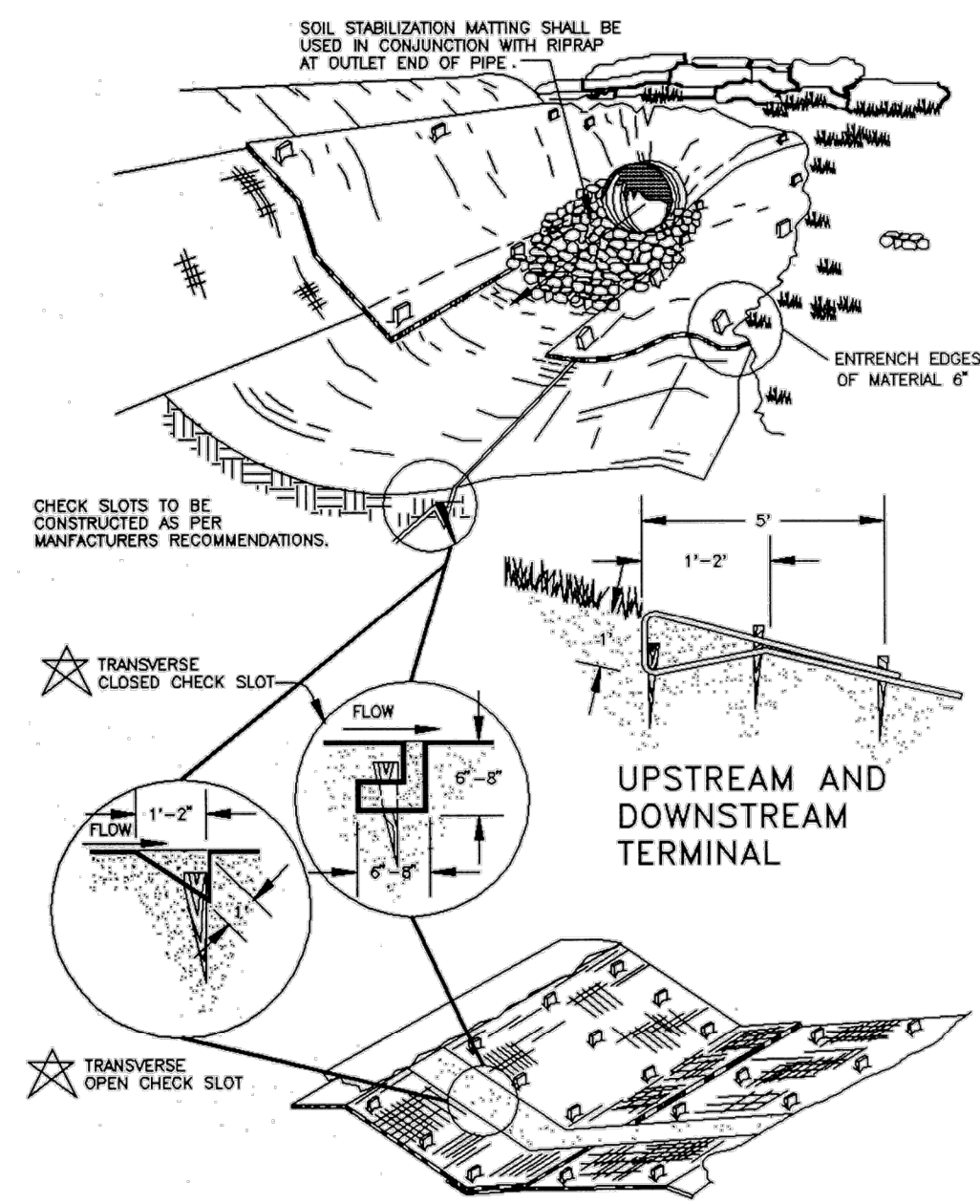
Plate 3.36-:

Installation Requirements

Site Preparation - After site has been shaped and graded to approved design, prepare a friable seedbed relatively free from clods and rocks more than 1 inch in diameter, and any foreign material that will prevent contact of the soil stabilization mat with the soil surface. If necessary, redirect any runoff away from the ditch or slope during installation.

STAKES, STAPLES, & PINS FOR INSTALLATION OF SOIL STABILIZATION MATTING DEVELOPED FROM VADEQ 1992 MANUAL

**TYPICAL TREATMENT-2
SOIL STABILIZATION
MATTING INSTALLATION**

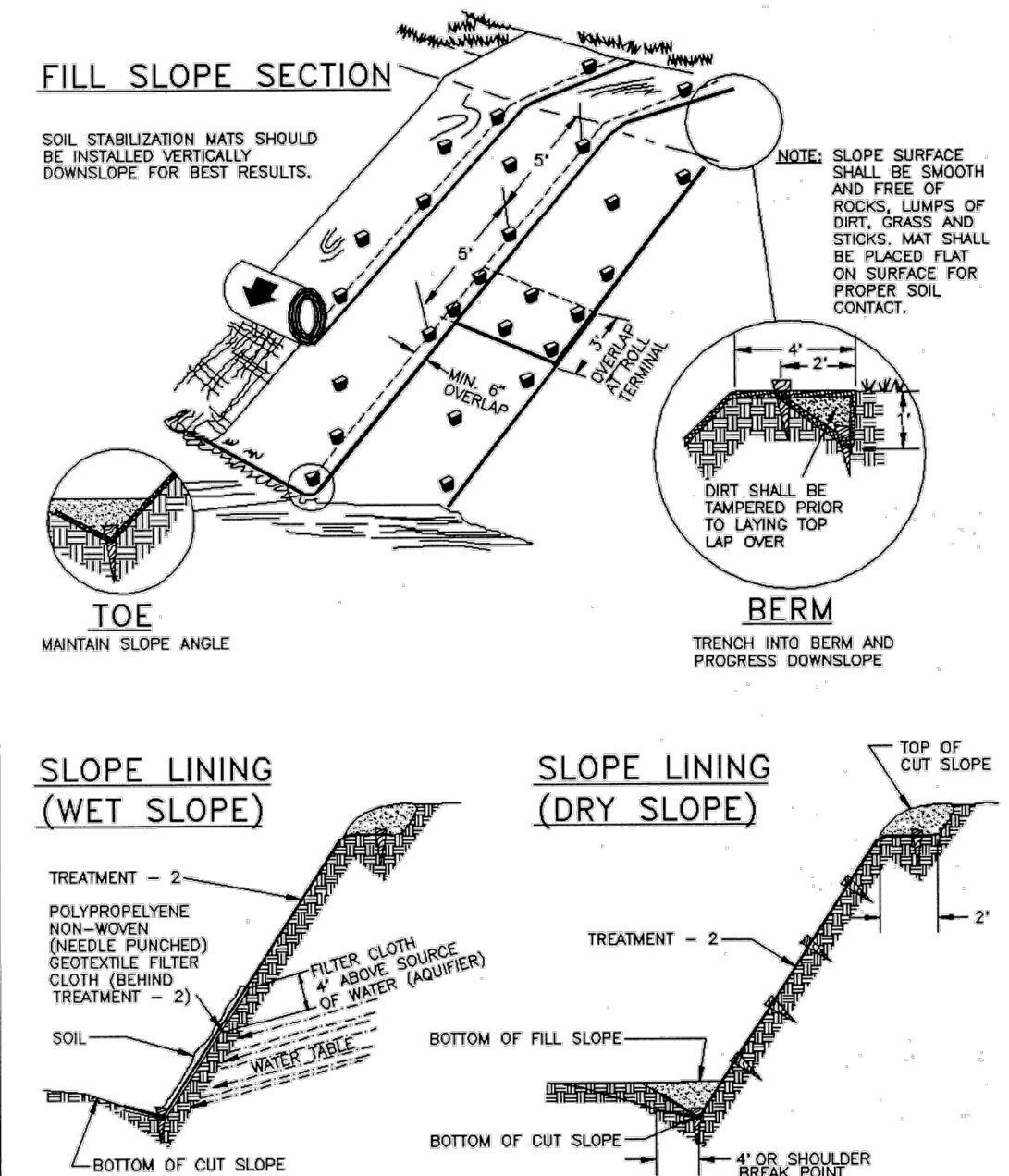


Source: VDOT Road and Bridge Standards

Plate 3.36-4

TYPICAL TREATMENT
SOIL STABILIZATION MATTING INSTALLATION
DEVELOPED FROM VADEQ 1992 MANUAL

*TYPICAL TREATMENT - 2
SOIL STABILIZATION MATTING
SLOPE INSTALLATION*



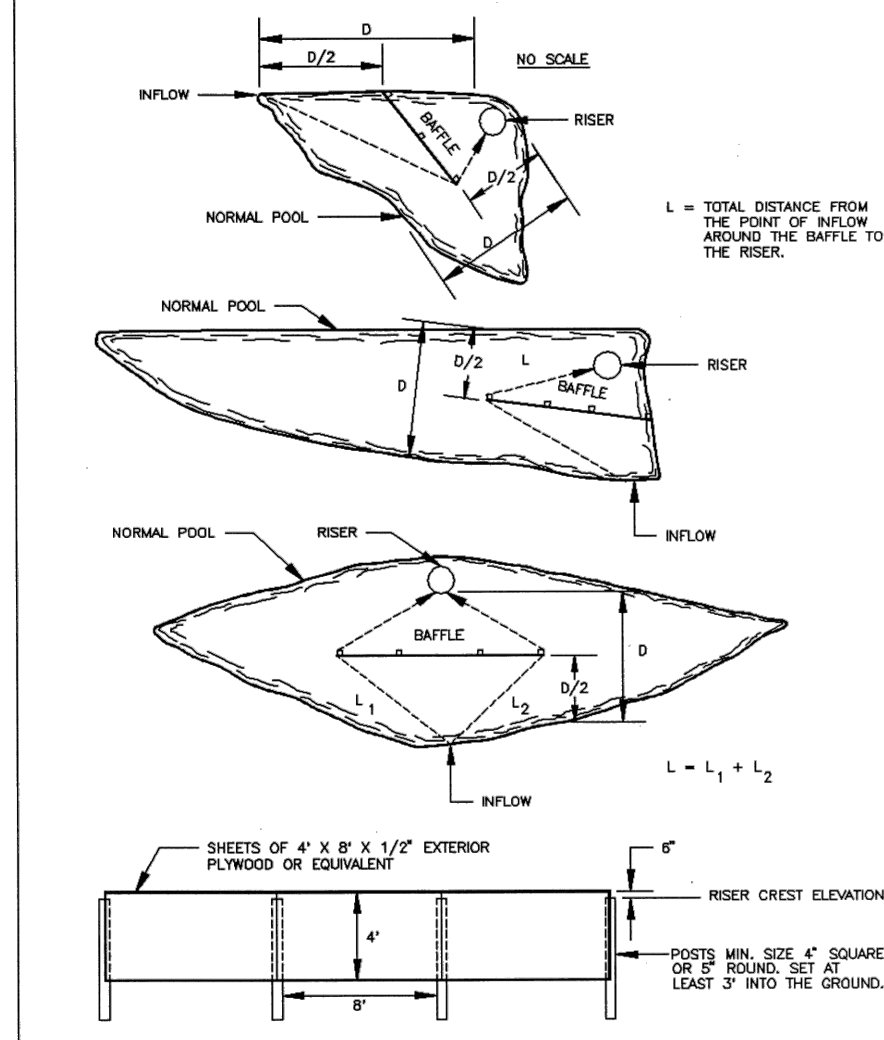
Source: VDOT Road and Bridge Standards

Plate 3.36-5

SOIL STABILIZATION MATTING SLOPE INSTALLATION

DEVELOPED FROM VADEQ 1992 MANUAL

EXAMPLE PLAN VIEWS OF
BAFFLE LOCATIONS IN
SEDIMENT BASINS



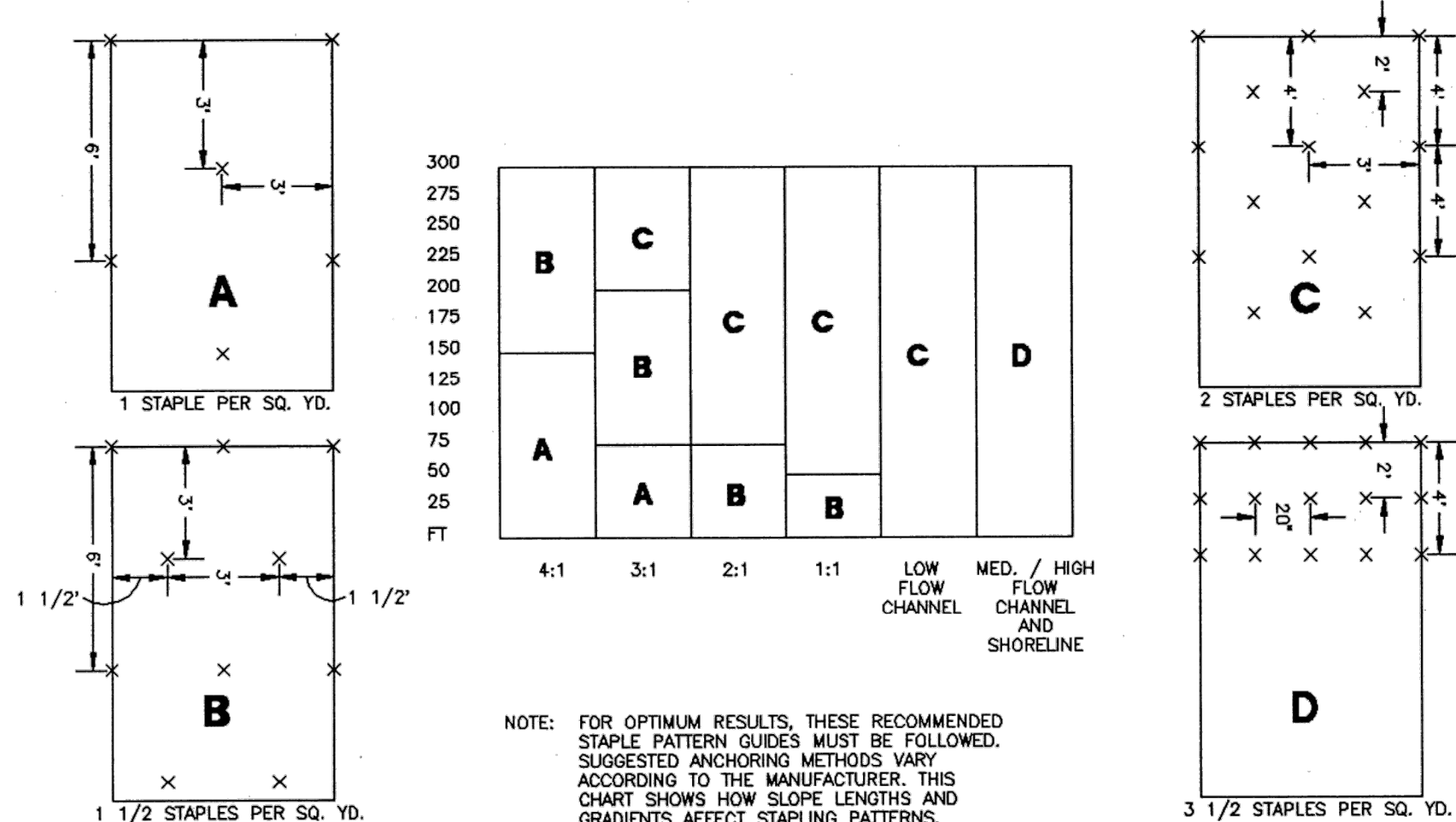
Source: USDA-SCS

Plate 3.14-6

III - 94

BAFFLE DETAIL
TAKEN FROM VADEQ 1992 MANUAL

**GENERAL STAPLE PATTERN GUIDE
AND RECOMMENDATIONS
FOR TREATMENT - 2
(SOIL STABILIZATION MATTING)**



NOTE: FOR OPTIMUM RESULTS, THESE RECOMMENDED STAPLE PATTERN GUIDES MUST BE FOLLOWED. SUGGESTED ANCHORING METHODS VARY ACCORDING TO THE MANUFACTURER. THIS CHART SHOWS HOW SLOPE LENGTHS AND GRADIENTS AFFECT STAPLING PATTERNS.

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



N.T.S.



N/A = Not Applicable

² For Geotextile Linings, a Manning's n value of 0.030 was assumed based on the range of values provided in Table 7-2A of the VDOT Drainage Manual (Chapter 7).

³ For grass-lined channels, a Manning's n value of 0.027 was assumed based on the range of values provided in Appendix 7D-1 of the VDOT Drainage Manual

⁴For Geotextile Linings, allowable shear stress values are as reported in Table 7-1 of the VDOT Drainage Manual (Chapter 7).

⁵ For grass-lined channels, permissible velocities are as reported in Table 3.17-A of the VESCH STD & SPEC 3.17.

⁶ Shear and velocity calculated using the maximum channel slope condition to be conservative

⁷The 10-Year 24-hour design flow was calculated in Hydraflow Hydrographs using TR-55 methodology

⁸ A minimum freeboard of 0.5 feet is assumed for design purposes in accordance with VA DEQ Stormwater Design Specification No. 3 - Grass Channels.

⁹ Flow depth calculated using the minimum channel slope condition to be conservative.

N.T.S.

ALL CHANNELS HAVE BEEN DESIGNED IN ACCORDANCE WITH VAQED STD & SPEC 3.17. CHANNELS WITH ROCK CHECK DAMS WILL SERVE AS WATER QUANTITY BMPs BUT ARE NOT INTENDED TO SERVE A WATER QUALITY FUNCTION SO THE VA BMP CLEARINGHOUSE SPECIFICATION NO. 3 – GRASS CHANNELS IS NOT APPLICABLE.

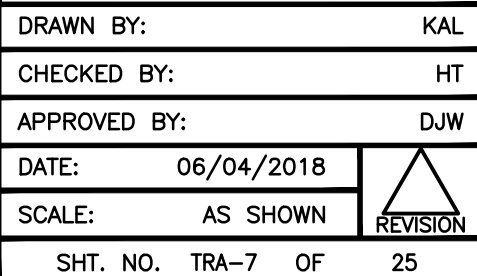
 Mountain Valley Pipeline

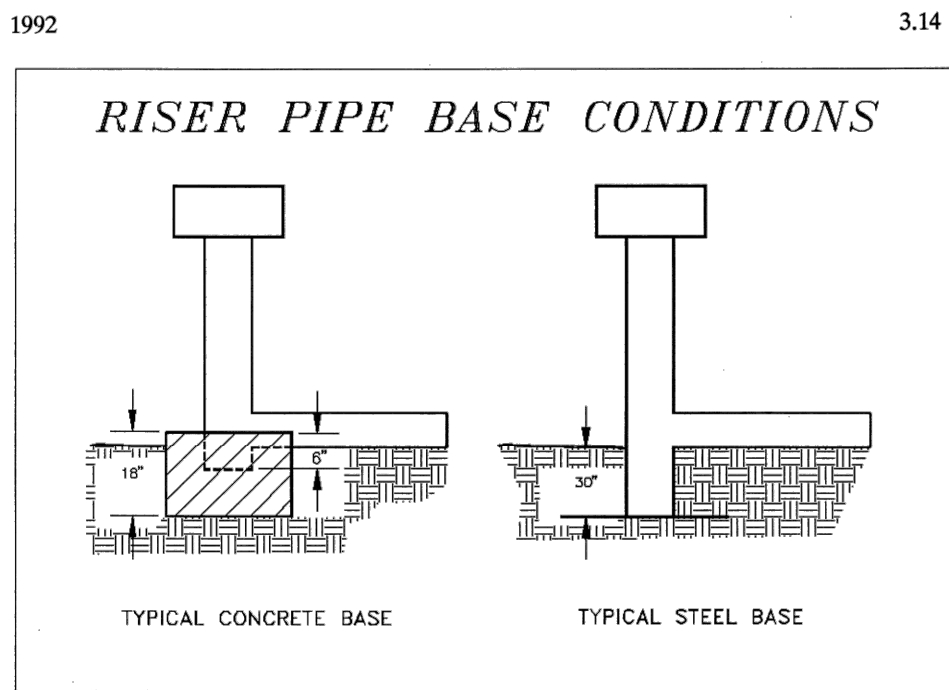
EROSION AND SEDIMENT CONTROL DETAILS

MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECTION

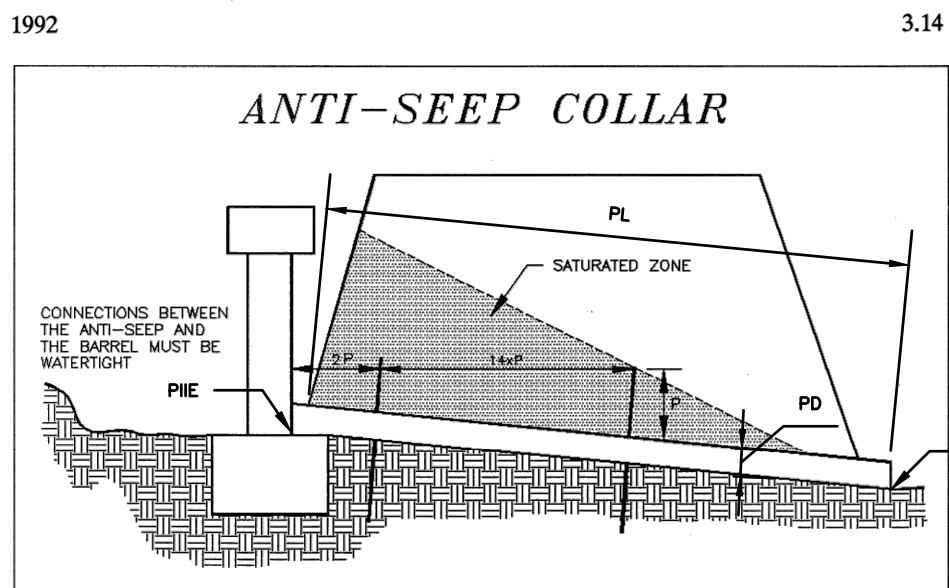


CONSTRUCTION PLANS

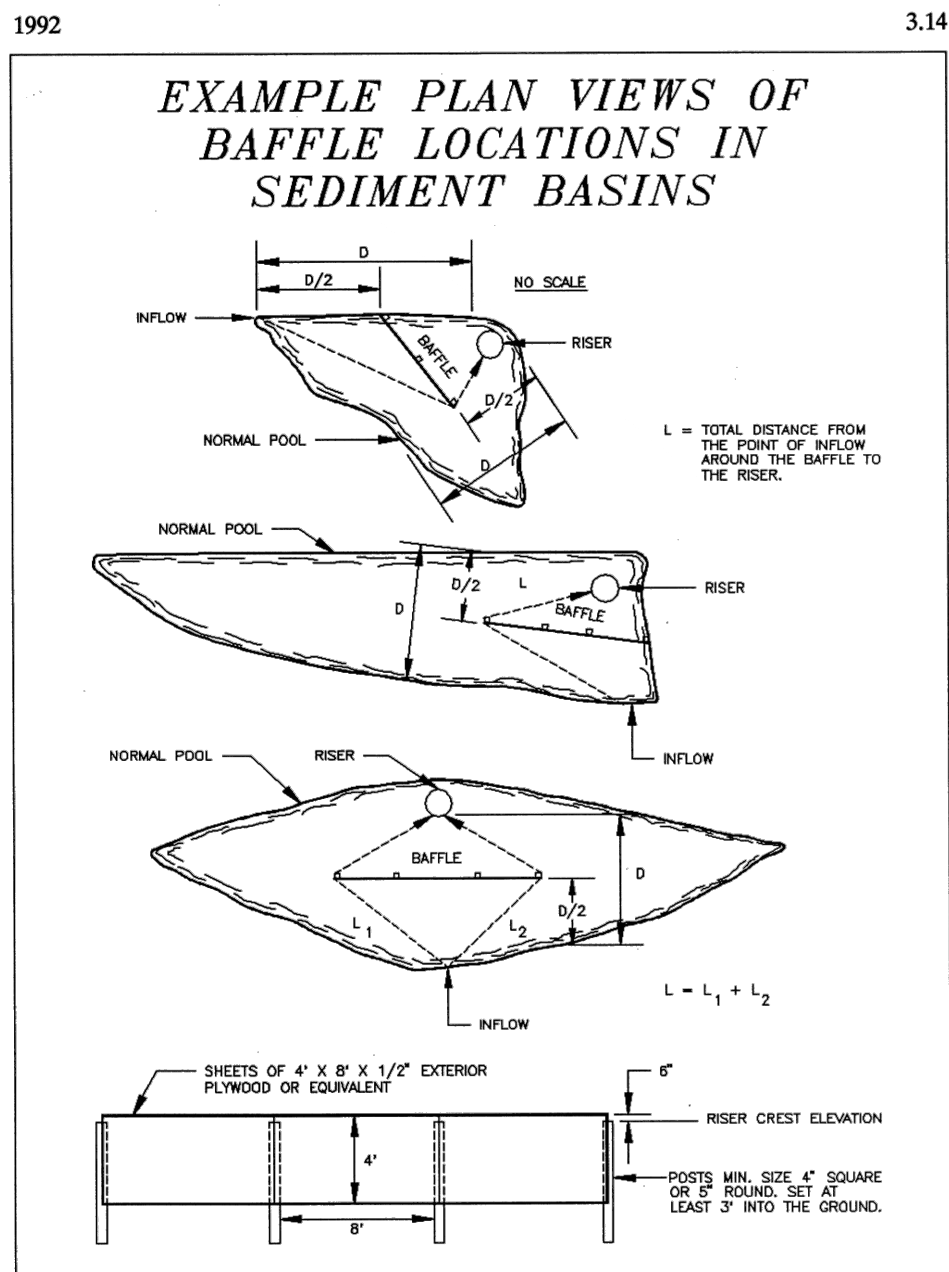




Source: Va. DSWC Plate 3.14-3



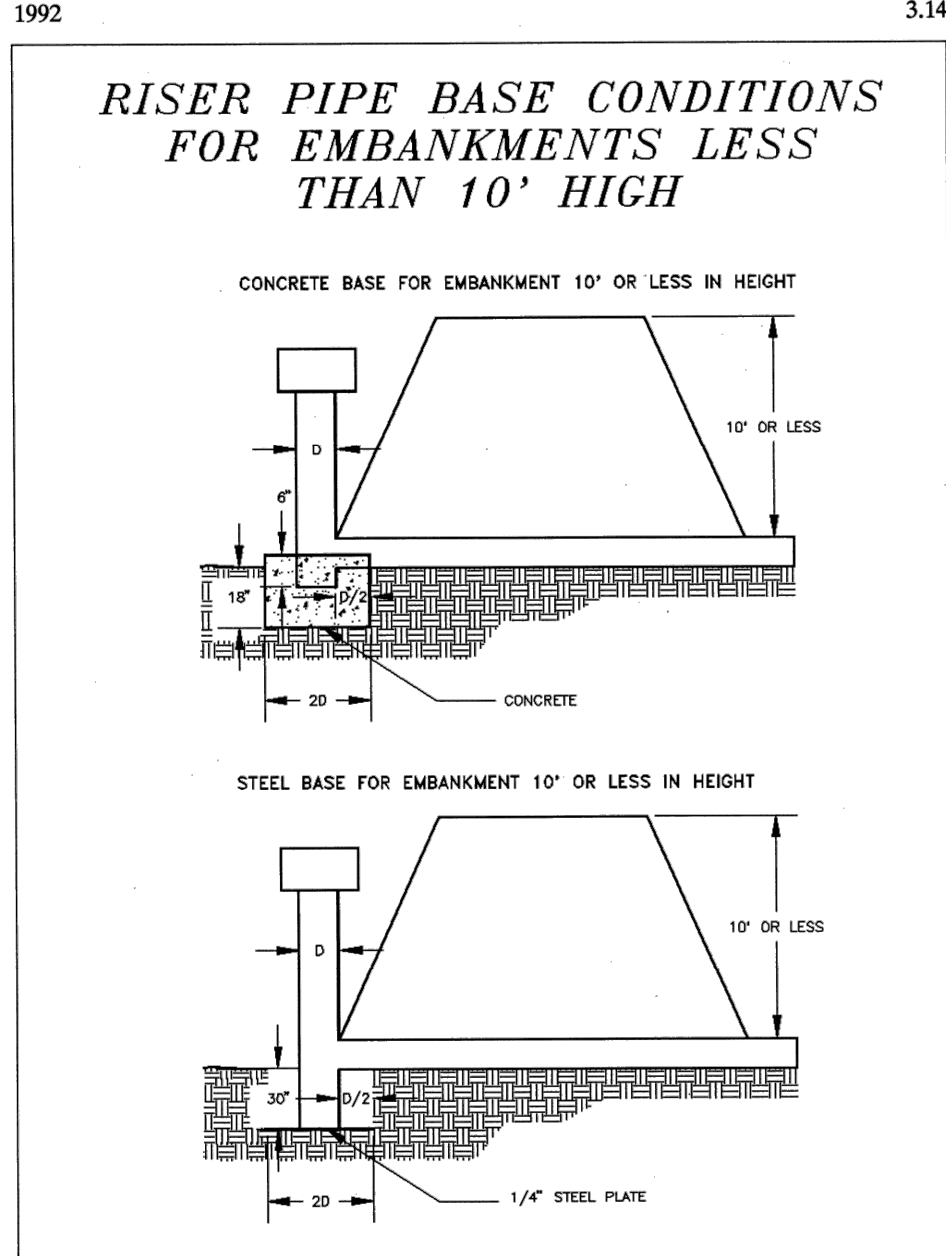
Source: Va. DSWC Plate 3.14-4



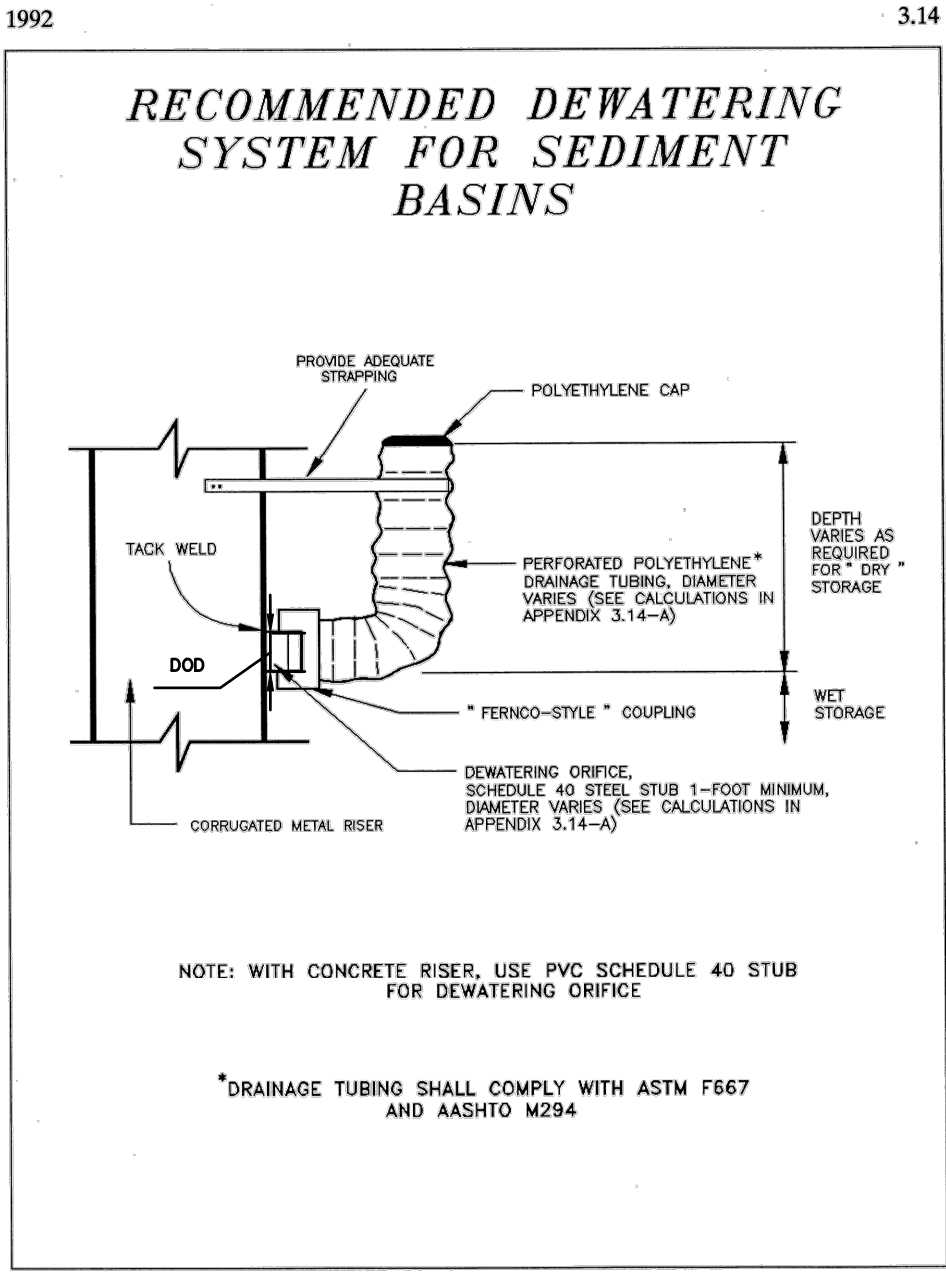
Source: USDA-SCS Plate 3.14-6

NOTE:
REFER TO THE SEDIMENT BASIN PLAN VIEWS ON SHEET TRA-19 AND THE SEDIMENT BASIN SECTION VIEWS ON SHEET TRA-23 FOR ADDITIONAL SITE-SPECIFIC DETAILS FOR SEDIMENT BASIN SB-1 AND SB-2.

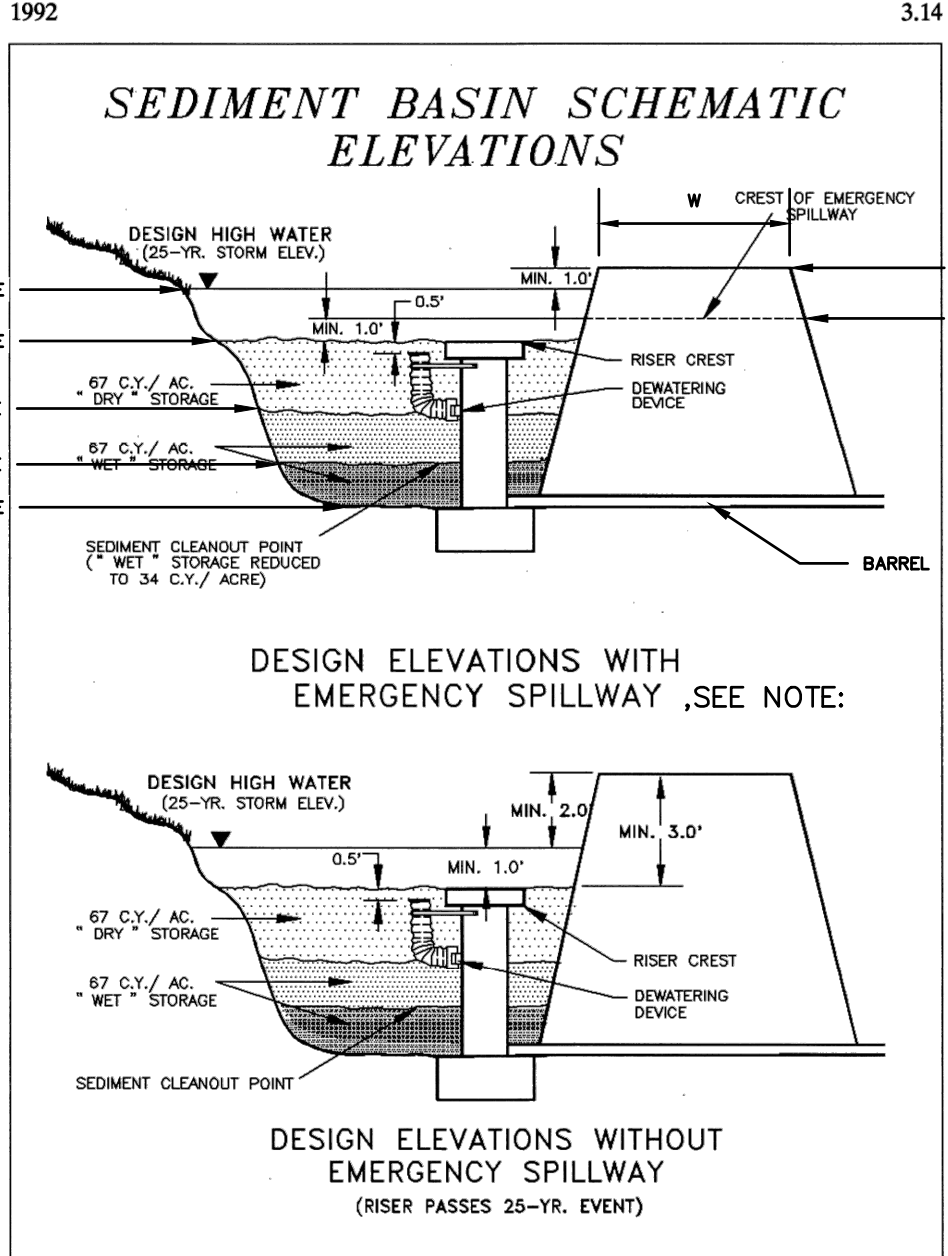
SEDIMENT BASIN DETAILS
TAKEN FROM VADEQ 1992 MANUAL



Source: Va. DSWC Plate 3.14-14

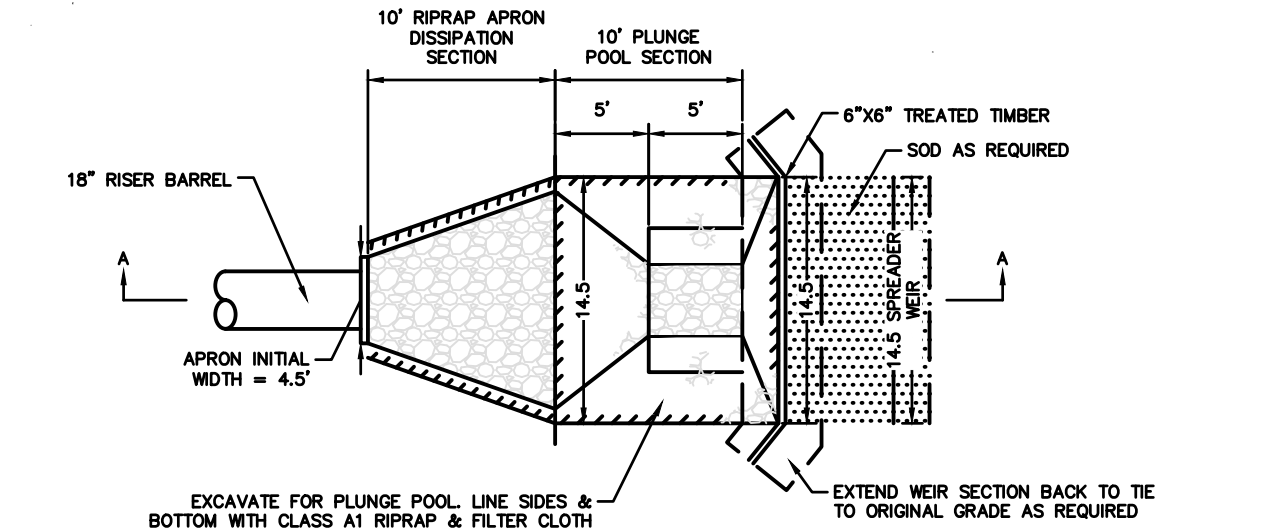
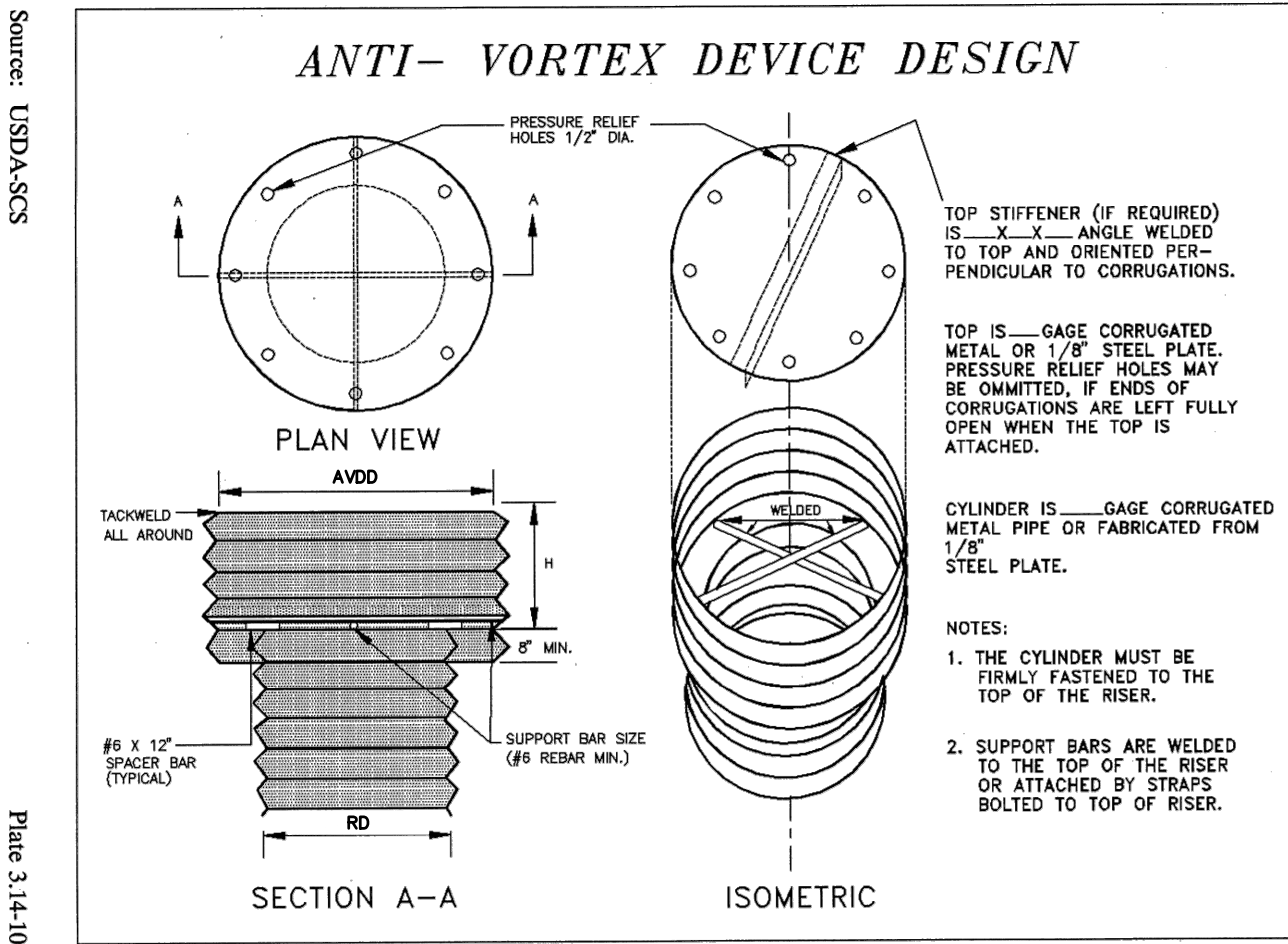


Source: Va. DSWC Plate 3.14-15

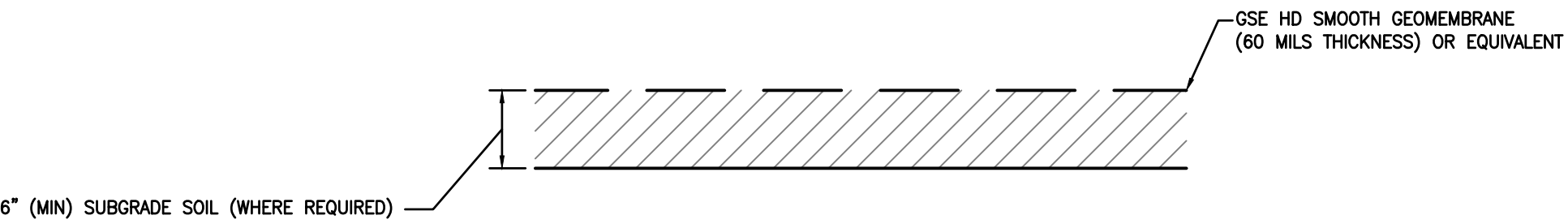


Source: Va. DSWC Plate 3.14-2

NOTE:
SEE GENERIC DETAILS FOR ANTI-VORTEX DEVICE DESIGN, ANTI-SEEP COLLAR, AND RECOMMENDED DEWATERING SYSTEM FOR SEDIMENT BASINS FOR ADDITIONAL DESIGN DIMENSIONS/ELEVATIONS ASSOCIATED WITH THE RISER, BARREL, AND DEWATERING DEVICE, RESPECTIVELY.



SB-1/STORMWATER POND RISER BARREL OUTFLOW SPREADER DEVICE DESIGN
N.T.S.



- NOTE:**
- PREPARE LINER SUBGRADE TO PROVIDE A RELATIVELY SMOOTH SURFACE FREE OF PROTRUSIONS OR OTHER DEFECTS THAT MAY DAMAGE THE LINER OR INHIBIT THE INSTALLATION OF THE LINER. IF THE EXISTING SUBSURFACE MATERIAL IS UNSUITABLE, PROVIDE A SIX-INCH LIFT OF SUITABLE MATERIAL OVER EXISTING UNSUITABLE SUBGRADE.
 - REFER TO THE MANUFACTURER'S INSTALLATION GUIDELINES AND THE TECHNICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

TYPICAL IMPERVIOUS LINER DETAIL
N.T.S.

NOTE:
AN IMPERVIOUS LINER IS ONLY PROPOSED FOR SEDIMENT BASIN 1 (SB-1), WHICH WILL BE CONVERTED TO A STORMWATER POND DURING FINAL SITE RESTORATION (SEE SHEET TRA-25), SINCE IT RECEIVES RUNOFF FROM THE PERMANENT PAD WHICH IS CLASSIFIED AS A "HOTSPOT" DUE TO THE POTENTIAL POLLUTANTS STORED ON-SITE.

TRANSCO SEDIMENT BASINS																							
Basin #	Drainage Area (Acres)	WET STORAGE	DRY STORAGE	Bottom of Basin Elevation	Top of Dry Storage Elevation	Riser Diameter	Top of Wet Storage Elevation	Twose	Sediment Clean-Out	SCOE	Dewatering Orifice Diameter	25-Yr Design Storm Elevation	DSE	Emergency Spillway Elevation	TEE	Embankment Top of Embankment	Flow Width (ft.)	Baffle Length	Baffle Width	Barrel Length	Pipe Diameter	Pipe Invert Elevation	Embankment Top of Embankment
SB-1	7.72	517	548	517	1721	639.00	642.00	36	639.80	639.40	7	642.18	643.00	N/A	54	645.00	6	2.25:1	60	642.50	40	18	639.00
SB-2	10.08	675	2090	675	2316	651.00	654.00	36	652.50	651.75	7	654.81	657.00	N/A	54	657.00	6	2.25:1	115	658.50	40	18	651.00

- NOTE:**
1. SB-1 WILL BE CONVERTED TO A PERMANENT STORMWATER POND DURING THE RESTORATION PHASE.
 2. SEE SHEET TRA-25 FOR PERMANENT STORMWATER POND SECTION VIEWS.

REVISIONS:											
NO.		DATE		DWNL.		CHKD.		APPD.		DESCRIPTION	
2	11/21/17	MAP	HT	DW	ADDRESS VADEQ COMMENTS						
3	02/28/18	JMK	HT	DW	ADDRESS VADEQ COMMENTS						
4	04/10/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS						
5	05/11/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS						
6	05/23/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS						
7	06/04/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS						

Mountain Valley Pipeline		EROSION AND SEDIMENT CONTROL DETAILS		MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT		PITTSBURGH COUNTY, VIRGINIA		MOUNTAIN VALLEY PIPELINE, LLC		555 SOUTHPOINTE BLVD, SUITE 200		CANONSBURG, PA 15317	
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TETRA TECH		complex world CLEAR SOLUTIONS™		661 ANDERSEN DRIVE		FOSTER PLAZA 7		PITTSBURGH, PA 15220	
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CONSTRUCTION PLANS	
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DAVID J. WALLNER Lic. No. 0402057593 Professional Engineer	
DRAWN BY: KAL	
CHECKED BY: HT	
APPROVED BY: DJW	
DATE: 06/04/2018	
SCALE: AS SHOWN	
SHT. NO. TRA-8 OF 25	



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



NOTES

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

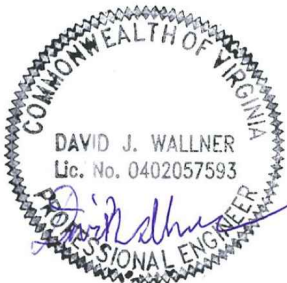



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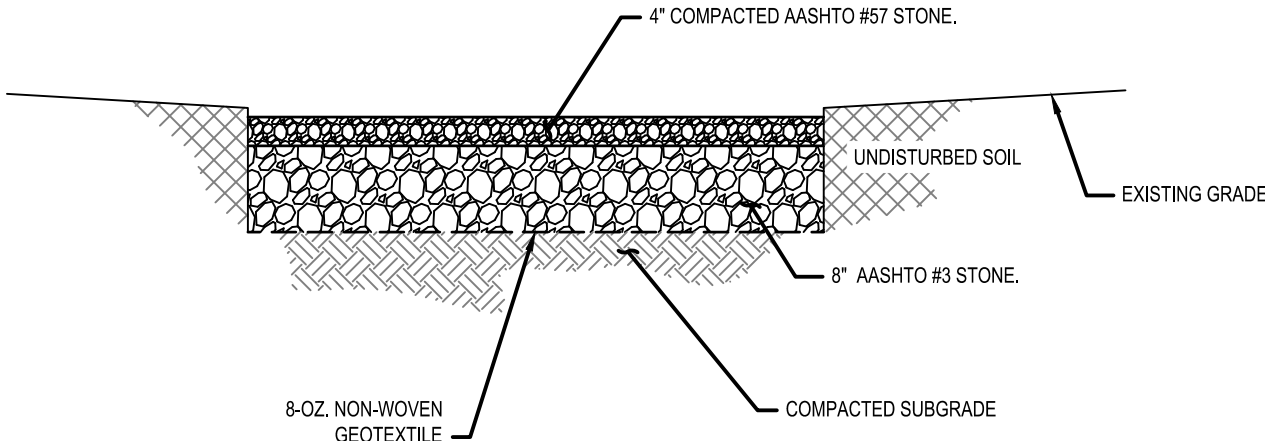


661 ANDERSEN DRIVE
FOSTER PLAZA 7
PITTSBURGH, PA 15220

CONSTRUCTION PLANS



DRAWN BY:		KAL
CHECKED BY:		HT
APPROVED BY:		DJW
DATE:	06/04/2018	 REVISION
SCALE:	AS SHOWN	
SHT. NO.	TRA-9	OF 25

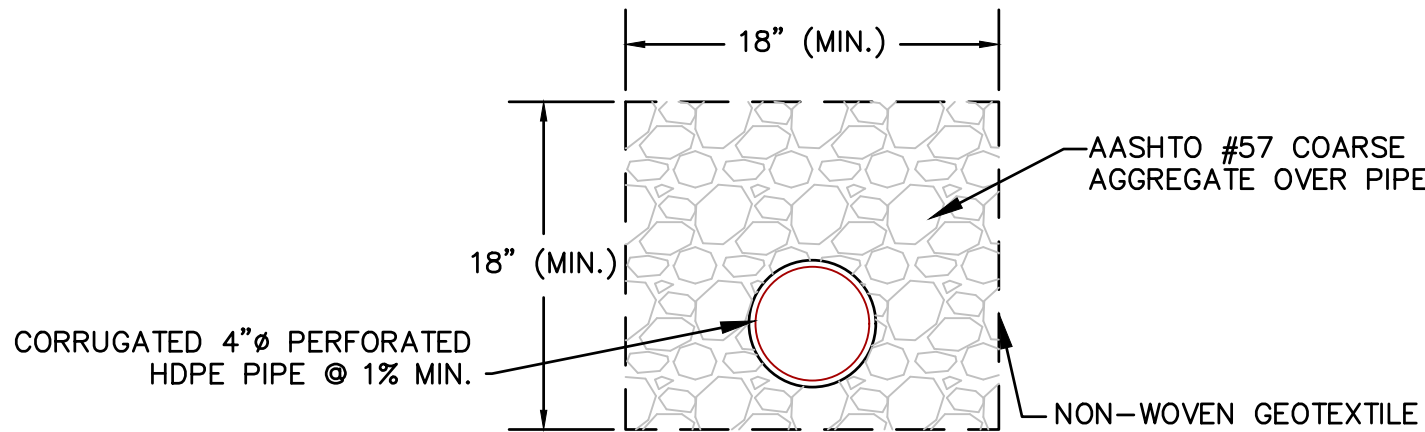


NOTES:

1. COMPACT SUBGRADE PRIOR TO BACKFILL PLACEMENT. FOR BACKFILL, A MIN. 95% COMPACTION (ASTM D 698) IS REQUIRED.
2. UNSUITABLE MATERIAL SHALL BE REMOVED PRIOR TO SUBGRADE COMPACTION AND BACKFILL PLACEMENT. ADDITIONAL SUBGRADE COMPACTION NOT REQUIRED FOR MLV PADS.

PERMANENT GRAVEL PAD

N.T.S.

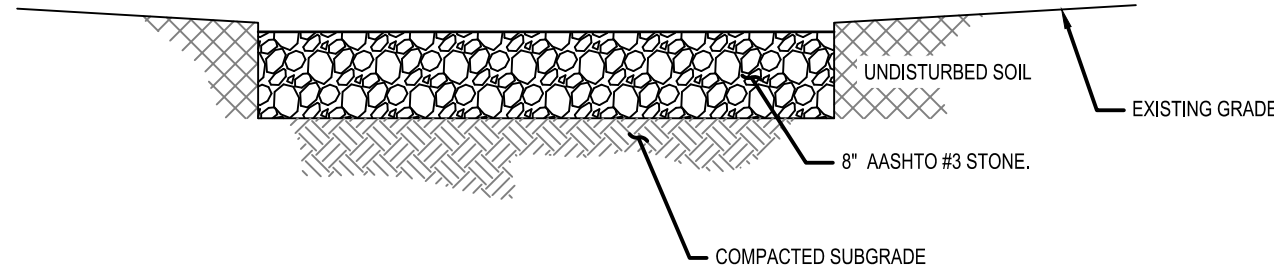


NOTE:

INSTALL SUBSURFACE DRAINS AT SEEPAGE AREAS AND AS NECESSARY DURING CONSTRUCTION. TIE THE SUBSURFACE DRAINS INTO SITE STORMWATER SYSTEM OR OUTLET BEYOND AND BELOW LIMITS OF NEW FILL. AT LEAST ONE DRAIN EVERY 8 VERTICAL FEET IS REQUIRED FOR FILL SLOPES THAT EXCEED 8 VERTICAL FEET.

SUBSURFACE BENCH DRAIN DETAIL

N.T.S.

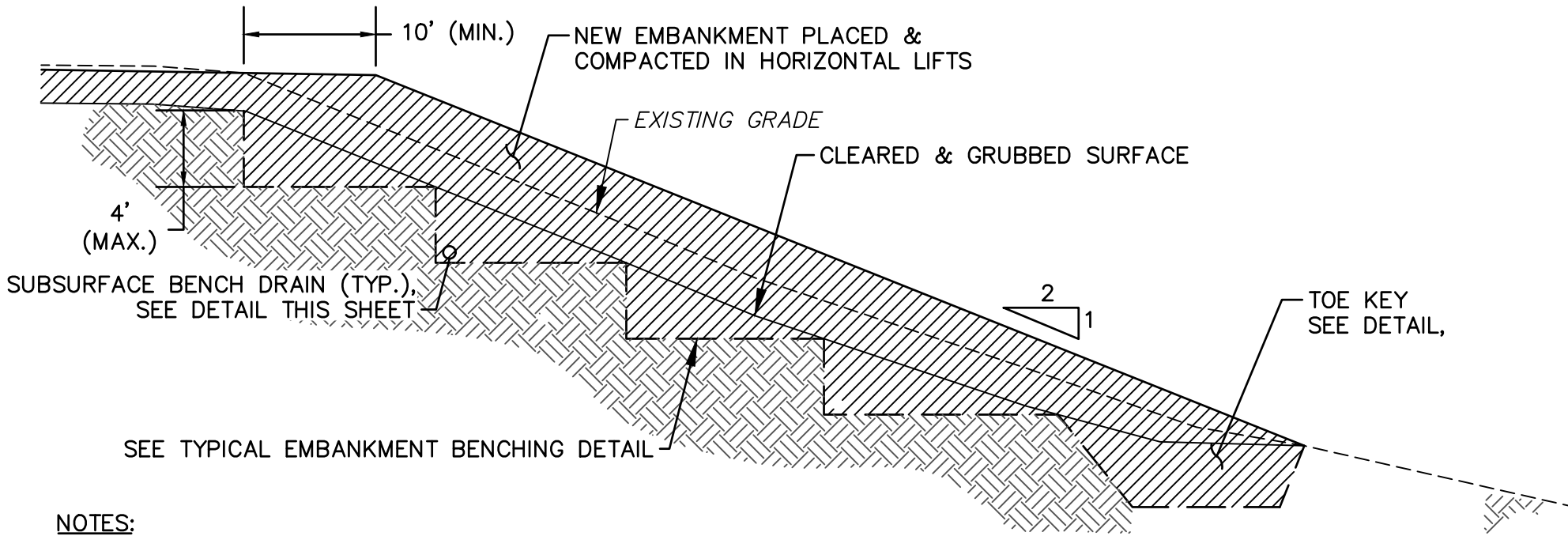


NOTES:

1. COMPACT SUBGRADE PRIOR TO BACKFILL PLACEMENT. FOR BACKFILL, A MIN. 95% COMPACTION (ASTM D 698) IS REQUIRED.
2. UNSUITABLE MATERIAL SHALL BE REMOVED PRIOR TO SUBGRADE COMPACTION AND BACKFILL PLACEMENT. ADDITIONAL SUBGRADE COMPACTION NOT REQUIRED FOR MLV PADS.

TEMPORARY GRAVEL PAD AND ACCESS ROAD

N.T.S.

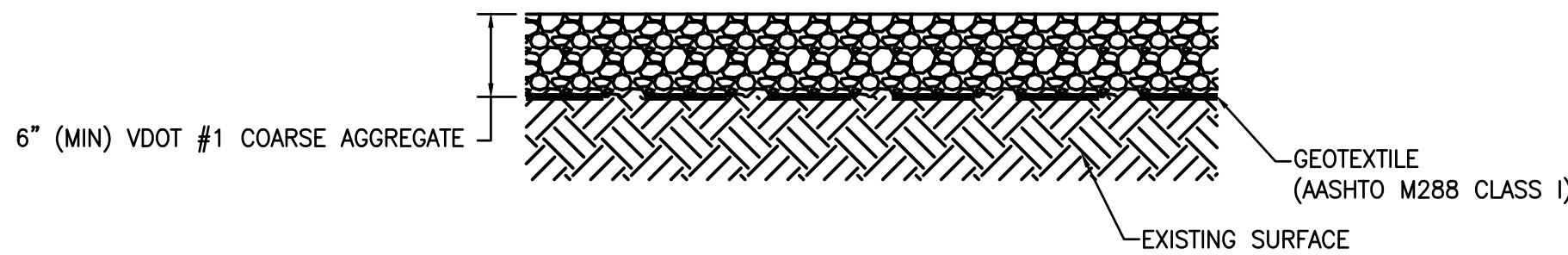


NOTES:

1. CONSTRUCT BENCHES ON SLOPES STEEPER THAN 6:1 TO PROVIDE POSITIVE BONDING WITH EXISTING GROUND.
2. FOR BACKFILL A MIN. 95% COMPACTION (ASTM D 1557) IS REQUIRED.
3. COMPACT SUBGRADE PRIOR TO BACKFILL PLACEMENT. IF SEEPS OR SPRINGS ARE ENCOUNTERED, PROVIDE DRAINS AND OUTLET THE WATER PER DIRECTION OF ENGINEER.
4. UNSUITABLE MATERIAL SHALL BE REMOVED PRIOR TO SUBGRADE COMPACTION AND BACKFILL PLACEMENT.

TYPICAL FILL BONDING BENCH DETAIL

N.T.S.



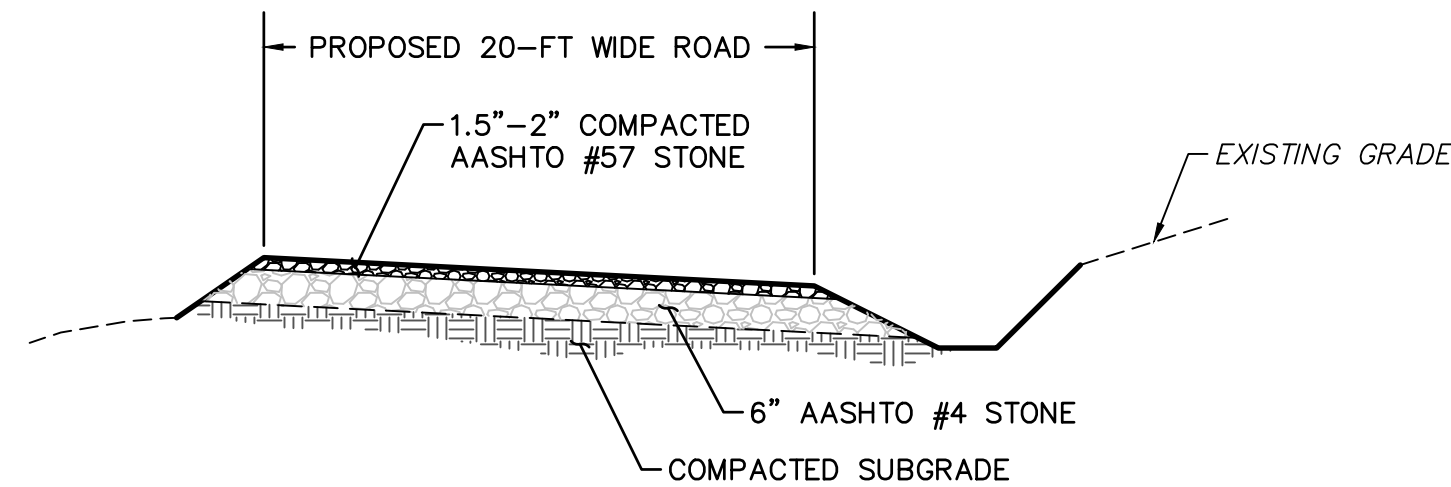
TEMPORARY GRAVEL SURFACE SPECIFICATIONS

- 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.

TEMPORARY GRAVEL SURFACE DETAIL

(ATWS AND TEMPORARY MATERIAL STORAGE AREA)

N.T.S.



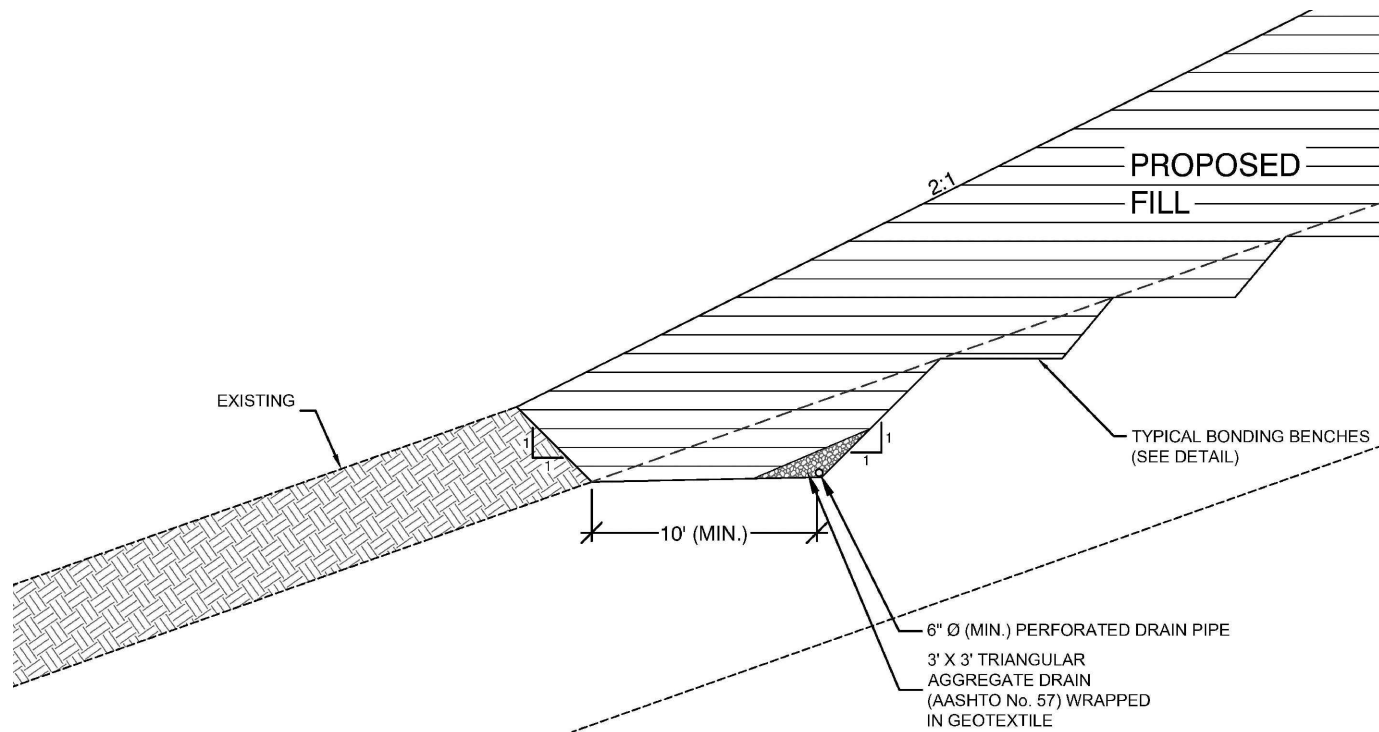
NOTES:

1. COMPACT SUBGRADE PRIOR TO BACKFILL PLACEMENT. FOR BACKFILL, A MIN. 95% COMPACTION (ASTM D 698) IS REQUIRED.
2. UNSUITABLE MATERIAL SHALL BE REMOVED PRIOR TO SUBGRADE COMPACTION AND BACKFILL PLACEMENT.

GRAVEL ACCESS ROAD DETAIL

(PERMANENT ACCESS ROAD MVP-PI-343.01)

N.T.S.

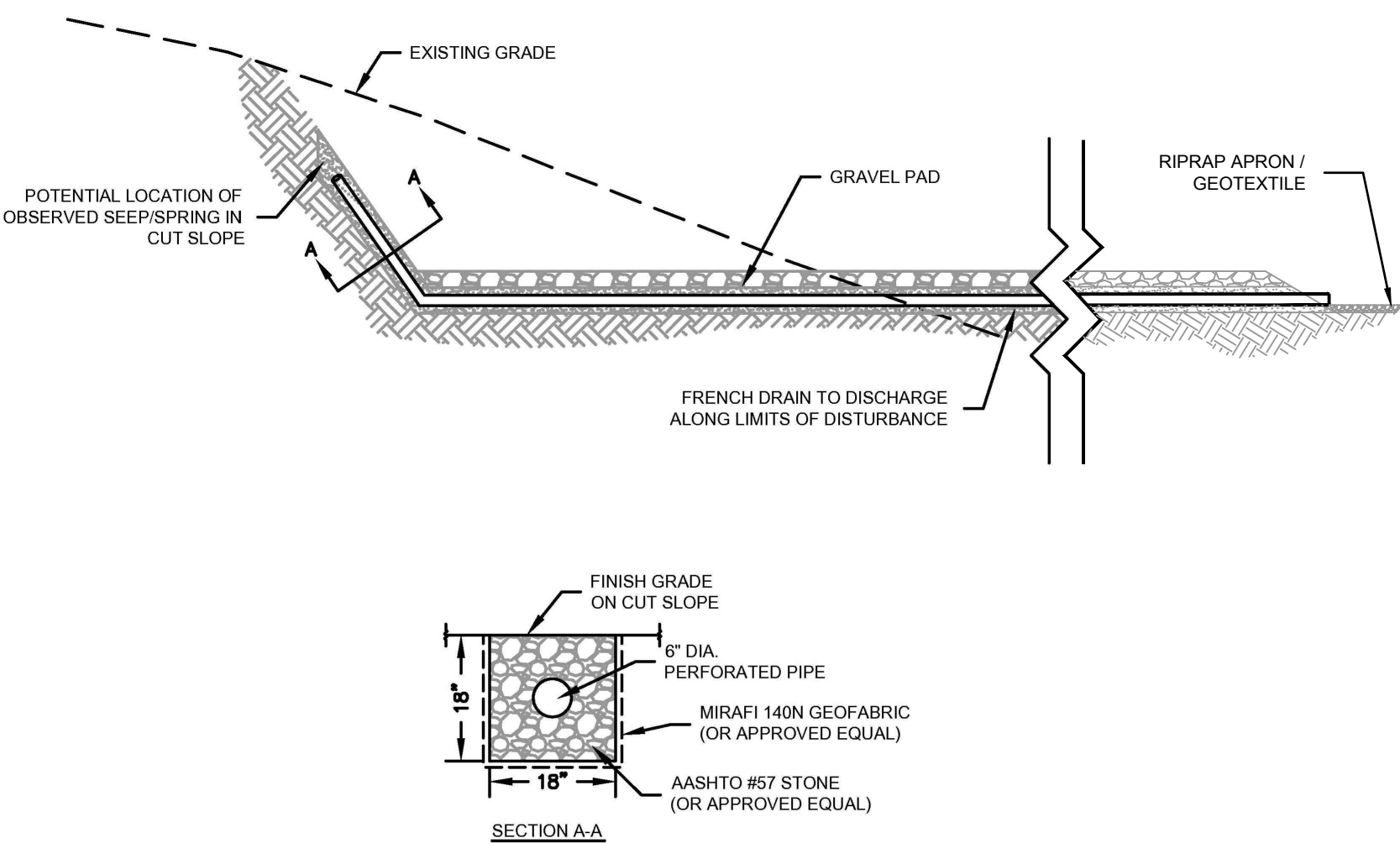


NOTE:

1. TOE KEYS SHOULD BE INCLUDED FOR ALL NEW FILL SLOPES OVER 10 FEET IN HEIGHT AND SHOULD BE CONSTRUCTED ALONG THE ENTIRE TOE OF THE SLOPE. THE TOE KEY SHOULD BE EXCAVATED TO COMPETENT RESIDUAL SOILS, WEATHERED BEDROCK, OR BEDROCK.
2. COMPACTED ENGINEERED FILL OR BEST AVAILABLE ROCK FILL, WHICH IS EXPECTED TO BE ON SITE, ARE SUITABLE FOR TOE KEY BACKFILL.
3. FOR TOE OF FILL SLOPES ENCOUNTERING WET, SOFT OR LOOSE SOILS, EXCAVATE INTO NATURAL SOILS OR WEATHERED BEDROCK. THE BASE OF THE TOE KEY SHALL BE A MINIMUM 10 FEET IN WIDTH AND INCLUDE A MINIMUM OF 5 FEET OF BEST AVAILABLE ROCK FILL OR AASHTO #1. THE REMAINING TOE KEY BACKFILL MAY BE EITHER COMPACTED ENGINEERED FILL OR BEST AVAILABLE ROCK FILL.
4. VARIATIONS IN THE DIMENSIONS OF THE ROCK TOE KEY SHOULD BE EXPECTED SINCE THEY WILL BE DEPENDENTS ON THE SLOPE/SOIL CONDITIONS PRESENT.
5. A DRAINAGE COLLECTION SYSTEM CONSISTING OF ASHTO #57 STONE WITH PERFORATED PIPE SHOULD BE INSTALLED WITH ALL TOE KEYS. THE DRAIN SHOULD CONSIST OF A 6-INCH DIAMETER PERFORATED PIPE ENCASED IN A GRANULAR FREE-DRAINING MATERIAL, PLACED IN A MINIMUM 3 FOOT BY 3 FOOT TRIANGULAR CROSS SECTION DRAIN. THE DRAIN SHOULD SLOPE TO ALLOW FOR GRAVITY DRAINAGE AND DAYLIGHT TO DIRECT WATER AWAY FROM THE TOE. THE STONE SHALL BE WRAPPED WITH 8-OZ GEOTEXTILE FABRIC.

TOE KEY DETAIL

N.T.S.



NOTE:

IF EVIDENCE OF A SEEP/SPRING IN A CUT SLOPE IS OBSERVED, THE CONTRACTOR SHOULD INSTALL A FRENCH DRAIN PER THE DETAIL ABOVE.

FRENCH DRAIN AT OBSERVED SEEP/SPRING IN CUT SLOPES

N.T.S.

Transco Interconnect Quantities Table				
Date: April 10, 2018				
Item	Each	Length (LF)	Area/ Volume	
LOD HAS BEEN MERGED WITH PIPELINE LOD	-	-	-	AC
Proposed Permanent Access Road	-	1,611	-	
Proposed Temporary Access Road	-	243	-	
Aggregate- Interconnect Pad				
AASHTO #57 (assuming 1.3 TN/CY)	-	-	4,054	TN
AASHTO #3 (assuming 1.3 TN/CY)	-	-	12,173	TN
Aggregate- TEMPORARY CONSTRUCTION PAD				
AASHTO #57 (assuming 1.3 TN/CY)	-	-	0	TN
AASHTO #3 (assuming 1.3 TN/CY)	-	-	5,206	TN
Aggregate- PERMANENT ACCESS ROAD				
AASHTO #57 (assuming 1.3 TN/CY)	-	-	776	TN
AASHTO #4 (assuming 1.3 TN/CY)	-	-	227	TN
Aggregate- TEMPORARY ACCESS ROAD				
AASHTO #57 (assuming 1.3 TN/CY)	-	-	0	TN
AASHTO #3 (assuming 1.3 TN/CY)	-	-	157	TN
Permanent Cut	-	-	11,511	CY
Permanent Fill	-	-	8,304	CY
Temporary Cut	-	-	21,624	CY
Temporary Fill	-	-	20,510	CY
Bmp's				
12" Compost Filter Sock	-	2,600	-	
18" Compost Filter Sock	-	1,351	-	
24" Compost Filter Sock	-	0	-	
Stacked Compost Filter Sock	-	0	-	
Silt Fence	-	0	-	
Erosion Control Matting	-	-	15,168	SY
Stone Construction Entrance	-	-	4,108	SF
18" Cross Drain Culverts	5	-	-	
24" Cross Drain Culverts	1	-	-	
Channels	11	-	-	
VDOT EC-3 Type 2 Channel Liner	-	-	412	SY
Orange Construction Safety Fence	-	1955	-	
Riprap Outlet Protection	10	-	-	

REFERENCES:

VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, DATED 1992

ADDRESS	VADEQ	COMMENTS
DW	HT	MVP
HT	MVP	11/21/17
MVP	11/21/17	2
DW	HT	02/28/18
HT	02/28/18	3
DW	HT	04/10/18
HT	04/10/18	4
DW	HT	05/11/18
HT	05/11/18	5
DW	HT	05/23/18
HT	05/23/18	6
DW	HT	06/04/18
HT	06/04/18	7
CHKD:	DATE:	NO:
APPD:	DATE:	NO:
REVISIONS:		



CONSTRUCTION DETAILS

MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT

PITTSYLVANIA COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

CANONSBURG, PA 15317



TETRA TECH

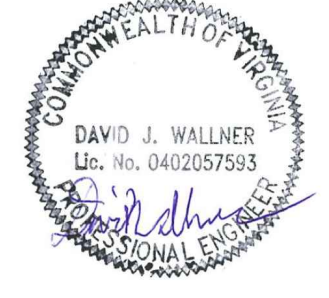
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661 ANDERSEN DRIVE

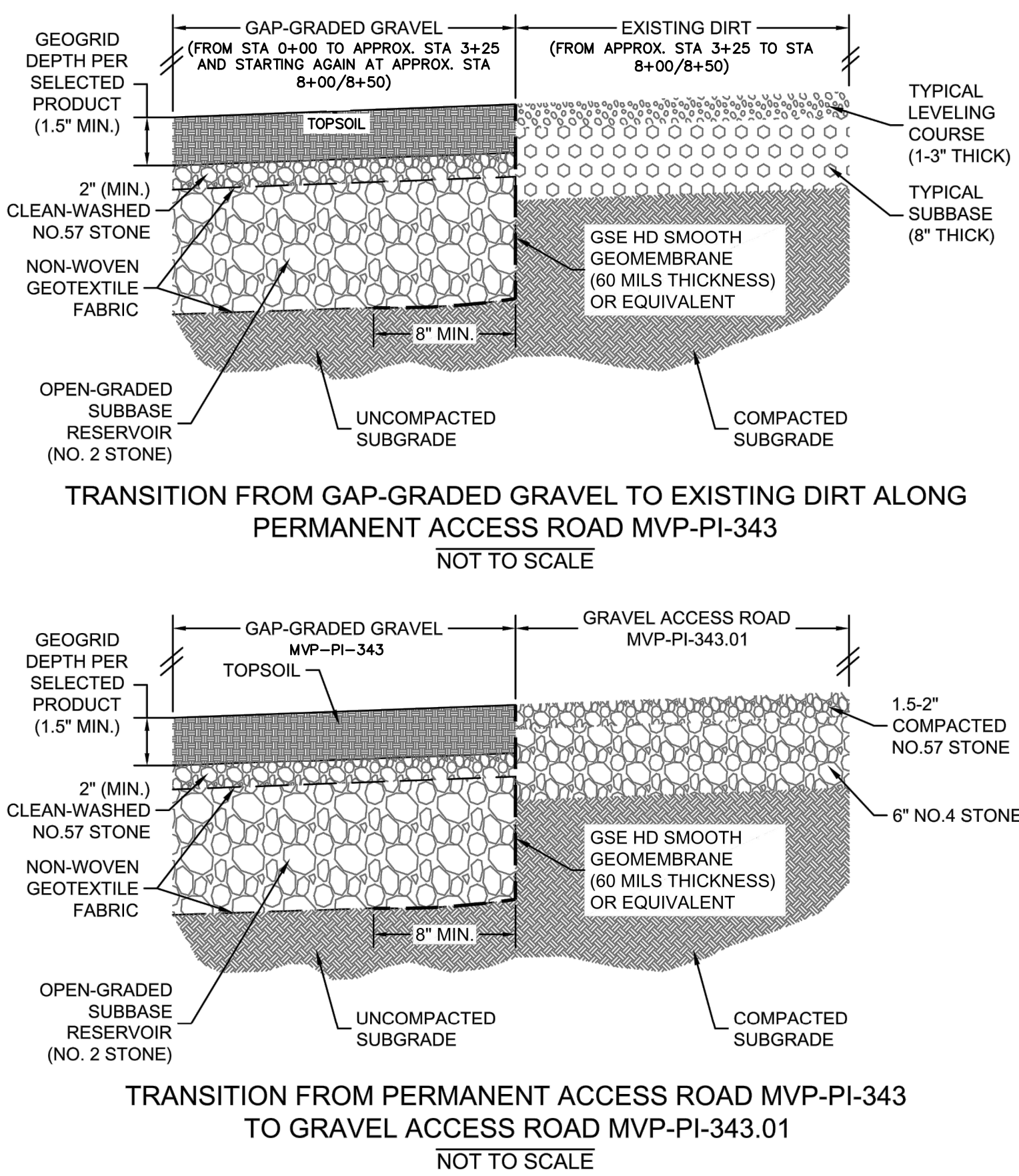
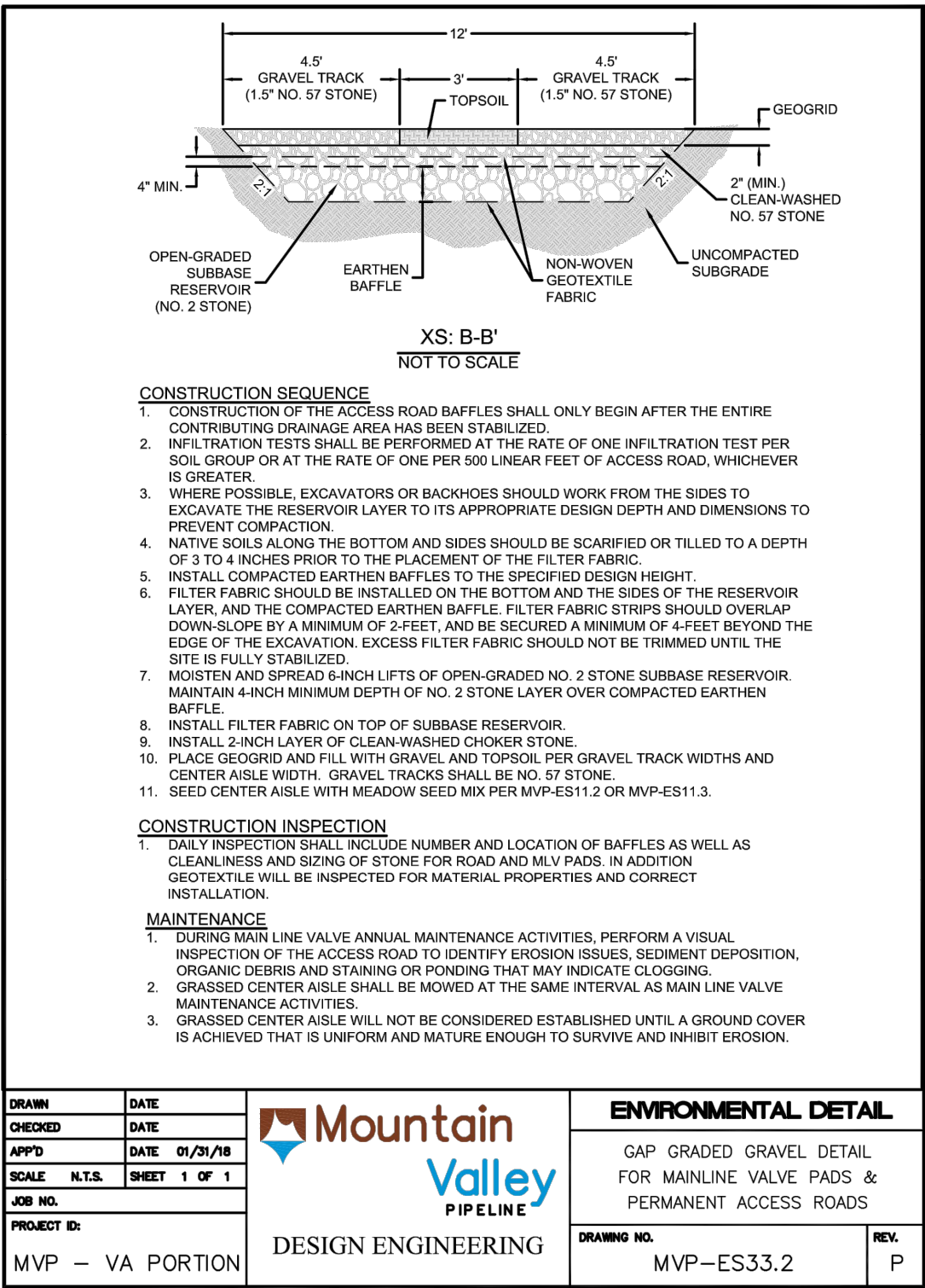
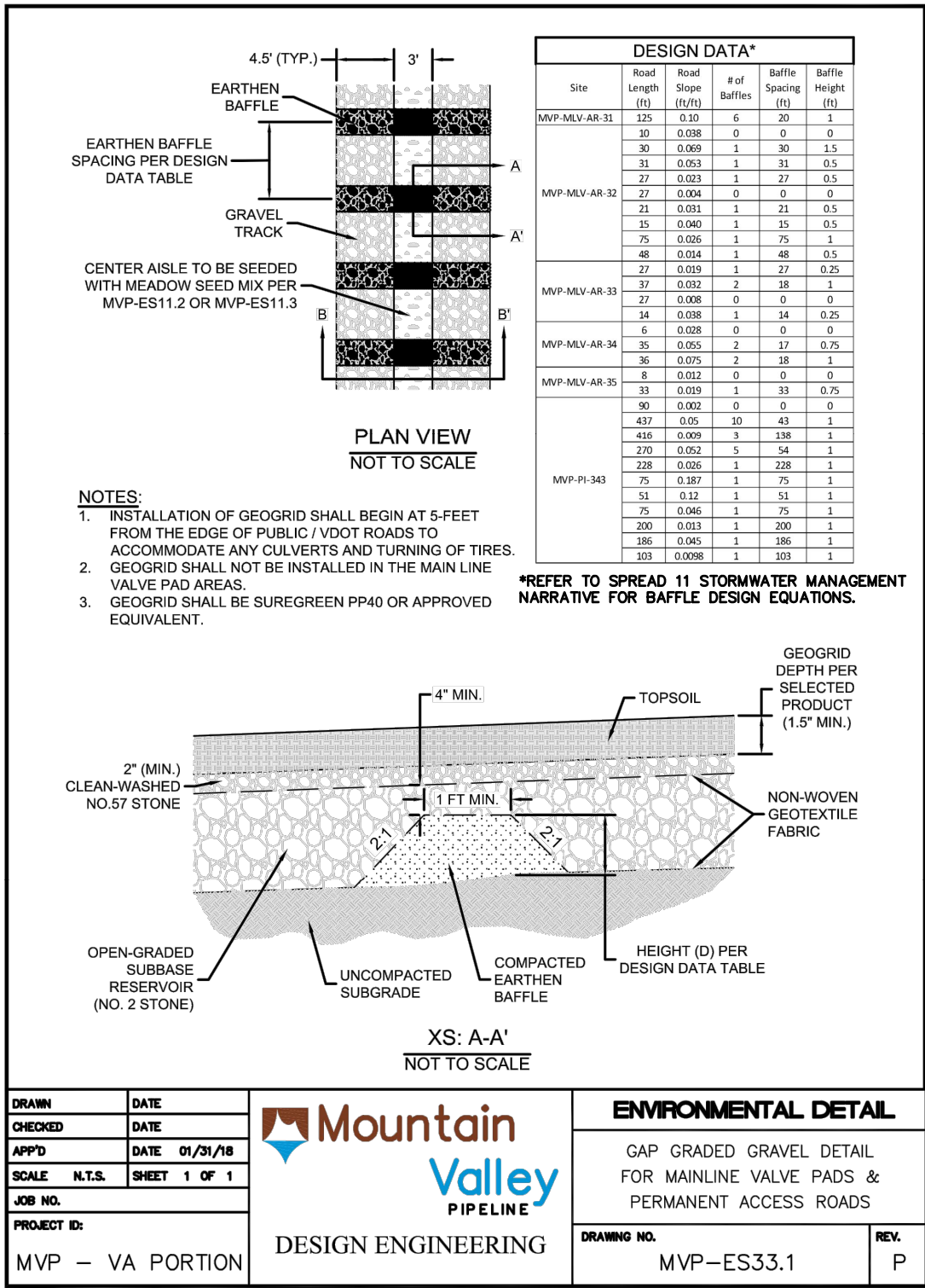
FOSTER PLAZA 7

PITTSBURGH, PA 15220

CONSTRUCTION PLANS



DRAWN BY:	KAL
CHECKED BY:	HT
APPROVED BY:	DWJ
DATE:	06/04/2018
SCALE:	AS SHOWN
SHT. NO.	TRA-10 OF 25



PERMANENT ACCESS ROAD MVP-PI-343 GAP GRADED GRAVEL DETAILS

N.T.S.

REFERENCES:
VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, DATED 1992

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DW	HT	MJP	HT	JWK	HT	KAL	HT	KAL	HT	DJW	HT	CHKD.	APPD.
2	11/21/17	2	11/21/17	3	02/28/18	4	04/10/18	5	05/11/18	6	05/23/18	7	06/04/18
MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT PITTSBURGH COUNTY, VIRGINIA												MOUNTAIN VALLEY PIPELINE, LLC 555 SOUTHPOINTE BLVD, SUITE 200 CANONSBURG, PA 15317	
TETRA TECH complex world CLEAR SOLUTIONS™ 661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220													
CONSTRUCTION PLANS													
COMMONWEALTH OF VIRGINIA DAVID J. WALLNER Lic. No. 0402057593 Professional Engineer													
DRAWN BY: KAL												REVISED	
CHECKED BY: HT												REVISED	
APPROVED BY: DJW												REVISED	
DATE: 06/04/2018												REVISED	
SCALE: AS SHOWN												REVISED	
SHT. NO. TRA-10A OF 25												REVISED	

Forest Regeneration Woody Seed Mix and Application Rates.

Species	Common Name	Seeding Rate (lbs/acre)
Oak-Hickory Forest a		
<i>Fagus grandifolia</i>	American Beech	0.3
<i>Liriodendron tulipifera</i>	Tulip Poplar	0.3
<i>Pinus strobus</i>	White Pine	0.3
<i>Virginia virginiana</i>	Virginia Pine	0.3
<i>Prunus serotina</i>	Black Cherry	0.3
<i>Amelanchier canadensis</i>	Canadian Serviceberry	0.3
<i>Cercis canadensis</i>	Eastern Redbud	0.3
<i>Cornus florida</i>	Flowering Dogwood	0.3
<i>Disosyros virginiana</i>	Perashmon	0.3
<i>Ilex opaca</i>	American Holly	0.3
<i>Nyssa sylvatica</i>	Black Gum	0.3
<i>Sassafras albidum</i>	Sassafras	0.3
<i>Hamelis virginiana</i>	Witch Hazel	0.3
<i>Lindera benzoin</i>	Spicebush	0.3
<i>Vaccinium angustifolium</i>	Lowbush Blueberry	0.3
<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	0.3
<i>Vitis asiativa</i>	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 Root Seeding Planting for more information. At minimum, 3 of the 5 overstory, 4 of the 7 understory, and 2 of the 4 shrub species will comprise the woody seed mix for Oak-Hickory Forests.

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

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PROJECT ID:

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DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

FOREST REGENERATION WOODY SEED MIX AND APPLICATION RATES

DRAWING NO.

REV.

MVP – VA PORTION

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

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

20.00

TEMPORARY SEED MIX:
911 - 2115 - 5050 MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WINTER RYE (SECALE CEREALE) (50-100 LBS/AC)
2116 - 4130 - ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) (60-100 LBS/AC)
511 - 8311 - GERMAN MILLET (SETARIA ITALICA) (60 LBS/AC)

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UPLAND MEADOW SEED MIX AND APPLICATION RATES

DRAWING NO.

REV.

MVP – VA PORTION

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)
45.00				
<i>Agrostis perennans</i>	Autumn Bentgrass	3.15	5.5 - 7.5	Midsummer
<i>Elymus virginicus</i>	Virginia Wildrye	9.05	5.0 - 7.4	June to October
<i>Plantain canadensis</i>	Plantain	4.50	4.0 - 7.5	May to September
<i>Schizachyrium scoparium</i>	Little Bluestem	11.25	5.0 - 7.4	July to October
<i>Sorghastrum nutans</i>	Indiangrass	14.40	5.0 - 7.8	August to October
<i>Asclepias syriaca</i>	Common Milkweed	0.09		June to August
<i>Aster pilosus</i>	Heath Aster	0.05	5.4 - 7.0	After fall frost
<i>Chamaecrista fasciculata</i>	Partridge Pea	0.45	5.5 - 7.5	July to September
<i>Coneopis lanceolata</i>	Lanceleaf Coneopis	0.45	6.0 - 7.0	April to July
<i>Eupatorium coelestinum</i>	Mistflower	0.05	5.5 - 7.5	July to October
<i>Helicopsis helianthoides</i>	Oweys Sunflower	0.40		July to August
<i>Liatris graminifolia</i>	Grassleaf Blazing Star	0.09	5.8 - 6.8	August to October
<i>Monarda fistulosa</i>	Wild Bergamot	0.23	6.0 - 8.0	June to September
<i>Pycnanthemum incanum</i>	Hoary Mountainmint	0.05	< 6.8	summer
<i>Rudbeckia hirta</i>	Blackeyed Susan	0.45	6.0 - 7.0	May to July
<i>Senna hebecarpa</i>	Wild Senna	0.23		July to August
<i>Solidago nemoralis</i>	Gray Goldenrod	0.05	6.5 - 7.5	August to September
<i>Tradescantia ohiensis</i>	Ohio Spiderwort	0.05		late April to mid-July

45.00

ANNUAL RYEGRASS WILL BE USED AT A RATE OF 40 LBS/AC FOR STABILIZATION OF WETLANDS DISTURBED BY THE PROJECT.
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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UPLAND STEEP SLOPE SEED MIX AND APPLICATION RATES

DRAWING NO.

REV.

MVP – VA PORTION

MVP–ES11.3

0

Wetlands Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
20.00				
<i>Alisma subcordatum</i>	Mud Plantain	0.04		Midsummer
<i>Carex gynandra</i>	Fringed Sedge	0.10	5.0 - 7.0	June to July
<i>Carex lupulina</i>	Hop Sedge	1.00		May to June
<i>Carex lasiocarpa</i>	Shallow Sedge	3.00	6.2 - 7.0	June to October
<i>Carex scoparia</i>	Blunt Bloom Sedge	1.00	4.9 - 6.8	June to July
<i>Carex vulpinoidea</i>	Fox Sedge	6.90	4.6 - 6.9	July to August
<i>Cinna arundinacea</i>	Wood Reedgrass	0.40	6.8 - 8.9	June to August
<i>Elymus virginicus</i>	Virginia Wildrye	4.00	4.0 - 6.5	August to September
<i>Juncus effusus</i>	Soft Rush	0.60	5.0 - 7.4	June to October
<i>Oenoclea sensibilis</i>	Sensitive Fern	0.20	5.5 - 7.0	May to June
<i>Scirpus cyperinus</i>	Woolgrass	0.20		June to October

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

20.00

ANNUAL RYEGRASS WILL BE USED AT A RATE OF 40 LBS/AC FOR STABILIZATION OF WETLANDS DISTURBED BY THE PROJECT.
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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WETLAND SEED MIX AND APPLICATION RATES

DRAWING NO.

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MVP – VA PORTION

MVP–ES11.4

0

Riparian Seed Mix and Application Rates in Virginia.

Species	Common Name	Seeding Rate (lbs/acre)	pH	Bloom Period (if applicable)
20.00				
<i>Alisma subcordatum</i>	Autumn Bentgrass	0.04	5.0 - 7.0	Midsummer
<i>Carex gynandra</i>	Rig Bluestem	0.10		May to June
<i>Carex lupulina</i>	Virginia Wildrye	1.00	6.2 - 7.0	June to October
<i>Carex lurida</i>	Soft Rush	3.00	4.9 - 6.8	June to July
<i>Carex scoparia</i>	Path Rush	1.00	4.6 - 6.9	July to August
<i>Carex vulpinoidea</i>	Deertongue	6.90	6.8 - 8.9	June to August
<i>Cinna arundinacea</i>	Indiangrass	0.40	4.0 - 6.5	August to September
<i>Elymus virginicus</i>	Swamp Milkweed	4.00	5.0 - 7.4	June to October
<i>Juncus effusus</i>	Partridge Pea	0.60	5.5 - 7.0	May to June
<i>Oenoclea sensibilis</i>	Mistflower	0.20		June to October
<i>Scirpus cyperinus</i>	Joe Pyes Weed	0.20	4.8 - 7.2	July to September
<i>Asclepias incarnata</i>	Boneset	0.20		July to August
<i>Eupatorium coelestinum</i>	White Avers	0.40	5.0 - 8.0	June to July
<i>Eupatorium fistulosum</i>	Common Sneezeweed	0.10	5.5 - 7.5	July to October
<i>Eupatorium perfoliatum</i>	Oweys Sunflower	0.14	4.5 - 7.0	July to September
<i>Helenium autumnale</i>	Wild Bergamot	0.20		July to October
<i>Helicopsis helianthoides</i>	Slender Mountainmint	0.10	4.0 - 7.5	August to September
<i>Ludwigia alternifolia</i>	Blackeyed Susan	0.40		July to August
<i>Mimulus ringens</i>	Wild Senna	0.10		August to September
<i>Verbena hastata</i>	Blue Vervain	0.10		June to September
<i>Vernonia noveboracensis</i>	New York Ironweed	0.72		June to October

20.00

TEMPORARY SEED MIX:
911 - 2115 - 5050 MIX ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) AND WINTER RYE (SECALE CEREALE) (50-100 LBS/AC)
2116 - 4130 - ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) (60-100 LBS/AC)
511 - 8311 - GERMAN MILLET (SETARIA ITALICA) (60 LBS/AC)

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RIPARIAN SEED MIX AND APPLICATION RATES

DRAWING NO.

REV.

MVP – VA PORTION

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				
<i>Acer rubrum</i>	Red Maple	FAC	X	X
<i>Acer saccharinum</i>	Silver Maple	FACW	X	X
<i>Betula nigra</i>	River Birch	FACW	X	X
<i>Carpinus caroliniana</i>	American Hornbeam	FAC	X	X
<i>Carya glabra</i>	Pignut Hickory	FACU	X	X
<i>Carya ovata</i>	Shagbark Hickory	FACU	X	X
<i>Clonanthus virginicus</i>	White Firg Tree	FAC+	X	X
<i>Diostyros virginiana</i>	Common Persimmon	FAC-	X	X

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

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

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ENVIRONMENTAL DETAIL

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

DRAWING NO.

REV.

MVP – VA PORTION

MVP–ES11.6

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 Shrubs				
<i>Alnus serrulata</i>	Brook-side Alder	OSL		X
<i>Amelanchier canadensis</i>	Canada Serviceberry	FAC	X	X
<i>Aronia arbutifolia</i>	Red Chokecherry	FACW	X	X
<i>Baccharis halimifolia</i>	Groundsel Bush	FACW-	X	X
<i>Cephaelis occidentalis</i>	Butterbush	OB	X	X
<i>Cornus amomum</i>	Silly Dogwood	FACW	X	X
<i>Cornus stolonifera</i>	Red-osier Dogwood	FAC	X	X
<i>Hamelis virginiana</i>	American Witchhazel	FAC-	X	X
<i>Ilex verticillata</i>	Common Winterberry	FACW+	X	X
<i>Itea virginica</i>	Virginia Willow	OSL		X
<i>Ilex rubra</i>	Marsh Elder	FACW+	X	X
<i>Leucochoa racemosa</i>	Fatleaf-bush	FACW	X	X
<i>Lindera benzoin</i>	Spicebush	FACW-	X	X
<i>Lyonia ligustrina</i>	Maleberry	FACW	X	X
<i>Magnolia virginiana</i>	Sweetbay Magnolia	FACW+	X	X
<i>Physocarpus opulifolius</i>	Eastern Ninebark	FACW	X	X
<i>Sambucus canadensis</i>	American Elder	FACW-	X	X
<i>Vaccinium corymbosum</i>	Highbush Blueberry	FACW-	X	X
<i>Viburnum dentatum</i>	Arrow-wood	FAC	X	X
<i>Viburnum prunifolium</i>	Black-haw	FACU	X	X

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

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ENVIRONMENTAL DETAIL

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

DRAWING NO.

REV.

MVP – VA PORTION

MVP–ES11.7

0

Stream crossings proposed for bare-root seeding plantings.

Waterbody Name	MP	County	State	Valuable Resource
Kimballton Branch	199.1, 199.4	Giles	VA	headwaters of wild trout stream, coldwater stream

Waterbody Name	MP	County	State	Valuable Resource
Story Creek	200.4	Giles	VA	candy darter, green floater, coldwater stream, wild trout stream
Little Story Creek	204.4	Giles	VA	coldwater stream, wild trout stream
Sinking Creek	211.2	Giles	VA	candy darter, green floater, coldwater stream, wild trout stream, non-listed mussels
UNT Craig Creek	219.2	Montgomery	VA	Headwaters of James spiny mussel occurrences, USFS lands area
UNT Craig Creek	219.3	Montgomery	VA	Headwaters of James spiny mussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James spiny mussel occurrences, USFS lands area
Craig Creek	219.7	Montgomery	VA	Headwaters of James spiny mussel occurrences, USFS lands area
UNT Craig Creek	219.8	Montgomery	VA	Headwaters of James spiny mussel occurrences, USFS lands area
UNT Craig Creek	220.0	Montgomery	VA	Headwaters of James spiny mussel occurrences, USFS lands area
Mill Creek	222.2	Montgomery	VA	upstream of Roanoke logperch suitable habitat, oranegin madtom, coldwater stream, wild trout
North Fork/Roanoke River	227.2	Montgomery	VA	Roanoke logperch present, non-listed mussels present, oranegin madtom, coldwater stream, wild trout
North Fork Roanoke River	227.4	Montgomery	VA	Roanoke logperch present, non-listed mussels present, oranegin madtom, coldwater stream, wild trout
Bradshaw Creek	230.7	Montgomery	VA	Roanoke logperch suitable habitat, oranegin madtom, coldwater stream, wild trout
Bradshaw Creek	231.5	Montgomery	VA	Roanoke logperch suitable habitat, oranegin madtom, coldwater stream, wild trout
Roanoke River	235.4	Montgomery	VA	Roanoke logperch present, oranegin madtom, non-listed mussels present
Bottom Creek	241.1	Roanoke	VA	upstream of Bottom Creek Gorge, oranegin madtom, coldwater stream, wild trout
Bottom Creek	242.5	Roanoke	VA	upstream of Bottom Creek Gorge, oranegin madtom, coldwater stream, wild trout

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

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STREAM CROSSINGS PROPOSED FOR BARE ROOT SEEDING PLANTINGS

DRAWING NO.

REV.

MVP – VA PORTION

MVP–ES11.8

0

Stream crossings proposed for bare-root seeding plantings.

Waterbody Name	MP	County	State	Valuable Resource
Mill Creek	245.1	Roanoke	VA	upstream of Bottom Creek Gorge, oranegin madtom, coldwater stream, wild trout
Green Creek	247.1	Franklin	VA	upstream of Bottom Creek Gorge, oranegin madtom, coldwater stream, wild trout
Green Creek	247.4	Franklin	VA	upstream of Bottom Creek Gorge, oranegin 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
Maggdoe Creek	269.4	Franklin	VA	Roanoke logperch suitable habitat
Blackwater River	269.7	Franklin		

Definition

Purpose:

- ### Conditions Where Practice Applies

- ### Planning Considerations

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



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Organic Mulches

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

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



Mountain Valley
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Blankets and 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

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.

a. Where seed is to be applied as part of a hydroseeder slurry containing fiber mulch.



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



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

- ### Specifications

Materials

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.



Mountain
Valley
PIPELINE

 **Mountain Valley**
PIPELINE

CONSTRUCTION SEQUENCE AND NOTES

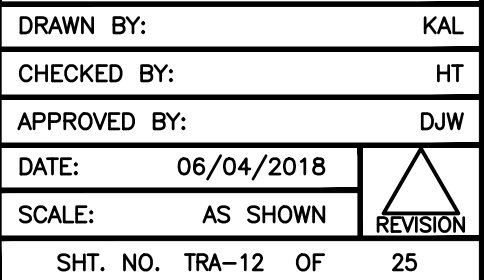
IN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200
CANONSBURG, PA 15317



CONSTRUCTION PLANS



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.

DRAWN	DATE
CHECKED	DATE
APPD	DATE 06/11/17
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID:	
MVP – VA PORTION	

Mountain Valley PIPELINE

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

TOPSOILING & SOIL HANDLING

DRAWING NO.	MVP–ES46.2	REV.	P
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Once the topsoil has been applied to the subgrade the topsoil should be disked and raked. Excess rock will be removed from at least the top 12 inches of soil to the extent practicable in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas at the landowner's request. The size, density, and distribution of rock on the construction work area shall be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing. Refer to Standards and Specifications Section 2.8 Final Grading for additional information.

TABLE 3.30-A		
CUBIC YARDS OF TOPSOIL REQUIRED FOR APPLICATION TO VARIOUS DEPTHS		
DEPTH (INCHES)	PER 1,000 SQUARE FEET	PER ACRE
1	3.1	134
2	6.2	268
3	9.3	402
4	12.4	537
5	15.5	672
6	18.6	806

SOURCE: Va. DSWC

Soil Sterilants

No seed shall be placed on soil which has been treated with soil sterilants until sufficient time has elapsed to permit dissipation of toxic materials.

Special Soil Related Requirements for Working in Wetlands

Norfolk District 2017 Nationwide Permit Regional Conditions, dated March 20, 2017 (subject to revision in Spring of 2017), NWP 12 – Utility Line Activities items 3.b.iii, 5.a, and 5.b require the following:

- Minimizing clearing of wetlands. Grubbing shall be limited to the permanent easement for underground utility lines. Outside of the permanent easement, wetland vegetation shall only be removed at or above the ground surface unless written justification is provided and the impacts are reviewed and approved by the Corps.
- Whenever practicable, excavated material shall be placed on a Corps confirmed upland site. However, when this is not practicable, temporary stockpiling is hereby authorized provided that:
 - All excavated material stockpiled in a vegetated wetland area is placed on filter cloth, mats, or some other semi-permeable surface. The material will be stabilized with straw bales, filter cloth, etc. to prevent reentry into any waterway.
 - All excavated material must be placed back into the trench to the original contour and all excess excavated material must be completely removed from the wetlands within 30 days after the pipeline has been laid through the wetland areas. Permission must be granted by the District Commander or his authorized representatives if the material is to be stockpiled longer than 30 days.

DRAWN	DATE
CHECKED	DATE
APPD	DATE
SCALE N.T.S.	SHEET 1 OF 1
JOB NO.	
PROJECT ID:	
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Mountain Valley PIPELINE

DESIGN ENGINEERING

ENVIRONMENTAL DETAIL

TOPSOILING & SOIL HANDLING

DRAWING NO.	MVP–ES46.3	REV.	P
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Mountain Valley PIPELINE

CONSTRUCTION SEQUENCE AND NOTES

MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT

PITTSYLVANIA COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

CANONSBURG, PA 15317

TETRA TECH

complex world | CLEAR SOLUTIONS™

661 ANDERSEN DRIVE
FOSTER PLAZA 7
PITTSBURGH, PA 15220

CONSTRUCTION PLANS

COMMONWEALTH OF VIRGINIA

DAVID J. WALLNER

Lic. No. 0402057593

Professional Engineer

DRAWN BY:	KAL
CHECKED BY:	HT
APPROVED BY:	DJW
DATE:	06/04/2018
SCALE:	AS SHOWN
SHT. NO.	TRA–13 OF 25

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.

THE TRANSCO INTERCONNECT SITE IS LOCATED IN PITTSYLVANIA COUNTY, JUST SOUTH OF S.R. 692 (TRANSCO ROAD) IN TRANSCO VILLAGE (I.E., THE END OF SPREAD 11). ACCESS TO THE SITE WILL BE PROVIDED BY A NEWLY CONSTRUCTED PERMANENT GRAVEL ACCESS ROAD (MVP-PI-343.01), AND THE PERMANENT SITE WILL CONSIST OF A 310-FT BY 295-FT GRAVEL PAD AREA. THE LIMIT OF DISTURBANCE (LOD) FOR THE TRANSCO INTERCONNECT SITE, WHICH ALSO INCLUDES A PORTION OF THE SPREAD 11 PIPELINE, IS APPROXIMATELY 39.45 ACRES. THE PERMANENT PIPELINE RIGHT-OF-WAY (ROW) WILL BE 50 FEET WIDE.

TEMPORARY DEVELOPMENT WITHIN THE TRANSCO INTERCONNECT SITE INCLUDES A TEMPORARY PAD AND ACCESS ROAD THAT WILL BE USED FOR APPROXIMATELY TEN (10) WEEKS DURING THE CONSTRUCTION OF THE PERMANENT INTERCONNECT PAD AND GAS PIPING ON THE PAD, AS WELL AS A TEMPORARY MATERIAL STORAGE AREA AND AN ADDITIONAL TEMPORARY WORK SPACE (ATWS) THAT WILL BE USED FOR APPROXIMATELY NINE (9) MONTHS DURING CONSTRUCTION OF THE PIPELINE. TEMPORARY GRAVEL WILL BE PLACED OVER THE FULL EXTENT OF THE TEMPORARY PAD AND ACCESS ROAD, AND A LARGE PORTION OF THE TEMPORARY MATERIAL STORAGE AREA AND ATWS. BOTH THE TEMPORARY PAD/ACCESS ROAD AND TEMPORARY MATERIAL STORAGE AREA WILL BE RESTORED TO ORIGINAL CONDITIONS (APPROXIMATE PRE-EXISTING CONTOURS AND PRE-EXISTING LAND USE) FOLLOWING CONSTRUCTION OF THE INTERCONNECT PAD FACILITIES AND PIPELINE, RESPECTIVELY.

2. EXISTING SITE CONDITIONS:
EXISTING GROUND COVER INCLUDES MEADOW, TURF, WOODS, DIRT ROADS, A SINGLE FAMILY HOME AND AN EXISTING GRAVEL ACCESS ROAD. THERE ARE NINE DRAINAGE AREAS FOR THE PROJECT. SLOPES ON THE SITE ARE GENERALLY BETWEEN 0 AND 10 PERCENT. THERE ARE NO STREAMS OR WETLANDS LOCATED WITHIN THE LIMIT OF DISTURBANCE (LOD) AT THIS SITE. THE SITE IS LOCATED ON ROLLING HILLS.

3. ADJACENT AREAS:
ADJACENT AREAS INCLUDE: INDUSTRIAL AREAS, FORESTED AREAS, SINGLE-FAMILY HOMES, PASTURE 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:
CREEDMOOR FINE SANDY LOAM (9B), MAYODAN FINE SANDY LOAM (23B), MAYODAN FINE SANDY LOAM (23C).

CREEDMOOR SERIES SOILS CONSIST OF DEEP, MODERATELY WELL-DRAINED, AND MODERATELY PERMEABLE SOILS. RUNOFF CLASS IS VERY HIGH. THICKNESS IS APPROXIMATELY 65 INCHES. DEPTH TO HARD BEDROCK IS MORE THAN 80 INCHES. TEXTURE RANGES BY HORIZON, INCLUDING FINE SANDY LOAM AND SANDY CLAY.

MAYODAN SERIES SOILS CONSIST OF DEEP, WELL-DRAINED SOILS WITH HIGH PERMEABILITY. POTENTIAL FOR SURFACE RUNOFF IS MEDIUM. THICKNESS IS APPROXIMATELY 65 INCHES. DEPTH TO BEDROCK IS MORE THAN 80 INCHES. TEXTURE RANGES BY HORIZON, INCLUDING FINE SANDY LOAM, CLAY, AND SANDY CLAY LOAM.

6. CRITICAL AREAS:
THERE ARE NO STREAMS AND WETLANDS WITHIN THE LOD. PRIOR TO GRADING ACTIVITIES, SEDIMENT BARRIERS WILL BE INSTALLED DOWNGRADIEN OF THE CONSTRUCTION WORK AREA AS NEEDED TO PREVENT THE FLOW OF SPOIL 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.

THE PROJECT IS LOCATED IN AN AREA THAT IS SUSCEPTIBLE TO POTENTIAL EROSION HAZARDS. THESE AREAS PRIMARILY OCCUR ON STEEP SLOPES. E&S CONTROLS ON THE SITE WILL MITIGATE EROSION HAZARDS. EROSION CONTROL BLANKET WILL BE PLACED IF A SLOPE AT THE SITE BECOMES UNSTABILIZED.

THERE ARE NO OTHER CRITICAL AREAS/FEATURES PRESENT AT THE SITE.

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.

- STRUCTURAL PRACTICES
 - 3.01 - SAFETY FENCE
 - 3.02 - CONSTRUCTION ENTRANCE
 - 3.04 - STRAW BALE BARRIER
 - 3.05 - SILT FENCE BARRIER
 - 3.06 - BRUSH BARRIER
 - 3.09 - TEMPORARY DIVERSION DIKE
 - 3.13 - SEDIMENT TRAP
 - 3.14 - SEDIMENT BASIN
 - 3.17 - STORMWATER CONVEYANCE CHANNEL
 - 3.18 - OUTLET PROTECTION
 - 3.20 - ROCK CHECK DAM
 - 3.21 - LEVEL SPREADER
 - 3.22 - VEGETATIVE STREAMBANK STABILIZATION
 - 3.24 - TEMPORARY STREAM CROSSING
 - 3.26 - DEWATERING STRUCTURE
 - 3.27 - TURBIDITY CURTAIN
 - 3.29 - SURFACE ROUGHENING
 - MVP-ES2 - PUMPED WATER FILTER BAG
 - MVP-ES3 - COMPOST FILTER SOCK
 - MVP-ES9 - BELTED SILT RETENTION FENCE
 - MVP-ES9.2 - SUPER SILT FENCE
 - MVP-ES9.3 - STACKED COMPOST FILTER SOCK
 - MVP-ES37 - TIMBER MAT / WETLAND CROSSING
 - MVP-ES0.1 - CLEAN WATER DIVERSION WITH END RELEASE
- 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:
PERMANENT DEVELOPMENT

PERMANENT DEVELOPMENT INCLUDES NEW IMPERVIOUS (GRAVEL) COVER FOR A 20-FOOT WIDE PERMANENT GRAVEL ACCESS ROAD (MVP-PI-343.01) AND A 310-FEET BY 295-FEET GRAVEL PAD AREA. STORMWATER ANALYSIS AND BMP DESIGNS WILL BE PERFORMED TO ENSURE THAT THE FOLLOWING VIRGINIA STATE REGULATIONS HAVE BEEN SATISFIED:

- WATER QUALITY (9VAC25-870-63) OR OFFSITE COMPLIANCE OPTIONS (9VAC25-870-69)
- WATER QUANTITY (9VAC25-870-66)
 - CONCENTRATED STORMWATER DISCHARGES THAT ARE RELEASED INTO A NATURAL OR MANMADE STORMWATER CONVEYANCE SYSTEM WILL BE IN COMPLIANCE WITH 9VAC25-870-66.B (CHANNEL PROTECTION) AND 9VAC25-870-66.C (FLOOD PROTECTION).
 - IF THERE IS NOT A DEFINED RECEIVING CHANNEL, IT WILL BE DEMONSTRATED THAT EITHER EXISTING SHEET FLOW CONDITIONS ARE MAINTAINED FOLLOWING CONSTRUCTION OR THAT THE PROPOSED OUTLET STRUCTURE RE-DISTRIBUTES DISCHARGE FOR THE 10-YEAR STORM AS SHEET FLOW; A SHEET FLOW DISCHARGE CONDITION FOR A PROPOSED OUTLET STRUCTURE (I.E., SPILLWAY, LEVEL SPREADER, PLUNGE POOL, RIPRAP APRON, ETC.) IS DEFINED AS ≤ 0.1-FT OF HEAD ON THE OUTLET STRUCTURE. INCREASED VOLUMES OF SHEET FLOW WILL BE EVALUATED IN ACCORDANCE WITH 9VAC25-870-66.D.

TEMPORARY DEVELOPMENT
TEMPORARY DEVELOPMENT INCLUDES A TEMPORARY PAD AND ACCESS ROAD, AS WELL AS A TEMPORARY MATERIAL STORAGE AREA AND AN ADDITIONAL TEMPORARY WORK SPACE (ATWS).

TEMPORARY GRAVEL WILL BE PLACED OVER THE ATWS LOCATED ON THE EAST SIDE OF THE PROPOSED ACCESS ROAD MVP-PI-343.01. HOWEVER, GRAVEL IN THESE AREAS WILL BE PLACED OVER A NON-WOVEN GEOTEXTILE WITH A PERMITTIVITY 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 IN THESE AREAS, AND THE INFILTRATION RATES OF THE EXISTING SOIL SURFACE ARE BEING MAINTAINED, NO ADDITIONAL STORMWATER CONTROLS ARE REQUIRED.

TEMPORARY GRAVEL WILL BE PLACED OVER THE FULL EXTENT OF THE TEMPORARY PAD, TEMPORARY ACCESS ROAD, THE PROPOSED MATERIAL STORAGE LAYDOWN AREA, AND GRADING AND LAND DISTURBANCE (INCLUDING TOPSOIL REMOVAL) ARE PROPOSED, WHICH WILL RESULT IN AN INCREASE IN PEAK RUNOFF RATES IF LEFT UNMANAGED. DURING CONSTRUCTION WHILE TEMPORARY GRAVEL IS IN PLACE, THESE PROJECT AREAS WILL BE IN COMPLIANCE WITH THE FOLLOWING STORMWATER QUANTITY GUIDELINES AS DIRECTED BY THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ):

- WATER QUANTITY WILL BE CONTROLLED BY USING THE TEMPORARY BEST MANAGEMENT PRACTICES (BMPS) DESCRIBED IN THE VESCH INSTEAD OF THE PERMANENT BMPS DESCRIBED IN THE VIRGINIA STORMWATER BMP CLEARINGHOUSE. ALL PROPOSED BMPS WILL BE DESIGNED AND MAINTAINED IN ACCORDANCE WITH THE VESCH.
- WHEN DISCHARGING INTO A NATURAL CHANNEL, DEMONSTRATE THAT THE 2-YEAR STORM DOES NOT OVERTOP THE CHANNEL BANKS AND THAT THE 2-YEAR VELOCITY IS NON-EROSIVE.
- WHEN DISCHARGING INTO A MAN-MADE CHANNEL (WHICH INCLUDES ROAD-SIDE DITCHES), DEMONSTRATE THAT THE 10-YEAR STORM DOES NOT OVERTOP THE CHANNEL BANKS AND THAT THE 2-YEAR VELOCITY IS NON-EROSIVE.
- WHEN DISCHARGING INTO A PIPE OR STORM SEWER SYSTEM, DEMONSTRATE THAT THE 10-YEAR STORM IS CONTAINED IN THE PIPE/SYSTEM.
- IF THERE IS NOT A DEFINED RECEIVING CHANNEL, DEMONSTRATE SHEET FLOW FOR THE 10-YEAR STORM FOR 100 FEET DOWNSTREAM OF PROJECT SITE AND/OR OUTLET STRUCTURE. A SHEET FLOW DISCHARGE CONDITION FOR A PROPOSED OUTLET STRUCTURE (I.E., SPILLWAY, LEVEL SPREADER, PLUNGE POOL, RIPRAP APRON, ETC.) IS DEFINED AS ≤ 0.1-FT OF HEAD ON THE OUTLET STRUCTURE. IF THE 10-YEAR FLOW CONCENTRATES WITHIN THAT 100 FEET, DEMONSTRATE NON-EROSIVE VELOCITY.

SEDIMENT TRAPS/BASINS WERE DESIGNED TO MANAGE/CONTROL STORMWATER RUNOFF TO MEET THE APPLICABLE GUIDELINES LISTED ABOVE DURING CONSTRUCTION WHILE TEMPORARY GRAVEL IS IN PLACE. THE FOLLOWING ASSUMPTIONS WERE MADE WHEN DESIGNING SEDIMENT TRAPS/BASINS TO SATISFY THE STORMWATER QUANTITY GUIDELINES:

- WHEN DESIGNING SEDIMENT TRAPS AND SEDIMENT BASINS, STAGE-STORAGE VOLUME CURVES AND OUTLET STRUCTURES WERE MODELEDO TO MATCH THE DESIGNS SHOWN ON THE EROSION AND SEDIMENT CONTROL (ESC) PLAN.
- WHEN DESIGNING SEDIMENT TRAPS, THE STARTING WATER SURFACE ELEVATION WITHIN THE MODEL WAS ASSUMED TO BE AT THE TOP OF WET STORAGE ELEVATION WITH EXCEPTION TO SEDIMENT TRAPS 3&4 (ST-3 AND ST-4). DUE TO THE LIMITED SPACE AND THE FLAT TOPOGRAPHY AROUND ST-3 AND ST-4, IT IS NOT POSSIBLE TO SITE A SEDIMENT BASIN SO ST-3 AND ST-4 WILL BE MAINTAINED TO ENSURE DRAWDOWN BETWEEN STORM EVENTS; THEREFORE, THE WET AND DRY STORAGE VOLUMES ARE INCLUDED IN THE STAGE-STORAGE VOLUME CURVE WHEN ROUTING FLOW THROUGH ST-3 AND ST-4.
- WHEN DESIGNING SEDIMENT TRAPS, FLOW THROUGH THE ROCK/RIPRAP OUTLET STRUCTURE OF THE SEDIMENT TRAP BELOW THE WEIR CREST ELEVATION WAS MODELED USING A STAGE-DISCHARGE CURVE THAT WAS CALCULATED USING DARCY'S LAW.
- WHEN DESIGNING SEDIMENT BASINS, THE FOLLOWING ASSUMPTIONS WERE APPLIED WHILE PERFORMING ROUTING COMPUTATIONS TO DETERMINE THE 2- AND 25-YEAR STORM ELEVATIONS PER VESCH STD & SPEC 3.14:
 - THE STARTING WATER SURFACE ELEVATION IS AT THE TOP OF WET STORAGE ELEVATION.
 - THE DEWATERING ORIFICE IS CLOGGED.
- WHEN ANALYZING PEAK RUNOFF FROM THE SITE, THE FOLLOWING ASSUMPTIONS WERE APPLIED TO THE SEDIMENT BASIN WHILE PERFORMING THE ROUTING COMPUTATIONS:
 - THE STARTING WATER SURFACE ELEVATION IS AT THE TOP OF WET STORAGE ELEVATION.
 - THE DEWATERING ORIFICE IS ACTIVE.

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 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

SILT FENCE - VADEQ STD & SPEC 3.05

SUPER SILT FENCE - MVP ES 9.2

STACKED COMPOST FILTER SOCK - MVP-ES9.3

TEMPORARY DIVERSION DIKE - VADEQ STD & SPEC 3.09

SEDIMENT TRAP - VADEQ STD & SPEC 3.13

SEDIMENT BASIN - VADEQ STD & SPEC 3.14

STORMWATER CONVEYANCE CHANNEL - VADEQ STD & SPEC 3.17

OUTLET PROTECTION - VADEQ STD & SPEC 3.18

RIPRAP - VADEQ STD & SPEC 3.19

LEVEL SPREADER - VADEQ STD & SPEC 3.21

CLEAN WATER DIVERSION WITH END RELEASE - MVP-ES0.1

12. 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. LIME AND FERTILIZER WILL BE ADDED IN ACCORDANCE WITH THE PROJECT SPECIFIC STANDARDS AND SPECIFICATIONS.

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:

- 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.
- 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.

2	11/21/17	MJP	HT	DW	ADDRESS VADEQ COMMENTS
3	02/28/18	JWK	HT	DW	ADDRESS VADEQ COMMENTS
4	04/10/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
5	05/11/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
6	05/23/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
7	06/04/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
NO:	DATE:	DWN:	CHKD:	APPD:	DESCRIPTION:
REVISIONS:					
<div><div><div>Mountain Valley Pipeline</div><div>CONSTRUCTION SEQUENCE AND NOTES</div><div>MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT</div><div>PITTSYLVANIA COUNTY, VIRGINIA</div></div><div><div>MOUNTAIN VALLEY PIPELINE, LLC</div><div>555 SOUTHPOINTE BLVD, SUITE 200</div><div>CANONSBURG, PA 15317</div></div></div>					
<div><div>TETRA TECH</div><div>complex world CLEAR SOLUTIONS™</div><div>661 ANDERSEN DRIVE FOSTER PLAZA 7 PITTSBURGH, PA 15220</div></div>					
<div>CONSTRUCTION PLANS</div>					
<div><div>COMMONWEALTH OF VIRGINIA</div><div>DAVID J. WALLNER Lic. No. 0402057593</div><div>Professional Engineer</div></div>					
DRAWN BY: KAL					
CHECKED BY: HT					
APPROVED BY: DWJ					
DATE: 06/04/2018					
SCALE: AS SHOWN					
SHT. NO. TRA-14 OF 25					

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 SITE 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.
- TEMPORARY SEDIMENT BARRIERS, INCLUDING APPROPRIATELY SIZED SILT FENCE OR COMPOST FILTER SOCK WILL BE PLACED AROUND SOIL STOCKPILES, AS NEEDED.
- STOCKPILE SLOPES WILL BE 2:1 OR FLATTER, AND STOCKPILES WILL NOT EXCEED 35 FEET IN HEIGHT.
- SEDIMENT TRAP(S) AND/OR SEDIMENT BASIN(S), ALONG WITH OTHER PERIMETER CONTROLS WHICH ARE INTENDED TO TRAP SEDIMENT, WILL BE CONSTRUCTED IMMEDIATELY AND WILL BE MADE FUNCTIONAL PRIOR TO UPSLOPE LAND DISTURBANCE. SEDIMENT TRAP(S) AND/OR SEDIMENT BASIN(S) SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PLAN AND DETAIL SHEET.
- 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.
- FOLLOWING PROJECT USE, SEGREGATED TOPSOIL WILL BE SPREAD OVER THE AREA FROM WHICH IT WAS REMOVED. DISTURBED AREAS WILL BE RESTORED TO THEIR ORIGINAL TOPOGRAPHIC CONTOURS AND LAND COVER WILL BE RETURNED TO PRE-EXISTING CONDITIONS.
- 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 FOR EARTHMOVING ACTIVITIES ASSOCIATED WITH CONSTRUCTION OF THE STATION:

- AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED WILL NOTIFY VA ONE CALL BY CALLING 811 OR 1-800-552-7001 OR VISIT VA811.COM
- INSTALL TEMPORARY EROSION AND SEDIMENT (E&S) CONTROLS PRIOR TO EARTH DISTURBANCE. INSTALL SEDIMENT TRAPS AND SEDIMENT BASINS IN ACCORDANCE WITH VESCH STD & SPEC 3.13 AND 3.14 RESPECTIVELY ALONG WITH OTHER PERIMETER CONTROLS PRIOR TO UPSLOPE LAND DISTURBANCE. REFER TO BEST MANAGEMENT PRACTICES (BMP) ON THE PLAN AND DETAIL SHEETS. ORANGE CONSTRUCTION FENCE SHOULD BE PLACED AROUND SENSITIVE LOCATIONS AS SHOWN ON THE PLANS. HAND CLEARING IS PERMISSIBLE PRIOR TO E&S CONTROL INSTALLATION.
- GENERAL CLEARING AND GRUBBING OF THE TREES AND BRUSH MAY COMMENCE AS NECESSARY FOR MATERIAL STORAGE LAYDOWN AREA, ACCESS ROAD, TEMPORARY PAD AND PERMANENT PAD CONSTRUCTION WITHIN THE LIMITS OF DISTURBANCE OR AS DIRECTED BY AN MVP DESIGNEE, WHICHEVER IS LESS. SMALLER DEBRIS SUCH AS SHRUBS AND LIMBS CAN BE CHIPPED AND UTILIZED ON-SITE AS PART OF THE SOIL STABILIZATION. UNLESS OTHERWISE DIRECTED BY THE LANDOWNER, LOGS WILL BE EITHER HAULED OFF-SITE OR GIVEN TO THE LANDOWNER UPON THEIR REQUEST; STUMPS AND/OR LOGS WILL BE GROUND, CHIPPED, WINDROWED, OR HAULED OFF-SITE.
- IN THE PROPOSED ADDITIONAL TEMPORARY WORK SPACE (ATWS) AREA, REMOVE VEGETATION BY BRUSH HOGGING THE AREA AND REMOVE TREES (IF NECESSARY) BY HAND FELLING/CUTTING STUMPS AT THE GROUND SURFACE. NO GRUBBING OR OTHER SOIL DISTURBING ACTIVITIES WILL BE CONDUCTED, AND TOPSOIL STRIPPING WILL NOT OCCUR, IN THE ATWS AREA. INSTALL TEMPORARY GRAVEL OVER GEOTEXTILE AFTER ALL VEGETATION/TREES ARE REMOVED.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND DISPOSE, TO AN APPROVED VADEQ WASTE DISPOSAL SITE, EXISTING STRUCTURES WITHIN THE LOD AS DIRECTED BY AN MVP DESIGNEE. THE HOUSE IS TO REMAIN ONSITE.
- STRIP TOPSOIL AND CONSTRUCT PROPOSED ACCESS ROADS WITH ROADSIDE DITCHES. CONSTRUCT TEMPORARY CHANNELS AND ASSOCIATED CULVERTS. PROVIDE SOIL STABILIZATION MATTING IN GRASS LINED CHANNELS CH-A, CH-B, CH-C, CH-D, CH-E, AND CH-F UNTIL VEGETATION IS ESTABLISHED. INSTALL CROSS DRAIN CULVERTS CC-1, CC-2, CC-3, CC-4, AND CC-5 WITH OUTLET PROTECTION AS SHOWN ON THE PLAN SHEETS.
- INSTALL CHECK DAMS, AND INTERNAL PRE-TREATMENT FEATURES AS SHOWN ON THE PLAN. THE TOP OF EACH CHECK DAM SHOULD BE CONSTRUCTED TO THE DESIGN ELEVATION.
- STRIP AND STOCKPILE TOPSOIL WITHIN THE LIMITS OF DISTURBANCE THE AREAS NEEDED TO CONSTRUCT THE PADS AND

STOCKPILE AREAS.

- MINIMIZE TOTAL AREA OF DISTURBANCE TO THE EXTENT PRACTICABLE. MAINTAIN TEMPORARY TOPSOIL STOCKPILES WITHIN EXISTING SOIL EROSION AND SEDIMENT CONTROLS.
- PROOF-ROLL ALL AREAS RECEIVING NEW FILL AND THE BOTTOM OF THE EXCAVATION (IF IN SOIL OR WEATHERED BEDROCK) WITH A 12-TON ROLLER COMPACTOR TO NON-VISIBLE MOVEMENT CRITERIA FOR THE TEMPORARY PAD, TEMPORARY LAYDOWN AREA, AND PERMANENT PAD. PROOF-ROLLING SHOULD NOT BE PERFORMED WHEN THE SUBGRADE IS WET OR FROZEN. IF ANY SOFT OR WET AREAS ARE ENCOUNTERED OR SOIL PUMPING IS OBSERVED, OVER-EXCAVATE THE AREA OR SINK-IN RIPRAP MATERIAL OF A MINIMUM 6 INCH SIZE AND COMPACT TO NO MOVEMENT. RIPRAP SHOULD BE COMPOSED OF LIMESTONE OR SANDSTONE.
- UPON COMPLETION OF SATISFACTORY PROOF-ROLLING, THE AREA CAN BE BACKFILLED WITH WELL-COMPACTED FILL, WITH THE EXCEPTION OF TOPSOIL, ORGANIC MATERIAL, OR CARBONACEOUS MATERIAL. ON-SITE EXCAVATED MATERIALS, SOIL OR SOIL/ROCK MIXTURE ARE SUITABLE FOR USE AS FILL. THE SIZE OF ROCK SHOULD BE LIMITED TO 2/3 OF THE LIFT THICKNESS (SEQUENCE #13). SCARIFY EACH LIFT PRIOR TO THE PLACEMENT OF THE OVERLYING LIFT.
- CREATE RIP RAP TOE KEY AND BONDING BENCHES PRIOR TO THE PLACEMENT OF BACKFILL ON EXISTING SLOPES PER "RIPRAP TOE KEY DETAIL AND TYPICAL FILL BONDING BENCH DETAIL." COMMON FILL FROM THE SITE IS ACCEPTABLE FOR PLACEMENT ABOVE THE TOE KEY AND BONDING BENCHES.
- PLACE AND COMPACT FILL IN 9-INCH THICK LOOSE HORIZONTAL LIFTS IF PLACING SOIL OR UP TO 18 INCHES LOOSE LIFT THICKNESS IF PLACING SOIL/ROCK; COMPACT EACH LIFT TO 95 PERCENT OF THE MAXIMUM DRY DENSITY AT +/- 2% OF THE OPTIMUM MOISTURE CONTENT AS DETERMINED BY THE STANDARD COMPACTION TEST (ASTM: D698). SEAL/COMPACT FINAL LIFT OF THE DAY TO PREVENT PRECIPITATION FROM INFILTRATING INTO THE FILL PLACED ON THE SITE.
- AN MVP DESIGNEE IS REQUIRED AT THE SITE DURING CONSTRUCTION TO MONITOR SITE DEVELOPMENT ACTIVITIES PER TETRA TECH'S RECOMMENDATIONS. THE DESIGNEE IS TO OBSERVE THE UNDERCUT, PROOF-ROLLING OF THE EXPOSED SUBGRADE/UNDERCUT PRIOR TO PLACING FILL AND TO MONITOR THE GRADATION, PLACEMENT AND COMPACTION OF FILL MATERIALS TO ENSURE THAT THE SPECIFIED GRADATION AND DENSITY REQUIREMENTS ARE BEING ACHIEVED. IN-PLACE NUCLEAR DENSOMETER TESTING SHOULD BE COMPLETED PER ASTM D 6938 EVERY 5,000 SQUARE FEET OR AT A MINIMUM OF ONE TEST PER LIFT. BASED UPON THE COMPLETION OF THE FIRST FEW LIFTS, THE CONTRACTOR AND THE ENGINEER MAY DEVELOP A CRITERION FOR FIELD COMPACTION OF SOILS. THE COMPACTION CRITERIA WOULD BE BASED ON NUMBER OF PASSES OF COMPACTION EQUIPMENT AND TYPE OF SOIL, USING THE SAME EQUIPMENT TO COMPACT THIS PARTICULAR SOIL TO THE REQUIRED DENSITY. IN THAT EVENT THE TESTING FREQUENCY FOR THE DENSITY MAY BE REDUCED PER RECOMMENDATION OF THE ENGINEER.
- CONSTRUCT REMAINING TEMPORARY PAD AND PERMANENT PAD WITH 2:1 FILL SLOPES AND RIPRAP SLOPE LINING AS SHOWN ON THE PLAN SHEETS AND ON THE DETAIL SHEET.
- STABILIZE EXPOSED AND UNWORKED SOILS AND STOCKPILES BY APPLICATION OF EFFECTIVE BMPS THAT PROTECT THE SOIL FROM THE EROSIIVE FORCES OF RAINDROPS, FLOWING WATER, AND WIND. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN 7 DAYS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
- REVEGETATE DISTURBED AREA PER SEEDING CHART OR PER LANDOWNER REQUEST. FOR 3:1 OR STEEPER SLOPES THE DISTURBED AREA WILL HAVE EROSION CONTROL FABRIC (BLANKETING OR FLEXTERRA) INSTALLED AS SHOWN ON THE DETAIL SHEET.
- FINAL AGGREGATE ON PERMANENT PAD TO BE INSTALLED DURING TOP DRESSING (BY MECHANICAL CONTRACTOR).
- TEMPORARY BMP'S WILL BE REMOVED UPON ACHIEVING VEGETATIVE STABILIZATION, WHICH IS DEFINED AS A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION. DISTURBED AREAS NOT ATTAINING AN ACCEPTABLE VEGETATIVE COVER SHALL BE RESEEDD AS NEEDED UNTIL THE ENDPOINT IS ACHIEVED.
- 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 CHOPPED 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 RESEEDD 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 THE SITE AREA TO PRE-CONSTRUCTION GRADES AND FINAL CLOSURE OF THE PROJECT DEFINED AS "ACHIEVING VEGETATIVE STABILIZATION". THE SEQUENCE IS:

- ALL TEMPORARY BMP'S WILL BE MAINTAINED IN PLACE DURING RESTORATION AS SHOWN ON THE PLANS UNTIL FINAL STABILIZATION OF THE CONTRIBUTING DRAINAGE AREA TO THE BMP IS ACHIEVED.
- RESTORE TEMPORARY CONSTRUCTION PAD AND TEMPORARY STOCKPILES TO EXISTING GRADE AS SHOWN ON THE PLAN.
- TEMPORARY E&S CONTROLS SUCH AS DIKES, SILT FENCES, AND OTHER EROSION CONTROL MEASURES SHOULD BE INTEGRATED INTO THE SWALE DESIGN THROUGHOUT THE CONSTRUCTION SEQUENCE. SPECIFICALLY, BARRIERS SHOULD BE INSTALLED AT KEY CHECK DAM LOCATIONS, AND EROSION CONTROL FABRIC SHOULD BE USED TO PROTECT THE CHANNEL.
- REMOVE TEMPORARY GRAVEL AND UNDERLYING GEOTEXTILE WITHIN TEMPORARY MATERIAL STORAGE LAYDOWN AND ADDITIONAL TEMPORARY WORK SPACE (ATWS) AREAS, AND DISC/AERATE SOILS TO A DEPTH OF 4-6" TO FACILITATE REVEGETATION.
- APPLY SPECIALTY SEEDS AS REQUIRED THAT WILL NOT BE HANDLED IN THE MULCH PHASE (STEP 6), SEED THE AREA USING THE SEED MIXES AND RATES SPECIFIED IN MVP-ES11.1 TO MVP-ES11.9.
- 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).

- REMOVAL OF CROSS CULVERT CC-4 AND SEDIMENT TRAPS ST-1 AND ST-2, AND INSTALLATION OF CHANNELS CH-H, CH-L, AND CH-M, MAY ONLY BEGIN AFTER THE ENTIRE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED WITH VEGETATION. EROSION AND SEDIMENT CONTROLS FOR CONSTRUCTION OF THE CHANNELS SHOULD BE INSTALLED AS SPECIFIED IN THE EROSION AND SEDIMENT CONTROL PLAN.
- GRADE CHANNELS CH-H, CH-L, AND CH-M TO THE FINAL DIMENSIONS SHOWN ON THE PLAN. ANY ACCUMULATION OF SEDIMENT THAT DOES OCCUR WITHIN THE CHANNELS MUST BE REMOVED DURING THE FINAL STAGES OF GRADING TO ACHIEVE THE DESIGN CROSS-SECTION. INSTALL LEVEL SPREADER LS-2 AT THE OUTLET OF CHANNEL CH-H.
- HYDRO-SEED THE BOTTOM AND BANKS OF CHANNELS CH-H, CH-L, AND CH-M, AND PEG IN EROSION CONTROL FABRIC OR BLANKET WHERE NEEDED. AFTER INITIAL PLANTING, A BIODEGRADABLE EROSION CONTROL FABRIC SHOULD BE USED, CONFORMING TO STANDARD AND SPECIFICATION 3.36 OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.
- PREPARE PLANTING HOLES FOR ANY BERMUDA GRASS OR EQUIVALENT, THEN PLANT MATERIALS AND WATER THEM WEEKLY IN THE FIRST TWO MONTHS. THE CONSTRUCTION CONTRACT SHOULD INCLUDE A CARE AND REPLACEMENT WARRANTY TO ENSURE VEGETATION IS PROPERLY ESTABLISHED AND SURVIVES DURING THE FIRST GROWING SEASON FOLLOWING CONSTRUCTION.
- CONDUCT THE FINAL CONSTRUCTION INSPECTION AND DEVELOP A PUNCHLIST FOR FACILITY ACCEPTANCE.

- FOLLOWING A DETERMINATION THAT THE SITE HAS ACHIEVED VEGETATIVE STABILIZATION, REMOVE PERIMETER CONTROLS ALONG THE LIMITS OF DISTURBANCE. THE COMPOST FILTER SOCK CAN BE "OPENED" AND THE MULCH CONTAINED WITHIN CAN BE SPREAD WITHIN THE LIMITS OF DISTURBANCE.

ADDRESS VADEQ COMMENTS		DW	HT	MVP	2	11/21/17
ADDRESS VADEQ COMMENTS		DW	HT	JWK	3	02/28/18
ADDRESS VADEQ COMMENTS		DW	HT	KAL	4	04/10/18
ADDRESS VADEQ COMMENTS		DW	HT	KAL	5	05/11/18
ADDRESS VADEQ COMMENTS		DW	HT	KAL	6	05/23/18
ADDRESS VADEQ COMMENTS		DW	HT	KAL	7	06/04/18
DESCRIPTION:		CHKD.:	DATE:	DWN.:	NO.:	
REVISIONS:						

Mountain Valley Pipeline

CONSTRUCTION SEQUENCE AND NOTES


MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT

PITTSYLVANIA COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

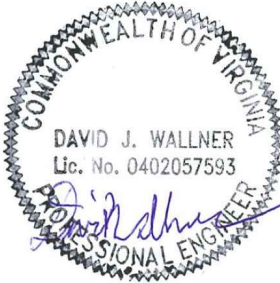
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FOSTER PLAZA 7
PITTSBURGH, PA 15220

CONSTRUCTION PLANS



DAVID J. WALLNER
Lic. No. 0402057593
PROFESSIONAL ENGINEER
STATE OF VIRGINIA

DRAWN BY:	KAL
CHECKED BY:	HT
APPROVED BY:	DWJ
DATE:	06/04/2018
SCALE:	AS SHOWN
SHT. NO.	TRA-16 OF 25

TRANSCO SWM NARRATIVE

I. PROJECT DESCRIPTION

THE TRANSCO INTERCONNECT SITE (PROJECT) IS PART OF THE MOUNTAIN VALLEY PIPELINE PROJECT, WHICH EXTENDS FROM WETZEL COUNTY, WEST VIRGINIA TO PITTSYLVANIA COUNTY, VIRGINIA. THE PROJECT SITE IS LOCATED IN PITTSYLVANIA COUNTY, JUST SOUTH OF S.R. 692 (TRANSCO ROAD) IN TRANSCO VILLAGE. EXISTING GROUND COVER WITHIN THE PROJECT'S 39.45-ACRE LIMIT OF DISTURBANCE (LOD) IS PRIMARILY FOREST, BUT THERE IS SOME EXISTING DEVELOPMENT INCLUDING A GRAVEL DRIVEWAY, A DIRT TRAIL, AND AN ABANDONED HOUSE. SOILS WITHIN THE PROJECT'S LOD ARE MOSTLY HYDROLOGIC SOIL GROUP (HSG) B WITH EXCEPTION TO A SMALL AREA TO THE SOUTHEAST WHICH IS MADE UP OF HSG D SOILS. SLOPES WITHIN THE PROJECT'S LOD ARE GENERALLY BETWEEN 0% AND 10%, AND THERE ARE NO STREAMS OR WETLANDS LOCATED WITHIN THE LOD.

THE PROJECT SITE WILL INCLUDE BOTH PERMANENT DEVELOPMENT AND TEMPORARY DEVELOPMENT:

PERMANENT DEVELOPMENT

PERMANENT DEVELOPMENT WITHIN THE PROJECT SITE INCLUDES A NEWLY CONSTRUCTED 20-FOET WIDE PERMANENT GRAVEL ACCESS ROAD (MVP-PI-343.01) AND A 310-FOET BY 295-FOET GRAVEL PAD AREA; A SECOND PERMANENT GRAVEL ACCESS ROAD THAT SPLITS OFF FROM MVP-PI-343.01 AND EXTENDS BEYOND THE PROJECT SITE (MVP-PI-343) IS ALSO PROPOSED. A PORTION OF THE SPREAD 11 PIPELINE IS ALSO WITHIN THE PROJECT LOD; THE PERMANENT PIPELINE RIGHT-OF-WAY (ROW) WILL BE 50-FOET WIDE.

TEMPORARY DEVELOPMENT

TEMPORARY DEVELOPMENT WITHIN THE PROJECT SITE INCLUDES A TEMPORARY PAD AND ACCESS ROAD THAT WILL BE USED FOR APPROXIMATELY TEN (10) WEEKS DURING THE CONSTRUCTION OF THE PERMANENT INTERCONNECT PAD AND GAS PIPING ON THE PAD, AS WELL AS A TEMPORARY MATERIAL STORAGE AREA AND AN ADDITIONAL TEMPORARY WORK SPACE (ATWS) THAT WILL BE USED FOR APPROXIMATELY NINE (9) MONTHS DURING CONSTRUCTION OF THE PIPELINE. TEMPORARY GRAVEL WILL BE PLACED OVER THE FULL EXTENT OF THE TEMPORARY PAD AND ACCESS ROAD, AND A LARGE PORTION OF THE TEMPORARY MATERIAL STORAGE AREA AND ATWS. BOTH THE TEMPORARY PAD/ACCESS ROAD AND TEMPORARY MATERIAL STORAGE AREA WILL BE RESTORED TO APPROXIMATE ORIGINAL CONDITIONS (APPROXIMATE PRE-EXISTING CONTOURS AND PRE-EXISTING LAND USE) FOLLOWING CONSTRUCTION OF THE INTERCONNECT PAD FACILITIES AND PIPELINE, RESPECTIVELY.

II. TRANSCO ANALYSIS

STORMWATER RUNOFF CONSIDERATIONS ASSOCIATED WITH TEMPORARY DEVELOPMENT ARE DISCUSSED IN DETAIL IN THE ESC NARRATIVE. THIS NARRATIVE PROVIDES DETAILED INFORMATION ON HOW THE PROPOSED STORMWATER MANAGEMENT METHODOLOGY FOR PERMANENT DEVELOPMENT IS IN FULL COMPLIANCE WITH VIRGINIA STATE REGULATIONS.

D. WATER QUALITY

THE TRANSCO-INTERCONNECT SITE CONTAINS EXISTING IMPERVIOUS COVER, MOST OF WHICH WILL REMAIN OR BE SLIGHTLY MODIFIED IN THE POST-CONSTRUCTION CONDITION AND CAN THEREFORE BE CLASSIFIED AS RE-DEVELOPMENT. THE TRANSCO-INTERCONNECT SITE CROSSES TWO (2) 6TH ORDER, OR HUC 12, BOUNDARIES: 030101050104 AND 030101050203. LAND USE TOTAL ACREAGE FOR EACH 6TH ORDER BOUNDARY IS AS FOLLOWS:

030101050104					
Land Cover					
	A	B	C	D	Totals
Forest/Open Space (ROW)	0.00	23.51	0.00	0.27	23.78
Managed Turf	0.00	1.86	0.00	0.00	1.86
Ag Lands	0.00	0.00	0.00	0.00	0.00
Ex. Impervious Cover	0.00	0.78	0.00	0.05	0.83
New Impervious Cover	0.00	3.40	0.00	0.02	3.42
	0.00	29.55	0.00	0.34	29.89

030101050203					
Land Cover					
	A	B	C	D	Totals
Forest/Open Space (ROW)	0.00	8.54	0.00	0.00	8.54
Managed Turf	0.00	0.29	0.00	0.00	0.29
Ag Lands	0.00	0.00	0.00	0.00	0.00
Ex. Impervious Cover	0.00	0.48	0.00	0.00	0.48
New Impervious Cover	0.00	0.25	0.00	0.00	0.25
	0.00	9.56	0.00	0.00	9.56

VRRM CALCULATIONS SHOW THAT THE LOW PHOSPHORUS LOADING IN THE PRE- AND POST-CONSTRUCTION FORESTED AREAS OFFSET LOADING INCREASES FROM NEW IMPERVIOUS COVER, PER SECTION III.D.1. WATER QUALITY ABOVE. VRRM SITE DATA TABS FOR EACH OF THE TWO TRANSCO SITE 6TH ORDER BOUNDARIES ARE PROVIDED IN THE TRANSCO SITE PHOSPHORUS LOADING EXHIBIT.

030101050104					
Total Phosphorus Loading [lb/yr]					
Land Cover	A	B	C	D	Totals
Forest/Open Space (ROW)	0.00	1.68	0.00	0.03	1.72
Managed Turf	0.00	0.89	0.00	0.00	0.89
Ag Lands	N/A	N/A	N/A	N/A	N/A
Ex. Impervious Cover	0.00	1.75	0.00	0.12	1.87
New Impervious Cover	0.00	7.72	0.00	0.05	7.78
	0.00	12.04	0.00	0.20	12.25

030101050203					
Total Phosphorus Loading [lb/yr]					
Land Cover	A	B	C	D	Totals
Forest/Open Space (ROW)	0.00	0.61	0.00	0.00	0.61
Managed Turf	0.00	0.14	0.00	0.00	0.14
Ag Lands	N/A	N/A	N/A	N/A	N/A
Ex. Impervious Cover	0.00	0.95	0.00	0.00	0.95
New Impervious Cover	0.00	0.70	0.00	0.00	0.70
	0.00	2.40	0.00	0.00	2.40

THIS FURTHER ANALYSIS SUPPORTED THE CONCLUSION THAT TOTAL PHOSPHORUS LOADING DOES NOT EXCEED THE 0.41 LB TP/AC/YR MAXIMUM WITHIN EACH 6TH ORDER BOUNDARY.

Transco Site			
6th Order HUC 12	Area [ac]	TP Load [lb TP/yr]	TP Load* [lb TP/ac/yr]
Total LOD	39.45	14.65	0.37
030101050104 LOD	29.89	12.25	0.41
030101050203 LOD	9.56	2.40	0.25

*Cannot exceed 0.41 lb TP/ac/yr, or other reduction measures are required.

E. WATER QUANTITY

STORMWATER ANALYSIS AND BMP DESIGNS WERE PERFORMED TO ENSURE THAT VIRGINIA STATE REGULATION 9VAC25-870-66 HAS BEEN SATISFIED, SPECIFICALLY:

1. CONCENTRATED STORMWATER DISCHARGES THAT ARE RELEASED INTO A NATURAL OR MANMADE STORMWATER CONVEYANCE SYSTEM WILL BE IN COMPLIANCE WITH 9VAC25-870-66.B (CHANNEL PROTECTION) AND 9VAC25-870-66.C (FLOOD PROTECTION).

2. IF THERE IS NOT A DEFINED RECEIVING CHANNEL, IT WILL BE DEMONSTRATED THAT EITHER EXISTING SHEET FLOW CONDITIONS ARE MAINTAINED FOLLOWING CONSTRUCTION OR THAT THE PROPOSED OUTLET STRUCTURE RE-DISTRIBUTES DISCHARGE FOR THE 10-YEAR STORM AS SHEET FLOW; A SHEET FLOW DISCHARGE CONDITION FOR A PROPOSED OUTLET STRUCTURE (I.E., SPILLWAY, LEVEL SPREADER, PLUNGE POOL, RIPRAP APRON, ETC.) IS DEFINED AS ≤ 0.1-FT OF HEAD ON THE OUTLET STRUCTURE. INCREASED VOLUMES OF SHEET FLOW WILL BE EVALUATED IN ACCORDANCE WITH 9VAC25-870-66.D.

SINCE PERMANENT GRAVEL ACCESS ROAD MVP-PI-343 EXTENDS BEYOND THE PROJECT SITE, WATER QUANTITY REQUIREMENTS FOR MVP-PI-343 ARE ADDRESSED AS PART OF SPREAD 11; REFER TO THE SPREAD 11 SWM NARRATIVE FOR MORE INFORMATION. THIS SWM NARRATIVE AND THE CORRESPONDING TRANSCO CALCULATION REPORT (PROVIDED SEPARATELY) FOCUS ON STORMWATER MANAGEMENT FOR THE PERMANENT GRAVEL ACCESS ROAD MVP-PI-343.01 AND THE PERMANENT GRAVEL PAD TO ENSURE THAT THE APPLICABLE WATER QUANTITY REQUIREMENTS ARE SATISFIED.

i. SITE RUNOFF ANALYSIS

THE HYDROLOGY AND HYDRAULICS (H&H) ANALYSIS WAS PERFORMED IN ACCORDANCE WITH TR-55, URBAN HYDROLOGY FOR SMALL WATERSHEDS. THE TR-55 CALCULATIONS WERE MODELED USING THE AUTOCAD CIVIL 3D HYDRAFLOW EXTENSION.

THE PROJECT SITE IS LOCATED ON BOTH SIDES OF THE DRAINAGE DIVIDE SEPARATING THE HUC 030101050104 (CHERRYSTONE CREEK) AND HUC 030101050203 (SHOCKOE CREEK - BANISTER RIVER) WATERSHEDS. RUNOFF FROM THE SITE IS RELEASED TO A ROADSIDE DITCH THAT PARALLELS TRANSCO ROAD TO THE NORTH (DRAINAGE AREA DA-A), AN EXISTING NETWORK OF STREAMS TO THE SOUTH AND WEST (DRAINAGE AREA DA-B), AND AN EXISTING WETLAND TO THE SOUTH AND EAST (DRAINAGE AREA DA-C). THESE DRAINAGE AREAS WERE DIVIDED INTO MULTIPLE SUB-DRAINAGE AREAS TO EVALUATE THE EFFECTS ON EACH OF THESE EXISTING FEATURES FOLLOWING CONSTRUCTION. SPECIFICALLY, THE PROJECT SITE WAS SUB-DIVIDED INTO EIGHT SUB-DRAINAGE AREAS: DA-A1, DA-A2, DA-B1, DA-B2, DA-B3, DA-B4, DA-B5, AND DA-C. REFER TO THE TRANSCO CALCULATION REPORT, PROVIDED SEPARATELY, FOR DRAINAGE AREA MAPS AND MORE INFORMATION PERTAINING TO THE STORMWATER ANALYSIS SUMMARIZED IN THE FOLLOWING SECTIONS.

ii. CONCENTRATED DISCHARGES TO STORMWATER CONVEYANCE SYSTEMS

CONCENTRATED STORMWATER DISCHARGE FROM DA-A1 AND DA-A2 IS RELEASED TO A MANMADE STORMWATER CONVEYANCE SYSTEM (EXISTING DITCHLINE THAT PARALLELS TRANSCO ROAD), AND CONCENTRATED STORMWATER DISCHARGE FROM DA-B4 AND DA-B5 IS RELEASED TO A NATURAL CONVEYANCE SYSTEM (STREAMS S-KL18 AND S-H45, RESPECTIVELY). THESE SUB-DRAINAGE AREAS WERE EVALUATED IN ACCORDANCE WITH 9VAC25-870-66.B (CHANNEL PROTECTION) AND 9VAC25-870-66.C (FLOOD PROTECTION) OF THE VIRGINIA STATE REGULATIONS.

iii. SHEET FLOW

EXISTING SHEET FLOW CONDITIONS IN DA-B1, DA-B2, DA-B3 AND DA-C ARE MAINTAINED FOLLOWING CONSTRUCTION SINCE THE EXISTING LAND USE AND TOPOGRAPHIC CONDITIONS ARE EITHER BEING MAINTAINED DURING OR RESTORED FOLLOWING CONSTRUCTION.

LEVEL SPREADERS LS-1 AND LS-3 WERE DESIGNED AT THE OUTLET OF PROPOSED CULVERTS CC-5 AND CC-6, RESPECTIVELY, SINCE THEY DO NOT DISCHARGE DIRECTLY TO A CHANNEL; A LEVEL SPREADER (LS-2) WAS ALSO DESIGNED AT THE OUTLET OF CHANNEL CH-H IN DA-B4 SINCE THE EXISTING GEOMETRY OF THE BROAD SWALE IS NOT CLEARLY DEFINED AT THE POINT OF DISCHARGE. FOR DA-B5, THERE IS MINIMAL FLOW THROUGH THE RISER BARREL DURING THE 10-YEAR EVENT FOR THE POST-CONSTRUCTION CONDITION SO IT WAS DEMONSTRATED THAT THE PROPOSED RIPRAP APRON PROVIDES NON-EROSIVE SHEETFLOW OFFSITE AS AN ALTERNATIVE TO MEETING THE 9VAC25-870-66.B REQUIREMENT SINCE ZERO DISCHARGE FROM THE OUTLET STRUCTURE IS NEEDED IN ORDER TO SATISFY THAT REQUIREMENT; PER 9VAC25-870-66.D, INCREASED VOLUMES OF SHEETFLOW ARE ALLOWABLE AS LONG AS IT DOES NOT IMPACT DOWNGRADIANT PROPERTIES OR RESOURCES, AND A DOWNSTREAM POINT OF INTEREST ALONG STREAM S-H45 (I.E., DA-B5 POI; SEE TABLE U) HAS BEEN EVALUATED TO DEMONSTRATE COMPLIANCE WITH THE CHANNEL PROTECTION (9VAC25-870-66.B) AND FLOOD PROTECTION (9VAC25-870-66.C) REQUIREMENTS.

iv. WATER QUANTITY BMPS

STORMWATER QUANTITY FOR THE 20-FOET WIDE PERMANENT GRAVEL ACCESS ROAD (MVP-PI-343.01) IS CONTROLLED/MANAGED VIA VEGETATED STORMWATER CONVEYANCE CHANNELS WITH ROCK CHECK DAMS TO PROVIDE STORMWATER DETENTION. STORMWATER QUANTITY FOR THE 310-FOET BY 295-FOET GRAVEL PAD AREA IS CONTROLLED/MANAGED VIA A PERMANENT STORMWATER POND. THESE STORMWATER QUANTITY BMPS WERE MODELED IN HYDRAFLOW AS RESERVOIRS.

BASED ON THE RESULTS PRESENTED IN THE SUMMARY TABLES BELOW, THE PROJECT SATISFIES THE APPLICABLE VIRGINIA STATE STORMWATER QUANTITY REGULATIONS.

Water Quantity Summary Table										
Point of Interest (POI)	Type of Discharge	1-Year			2-Year			10-Year		
		Pre- Peak Flow (cfs)	Post- Peak Flow (cfs)	Flow Differential	Pre- Peak Flow (cfs)	Post- Peak Flow (cfs)	Flow Differential	Pre- Peak Flow (cfs)	Post- Peak Flow (cfs)	Flow Differential
¹ DA-A POI	Concentrated to Manmade Conveyance System	1.092	0.585	-0.507	4.768	3.695	-1.073	22.090	18.300	-3.790
¹ DA-A LOD Outlet POI	Concentrated to Manmade Conveyance System	0.346	0.204	-0.142	1.402	1.264	-0.138	6.115	5.746	-0.369
¹ DA-B4 POI	Concentrated to Natural Conveyance System	0.455	0.353	-0.102	1.810	1.767	-0.043	8.503	8.419	-0.084
^{1, 2} DA-B4 LOD Outlet POI	Concentrated to Natural Conveyance System	0.357	0.356	-0.001	1.443	1.575	0.132	6.798	7.768	0.970
¹ DA-B5 POI	Concentrated to Natural Conveyance System	0.110	0.088	-0.022	0.543	0.443	-0.100	2.858	2.765	-0.093

¹Energy Balance requirements are satisfied. Refer to the Transco Calculation Report, provided separately, for calculations.

²Level Spreader LS-2 has been sized at Outlet CH-H in DA-B4 to ensure non-erosive sheet flow up to the 10-year event since the geometry of the existing broad swale is not clearly defined at the point of discharge, and a downstream point of interest along Stream S-KL18 ("DA-B4 POI" above) was evaluated to demonstrate compliance with 9VAC25-870-66.B (Channel Protection) and 9VAC25-870-66.C (Flood Protection).

Level Spreader Schedule			
ID	10-Year Design Flow (cfs)	Level Spreader Length (ft)	Level Spreader Lip (Vegetated or Rigid)
LS-1	1.15	12	Rigid
LS-2	7.77	82	Rigid
LS-3	1.71	18	Rigid

C. PROPOSED CULVERTS

PROPOSED RELIEF CULVERTS ALONG THE PERMANENT ACCESS ROAD (MVP-PI-343.01) WERE SIZED TO SAFELY CONVEY THE 10-YEAR 24-HOUR DESIGN FLOW, AND OUTLET PROTECTION WAS DESIGNED IN ACCORDANCE WITH VESCH STD & SPEC 3.18. REFER TO THE TRANSCO CALCULATION REPORT, PROVIDED SEPARATELY, FOR MORE INFORMATION PERTAINING TO THE DESIGN CALCULATIONS. A SCHEDULE SUMMARIZING THE CULVERT DESIGNS IS PROVIDED BELOW.

Table 3 - Ditch Relief Culvert Schedule								
Culvert No.	Drainage Area (ac)	10-Year Design Flow (cfs)	Culvert Diameter (in)	Culvert Length (ft)	Invert Elevation at Inlet (ft) ²	Invert Elevation at Outlet(ft) ²	Culvert Slope	Culvert Material
CC-1	6.27	5.75	24	130	654.3	653.3	0.8%	CPP or Approved Equal
CC-2	2.10	3.29	18	131	657.4	656.1	1.0%	CPP or Approved Equal
CC-3	0.80	1.44	18	110	658.0	654.0	3.6%	CPP or Approved Equal
CC-4 (Temporary)	2.90	4.73	18	179	653.8	650.0	2.1%	CPP or Approved Equal
CC-5	0.86	1.17	18	88	663.2	661.7	1.7%	CPP or Approved Equal
CC-6	1.31	1.71	18	98	658.1	657.5	0.6%	CPP or Approved Equal

REVISIONS:									



SWM NARRATIVE

MOUNTAIN VALLEY PIPELINE PROJECT – TRANSCO INTERCONNECT

PITTSYLVANIA COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

CANONSBURG, PA 15317



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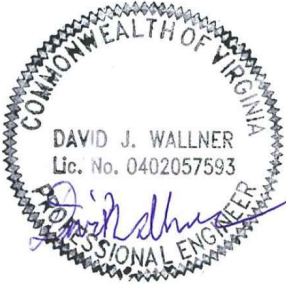
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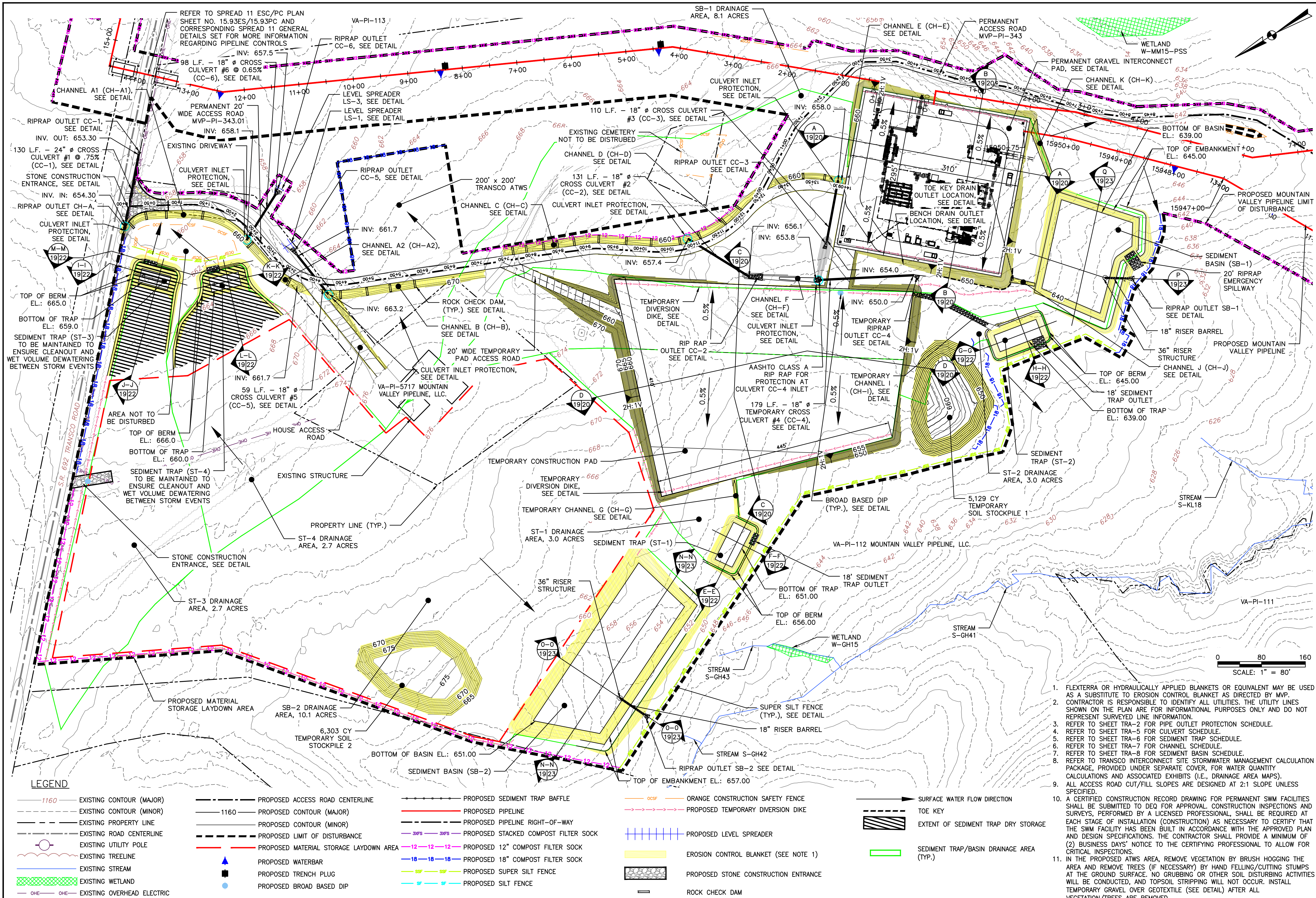
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5	05/11/18	KAL		6	05/23/18	KAL		7	06/04/18	KAL	

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Mountain Valley Pipeline

EROSION AND SEDIMENT CONTROL PLAN

MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT

PITTSBURGH COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

CANONSBURG, PA 15317

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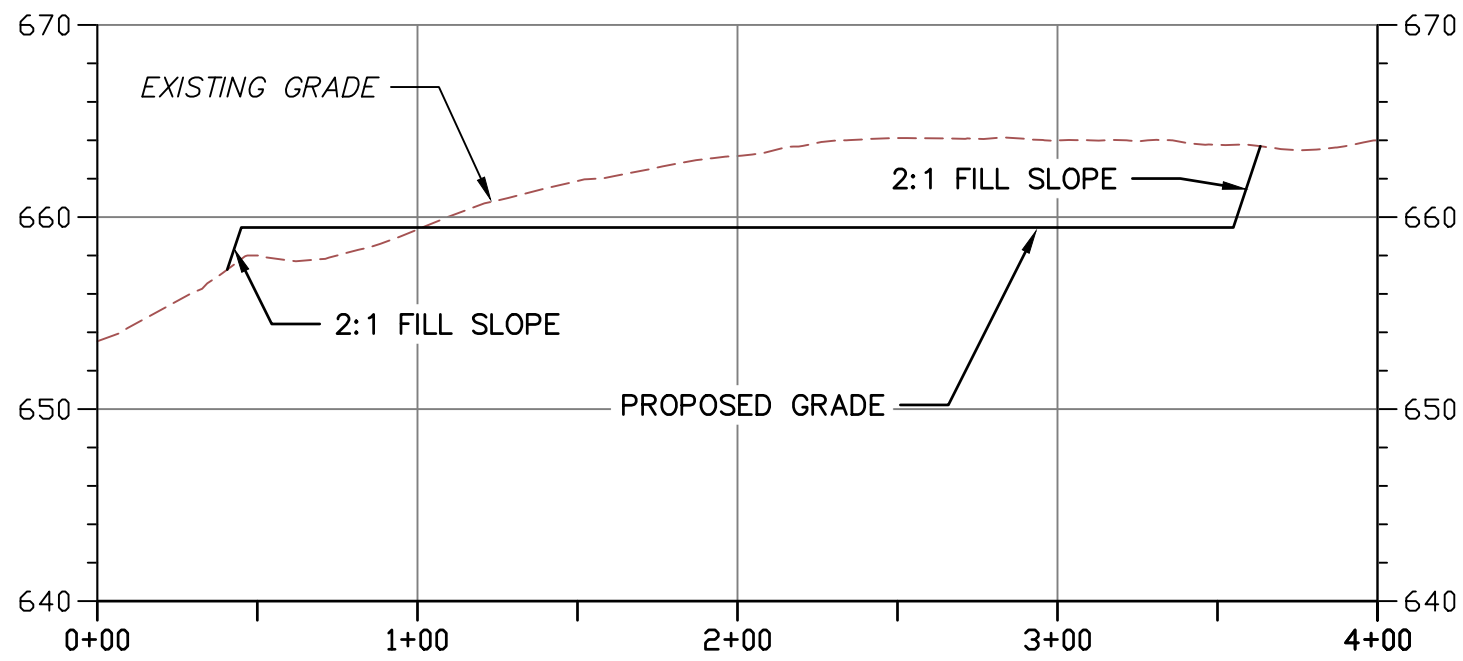
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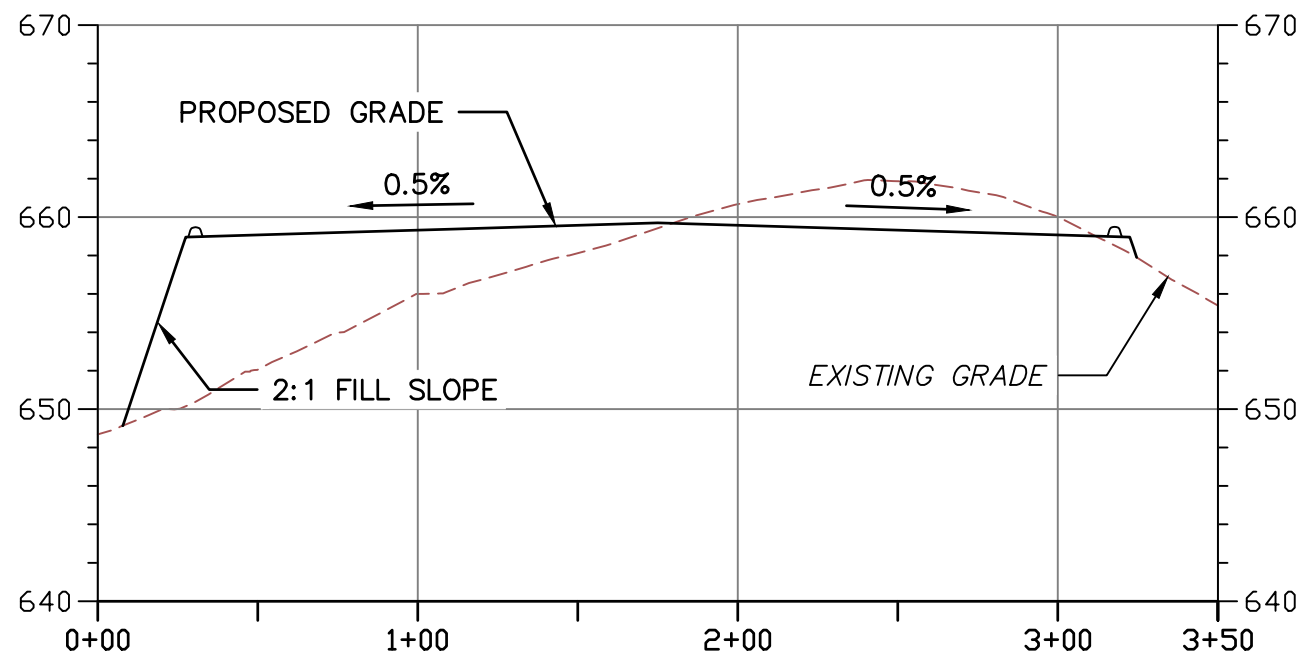
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DAVID J. WALLNER
Lic. No. 0402057593
Professional Engineer

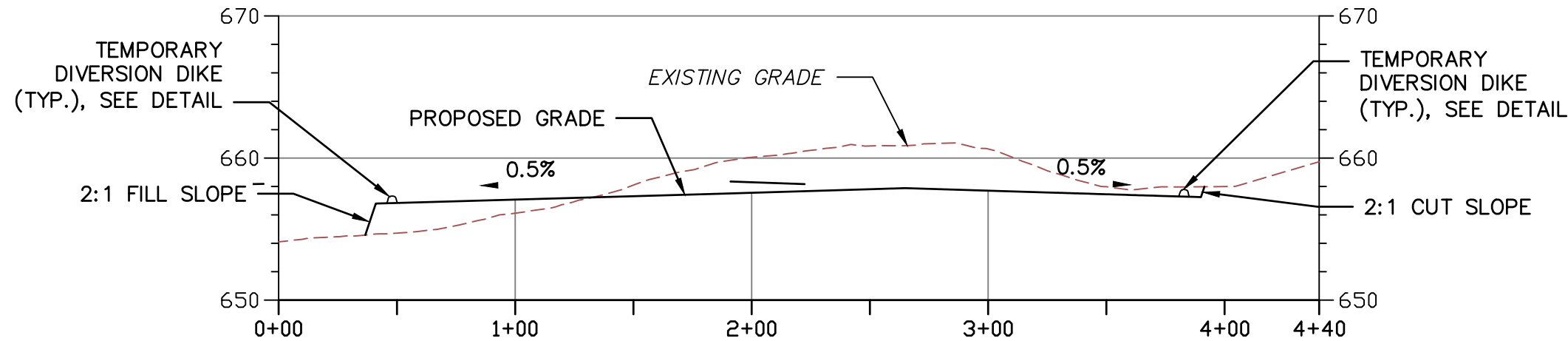
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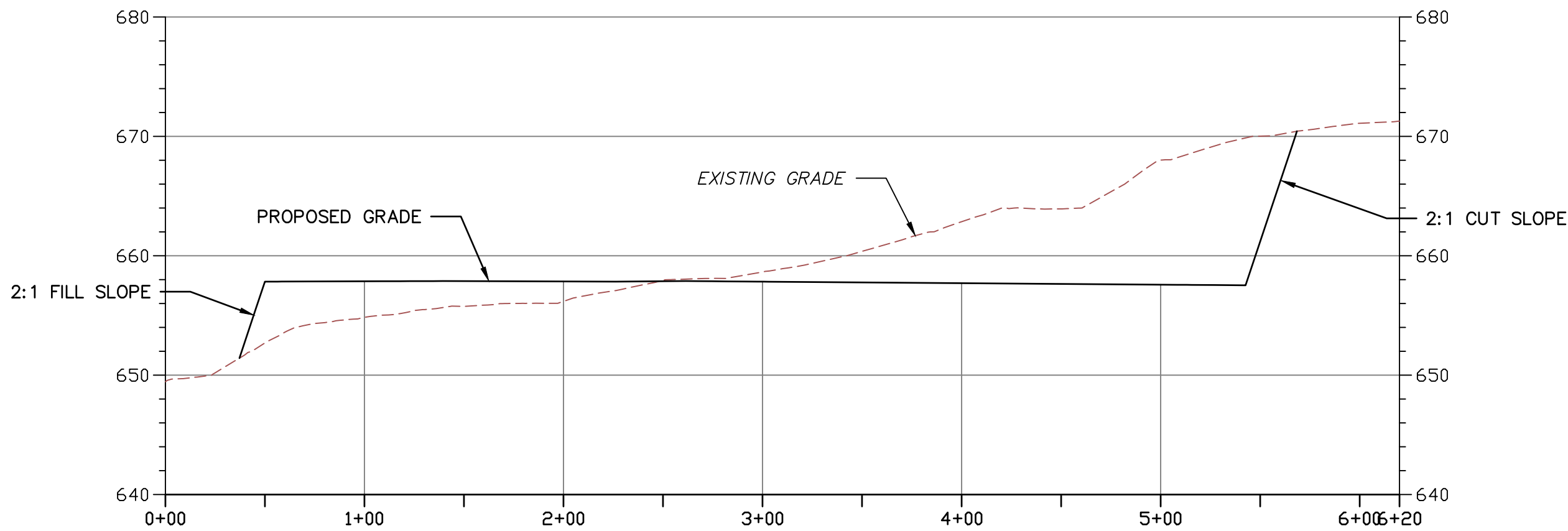
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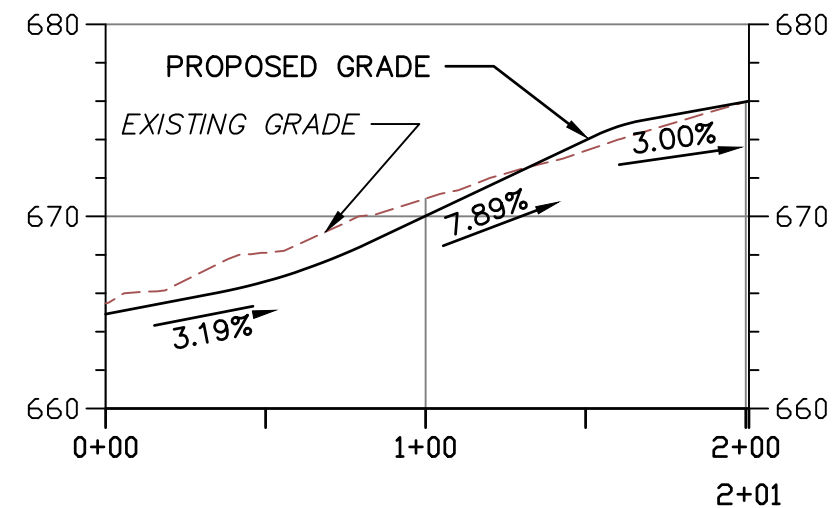
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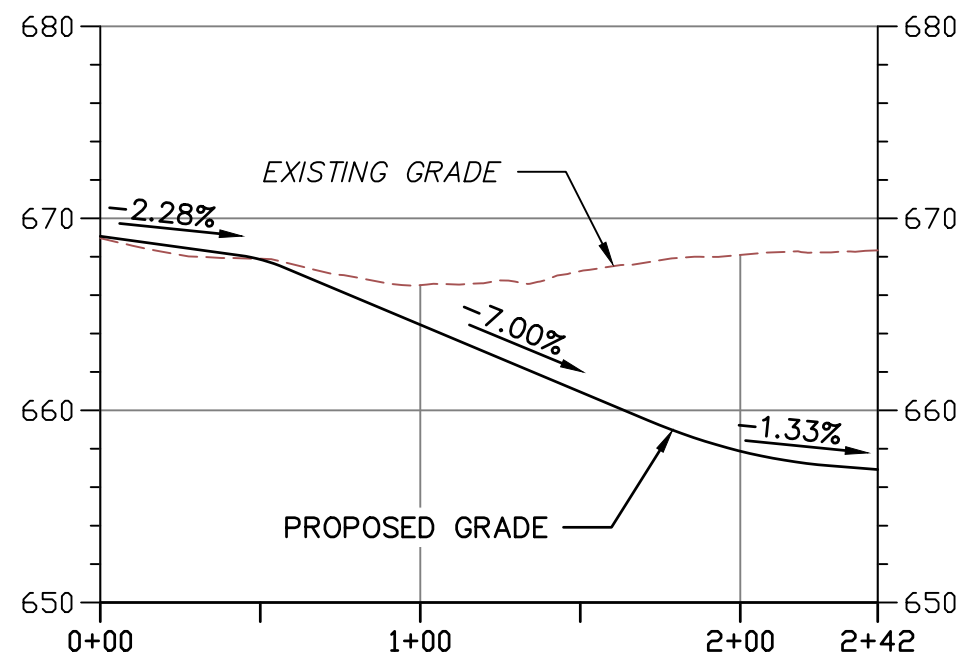
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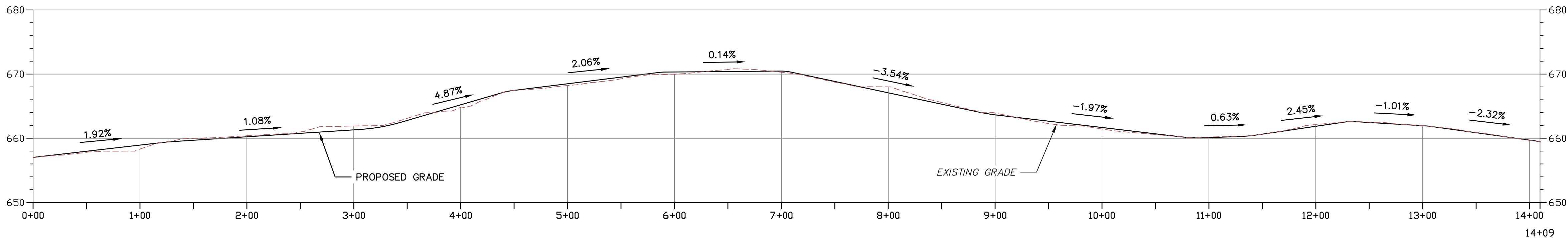
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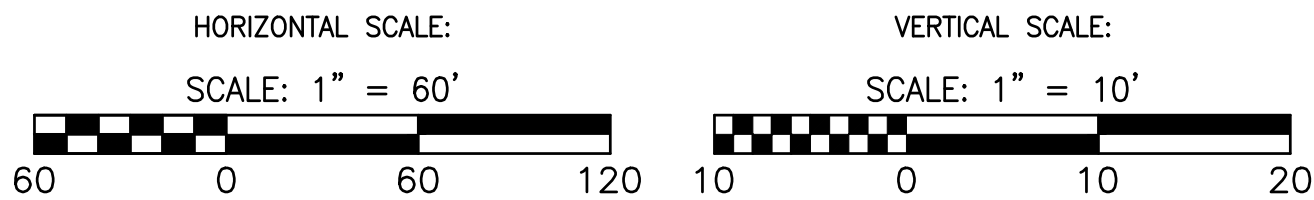
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4	04/10/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS								
5	05/11/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS								
6	05/23/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS								
7	06/04/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS								



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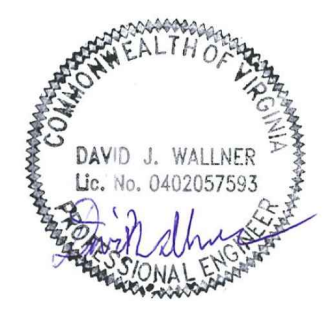
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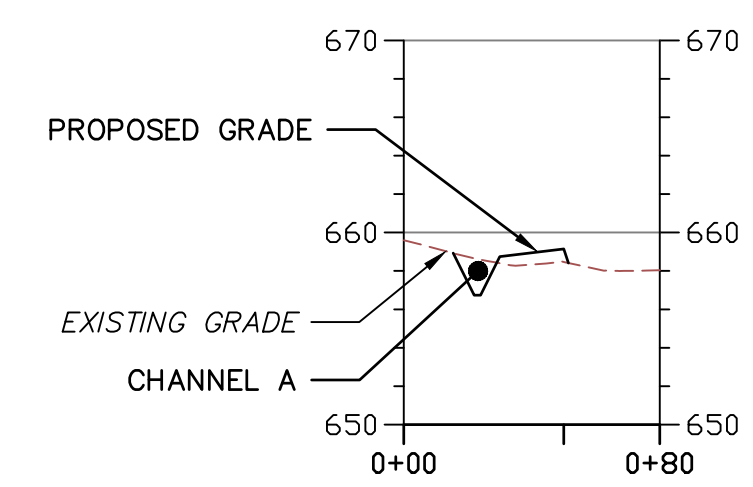
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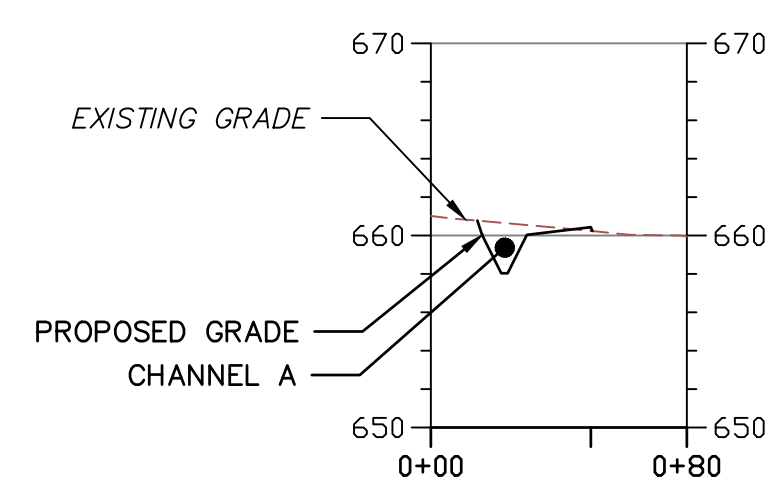


DAVID J. WALLNER
Lic. No. 0402057593
PROFESSIONAL ENGINEER

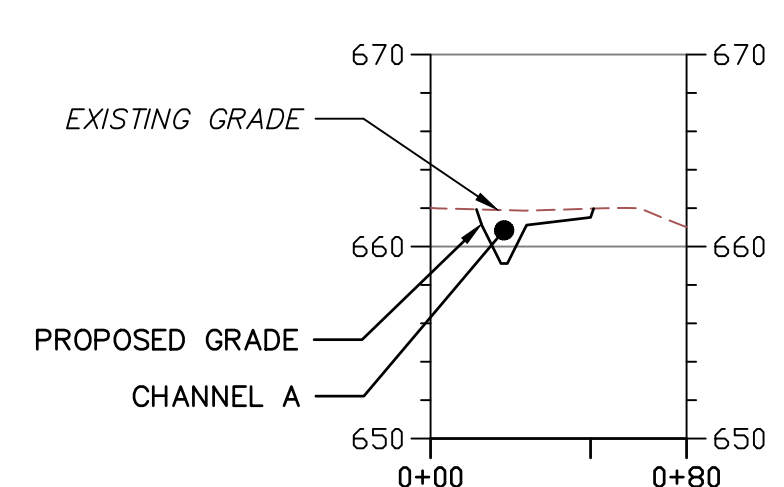
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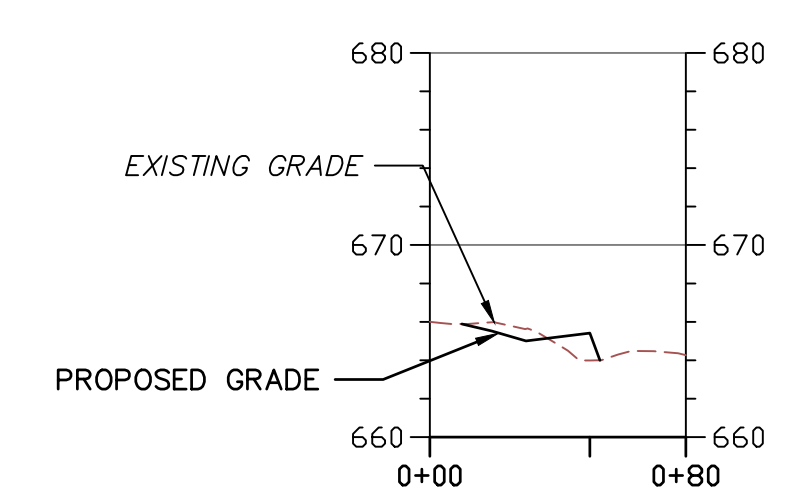
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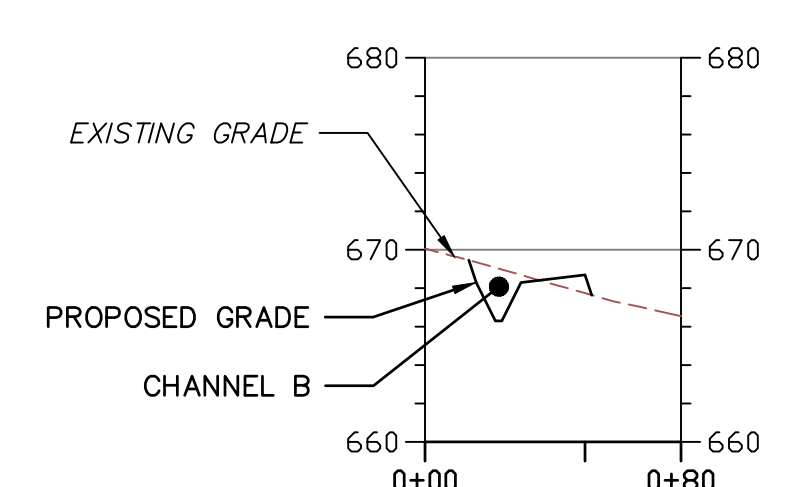
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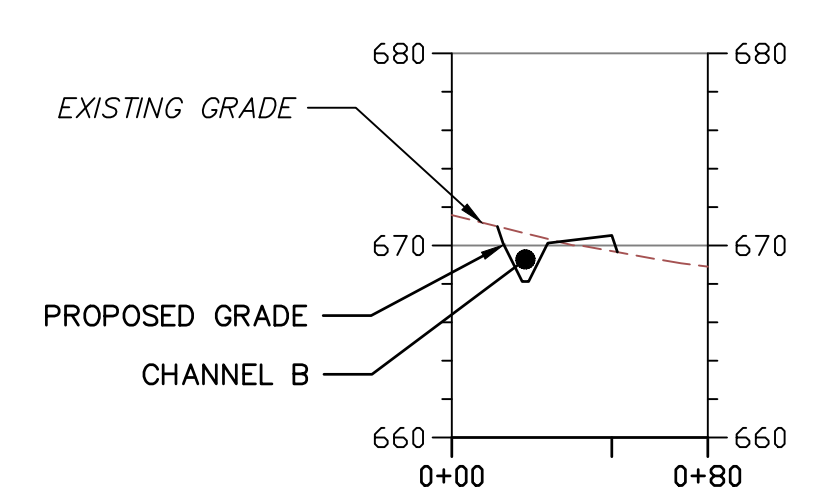
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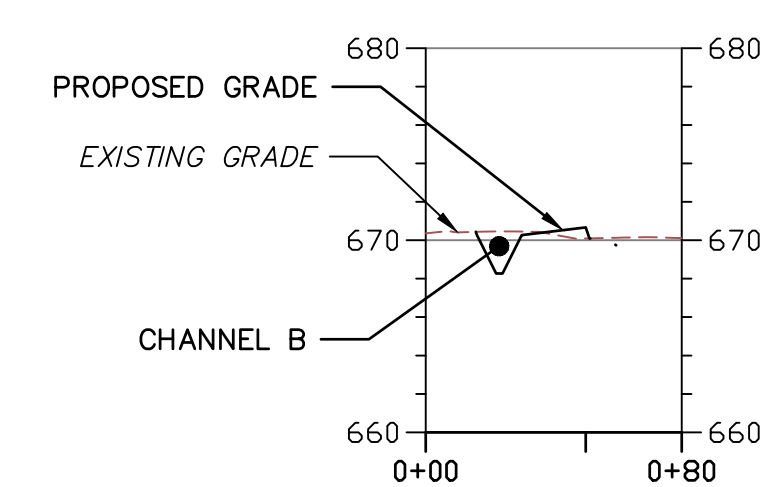
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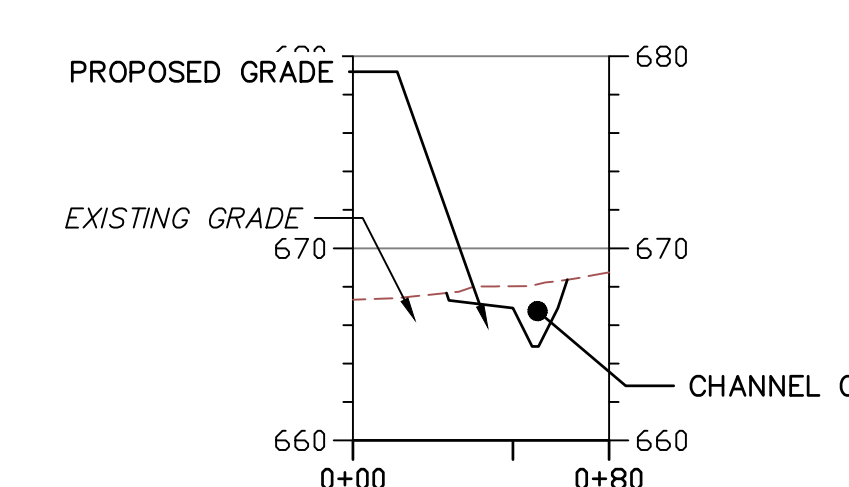
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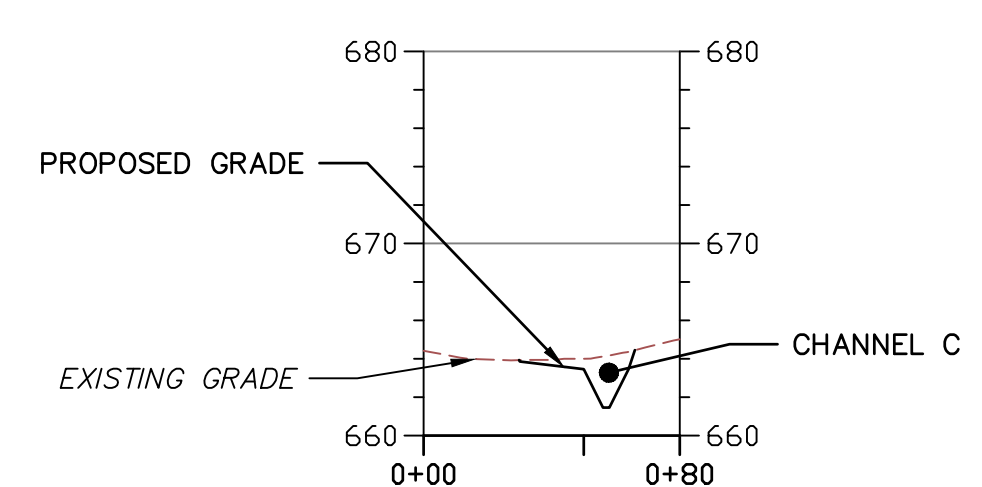
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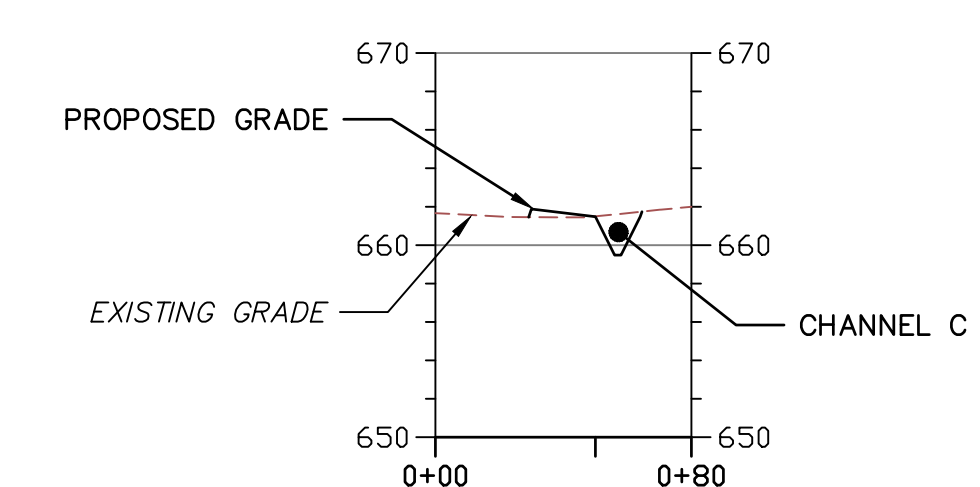
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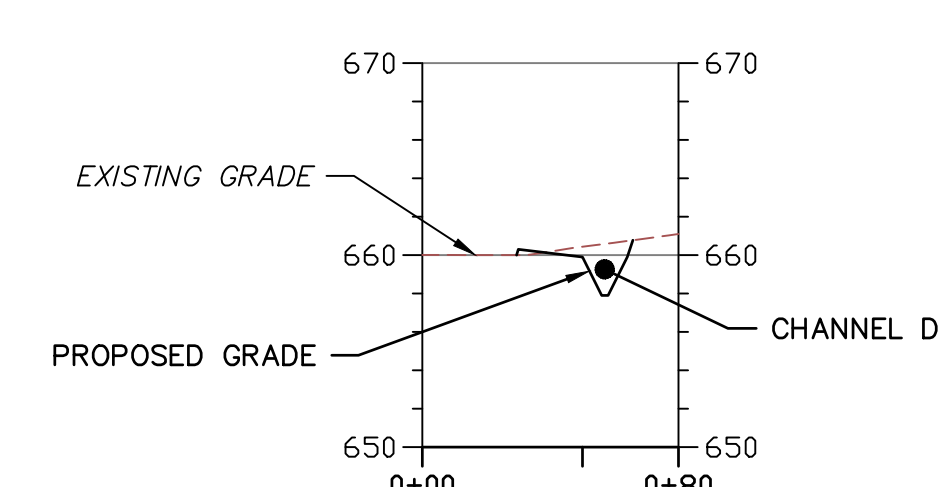
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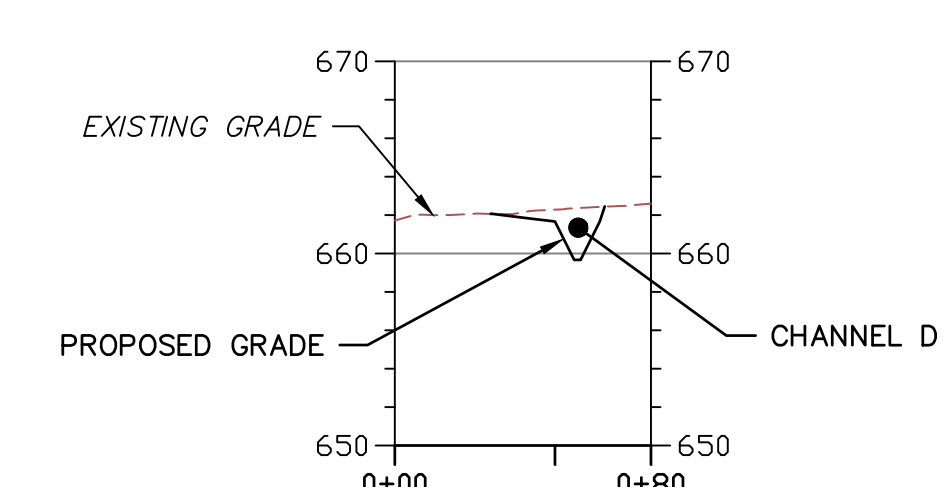
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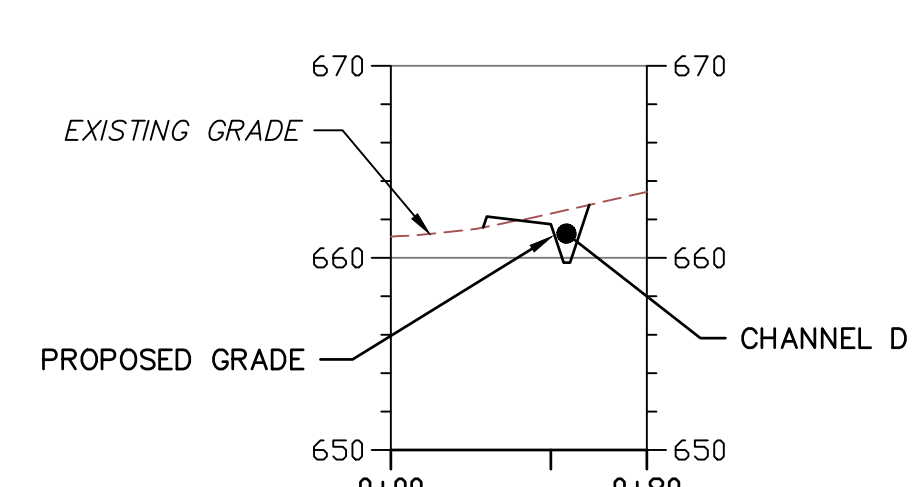
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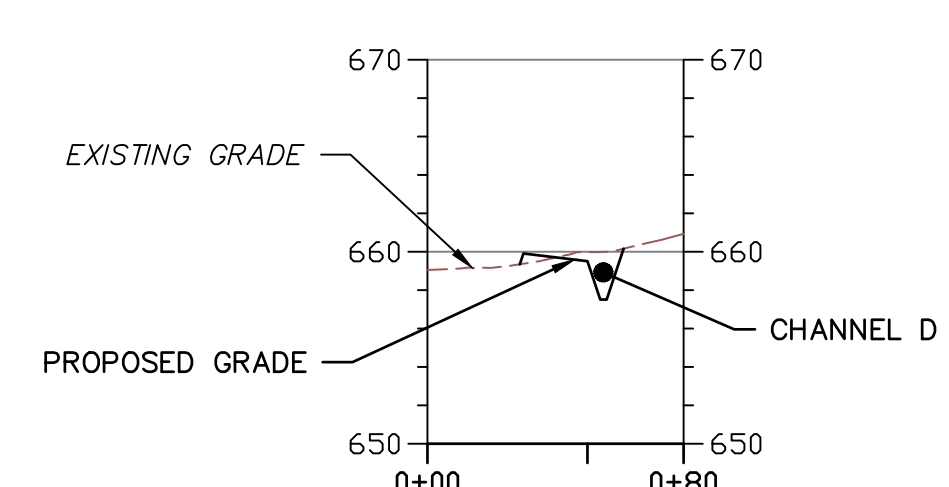
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SCALE AS NOTED



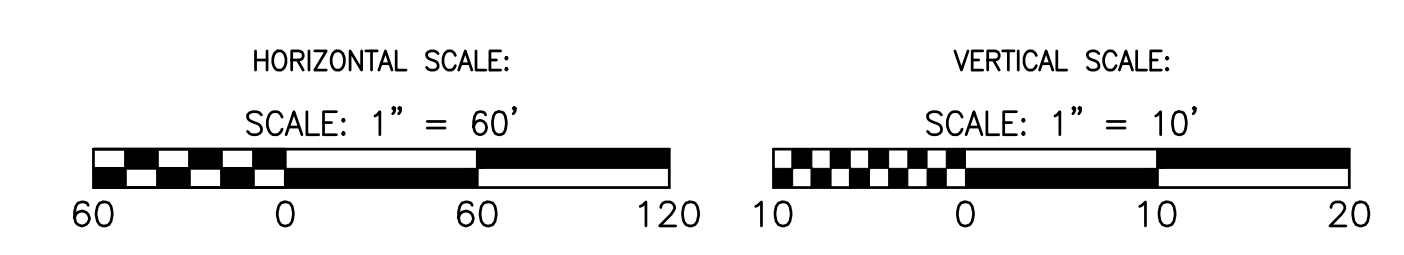
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SCALE AS NOTED




ACCESS ROAD SECTION
@ STA. 13+00
SCALE AS NOTED



ACCESS ROAD SECTION
@ STA. 14+00
SCALE AS NOTED




ADDRESS VADEQ COMMENTS		DW	HT	MUP	11/21/17	2
ADDRESS VADEQ COMMENTS		DW	HT	JWK	02/28/18	3
ADDRESS VADEQ COMMENTS		DW	HT	KAL	04/10/18	4
ADDRESS VADEQ COMMENTS		DW	HT	KAL	05/11/18	5
ADDRESS VADEQ COMMENTS		DW	HT	KAL	05/23/18	6
ADDRESS VADEQ COMMENTS		DW	HT	KAL	06/04/18	7
DESCRIPTION:		CHKD.:	DATE:	DWN.:	NO.:	
REVISIONS:						



ACCESS ROAD SECTIONS
MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT
PITTSBURGH COUNTY, VIRGINIA

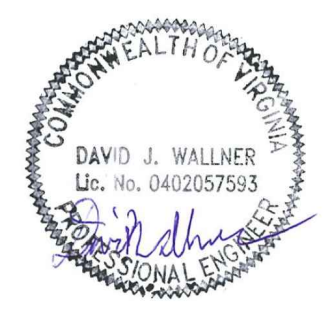
MOUNTAIN VALLEY PIPELINE, LLC
555 SOUTHPOINTE BLVD, SUITE 200
CANONSBURG, PA 15317



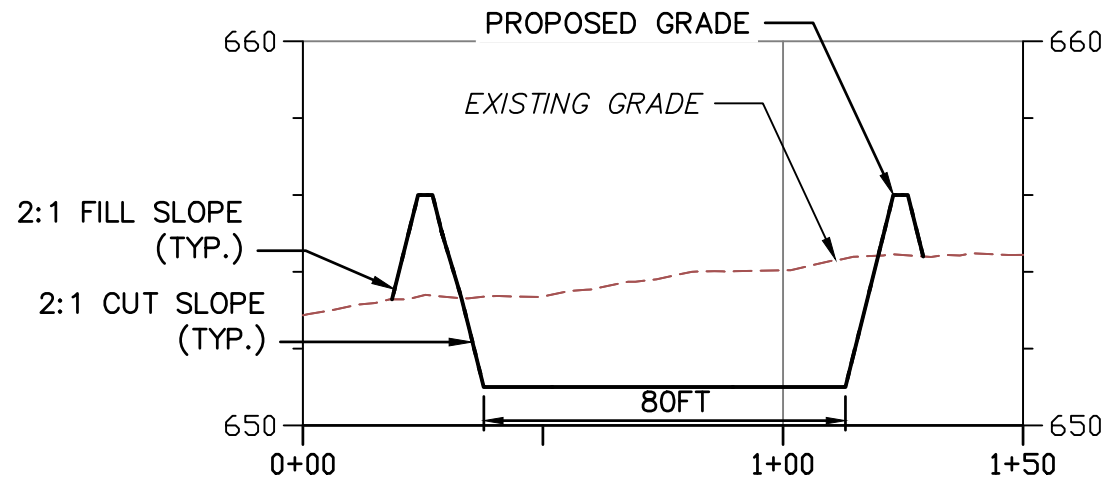
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PITTSBURGH, PA 15220

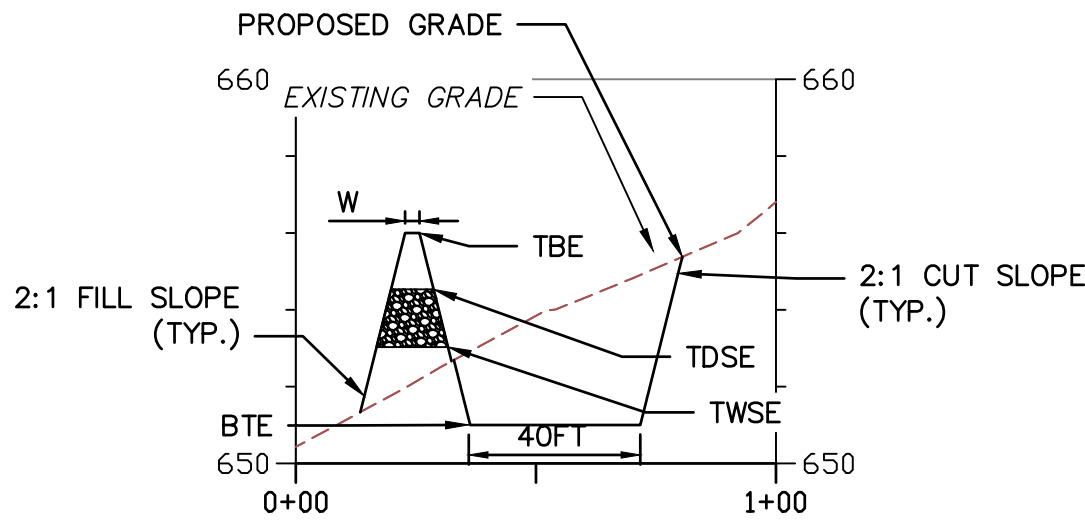
CONSTRUCTION PLANS



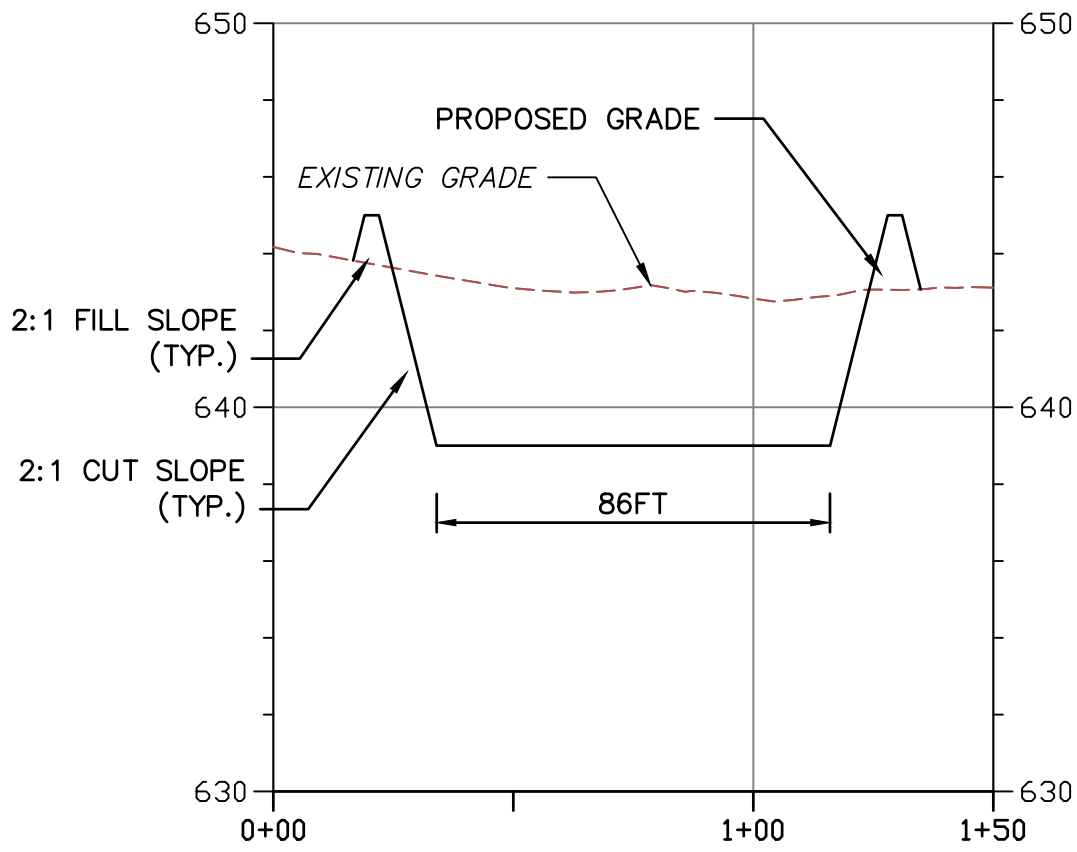
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APPROVED BY:	DWJ
DATE:	06/04/2018
SCALE:	AS SHOWN
SHT. NO.	TRA-21 OF 25



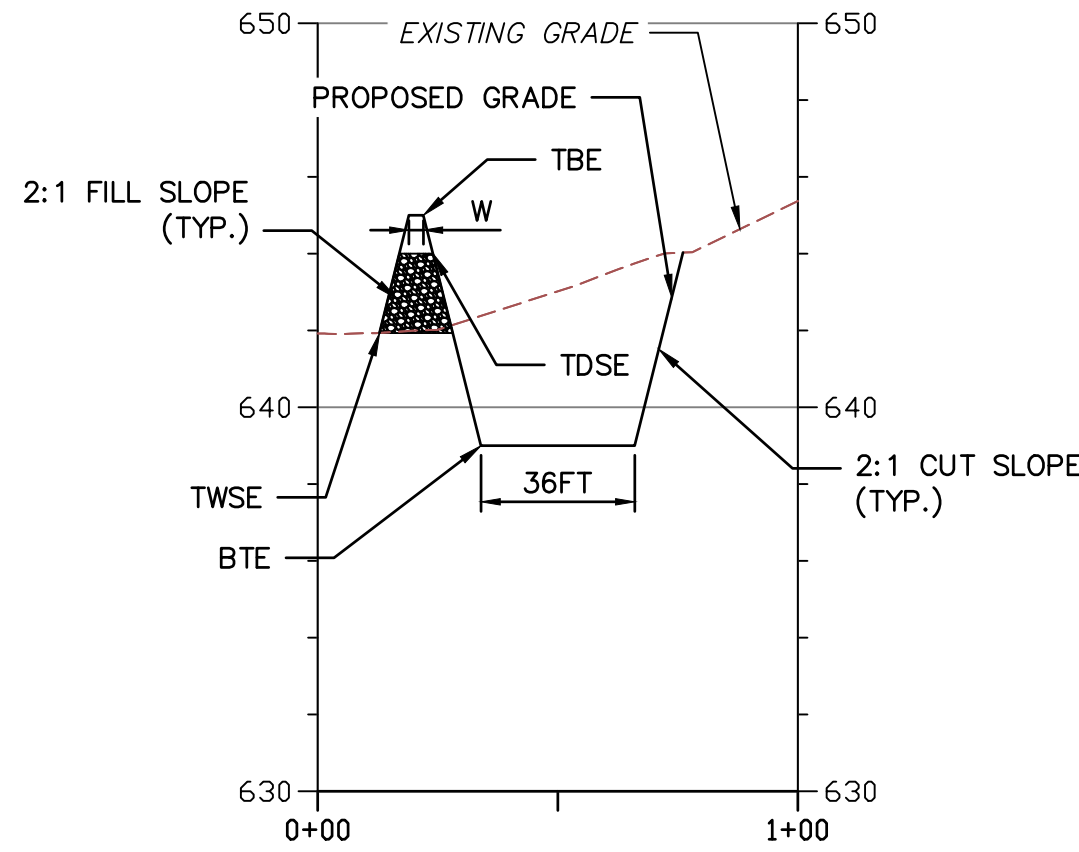
SEDIMENT TRAP 1
SECTION E-E
SCALE AS NOTED



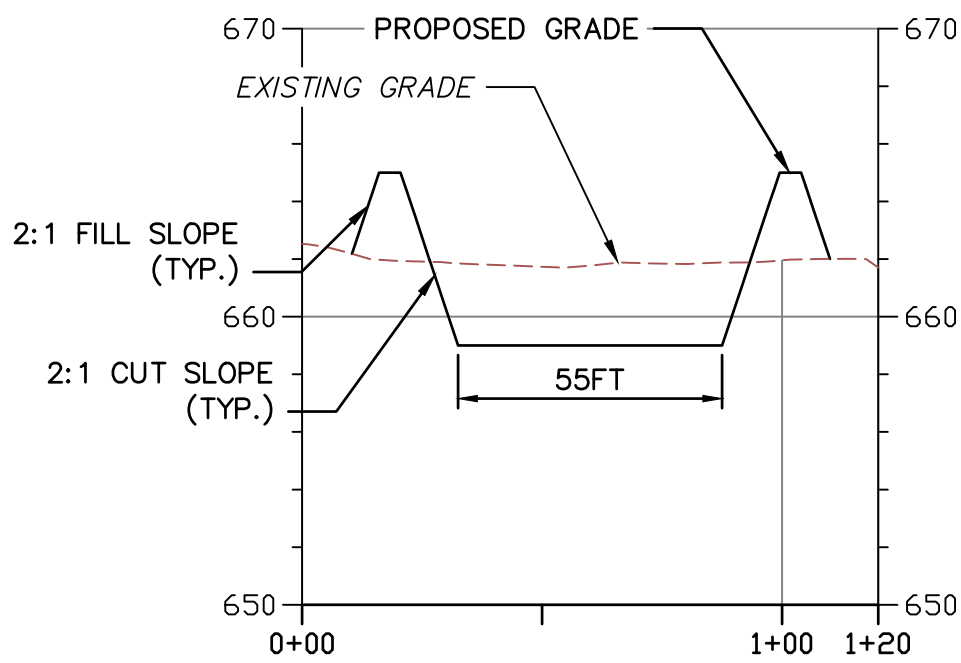
SEDIMENT TRAP 1
SECTION F-F
SCALE AS NOTED



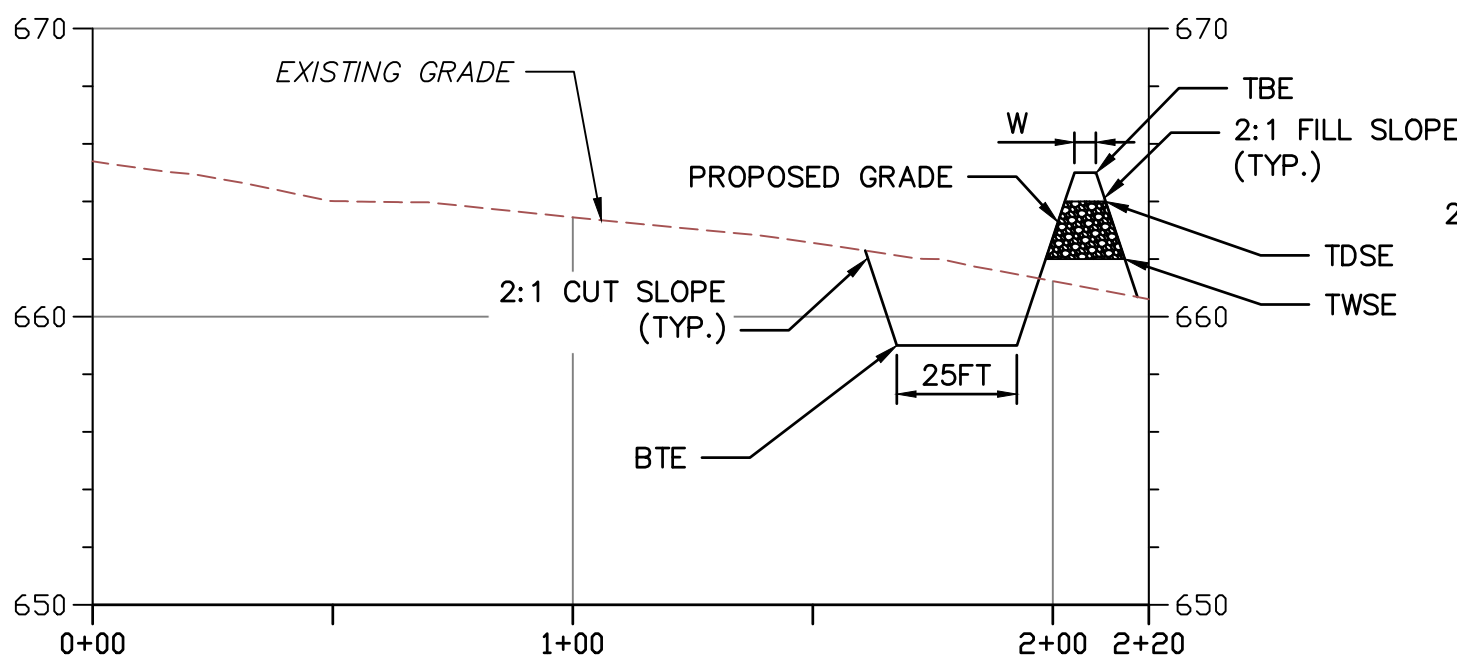
SEDIMENT TRAP 2
SECTION G-G
SCALE AS NOTED



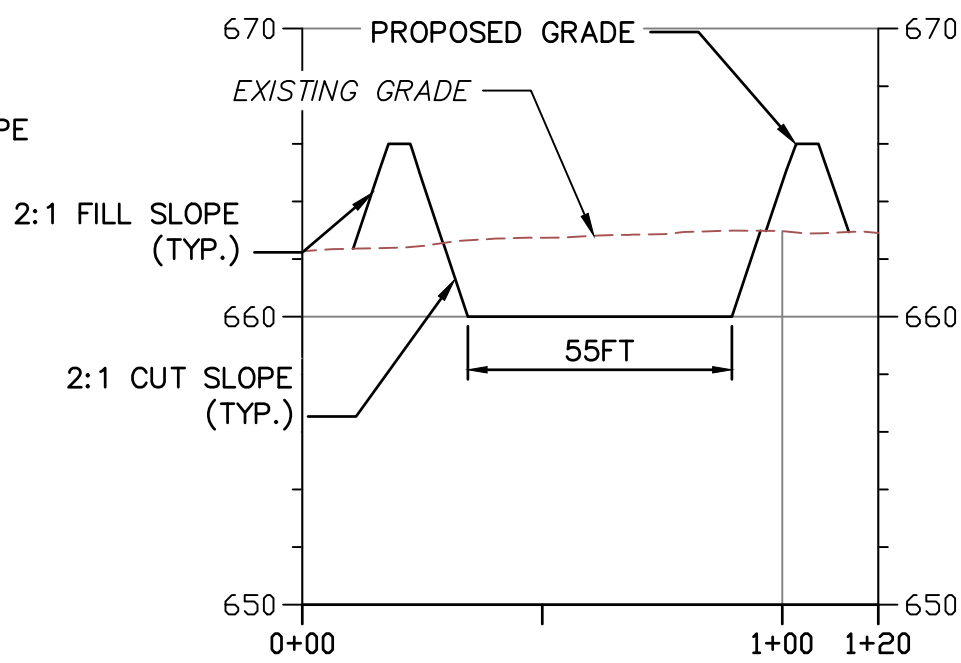
SEDIMENT TRAP 2
SECTION H-H
SCALE AS NOTED



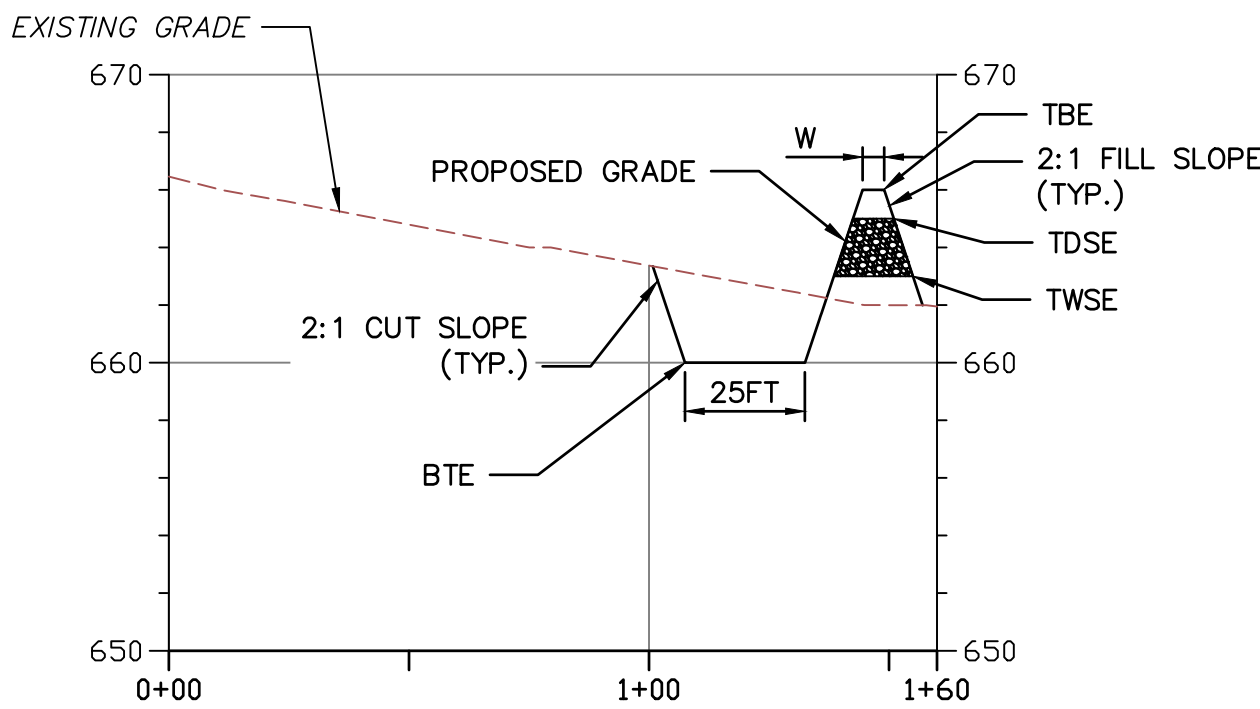
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SECTION I-I
SCALE AS NOTED



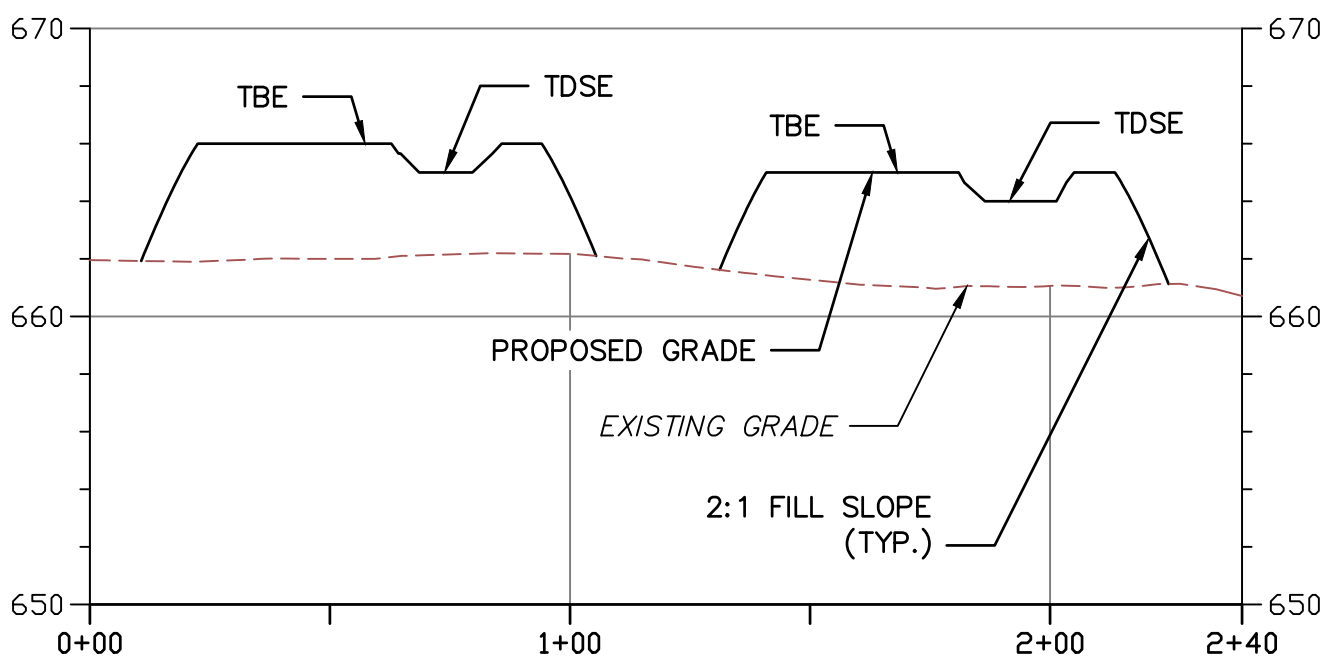
SEDIMENT TRAP 3
SECTION J-J
SCALE AS NOTED



SEDIMENT TRAP 4
SECTION K-K
SCALE AS NOTED

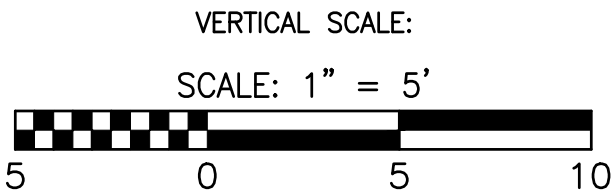
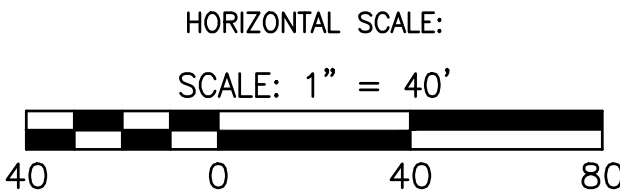


SEDIMENT TRAP 4
SECTION L-L
SCALE AS NOTED




SEDIMENT TRAP 3 & 4
SECTION M-M
SCALE AS NOTED

Trap #	Drainage Area (Acres)	SEDIMENT TRAP												
		WET STORAGE				DRY STORAGE				Outlet Length (Ft.)	Bottom Elevation	Top of Berm Elevation	Top of Berm Width	Dimensions, L x W (Ft.)
		Volume Required (Cu. Yd.)	Volume Provided (Cu. Yd.)	Elevation		Volume Required (Cu. Yd.)	Volume Provided (Cu. Yd.)	Elevation						
ST-1	2.91	195	340	653.00		195	238	655.00	18	651.00	656.00	3	80x40	
ST-2	2.85	191	288	642.00		191	370	644.00	18	639.00	645.00	4.5	86x36	
ST-3	2.70	181	247	662.00		181	441	664.00	18	659.00	665.00	4.5	55x25	
ST-4	2.70	181	242	663.00		181	453	665.00	18	660.00	666.00	4.5	55x25	



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



PROFILES AND SECTIONS
MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT
PITTSBURGH COUNTY, VIRGINIA

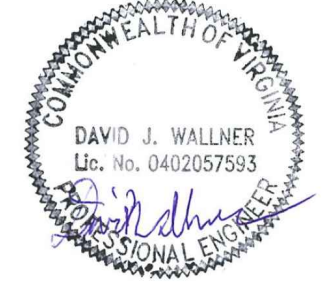
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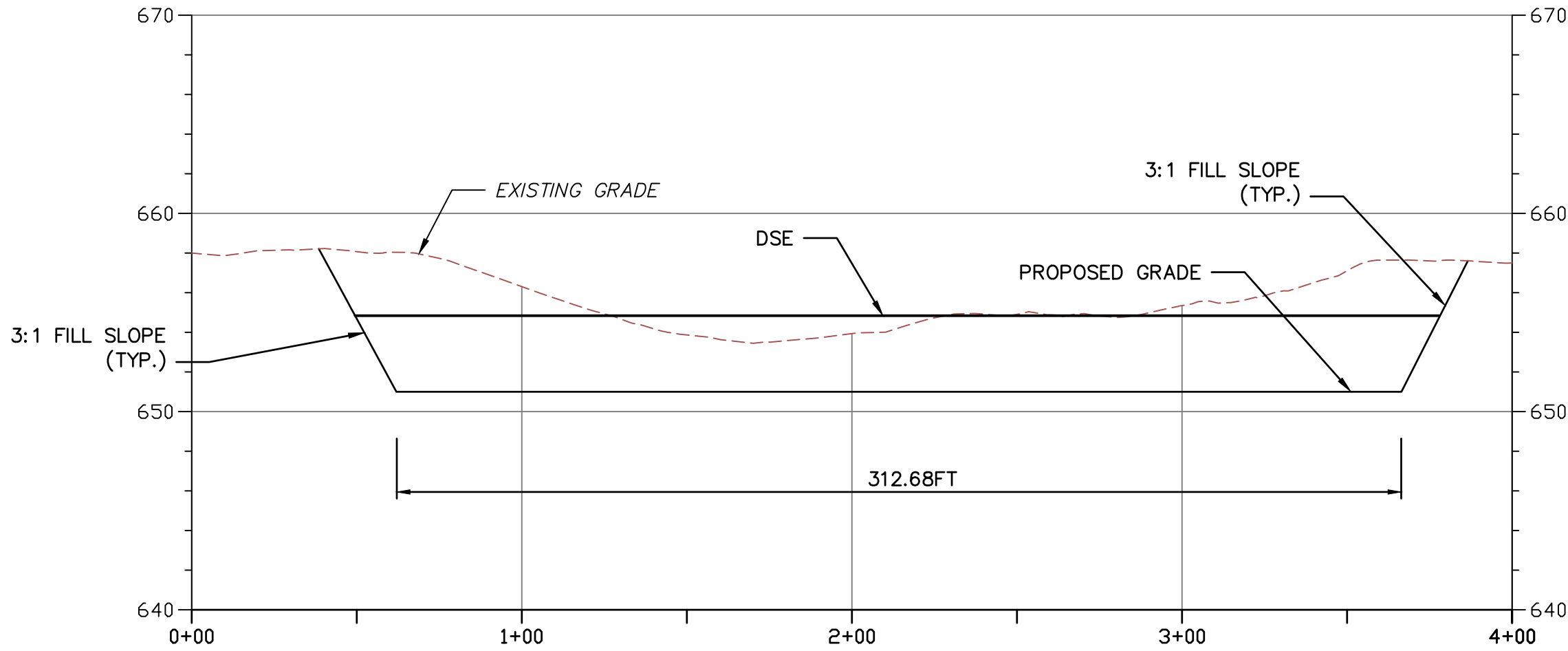
661 ANDERSEN DRIVE
FOSTER PLAZA 7
PITTSBURGH, PA 15220

CONSTRUCTION PLANS

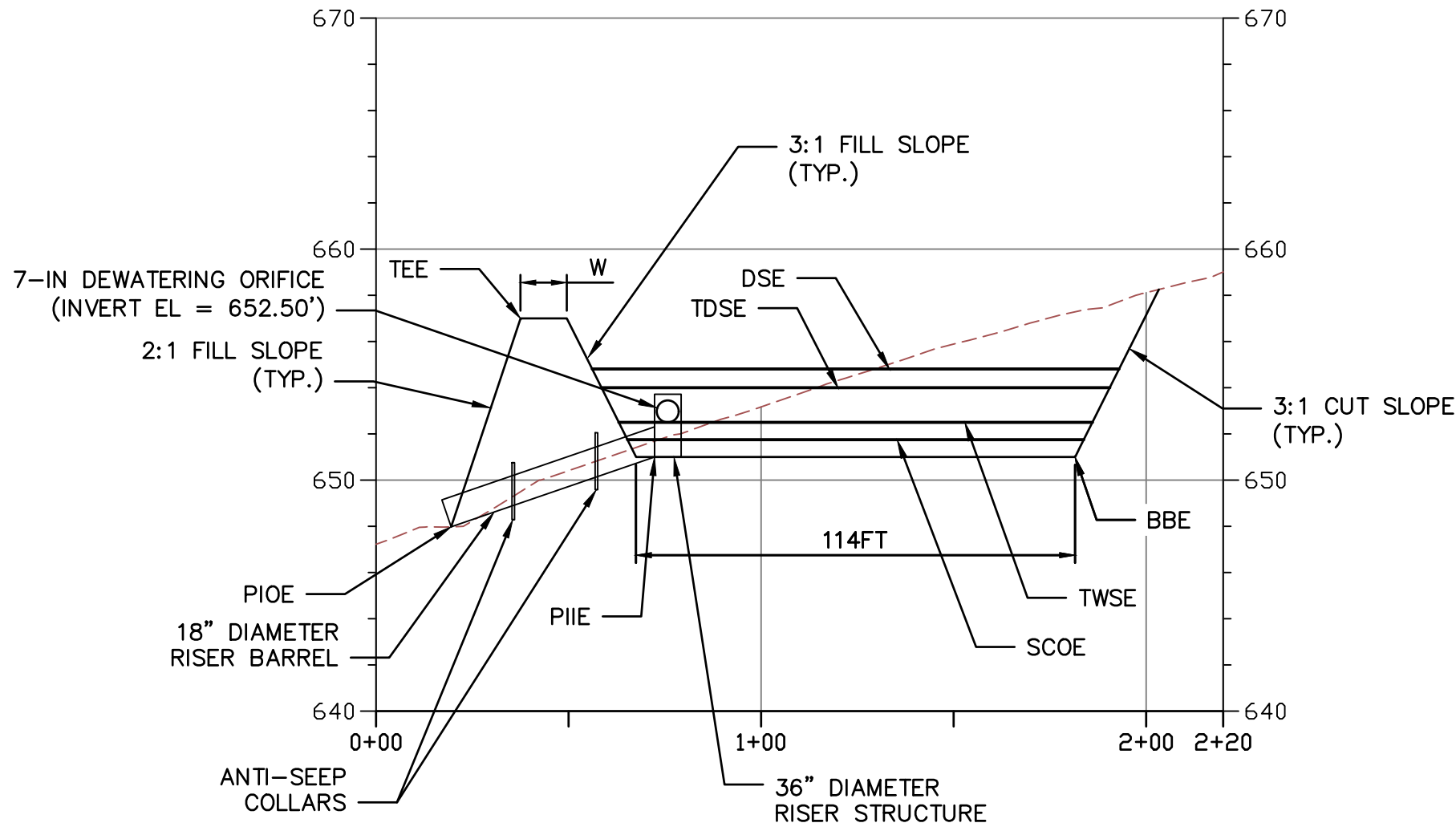


DAVID J. WALLNER
Lic. No. 0402057593
PROFESSIONAL ENGINEER

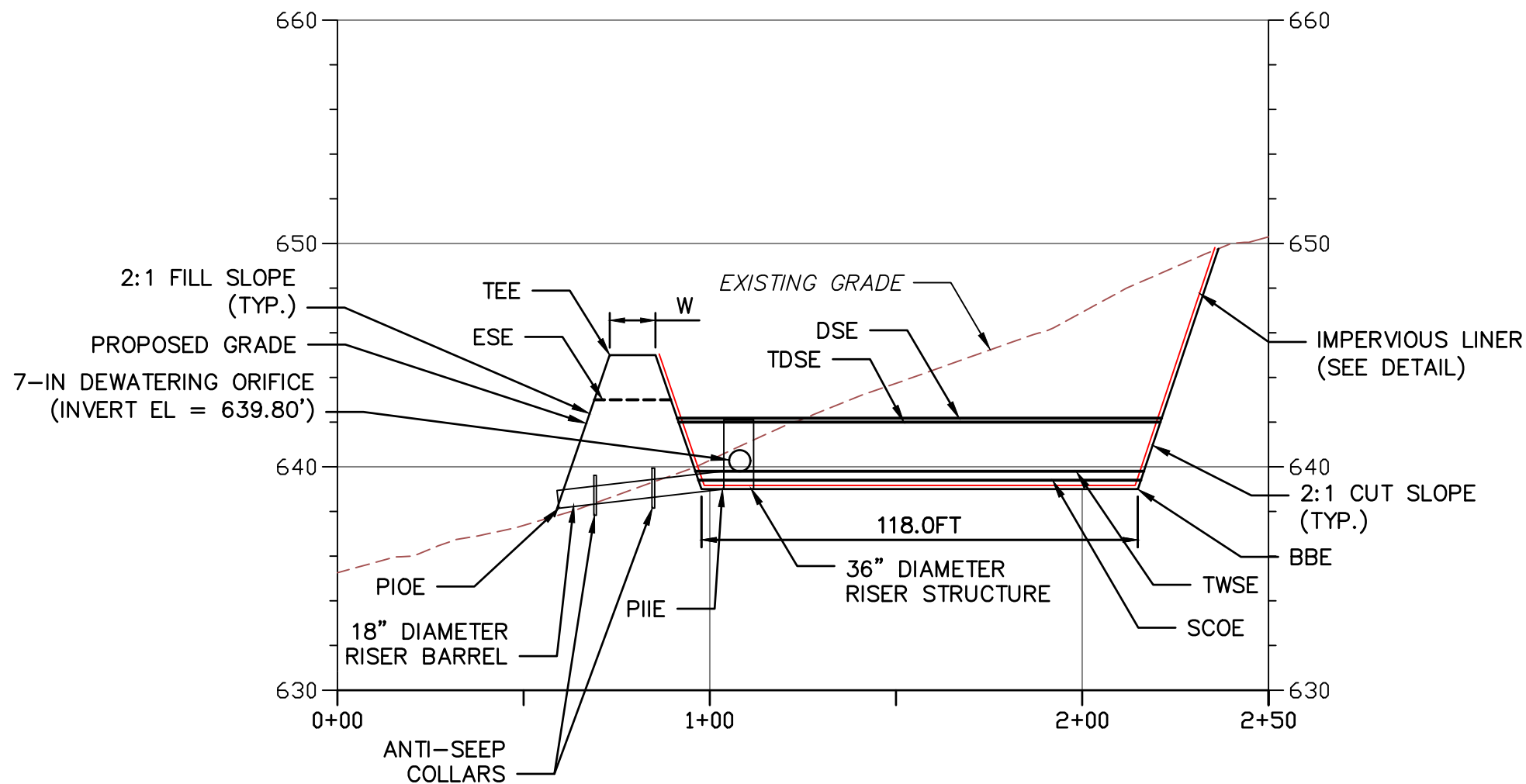
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CHECKED BY:	HT
APPROVED BY:	DWJ
DATE:	06/04/2018
SCALE:	AS SHOWN
SHT. NO.	TRA-22 OF 25



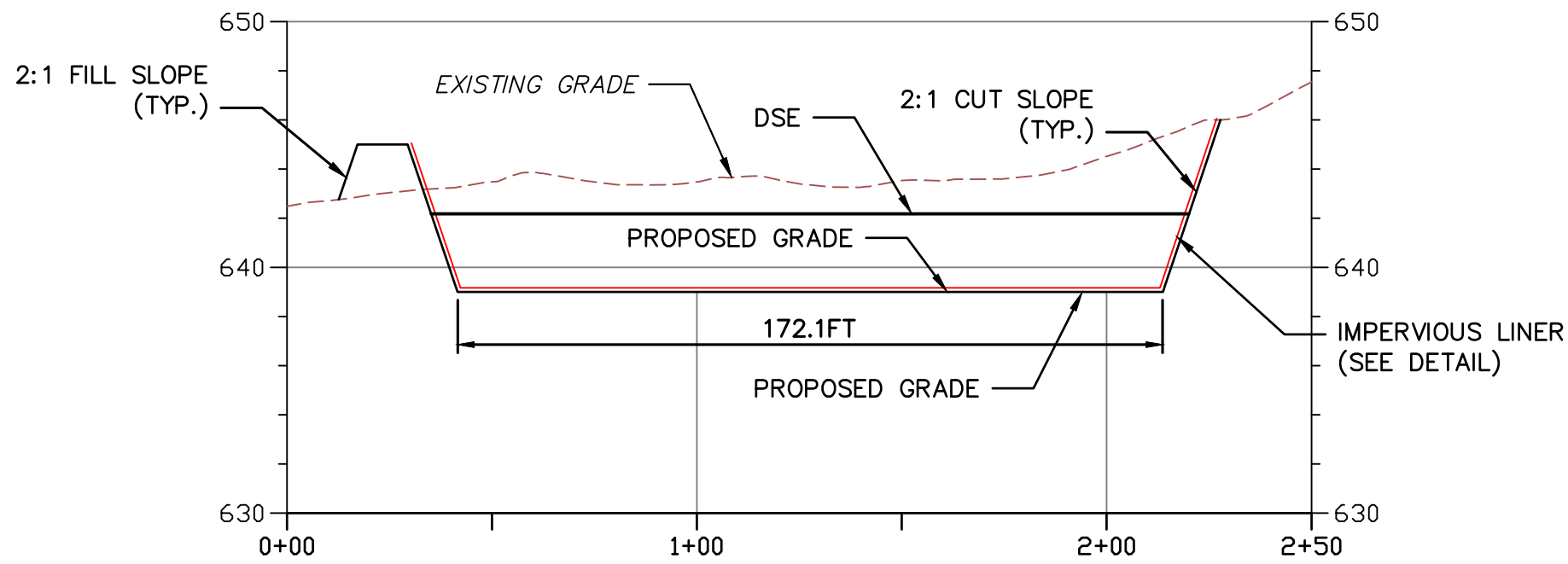
SEDIMENT BASIN 2
SECTION N-N
SCALE AS NOTED



SEDIMENT BASIN 2
SECTION O-O
SCALE AS NOTED



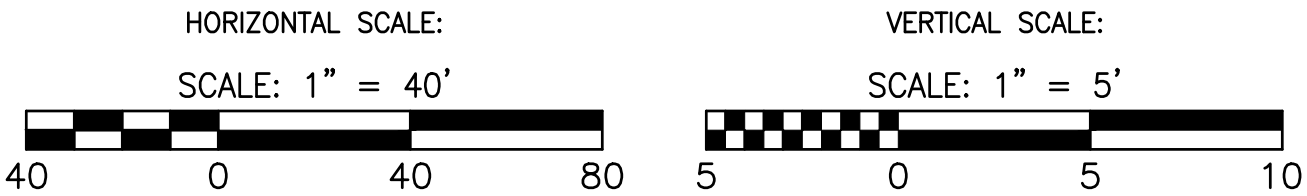
SEDIMENT BASIN 1
SECTION P-P
SCALE AS NOTED



SEDIMENT BASIN 1
SECTION Q-Q
SCALE AS NOTED

TRANSCO SEDIMENT BASINS																																
Basin #	Drainage Area (Acres)	WET STORAGE		DRY STORAGE		Bottom of Basin Elevation	Top Of Dry Storage Elevation	Riser Diameter	Top of Wet Storage Elevation	TWSE	Sediment Clean-Out Elevation	SCOE	Dewatering Orifice Diameter	25-Yr Design Storm Elevation	DSE	Emergency Spillway Elevation	ESE	Anti-Vortex Device Diameter	AVDD (In.)	Top of Embankment Elevation	TEE	Top of Embankment Width	BAFFLE				BARREL				Number of Anti Seep Collars	Size of Anti Seep Collars (Ft.)
		Volume Required (Cu. Yd.)	Volume Provided (Cu. Yd.)	Volume Required (Cu. Yd.)	Volume Provided (Cu. Yd.)																		Flow Length to Width Ratio	Baffle Length (Ft.)	Top of Baffle Elevation	Pipe Length PL (Ft.)	Pipe Diameter PD (In.)	Pipe Invert Elevation	PIE	Invert Out Elevation		
SB-1	7.72	517	548	517	1721	639.00	642.00	36	639.80	639.40	7	642.18	643.00	54	645.00	6	2.25:1	60	642.50	40	18	639.00	638.15	2	5.5							
SB-2	10.08	675	2090	675	2316	651.00	654.00	36	652.50	651.75	7	654.81	N/A	54	657.00	6	2.25:1	115	658.50	40	18	651.00	647.90	2	5.5							

SEDIMENT BASIN SCHEDULE



ADDRESS VADEQ COMMENTS

ADDRESS VADEQ COMMENTS

ADDRESS VADEQ COMMENTS

ADDRESS VADEQ COMMENTS

ADDRESS VADEQ COMMENTS

ADDRESS VADEQ COMMENTS

NO:

DW

HT

MJP

11/21/17

3

02/28/18

04/10/18

05/11/18

05/23/18

06/04/18

DATE:

CHKD:

APPD:

REVISIONS:

Mountain Valley Pipeline

PROFILES AND SECTIONS

MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT

PITTSYLVANIA COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

CANONSBURG, PA 15317

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PITTSBURGH, PA 15220

CONSTRUCTION PLANS

COMMONWEALTH OF PENNSYLVANIA

DAVID J. WALLNER

Lic. No. 0402057593

Professional Engineer

DRAWN BY:

CHECKED BY:

APPROVED BY:

DATE:

SCALE:

SHT. NO.

TRA-23

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25

KAL

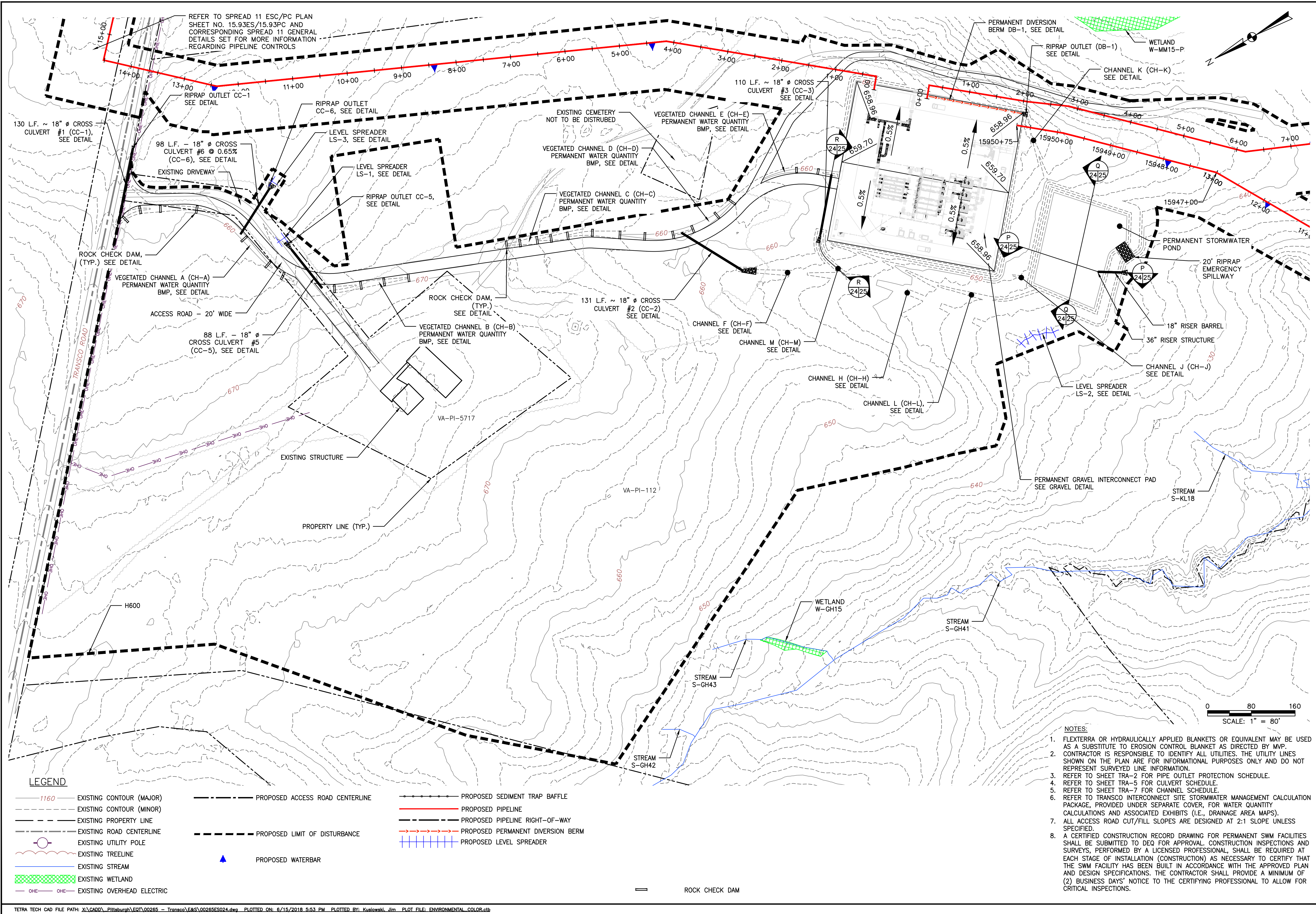
HT

DJW


06/04/2018

AS SHOWN

REVISION




ADDRESS VADEQ COMMENTS		ADDRESS VADEQ COMMENTS		ADDRESS VADEQ COMMENTS		ADDRESS VADEQ COMMENTS		ADDRESS VADEQ COMMENTS		DESCRIPTION	
DW	HT	DW	HT	DW	HT	DW	HT	DW	HT	CHKD	APPD
2	11/21/17	MJP									
3	02/28/18	JMK									
4	04/10/18	KAL									
5	05/11/18	KAL									
6	05/23/18	KAL									
7	06/04/18	KAL									
NO. DATE: DWN: CHKD: APPD:										REVISIONS:	



FINAL SITE RESTORATION PLAN
MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT
PITTSBURGH COUNTY, VIRGINIA

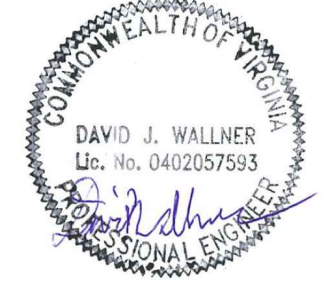
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CANONSBURG, PA 15317



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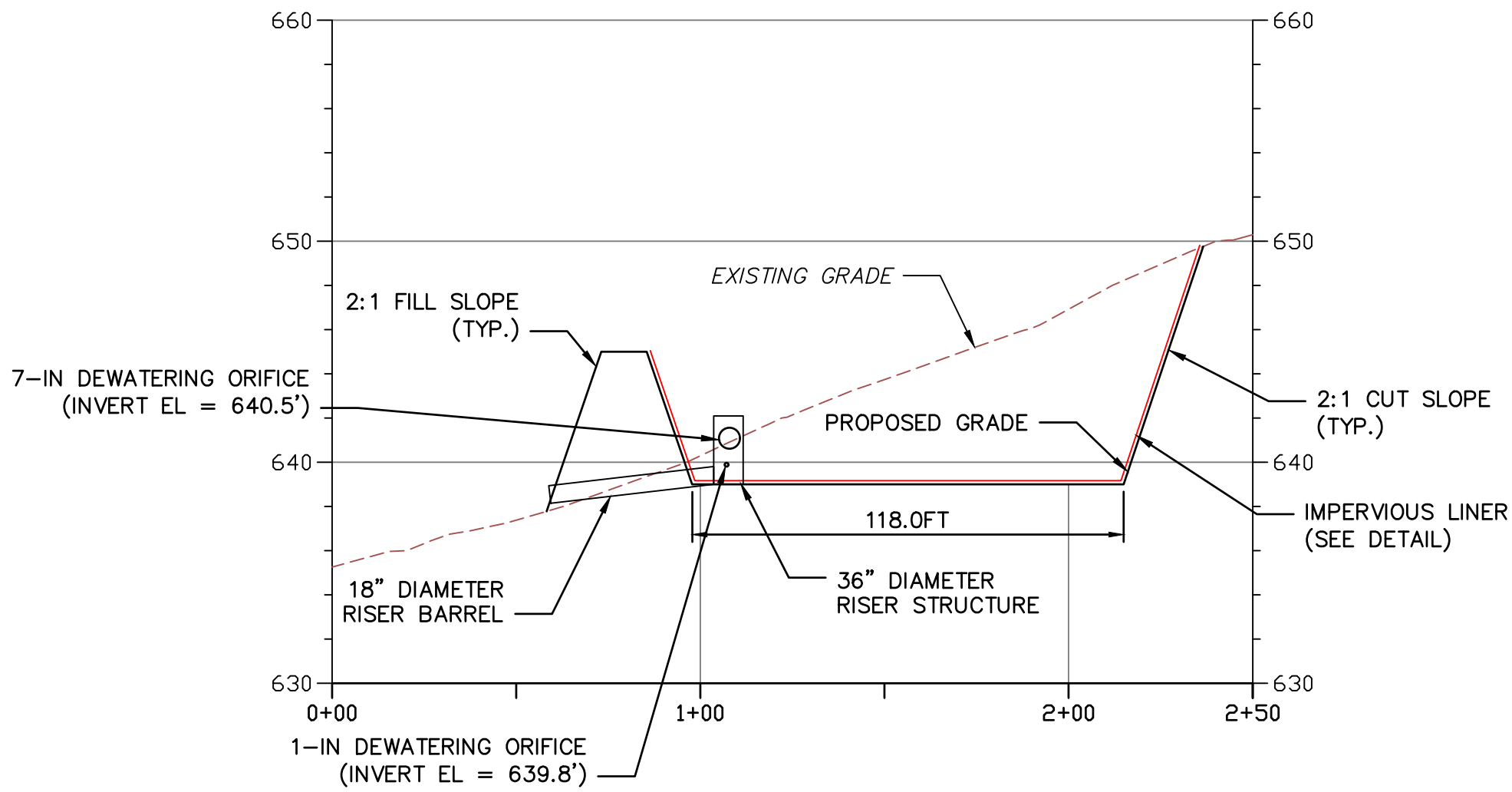
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PITTSBURGH, PA 15220

CONSTRUCTION PLANS



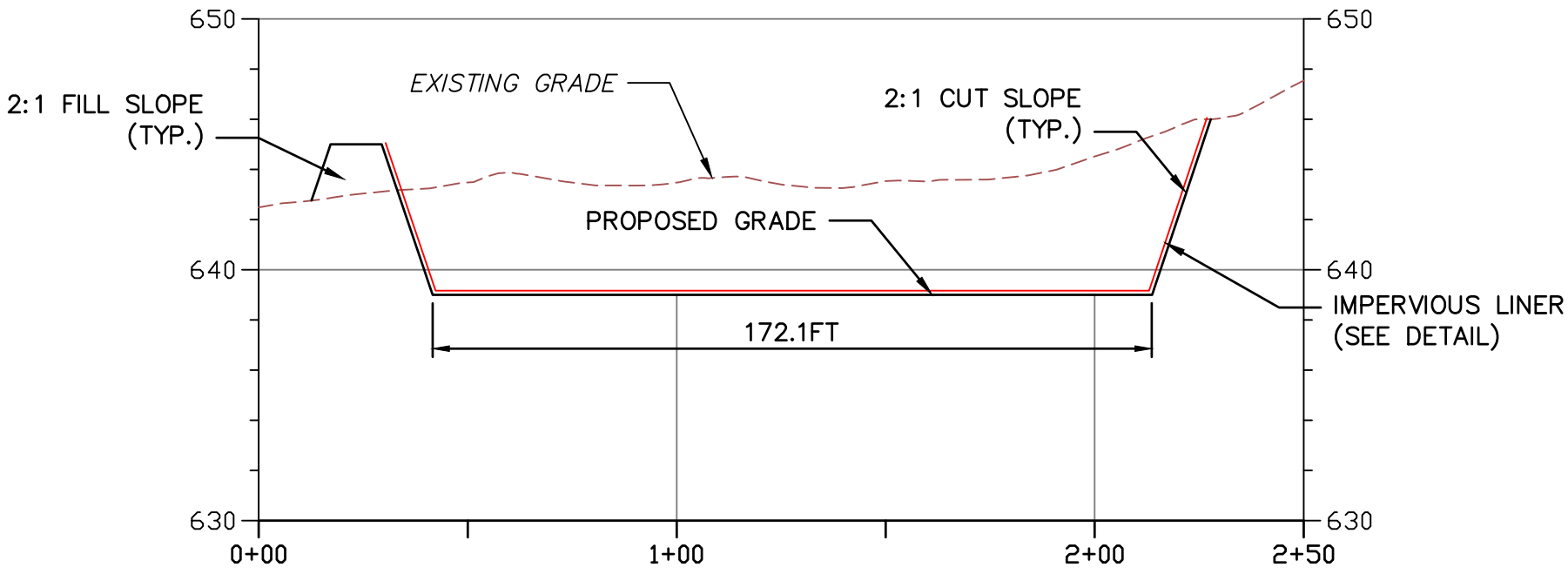
DAVID J. WALLNER
Lic. No. 0402057593
Professional Engineer
State of Virginia

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DATE:	06/04/2018
SCALE:	AS SHOWN
SHT. NO. TRA-24 OF	25

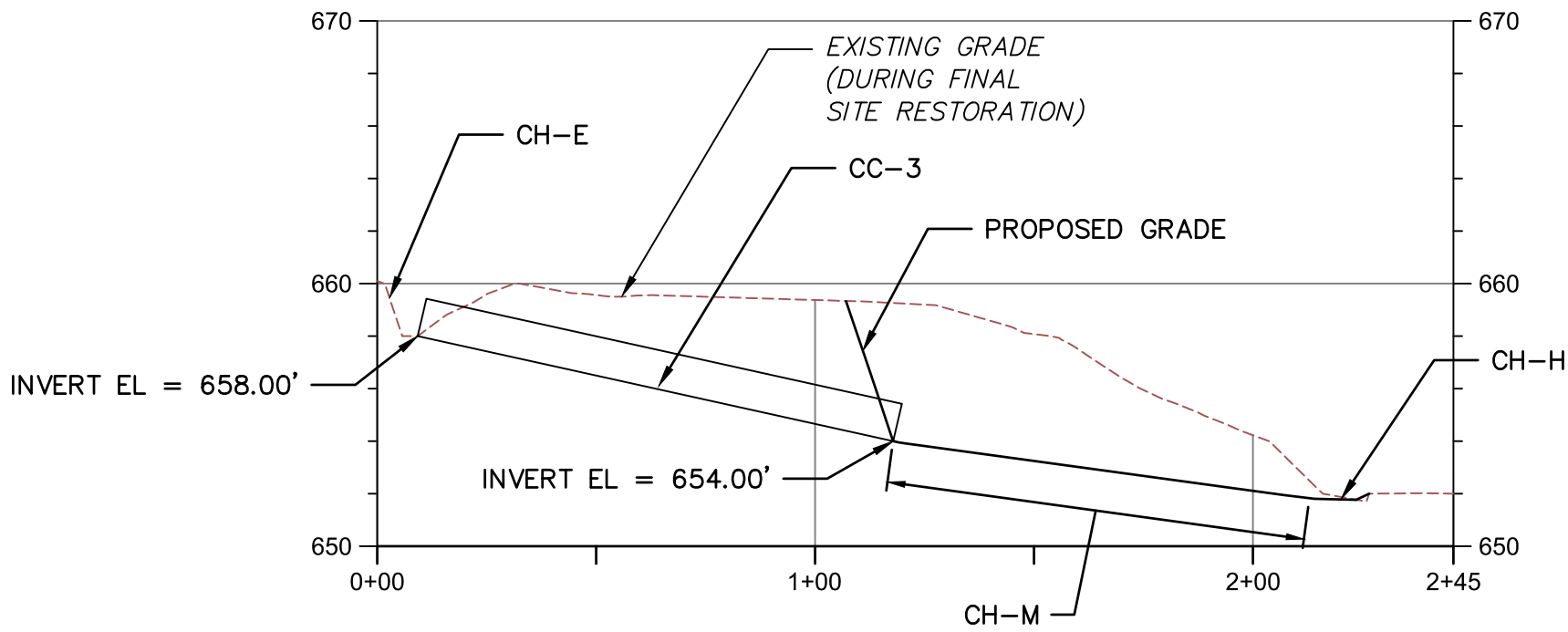


PERMANENT STORMWATER POND
SECTION P-P
SCALE AS NOTED

NOTE:
DURING RESTORATION, THE SEDIMENT BASIN DEWATERING ORIFICE AT EL. 639.80' WILL BE PLUGGED AND A NEW 1-IN ORIFICE AND 7-IN ORIFICE WILL BE INSTALLED AS SPECIFIED ABOVE TO SATISFY STORMWATER CONTROL REQUIREMENTS.

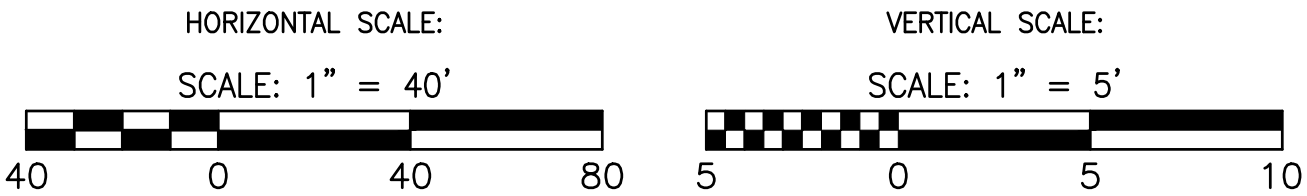


PERMANENT STORMWATER POND
SECTION Q-Q
SCALE AS NOTED



CC-3
SECTION R-R
SCALE AS NOTED

TRANSCO SEDIMENT BASINS																																		
Basin #	Drainage Area (Acres)	WET STORAGE		DRY STORAGE		Bottom of Basin Elevation	BBE	Top Of Dry Storage Elevation	TDSE	Riser Diameter	RD (In.)	Top of Wet Storage Elevation	TWSE	Sediment Clean-Out Elevation	SCOFE	Dewatering Orifice Diameter	25-Yr Design Storm Elevation	DSE	Emergency Spillway Elevation	FSE	Anti-Vortex Device	Diameter AVDD (In.)	Top of Embankment Elevation	TEE	Top of Embankment	Width T (Ft.)	BAFFLE				BARREL			
		Volume Required (Cu. Yd.)	Volume Provided (Cu. Yd.)	Volume Required (Cu. Yd.)	Volume Provided (Cu. Yd.)																						Length to Baffle	Baffle Length	Baffle Elevation	Pipe Length PL (Ft.)	Pipe Diameter PD (In.)	Pipe Invert Elevation	Pipe Out Elevation	PIOE
SB-1	7.72	517	548	517	1721	639.00		642.00		36		639.80		639.40		7	642.18	643.00		54	645.00	6	2.25:1	60	642.50	40	18	639.00	638.15	2	5.5			
SB-2	10.08	675	2090	675	2316	651.00		654.00		36		652.50		651.75		7	654.81	N/A		54	657.00	6	2.25:1	115	658.50	40	18	651.00	647.90	2	5.5			



Mountain Valley Pipeline

PROFILES AND SECTIONS

MOUNTAIN VALLEY PIPELINE PROJECT - TRANSCO INTERCONNECT

PITTSBURGH COUNTY, VIRGINIA

MOUNTAIN VALLEY PIPELINE, LLC

555 SOUTHPOINTE BLVD, SUITE 200

CANONSBURG, PA 15317

REVISIONS:

NO.	DATE	DWN.	CHKD.	APPD.	DESCRIPTION
2	11/21/17	MJP			
3	02/28/18	JWK	HT	DW	ADDRESS VADEQ COMMENTS
4	04/10/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
5	05/11/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
6	05/23/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS
7	06/04/18	KAL	HT	DW	ADDRESS VADEQ COMMENTS

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CONSTRUCTION PLANS

COMMONWEALTH OF PENNSYLVANIA

DAVID J. WALLNER

Lic. No. 0402057593

Professional Engineer

DRAWN BY:

KAL

CHECKED BY:

HT

APPROVED BY:

DWJ

DATE:

06/04/2018

SCALE:

AS SHOWN

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TRA-25

OF

25

REVISION