



MVP Southgate Project

Docket No. PF18-4-000

Draft

Resource Report 1 – General Project Description

August 2018

MVP Southgate Project Draft Resource Report 1 – General Project Description

Resource Report 1 – Filing Requirements	
Information	Location in Resource Report
Minimum Filing Requirements	
1. Provide a detailed description and location map of the Project facilities (§ 380.12(c)(1)). <ul style="list-style-type: none"> • Include all pipeline and aboveground facilities. • Include support areas for construction or operation. • Summarize the total acreage of land affected by construction and operation of the project. 	Section 1.2 Figure 1.2-1 Section 1.3 Resource Report 8
2. Describe any non-jurisdictional facilities that would be built in association with the Project. (§ 380.12(c)(2)). <ul style="list-style-type: none"> • Include auxiliary facilities (See § 2.55(a)). • Describe the relationship to the jurisdictional facilities. • Include ownership, land requirements, gas consumption, megawatt size, construction status, and an update of the latest status of Federal, state, and local permits/approvals. • Include the length and diameter of any interconnecting pipeline. • Apply the four-factor test to each facility (see § 380.12(c)(2)(ii)). 	Section 1.9
3. Provide current, original United States Geological Survey (USGS) 7.5-minute series topographic maps with mileposts showing the Project facilities (§ 380.12(c)(3)). <ul style="list-style-type: none"> • Maps of equivalent details are acceptable if legible (check with staff). • Show locations of all linear project elements, and label them. • Show locations of all significant aboveground facilities, and label them. 	Appendix 1-A (full sized USGS quadrangles maps) Appendix 1-B (USGS map excerpts)
4. Provide aerial images or photographs or alignment sheets based on these sources with mileposts showing the Project facilities. (§ 380.12(c)(3)). <ul style="list-style-type: none"> • No more than one-year old. • Scale no smaller than 1:6,000. 	Appendix 1-A (alignment sheets)
5. Provide plot/site plans of compressor stations showing the location of the nearest noise-sensitive areas (NSA) within one mile (§ 380.12(c)(3,4)). <ul style="list-style-type: none"> • Scale no smaller than 1:3,600. • Show reference to topographic maps and aerial alignments provided above. 	Appendix 1-C2 (plot plans) (CUI//CEII)
6. Describe construction and restoration methods (§ 380.12(c)(6)).	Section 1.4
7. Identify the permits required for construction across surface waters (§ 380.12(c)(9)). <ul style="list-style-type: none"> • Include the status of all permits. • For construction in the Federal offshore area, be sure to include consultation with the MMS. File with the MMS for rights-of-way grants at the same time or before you file with FERC. 	Section 1.7 Table 1.7-1
8. Provide the names and addresses of all affected landowners as required and certify that all affected landowners will be notified. <ul style="list-style-type: none"> • Affected landowners are defined in § 157.6(d)(2). • Provide an electronic copy directly to the environmental staff. 	Appendix 1-M (landowner line list) (CUI//PRIV)

Resource Report 1 – Filing Requirements	
Information	Location in Resource Report
Additional Information Often Missing and Resulting in Data Requests	
9. Describe all authorizations required to complete the proposed action and the status of applications for such authorizations.	Section 1.7 Table 1.7-1
10. Provide plot/site plans of all other aboveground facilities that are not completely within the right-of-way.	Appendix 1-C2 (plot plans) (CUI//CEII)
11. Provide detailed typical construction right-of-way cross-section diagrams showing information such as widths and relative locations of existing rights-of-way, new permanent rights-of-way, and temporary construction rights-of-way.	Appendix 1-C1 (typicals)
12. Summarize the total acreage of land affected by construction and operation of the Project.	Section 1.3
13. If Resource Report 5 - Socioeconomics is not provided, provide the start and end dates of construction, the number of pipeline spreads that would be used, and the workforce per spread.	Resource Report 5
14. Send two (2) additional copies of topographic maps and aerial images/photographs directly to the environmental staff of the Office of Energy Projects (OEP).	Appendix 1-A (alignment sheets)

DRAFT RESOURCE REPORT 1 GENERAL PROJECT DESCRIPTION

TABLE OF CONTENTS

1.1	INTRODUCTION	1-1
1.1.1	Environmental Resource Report Organization	1-1
1.1.2	Purpose and Need	1-2
1.2	LOCATION AND DESCRIPTION OF FACILITIES	1-4
1.2.1	Pipeline Facilities.....	1-4
1.2.2	Aboveground Facilities.....	1-7
1.2.2.1	Compressor Stations.....	1-7
1.2.2.2	Pig Launchers and Receivers.....	1-9
1.2.2.3	Mainline Valves and Meter Stations	1-9
1.2.2.4	Telecommunications.....	1-10
1.2.2.5	Electric Utility Service	1-10
1.3	LAND REQUIREMENTS.....	1-11
1.3.1	Pipeline	1-11
1.3.2	Aboveground Facilities.....	1-12
1.3.3	Access Roads	1-13
1.3.4	Additional Temporary Workspace.....	1-13
1.3.5	Contractor Yards.....	1-14
1.4	CONSTRUCTION PROCEDURES.....	1-16
1.4.1	Pipeline	1-16
1.4.1.1	Standard Construction and Restoration Techniques.....	1-17
1.4.1.2	Special Construction Procedures	1-29
1.4.2	Aboveground Facilities Construction	1-30
1.4.3	Restoration.....	1-31
1.4.3.1	Pipeline.....	1-31
1.4.3.2	Aboveground Facilities.....	1-32
1.4.3.3	Access Roads.....	1-32
1.4.3.4	Contractor Yards	1-32
1.4.4	Quality Assurance Measures.....	1-33
1.4.4.1	Environmental Training and Inspection	1-33
1.4.5	Construction Schedule and Work Force	1-34
1.5	OPERATION AND MAINTENANCE.....	1-34
1.5.1	Pipeline	1-35
1.5.2	Aboveground Facilities.....	1-36
1.5.2.1	Compressor Station	1-36
1.5.2.2	Meter Stations.....	1-36
1.6	FUTURE PLANS AND ABANDONMENT	1-36
1.7	PERMITS AND APPROVALS.....	1-37

1.8	AFFECTED STAKEHOLDERS	1-38
1.8.1	Public Participation.....	1-39
1.8.1.1	FERC Scoping Sessions	1-40
1.8.2	Landowner Notification	1-41
1.8.3	Agency Outreach	1-41
1.9	NON-JURISDICTIONAL FACILITIES	1-41
1.10	CUMULATIVE IMPACTS.....	1-47
1.10.1	Potential Cumulative Impact on Resources within the Project Area	1-55
1.11	REFERENCES	1-58

LIST OF FIGURES

Figure 1.2-1.	Project Overview	1-6
Figure 1.4-1.	Typical Pipeline Construction Sequence	1-18
Figure 1.9-1.	Electric Utilities for the Project Compressor Stations and Interconnects	1-43
Figure 1.10-1	Projects with Potential Cumulative Impacts	1-54

LIST OF TABLES

Table 1.2-1	MVP Southgate Project Pipeline Facilities	1-5
Table 1.2-2	MVP Southgate Project Aboveground Facilities	1-7
Table 1.2-3	MVP Southgate Project Mainline Valve Locations	1-9
Table 1.3-1	Land Requirements for the MVP Southgate Project Pipeline/Associated Workspace ..	1-11
Table 1.3-2	Land Requirements for the MVP Southgate Project Aboveground Facilities	1-12
Table 1.3-3	MVP Southgate Project Potential Rectifier and Groundbed Locations	1-13
Table 1.3-4	Contractor Yards along the MVP Southgate Project Pipeline	1-15
Table 1.4-1	Construction Spreads for the MVP Southgate Project.....	1-17
Table 1.4-2	Construction Schedule for Major Components of the MVP Southgate Project.....	1-34
Table 1.5-1	Schedule for Major Components of the MVP Southgate Project	1-35
Table 1.7-1	Anticipated Permits and Consultations for the MVP Southgate Project.....	1-37
Table 1.9-1	Electric Service Facilities to Support the MVP Southgate Project	1-42
Table 1.10-1	Projects with Potential Cumulative Impacts	1-49

LIST OF APPENDICES

Appendix 1-A	Alignment Sheets and Full Size USGS Quadrangle Maps (Provided Under Separate Cover)
Appendix 1-B	USGS 7.5-Minute Topographic Maps Excepts
Appendix 1-C1	Typical Drawings
Appendix 1-C2	Plot Plans (Critical Energy/Electric Infrastructure Information, CUI//CEII) (Provided Under Separate Cover)
Appendix 1-D	Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

Appendix 1-E1	Existing Utility Corridors Adjacent to the MVP Southgate Project
Appendix 1-E2	Deviations from Existing Utility Corridors along the MVP Southgate Project
Appendix 1-F	Proposed New, Improved, and Private Access Roads for the MVP Southgate Project
Appendix 1-G	Project-Specific Erosion and Sediment Control Plan [<i>Not Included with this Draft</i>]
Appendix 1-H	Fire Prevention and Suppression Plan [<i>Not Included with this Draft</i>]
Appendix 1-I	Foreign Utility Lines Crossed by H-650 Pipeline - MVP Southgate Project
Appendix 1-J	Winter Construction Plan [<i>Not Included with this Draft</i>]
Appendix 1-K	Agency Correspondence (Provided Under Separate Cover)
Appendix 1-L	Public, Stakeholder, and Agency Participation Plan [<i>Not Included with this Draft</i>]
Appendix 1-M	Stakeholder List (Public) [<i>Not Included with this Draft</i>] Landowner Line List (Privileged and Confidential Information, CUI//PRIV) [<i>Not Included with this Draft</i>] Federal, State, Local Stakeholder List (Public) [<i>Not Included with this Draft</i>]
Appendix 1-N	Response Matrix for FERC Comments on First Draft Resource Reports 1 & 10

**DRAFT RESOURCE REPORT 1
GENERAL PROJECT DESCRIPTION****LIST OF ACRONYMS AND ABBREVIATIONS**

API	American Petroleum Institute
ATWS	additional temporary construction workspace
BMPs	best management practices
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
EI	Environmental Inspector
E&SCP	Erosion and Sediment Control Plan
East Tennessee	East Tennessee Natural Gas, LLC
FERC or Commission	Federal Energy Regulatory Commission
hp	horsepower
MLV	mainline valve
MMcf/d	million cubic feet per day
Mountain Valley	Mountain Valley Pipeline, LLC
MP	milepost
NGO	non-governmental organization
Plan	FERC Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC Wetland and Waterbody Construction and Mitigation Procedures
Project	MVP Southgate Project
psig	pounds per square inch gauge
PSNC Energy	PSNC Energy, a wholly owned subsidiary of SCANA Corporation
Transco	Transcontinental Gas Pipe Line Company, LLC
U.S.	United States
USACE	U.S. Army Corps of Engineers
USGS	U.S Geological Society

DRAFT RESOURCE REPORT 1

GENERAL PROJECT DESCRIPTION

1.1 INTRODUCTION

Mountain Valley Pipeline, LLC (“Mountain Valley”) is seeking a Certificate of Public Convenience and Necessity (“Certificate”) from the Federal Energy Regulatory Commission (“FERC” or “Commission”) pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project (“Project”). The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina. Mountain Valley proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline (known as the H-650 pipeline) to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States (“U.S.”), including for the Project’s anchor shipper, a local distribution company serving customers in North Carolina.

The proposed H-650 pipeline will interconnect with and receive gas from the existing Mountain Valley Pipeline near Chatham, Virginia, and deliver or receive gas to the East Tennessee Natural Gas, LLC (“East Tennessee”) mainline near Eden, North Carolina, and will deliver gas to connections with customers’ existing facilities in Eden and Graham, North Carolina. The Project is a stand-alone project from the Mountain Valley Pipeline and has an expected in-service date of late 2020. In addition to the H-650 pipeline, Mountain Valley proposes to construct and operate a new, approximately 36,801 horsepower (“hp”) compressor station (Lambert Compressor Station) near the beginning of the pipeline at milepost (“MP”) 0.0, a new, approximately 11,150 hp compressor station (Russell Compressor Station) near MP 26; and meter stations and other ancillary facilities required for the safe and reliable operation of the pipeline.

The FERC will conduct a full review of the Project under its regulations in compliance with the Natural Gas Act and the National Environmental Policy Act. On May 3, 2018, the Project requested approval from the FERC to initiate the Pre-filing review process for the Project, and the FERC issued its approval of the request on May 15, 2018, under Docket No. PF18-4-000. The Pre-filing review process allows for active participation by interested stakeholders early in Project development while maintaining a coordinated schedule and helps to ensure the timely review and determination on the Certificate application. Upon completion of the Pre-filing review process, the Project will file an application with the Commission for a Certificate to construct, install, own, operate, and maintain the Project.

1.1.1 Environmental Resource Report Organization

The FERC’s National Environmental Policy Act review process requires Mountain Valley to submit an Environmental Report consisting of 12 individual resource reports for natural gas pipeline projects. Each resource report addresses particular aspects of the environment in the Project area and evaluates the potential effects of the construction and operation of the Project on those aspects. Resource Report 1 is prepared and organized according to the FERC Guidance Manual for Environmental Report Preparation (February 2017). This report consists of a complete summary of the proposed Project facilities in Section 1.2, land requirements in Section 1.3, construction and restoration methods for the pipeline and aboveground facilities in Section 1.4, and the proposed construction schedule and workforce and operation and maintenance of Project facilities in Section 1.5. The Project currently has no plans for further expansion or abandonment as outlined in Section 1.6. This report also provides information on permits and approvals, including major consultations in Section 1.6, potential impacts on affected landowners in Section 1.7, non-

jurisdictional facilities in Section in Section 1.9, and cumulative impacts in section 1.10. Appendix 1-N provides a response matrix for FERC Comments on First Draft Resource Reports 1 & 10.

1.1.2 Purpose and Need

The purpose of the Project is to: (1) meet the growing needs of natural gas users in the southeastern U.S.; (2) add a new natural gas transmission pipeline to provide competition and enhance the reliability and resiliency of the existing pipeline infrastructure in North Carolina and southern Virginia; and (3) provide North Carolina and southern Virginia with direct pipeline access to the Marcellus and Utica gas regions in West Virginia, Ohio and southwestern Pennsylvania. The Project will enhance the diversity of gas supply and create additional pipeline capacity in the region.

Last year, PSNC Energy, a wholly-owned subsidiary of SCANA Corporation (“PSNC Energy”), solicited interest from existing and proposed interstate pipeline providers for additional natural gas transportation capacity. PSNC Energy is a local distribution company primarily engaged in the purchase, transportation, distribution, and sale of natural gas to more than 563,000 customers in North Carolina. PSNC Energy solicited interest because it requires additional pipeline capacity to meet forecasted incremental demand on its distribution system. Over the past four years, PSNC Energy has experienced a 15 percent increase in peak daily throughput on its system. This trend will carry forward into the future, as PSNC Energy expects its design day requirements to increase an additional 11 percent over the next five years. This past, present, and future demand growth on PSNC Energy’s system reflects, at least in part, the substantial population increase in North Carolina. North Carolina’s population is expected to increase by nearly 2 million people between 2020 and 2035.¹

While PSNC Energy considered other existing and proposed interstate pipeline providers, including Transcontinental Gas Pipeline Company, LLC (“Transco”) and Atlantic Coast Pipeline, LLC, PSNC Energy committed to 300 million cubic feet per day (“MMcf/d”) of firm transportation service to be made available by the Project. Mountain Valley and PSNC Energy entered into binding long-term agreements in December 2017 that made PSNC Energy an anchor shipper for the Project.² In choosing Mountain Valley and the Project to provide its needed incremental pipeline capacity, PSNC Energy cited numerous reasons,

¹ See North Carolina Office of State Budget and Management population projections, available at: https://files.nc.gov/ncosbm/demog/countytotals_populationoverview.html

² Mountain Valley and PSNC Energy entered into binding agreements more than three years after Mountain Valley entered the pre-filing process, and more than two months after the Commission issued its certificate, for the 303-mile

including transportation cost, supply cost, supply diversity, reliability/resiliency, and operational efficiencies:

- PSNC Energy found this Project provides the best-cost transportation alternative available to satisfy PSNC Energy's long-term interstate capacity needs.
- The Project will provide PSNC Energy with a third direct interstate pipeline connection, which will improve reliability and add resiliency to the interstate pipeline services PSNC Energy receives.³ The addition of a third interstate pipeline diversifies risk by giving PSNC Energy multiple options on geographically-diverse interstate pipelines. In the event of outages or constraints on one of the pipelines serving the region, PSNC Energy would have access to the other pipelines to continue serving its customers without interruption.
- The Project will provide PSNC Energy additional direct access to low-cost natural gas produced in the prolific Marcellus and Utica shale regions.⁴
- PSNC Energy will have more competitive and diverse options for natural gas supply. PSNC Energy will gain optionality in selecting best-cost supply sources and will be able to take advantage of price differentials across more gas supply regions.
- The Project will provide a direct connection between PSNC Energy's distribution system and the East Tennessee pipeline system. PSNC Energy currently sources gas from Saltville Storage and transports these volumes on the East Tennessee and Transco systems before delivery to PSNC Energy's distribution system. The Project provides a primary receipt and delivery forward haul transportation path that offers improved reliability as compared to the secondary-firm backhaul deliveries PSNC Energy currently receives from Transco.
- The Project will enable PSNC Energy to reroute deliveries it currently receives from the intrastate Cardinal Pipeline to areas other than the Raleigh/Durham region, which will avoid the need for an additional Cardinal expansion.
- The Project allows PSNC Energy to avoid incremental capital investment for system upgrades. The other pipeline alternatives considered by PSNC Energy would have required additional system upgrades.
- Mountain Valley and PSNC Energy have agreed to a minimum delivery pressure that is higher than Transco's existing obligation. Currently, PSNC Energy must make assumptions based on historical operating pressures on Transco when modeling its system. The minimum delivery pressure agreed to by the Project will allow PSNC Energy to be more confident in its pressure inputs when conducting system modeling and with daily operations by Gas Control. This should

Mountain Valley Pipeline Project. While the Mountain Valley Pipeline Project is targeted to commence service during 2019, Mountain Valley expects this Project to commence service in late 2020.

³ In 2013, the North Carolina Utilities Commission recognized the need for competitive interstate pipeline capacity alternatives in Docket No. G-100, Sub 91, *Investigation Regarding Competitive Alternatives for Additional Natural Gas Service Agreements*. The Project will satisfy this need for a new competitive interstate pipeline consistent with the expressed goal of the North Carolina Utilities Commission.

⁴ Mountain Valley and PSNC Energy also executed binding long-term agreements whereby PSNC Energy became a shipper on the Mountain Valley Pipeline Project.

improve PSNC Energy's ability to conduct system planning and enhance the operation of its system.

In addition to executing agreements that made PSNC Energy an anchor shipper for the Project, Mountain Valley conducted an Open Season between April 11, 2018 and May 11, 2018 to determine interest from additional shippers. Negotiations continue with additional interested shippers and are expected to conclude soon. The same rationales and benefits cited by PSNC Energy above also apply to other potential shippers on the Project.

The MVP Southgate Project is not designed to provide natural gas to any liquefied natural gas export terminal and has no intention of seeking authorization under Section 3 of the Natural Gas Act to export natural gas. The Project terminates at an inland location more than 185 miles from the nearest coastal Virginia port, 155 miles from the nearest coastal North Carolina port, and even farther from the nearest liquefied natural gas export terminal. Accordingly, Mountain Valley does not have the physical ability to export natural gas. As currently designed, gas transported on the MVP Southgate system will be delivered into customers' existing facilities in Eden and Graham, North Carolina. The Project's anchor shipper, PSNC Energy, has committed to 300 MMcf/d of firm transportation service and will use the gas it transports to serve its fast growing residential, commercial and industrial markets in North Carolina.

1.2 LOCATION AND DESCRIPTION OF FACILITIES

The Project includes construction of the H-650 underground pipeline and aboveground facilities located in Virginia and North Carolina. These facilities will be designed, constructed, tested, operated, and maintained in accordance with the requirements of 49 Code of Federal Regulations ("CFR"), Part 192, Transportation of Natural Gas and Other Gas by Pipeline; Minimum Safety Standards; 18 CFR § 380.15, Site and Maintenance Requirements; and other applicable federal and state regulations.

1.2.1 Pipeline Facilities

The H-650 pipeline is a new, 24-inch diameter, approximately 72-mile-long pipeline that will extend from a tap with the existing Mountain Valley Pipeline located at MP 0.0 approximately 3.0 miles east of the Town of Chatham in Pittsylvania County, Virginia. The Project will also construct a new compression station (Lambert Compressor Station) and interconnect near the tie-in point with the existing Mountain Valley Pipeline. Construction of both facilities is proposed on a parcel owned by Mountain Valley.

From the Lambert Compressor Station, the H-650 pipeline will traverse southwest approximately 26.2 miles into Rockingham County, North Carolina. The pipeline will then continue southwest into Rockingham County approximately 2.0 miles. From this point, it will continue southwest approximately 2.4 miles to a proposed delivery interconnect (T-15 Dan River Interconnect) located at approximate MP 30.5.

From the T-15 Dan River Interconnect, the H-650 pipeline will continue southwest for approximately 2.1 miles. East of the City of Eden, North Carolina, the H-650 pipeline will turn to the southeast near MP 32.6, and continue southeast approximately 20 miles, into Alamance County at (MP 52.5), east of the town of Wentworth and the City of Reidsville. From the Alamance County line, the H-650 pipeline will continue southeasterly to MP 65.5, where it will turn south and continue for about 6.5 miles to its proposed delivery terminus (T-21 Haw River Interconnect) located at MP 72.6 approximately 2.5 miles southeast of the City of Graham, North Carolina.

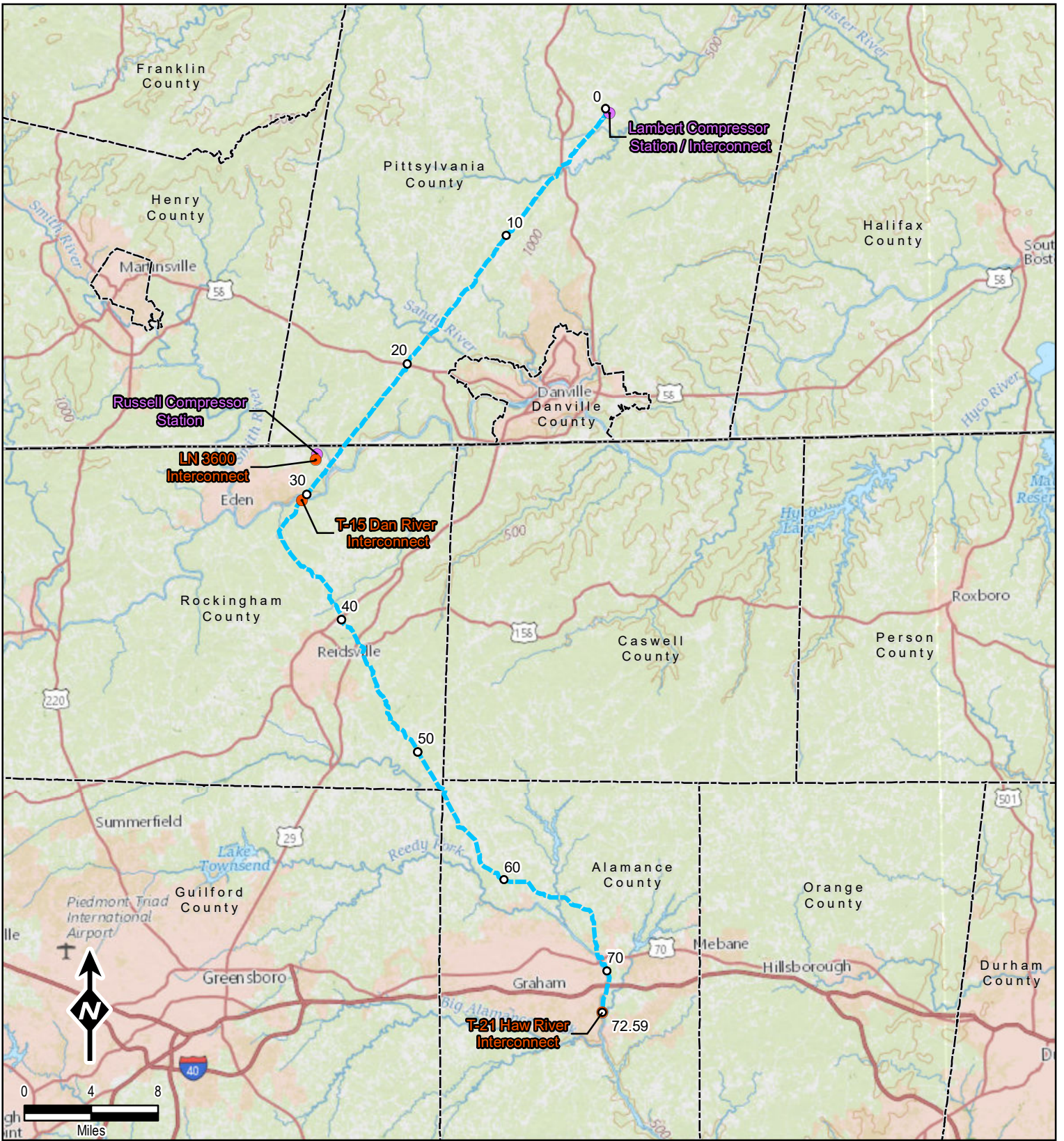
The pipeline will receive natural gas from the existing Mountain Valley Pipeline system (MP 0.0) and receive or deliver gas from a bidirectional interconnect with the East Tennessee transmission pipeline. Two downstream delivery points with the PSNC Energy system are proposed near MP 30 and MP 72. Additional delivery points may be added as the Project continues its commercial discussions; however, it is not expected that the pipeline route will materially change from that described herein. The pipeline will be designed for a Maximum Allowable Operating Pressure of 1,440 pounds per square inch gauge (“psig”) and will be constructed in compliance with 49 CFR Part 192.

Figure 1.2-1 provides an overview of the proposed Project facilities. Table 1.2-1 identifies the counties crossed by the proposed pipeline route by milepost. Appendix 1-A contains alignment sheets and full size U.S Geological Society (“USGS”) quadrangle maps for the Project and Appendix 1-B contains USGS 7.5-minute topographic quadrangle map excerpts. Appendix 1-C1 contains applicable Typical Right-of-way configurations and Construction Detail Drawings.

The H-650 pipeline will be constructed of high strength carbon steel pipe manufactured in accordance with the American Petroleum Institute’s (“API”) specification API 5L PSL2, Specification for Line Pipe. The Project will protect the pipe from corrosion by a fusion-bonded epoxy coating and an impressed current cathodic protection system during operation. Weld joints and other piping that are not factory coated will be field coated per applicable standards.

Approximate Milepost	Pipeline Diameter	County, State	Approximate Length (miles)
0.0 – 26	24-inch	Pittsylvania, VA	26
26 – 52		Rockingham, NC	26
52 - 72		Alamance, NC	20
Total			72

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Legend

- Mileposts
- Compressor Station
- Meter Station
- Proposed Pipeline Route
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 1.2-1

Project Overview

TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

1.2.2 Aboveground Facilities

Table 1.2-2 provides a summary of the proposed aboveground facilities that include two compressor stations, four meter (interconnect) stations, and pig launchers and receivers.

Table 1.2-2					
MVP Southgate Project Aboveground Facilities					
Compressor Stations					
Facility	Approximate Milepost ^{a/}	County, State	Isometric HP	Suction PSIG	Discharge PSIG
Lambert Compressor Station	0.2 mile east of MP 0.3	Pittsylvania, VA	36,801	780	[TBD]
Russell Compressor Station	1.2 miles west of MP 26.9	Rockingham, NC	11,150	[TBD]	[TBD]
Pig Launchers/Receivers					
Launcher/Receiver		Approximate Milepost	Associated Facility		
Pig Launcher		0.2 mile east of MP 0.3	Lambert Compressor Station		
Pig Receiver		30.5	T-15 Dan River Interconnect		
Pig Launcher		30.5	T-15 Dan River Interconnect		
Pig Receiver		72.6	T-21 Haw River Interconnect		
Meter Stations			Approximate Milepost		
Lambert Interconnect			0.2 mile east of MP 0.3		
LN 3600 Interconnect			1.1 miles west of MP 27.4		
T-15 Dan River Interconnect			30.5		
T-21 Haw River Interconnect			72.6		
^{a/} The Lambert Compressor Station is located approximately 0.2 mile east of approximate MP 0.3 of the H-650 pipeline and the Russell Compressor Station is located approximately 1.2 miles west of approximate MP 26.9 of the H-650 pipeline.					

1.2.2.1 Compressor Stations

The Project will require two new compressor stations to move gas from the beginning of the pipeline at the existing Mountain Valley Pipeline system in Pittsylvania County, Virginia, to the downstream delivery points along the pipeline. The Project’s typical plot plans for each compressor station are included in Appendix 1-C2.

The Project will require approximately 47,951 hp as dictated by the flow rate, pressure conditions expected on the H-650 pipeline, and ambient temperatures. The Project anticipates the supply pressure at the Lambert Interconnect (approximately 0.2 mile east of MP 0.3) to be approximately 780 psig while the delivery pressure at the T-21 Haw River Interconnect (MP 72.6) is expected to be approximately 750 psig. The gas flow will drop in pressure due to frictional losses and elevation changes as it travels southward within the H-650 pipeline. To compensate for these losses, as well as to meet the pressure requirements at the East Tennessee and PSNC Energy delivery interconnects, the pressure will be boosted by the two proposed

compressor stations. Natural gas fired turbine engines will power the compressors on the Project. The natural gas to power the compressors will be provided by the Project's shippers.

Lambert Compressor Station

The Project will construct the Lambert Compressor Station approximately 0.2 mile east of MP 0.3 in Pittsylvania County, Virginia on a parcel of land owned by Mountain Valley. The Lambert Compressor Station will pull gas from the existing Mountain Valley Pipeline system for delivery to the proposed Russell Compressor Station and downstream interconnects via the H-650 pipeline. The Project anticipates that the Lambert Compressor Station will contain two gas-driven turbines which combined will provide approximately 36,801 hp of compression. The station is expected to include a compressor building, electrical control building, office, and air compressor building. A chain linked fence security will surround the perimeter of the station site upon completion of construction. Equipment at the compressor station includes but is not limited to gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, heaters, and auxiliary micro-turbines. The Project has designed the Lambert Compressor Station to raise the pressure of the H-650 pipeline. The Project does not expect that this compressor station will require dehydration; however, typical filtration and separation equipment to protect the operating equipment will be installed. The Project's typical plot plan for the Lambert Compressor Station is included in Appendix 1-C2.

Please note that alignment sheets (Appendix 1-A) depict the Lambert Compressor Station located offset from the H-650 centerline. The final location for the Lambert Compressor Station was established after data for the draft resource reports and alignment sheets was compiled. Since that time, the Project has made an adjustment to the centerline between MP 0.0 and MP 0.4 to accommodate the final location of the Lambert Compressor Station. A revised alignment depicting a route adjustment to account for the Lambert Compressor Station location is included as Addendum 1 with the alignment sheets located in Appendix 1-A.

Russell Compressor Station

The Project will construct the Russell Compressor Station approximately 1.2 miles west of MP 26.9 in Rockingham County, North Carolina. The compressor station will contain one gas-driven turbine that will provide approximately 11,150 hp of compression. The station is expected to include a compressor building, electrical control building, office, and air compressor building. A chain-link security fence will surround the perimeter of the station site upon completion of construction. Equipment at the compressor station includes but is not limited to gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, heaters, and auxiliary micro-turbines. The Project does not expect that this compressor station will require dehydration; however, typical filtration and separation equipment to protect the operating equipment will be installed. The Project's typical plot plans for the Russell Compressor Station are included in Appendix 1-C2.

The Russell Compressor Station will include suction piping that will connect to the H-650 pipeline approximately 1.2 miles east of the station site. Discharge piping from this compressor station to the LN 3600 Interconnect will be also be installed approximately 0.3 mile and to the south. In the event that East Tennessee delivers gas to the Project flow will bypass the compressor. A preliminary layout for the compressor station suction/discharge piping is included as Addendum 2 with the alignment sheets located in Appendix 1-A. *[Note: The Project is designing suction/discharge piping and will provide final*

information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]

The Russell Compressor Station could deliver up to approximately 250 MMcf/d of gas to East Tennessee; however, the anticipated deliverability of the Russell Compressor Station is subject to pipeline pressure conditions both for the Project and for East Tennessee’s facilities. While the Project’s ability to receive gas from East Tennessee does not require the Russell Compressor Station, it is subject to pipeline pressure conditions for the two systems. Because the pressure differential between the systems would change constantly, the quantity of gas that could be received from East Tennessee is not definitive. The Project continues to negotiate with prospective customers regarding this receipt and/or delivery point.

1.2.2.2 Pig Launchers and Receivers

The Project has incorporated launching and receiving facilities to accommodate in-line inspection tools (smart pigs) for periodic internal inspections of the pipeline during operations (see Table 1.2-2 above). A pig launcher is located at the origination point inside the Lambert Compressor Station fence line approximately 0.2 mile east of MP 0.3, in Pittsylvania County, Virginia. The corresponding pig receiver will be located at MP 30.5 in Rockingham County, North Carolina, and a second pig launcher will also be located at this site. A second pig receiver will be located at the terminus of the pipeline at approximate MP 72.6 at the T-21 Haw River Interconnect near Graham, North Carolina. The locations of these facilities are included on the alignment sheets located in Appendix 1-A. The impacts associated with construction and operation of the pig launcher and receiver facilities will be minimal, as they are located within the limits of disturbance associated with the previously described aboveground facilities.

1.2.2.3 Mainline Valves and Meter Stations

Mainline Valves

The Project will install MLVs at intermediate locations as necessary to meet operational needs and the design and installation requirements described in 49 CFR 192.179(a) – Transmission Line Valves that require minimum distances to the nearest valve based on pipeline location class. Table 1.2-3 identifies the location of MLVs along the proposed pipeline route.

MLVs will be located within the permanent right-of-way of the pipeline. With the exception of those located at launcher/receiver locations, MLVs will be buried with aboveground extensions and equipped with valve actuators to allow for local or remote operation. Each MLV will be contained within a fenced, gated, and locked area. The Project will monitor the pipeline operating conditions 24 hours a day, 7 days a week by personnel in control centers using a Supervisory Control and Data Acquisition computer system.

Table 1.2-3		
MVP Southgate Project Mainline Valve Locations <u>a/</u>		
Name	County, State	Approximate Milepost Location
Lambert Compressor Station / Interconnect / MLV	Pittsylvania, VA	0.2 mile east of MP 0.3
MLV 2	Pittsylvania, VA	12.5
MLV 3	Pittsylvania, VA	18.4
MLV 4	Rockingham, NC	28.4

MVP Southgate Project Mainline Valve Locations <u>a/</u>		
Name	County, State	Approximate Milepost Location
MLV 5	Rockingham, NC	43.5
MLV 6	Alamance, NC	53.4
MLV 7	Alamance, NC	67.7
T-21 Haw River Interconnect / MLV	Alamance, NC	72.6
<u>a/</u> MLV's 2 through 7 will be 50 feet by 50 feet in area and will be wholly contained within the permanent right-of-way. Mainline valves at the Lambert Compressor Station / Interconnect and T-21 Haw River Interconnect will be located within the fence line of those facilities.		

Meter Stations

The Project will install meter (interconnect) stations consisting of but not limited to custody-transfer flow meter, pressure/flow regulator, over pressure protection, isolation MLVs, and associated instrumentation and controls at the proposed gas receipt and delivery points to measure the flow of natural gas between the Project and the interconnect (see Table 1.2-2). Each interconnect will consist of one or more meter runs located inside a fenced and gated site and will contain flow or pressure control. The metering sites will be located as close as practicable to the actual intersection of the Project and the receipt / delivery facilities to keep the length of the interconnecting piping to a minimum. The locations of these facilities are shown on the alignment sheets and maps located in Appendix 1-A and Appendix 1-B, respectively.

The meter stations will include upstream and downstream piping to connect to the H-650 pipeline and third party pipelines

1.2.2.4 Telecommunications

The Project will provide primary and backup telecommunications services for the compressor stations, meter stations, and MLV sites. The local service provider will provide primary telecommunications service and back-up is expected to be Very Small Aperture Terminal service. In addition, the Lambert and Russell compressor station sites will each have a communication tower up to 80 feet installed inside the station fence lines.

1.2.2.5 Electric Utility Service

The Project will commercially purchase electric power for the compressor station from the local distribution company as back-up electric power while a series of microturbine generators will serve as primarily power for the station. Electric powerlines for the Lambert and Russell compressor stations will be constructed and maintained within an approximate 50-foot-wide right-of-way. Electric power for the Lambert Compressor Station will require an approximate 0.3-mile-long powerline that will affect approximately 1.7 acres of open land and 0.1 acre of forested land. Electric power for the Russell Compressor Station will require an approximate 0.2-mile-long powerline that will affect approximately 1.0 acre of mixed open land and 0.3 acre of forested land. *[Note: The Project is currently evaluating backup electric systems and will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]* Electric services from the local distribution company will also

supply the meter stations, MLVs, and cathodic protection sites. In the event sites do not have convenient access to electrical services, solar power may be utilized.

1.3 LAND REQUIREMENTS

A summary of Project land requirements is included in Table 1.3-1. Additional information on land uses affected by the Project is included in Resource Report 8.

Facility	Land Required for Construction (acres)	Land Required for Operation (acres)
H-650 Pipeline <u>a/</u>	846.9	437.3
Additional Temporary Workspace	226.2	0.0
Cathodic Protection	2.4	2.4
Contractor Yards	234.9	0.0
Access Roads <u>b/</u>	148.5	5.5
<u>a/</u>	Acreage based on 100-foot construction right-of-way and 50-foot permanent right-of-way.	
<u>b/</u>	Acreage based on a 25-foot road width for temporary and permanent access roads.	

1.3.1 Pipeline

The pipeline will generally require a 100-foot-wide construction right-of-way consisting of a 50-foot permanent right-of-way and 50 feet of temporary workspace. The temporary workspace is necessary for worker safety, the safe travel of construction vehicles and equipment, stockpiling soil, and installation of erosion and sediment controls. The proposed 100 foot-wide construction right-of-way is consistent with the Interstate Natural Gas Association of America’s recommendations for a pipeline diameter of 18 to 24 inches. Additional temporary work space (“ATWS”) may be required to meet state erosion and sediment control requirements. These areas will be justified on a site-specific basis prior to construction. The Interstate Natural Gas Association of America recommends the use of a 95-foot baseline width and increasing or decreasing this baseline width for special conditions (Gulf Interstate Engineering 1999).

The Project will reduce the construction right-of-way width at wetland and stream crossings to 75 feet wherever possible. The Project will identify specific locations where additional workspace beyond 75 feet will be required. *[Note: The Project is currently evaluating areas where additional workspace beyond 75 feet will be required. Additional information will be provided in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]* A list of the ATWS areas required for the Project including milepost location, dimensions, current land use, and justification is included in Appendix 1-D.

The H-650 pipeline is located parallel to and adjacent with existing utility corridors, trails, and roads for approximately 47 percent (34 miles) of the proposed alignment. Where collocation with existing utility rights-of-way is proposed, the Project has designed the workspace such that the permanent right-of-way for the H-650 pipeline is located immediately adjacent to or partially within the existing right-of-way of the pipeline or electric transmission utility wherever feasible. The Project is proposing to use up to 25 feet of temporary workspace within the adjacent utility rights-of-way where possible; however final design and

use workspace within these areas is dependent on successful negotiation with the easement owner(s). Locations where segments of the Project are collocated or parallel to existing utility corridors and other rights-of-way are shown in Appendix 1-E1. Appendix 1-E2 provides information on where the proposed alignment deviates from existing corridors.

1.3.2 Aboveground Facilities

Land requirements for compressor stations, pig launcher and receiver sites, and meter stations are included in Table 1.3-2. MLV sites will be entirely contained within the H-650 pipeline right-of-way and will therefore not require any additional land disturbance. In addition, pig launcher/receivers will be located inside the fenced areas for the meter and compressor stations and will therefore not require any additional land disturbance.

Table 1.3-2			
Land Requirements for the MVP Southgate Project Aboveground Facilities			
Facility Name	Approximate MP	Land Required for Construction (acres)	Land Required for Operation (acres)
Compressor Stations			
Lambert Compressor Station	0.2 mile east of MP 0.3	18.6	4.1
Russell Compressor Station	1.2 miles west of MP 26.9	20.6	4.1
Meter Stations			
Lambert Interconnect <u>a/</u>	0.2 mile east of MP 0.3	0.0	0.0
LN 3600 Interconnect	1.1 miles west of MP 27.4	0.7	0.7 <u>b/</u>
T-15 Dan River Interconnect	30.5	1.5	1.5 <u>b/</u>
T-21 Haw River Interconnect	72.6	0.6	0.6 <u>b/</u>
Pig Launcher/Receiver <u>c/</u>			
Mainline Valves			
MLVs 2, 3, 4, 5, 6, 7	Various <u>d/</u>	0.3	0.3
<p>Note: Impact calculations do not include associated access roads.</p> <p><u>a/</u> The Lambert Interconnect will be within the Lambert Compressor Station site; therefore, acreage calculations for the Lambert Interconnect are included with the Lambert Compressor Station.</p> <p><u>b/</u> Operational land requirements are currently under evaluation. The Project used the acreage shown as a conservative estimate of potential effect. Land requirements will be revised in accordance with final design of the Interconnects and presented within the final Resource Reports associated with the Certificate application.</p> <p><u>c/</u> Pig launchers will be within aboveground facility sites (i.e., the Lambert Compressor Station, T-15 Dan River Interconnect, and T-21 Haw River Interconnect), therefore, acreages calculations for the pig launchers and receivers are included with those facilities.</p> <p><u>d/</u> See Table 1.2-3 for milepost locations of mainline valves (“MLV”).</p>			

Cathodic Protection

The Project is evaluating four potential rectifier locations for the Project (see Table 1.3-3). Surface groundbeds (approximate dimensions of 50 feet wide by 500 feet long) will be located perpendicular to the permanent easement. Approximately 2.4 acres will be required for these facilities. Deep wells, if used, may be contained within the 50-foot permanent right-of-way or adjoining (if required, an area 25 feet by 25 feet of additional permanent right-of-way). Once site inspections are completed, any impacts associated with ground beds will be quantified. *[Note: The Project continues to evaluate rectifier locations along the proposed H-650 pipeline route. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

MVP Southgate Project Potential Rectifier and Groundbed Locations				
Nearest Milepost	State	County	Cathodic Protection Section	Cathodic Protection Groundbed Type
10.9	VA	Pittsylvania	1	Conventional (Anodes & Cable)
21.2	VA	Pittsylvania	2	Conventional (Anodes & Cable)
42.1	NC	Rockingham	3	Conventional (Anodes & Cable)
60.2	NC	Alamance	4	Conventional (Anodes & Cable)

1.3.3 Access Roads

Lengths of new and existing roads to provide access to the pipeline right-of-way during construction and operation of the Project facilities are provided in Appendix 1-F. This list includes private roads, drives, lanes, and other roads that will be utilized during construction and operation. Other roads may include existing access roads installed for agricultural, well or construction access, or may be farm roads, all-terrain vehicle paths/trails, etc.

The Project will leverage the use of existing roads; however, new access roads may be required in locations that do not parallel existing linear infrastructure. Maintenance or upgrading may be required on some of the existing roads prior to use by construction equipment. A number of the existing dirt or gravel access roads will be graded and maintained to prevent rutting. Others may require widening or placement of additional stabilization means including but not limited to gravel or crushed stone on the existing surface to ensure safe travel conditions. Additional information for access roads is provided in Section 8.2.1.4 of Resource Report 8. The Project continues to conduct surveys to identify suitable access roads for use during the Project. *[Note: The Project continues to evaluate the locations of permanent and temporary access roads for the Project. The Project will provide additional information on access roads in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

1.3.4 Additional Temporary Workspace

ATWS areas will be required for construction activities requiring space outside the standard 100-foot construction right-of-way. Construction activities that may require ATWS include but are not limited to:

- Areas requiring extra depth of cover over the pipeline;
- Timber storage areas;

- Areas with unstable soil;
- Installation of erosion and sediment controls and other stormwater management facilities;
- Road and railroad crossings;
- Winch hills;
- Wetland and waterbody crossings;
- Conventional bores;
- Horizontal Direction Drills;
- Foreign pipeline crossings and interconnects;
- Foreign utility crossings;
- Areas requiring full-width topsoil segregation;
- Specific request of the landowner;
- Areas with steep side slopes, rock, or other difficult terrain;
- Pipeline access and truck turnarounds;
- Fabrication and staging areas; and
- Hydrostatic test water withdrawal and discharge locations.

The Project will determine the extent of ATWS on a site-specific basis. The ATWS areas will be restricted to the minimum size necessary to safely construct the pipeline with respect to the existing conditions anticipated at the time of construction. The Project will use the ATWS during construction for the purpose of material storage, storage of excess spoil at crossings, parking, vehicle turning radius, or other worker safety issues. In the case of wetlands and waterbodies, the ATWS will be located in accordance with the setback requirements contained in the FERC *Wetland and Waterbody Construction and Mitigation Procedures* (“Procedures”) (2013) and in consultation with other federal and state agencies. If field conditions do not allow for 50-foot setback from wetlands and/or waterbodies, the Project will request alternative measures to the FERC Procedures. Additional information regarding alternative measures to the FERC Procedures V.A.2.a and VI.B.1 are provided in Resource Report 2 and in Appendix 2-F.

Proposed ATWS and ancillary sites required for the Project on the alignment sheets and maps are provided in Appendix 1-A. A table that lists all ATWS by milepost, landowner (private, state, federal), area (square feet), current land use, and purpose of the ATWS (road crossing, etc.) are shown in Appendix 1-D. *[Note: The Project continues to evaluate the locations of ATWS for the Project. The Project will provide additional information on ATWS in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

1.3.5 Contractor Yards

The Project has identified potential contractor staging yards for temporary use during construction. These yards were selected to avoid streams, wetlands, and other sensitive habitats where possible. The Project

will use pipe storage yards to stockpile pipe and fabricate facilities, as necessary. The Project will use contractor yards during construction to stage construction operations, store materials, park equipment, and set up temporary construction offices. Depending upon the condition of these yards and their current use, some surface grading, drainage improvements, placement of surface materials (e.g., crushed rock), and internal roadways may be required. Table 1.3-4 details land requirements, MP, land ownership, and current land use for contractor yards. Contractor yard locations are shown on the USGS 7.5-minute topographic quadrangle map excerpts in Appendix 1-B.

Name	Type	Approx. MP	County	State	Location	Parcel	Land Use	Acres
CY-01	Contractor Yard / Laydown Yard	0.0	Pittsylvania	VA	Chatham	VA-PI-001.000	Forested	39.7
CY-02	Contractor Yard / Laydown Yard	5.8	Pittsylvania	VA	Chatham	VA-PI-036.000	Open	10.2
CY-03	Contractor Yard / Laydown Yard	13.0	Pittsylvania	VA	Danville	VA-PI-142.100.CY & VA-PI-142.200.CY	Forested, Open, Industrial	26.3
CY-04	Contractor Yard / Laydown Yard	30.5	Rockingham	NC	Eden	NC-RO-014.500.CY NC-RO-014.600.CY NC-RO-014.700.CY	Open	4.3
CY-05	Contractor Yard / Laydown Yard	30.8	Rockingham	NC	Eden	NC-RO-001.100.CY NC-RO-001.200.CY NC-RO-001.300.CY NC-RO-001.400.CY NC-RO-001.500.CY	Commercial, Open	50.0
CY-06	Contractor Yard / Laydown Yard	30.9	Rockingham	NC	Eden	NC-RO-014.100.CY NC-RO-014.200.CY	Open	16.0
CY-07	Contractor Yard / Laydown Yard	31.0	Rockingham	NC	Eden	NC-RO-002.200.CY NC-RO-002.300.CY	Open, Commercial, Forested	9.0
CY-08	Contractor Yard / Laydown Yard	44.0	Rockingham	NC	Reidsville	NC-RO-136.100.CY NC-RO-136.300.CY NC-RO-136.500.CY	Open, Industrial	19.1
CY-09	Contractor Yard / Laydown Yard	58.1	Guilford	NC	McLeansville	NC-GU-001.200.CY NC-GU-001.300.CY NC-GU-001.500.CY	Open, Forested, Residential	15.4
CY-10	Contractor Yard / Laydown Yard	60.1	Alamance	NC	Altamahaw-Ossipee	NC-AL-069.000	Open	8.5
CY-11	Contractor Yard / Laydown Yard	61.0	Alamance	NC	Glen Raven	NC-AL-074.000 NC-AL-076.000	Open	6.2
CY-12	Contractor Yard / Laydown Yard	70.4	Alamance	NC	Graham	NC-AL-190.200.CY NC-AL-190.300.CY NC-AL-190.400.CY NC-AL-190.500.CY NC-AL-190.600.CY NC-AL-190.700.CY	Open, Forested	22.9

Table 1.3-4
Contractor Yards along the MVP Southgate Project Pipeline

Name	Type	Approx. MP	County	State	Location	Parcel	Land Use	Acres
						NC-AL-190.800.CY NC-AL-190.900.CY NC-AL-190.110.CY		
CY-13	Contractor Yard /Laydown Yard	70.5	Alamance	NC	Graham	NC-AL-190.100.CY	Open	6.1
CY-14	Contractor Yard /Laydown Yard	71.1	Alamance	NC	Graham	NC-AL-192.000	Open, Commercial	1.3
							Total	234.9

1.4 CONSTRUCTION PROCEDURES

The Project will adopt the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* (“Plan”) and Procedures (2013) to minimize impacts on the environment. The Project will also develop its own Project-specific Erosion and Sediment Control Plan (“E&SCP”) that will outline best management practices (“BMPs”) to minimize impacts. The Project will train construction personnel in the environmental restrictions and/or requirements applicable to their particular job duties. The Project will provide construction management personnel and environmental inspectors (“EIs”) with the appropriate environmental information/materials specific to the Project. The Project will handle any hazardous materials stored or encountered during construction in accordance with the Project Spill, Prevention, Control, and Countermeasures Plan. All waste would be disposed of at an approved, off-site facility.

The Project does not expect that construction activities will occur in frozen ground conditions; however construction could occur during times of occasional snowfall in Virginia and North Carolina. Section 1.4.1.2 below outlines procedures for construction activities during the inclement winter season in the Mid-Atlantic region and measures to secure the right-of-way and protect it from erosion or other damages during the winter months. The Project anticipates that it will employ the following procedures to construct the Project; however, deviations are possible based on actual field conditions or to comply with regulatory or landowner requirements.

1.4.1 Pipeline

Construction of the Project will follow industry-accepted practices and procedures, as further described below. Generally, construction of the proposed pipeline will follow a set of sequential operations as shown in Figure 1.4-1. In this typical pipeline construction scenario, the construction spread proceeds along the pipeline right-of-way in one continuous operation. The Project will coordinate the entire process in such a manner as to minimize the total time a tract of land is disturbed and therefore exposed to erosion and temporarily precluded from normal use. To minimize the impacts of construction disturbance, The Project will utilize the FERC Plan and Procedures. Terrain and soil conditions, as well as inclement weather, can affect the timing and consistency of the operation. Appendix 1-C1 includes typical construction details depicting various construction scenarios. The following sections provide detailed descriptions of each proposed construction method.

1.4.1.1 Standard Construction and Restoration Techniques

Typical Upland Pipeline Construction Procedures

The Project will conduct construction activities in accordance with applicable federal and state regulations and guidelines, as well as the specific requirements of applicable permits. In addition to adopting the FERC Plan and Procedures, the Project will develop a Project-specific E&SCP based on field conditions and applicable state requirements and employed in conjunction with the FERC Plan and Procedures. The Project has identified several locations or activities where alternative measures to the FERC Plan and Procedures will be required during construction. These proposed alternative measures are listed in Appendix 2-F of Resource Report 2 and described according to the specific performance standard. Additionally, the Project provides justification as to why the proposed alternative measure is necessary. *[Note: The Project is in the process of evaluating locations or activities where alternative measures to the FERC Plan and Procedures will be required during construction. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Prior to initializing construction-related activities, the Project will secure right-of-way easements, or other required authorizations, from landowners whose properties will be crossed by the proposed pipeline alignment. The Project will return disturbed areas to original contours, and property boundary markers that are removed will be replaced with a civil survey boundary. The Project will stabilize disturbed areas as outlined in the FERC Plan and Procedures and The Project’s site-specific plans; however, plant seed mix components may vary based on site conditions, seed availability, landowner requests, and coordination with federal and state agencies.

Those portions of the Project located primarily in upland terrain will be crossed via conventional overland construction techniques for large-diameter pipelines. In the typical pipeline construction scenario, the construction contractor will construct the pipeline along the construction right-of-way using sequential pipeline construction techniques, including survey, staking and fence crossing; clearing and grading; trenching; pipe stringing, bending and welding; lowering-in and backfilling; hydrostatic testing; clean-up and restoration; and commissioning.

The Project is proposing to use two construction spreads to construct the pipeline. Table 1.4-1 provides the beginning and ending MP, length and construction year for each spread. The Project will construct the majority of the pipeline using conventional open-cut methods, which typically include the steps described in the following paragraphs. The details of each construction spread will be determined prior to construction. Specialized construction techniques for crossing sensitive resources such as wetlands and waterbodies are also provided in the following sections.

Spread	Begin MP	Ending MP	Mainline Length (Miles)	Construction Year	Spread Length (Miles)
1	0	30.5	30.5	2020	30.5
2	30.5	72	41.5	2020	41.5

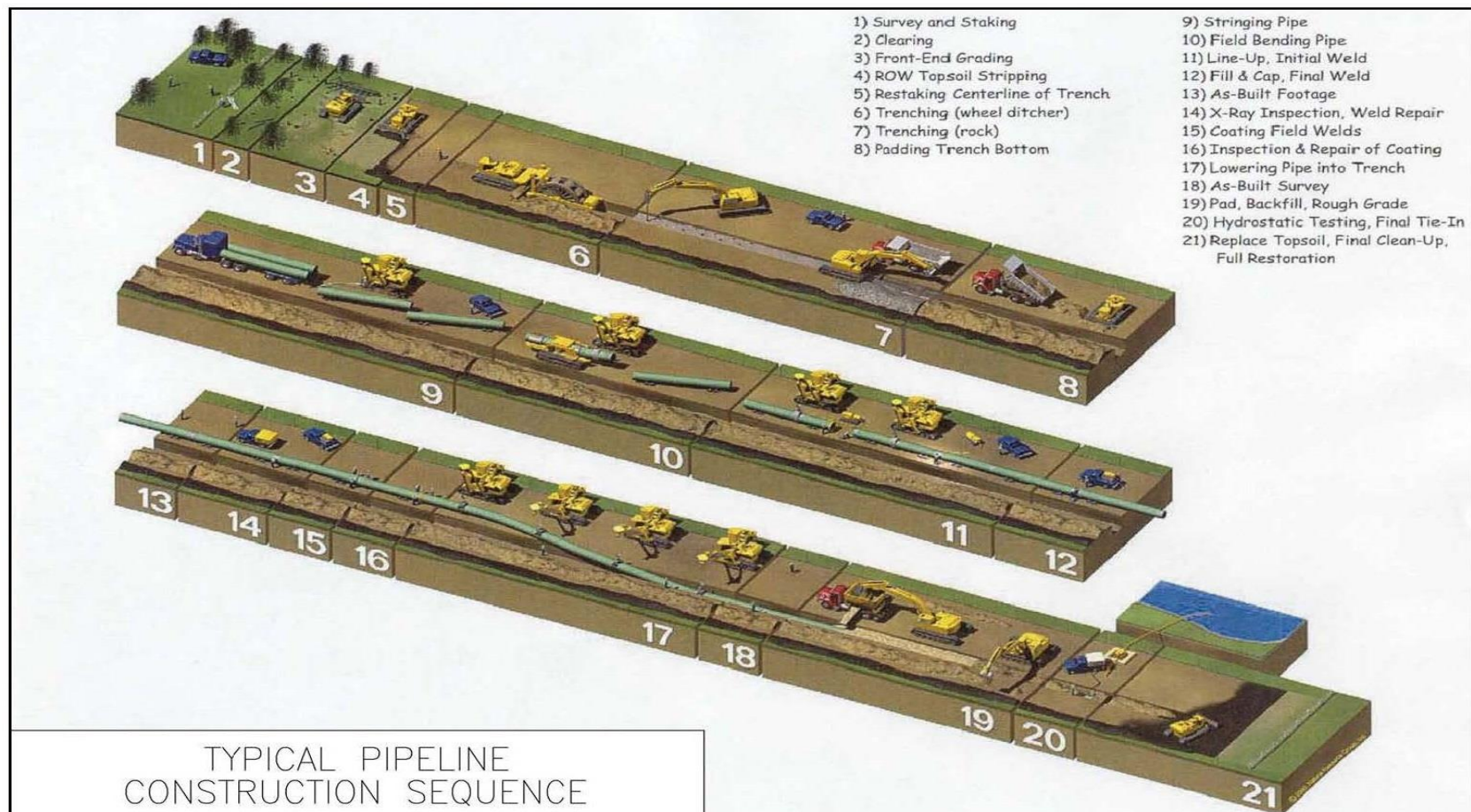


Figure 1.4-1. Typical Pipeline Construction Sequence

(a) Surveying

The initial step in preparing the right-of-way for construction will be the civil survey. A civil survey crew will stake the outside limits of the construction right-of-way, the centerline location of the H-650 pipeline, highway and railroad crossings, access roads, and any temporary ATWS, such as laydown areas or at stream crossings. The Project will contact the Virginia and North Carolina 811 “One Call” systems, and all known underground utilities (e.g., cables, conduits, and pipelines) will be located and flagged. The Project will notify affected landowners a minimum of 24 hours prior to surveying and staking of the proposed route, following applicable state/federal guidelines.

(b) Clearing and Grading, and Fencing

After the right-of-way has been surveyed and easements have been secured (for the permanent and temporary construction right-of-way, and any existing right-of-way if necessary), the Project will clear the right-of-way of obstructions (i.e., trees and stumps, brush, logs, and large rocks) according to the FERC Plan, the Project-specific E&SCP (Appendix 1-G), and applicable regulatory approvals. *[Note: The Project will provide its Project-specific E&SCP in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

The Project will clear the right-of-way to the width required for construction, but not more than specified on the pipeline alignment sheets and approved by FERC. These right-of-way widths indicate the maximum width necessary for construction, operation, and maintenance of the pipeline. At no time will the Project or its contractor clear or alter any areas outside of the boundaries of FERC-approved workspace areas. Should additional areas be required, the Project will request approval from the landowner and the FERC.

Merchantable timber will be stacked outside of the work area alongside the edge of the right-of-way or ATWS. Merchantable timber will be cut into lengths and stacked along the edge of the right-of-way or ATWS in areas that have previously been agreed upon by the landowner. If the landowner does not wish to use timber products or any other tree material, it will be windrowed with wildlife breaks.

The Project will dispose of brush and slash through burning, windrowing or chipping. Burning will be conducted on a case-by-case basis and in compliance with permit conditions, subject to local ordinances. The Project will implement its Fire Prevention and Suppression Plan (Appendix 1-H), which will be developed based on its experience in the region. *[Note: The Project will provide a Fire Prevention and Suppression Plan in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

The Project may windrow, burn, or haul off cleared vegetation depending on the terrain and landowner request. Windrow breaks/openings will allow for landowner passage, per pre-coordination and approval. If removed, the Project will haul trees/brush off to an approved location for disposal. If left permanently, the brush/slash windrow can provide habitat for wildlife and will not have any impacts on achieving adequate vegetative cover post-construction. If brush and slash is chipped, it will be either spread across the right-of-way in accordance with the FERC Plan and Procedures or blown off right-of-way per landowner pre-coordination and approval. Burning is the preferable method for disposing of brush and slash because it minimizes the number of trucks that would be required to remove chips from the right-of-way and reduces safety hazards of trucks entering the right-of-way. The Project will dispose of, split, grind,

or burn stumps to the satisfaction of the property owner and/or company representative in accordance with applicable law.

If fences (barbed wire, chain link, or other) are encountered along the construction right-of-way, then a fence crew will install temporary gates or gaps. The contractor's fence crew will install new posts to brace the areas on either side of the proposed cut to ensure that no damage occurs to other portions of the fence or wall. The Project will install temporary gates or gaps, if necessary, to contain livestock or to prohibit or otherwise control public access across the right-of-way. These temporary fences and/or gates will remain closed at all times except as required for construction purposes.

(c) Trenching

The Project will excavate the pipeline trench with a track-mounted backhoe or similar equipment and only use explosives when necessary in areas where rock substrates are at depths that interfere with conventional excavation or rock-trenching methods. Information on blasting, including a Project Blasting Plan, is included in Resource Report 6. On actively cultivated agricultural tracts, at wetland crossings, and in residential areas, subsoil will be segregated and stockpiled separately from topsoil per the FERC Plan. Locations where topsoil segregation may be implemented is provided in Resource Report 7.

The Project will stockpile excavated soils along the right-of-way on the side of the trench (the "spoil" side) away from the construction traffic and pipe assembly area (the "working" side). Where the pipeline route is collocated adjacent to an existing infrastructure, the spoil will generally be placed on the same side of the trench as the existing infrastructure.

(d) Stringing

New steel pipe for the pipeline will be procured and protected with an epoxy coating applied at the factory or at a coating yard (the beveled ends will be left uncoated for welding) and shipped to strategically located materials storage areas, contractor yards, or "pipe yards." Contractor yard locations are shown on the USGS 7.5-minute topographic quadrangle map excerpts in Appendix 1-B. The Project will transport the individual joints to the right-of-way by truck and place along the excavated trench in a single, continuous line that is easily accessible to the construction personnel on the working side of the trench (typically opposite the spoil side). This will allow the subsequent lineup and welding operations to proceed efficiently.

(e) Pipe Bending

The Project will deliver the pipe to the Project workspace in straight joints typically 40 to 60 feet in length. The use of controlled internal diameter fittings, in addition to the bending of pipe, will be required to allow the pipeline to follow natural grade changes and directional changes of the right-of-way. Prior to welding, track-mounted hydraulic bending machines will bend selected joints in the field.

(f) Pipe Assembly and Welding

Following stringing and bending, the Project will place the joints of pipe on temporary supports adjacent to the trench. The ends will be aligned and welded together using multiple passes for a full penetration weld. Only qualified welders can perform the welding. Automated welding techniques may be used in flatter areas if the terrain is suitable. The Project will employ qualified welders and implement welding procedures in accordance with applicable American Society for Mechanical Engineers, API, and 49 CFR Part 192 Standards including the latest edition of API Standard 1104.

(g) Non-Destructive Examination and Weld Repair

To ensure that the assembled pipe will meet or exceed the design strength requirements, the completed welds will be visually inspected and tested for integrity using non-destructive examination methods such as radiography (X-ray), or ultrasound, in accordance with API 1104. Welds displaying unacceptable slag inclusions, void spaces, or other defects will be repaired or replaced.

(h) Coating Field Welds, Inspection, and Repair

Following welding, the Project will sandblast the previously uncoated ends of the pipe at the joints and cover them in epoxy. The coating on the completed pipe section will be inspected, and damaged areas will be repaired prior to lowering in accordance with applicable industry standards.

(i) Pipe Lowering

The completed section of pipe will be lifted off temporary supports and lowered into the trench by side-boom tractors or equivalent equipment. Prior to lowering the pipe, the Project will inspect the trench to ensure that it is free of rocks and other debris that could damage the pipe or the coating. In rocky areas, if the bottom is not smooth, a layer of soil or sand may be placed on the bottom of the trench to protect the pipe using a padding machine or excavator with a “shaker bucket,” which separates rocks from satisfactory padding materials. Concrete-coated pipe or aggregate filled sacks (pipe weights) will be used if necessary for negative buoyancy in areas prone to flooding or with a high groundwater table.

(j) Padding and Backfilling

After the pipe is lowered into the trench, the Project will backfill the trench. Previously excavated materials will be pushed back into the trench using equipment or backhoes. Where the previously excavated material contains large rocks or other materials that could damage the pipe or coating, clean fill will be used to protect the pipe. Due to concerns about the acidity of fly ash and its potential impacts on cathodic protection, fly ash will not be used as backfill material. However, limestone dust or sand, which is typically basic and will often aid in the cathodic protection of the pipeline, may be used as backfill material. The remaining fill of the trench will be the aggregate of the excavation material removed at the time of the excavation. If additional fill is required, it will be either flowable fill or clean fill. After the subsoil is placed in the trench, segregated topsoil will be placed in the trench above the subsoil. Following backfilling in agricultural land, and open land, a small crown may be left to account for any future soil settling that might occur. In wetlands, a crown will not be left to ensure restoration of ground and surface water hydrology to pre-existing conditions. Excess soil will be distributed evenly on the right-of-way in accordance with landowner and agency requirements, only in upland areas and only to meet the pre-construction surface elevations.

(k) Hydrostatic Pressure Testing and Final Tie-In

Following backfilling of the trench, the Project will hydrostatically test the pipeline to ensure that it is capable of safely operating at the design pressure. If surface water is utilized for testing, baseline water samples will be taken at the source prior to filling of the pipe and prior to discharge. Test segments of the pipeline will be capped with test manifolds and filled with water and pressurized to a minimum of 1.1 to 1.5 times (based on location class) the maximum designed operating pressure in accordance with the U.S. Department of Transportation requirements identified in 49 CFR Part 192 prior to being placed in service.

Loss of pressure that cannot be attributed to other factors, such as temperature changes, will be investigated. Leaks detected will be repaired, and the segment will be retested.

Upon completion of the test, the water may be pumped to the next segment for testing, or the water may be discharged. The Project will discharge the test water through an energy-dissipating device in compliance with applicable regulatory approvals. Topography and the availability of test water will influence the length of each test segment. Information on the Project's hydrostatic test water withdrawal and discharge locations is provided in Resource Report 2. Test water will contact only new pipe. If chlorinated water is used for testing, a de-chlorinating agent or method may be required prior to discharge. Once a segment of pipe has been successfully tested and dried, the Project will remove the test manifold and the pipe will be connected to the remainder of the pipeline. The Project will implement Section VII of the FERC Procedures regarding hydrostatic testing, as well as any specifications in applicable regulatory approvals and clearances.

(l) Cleanup and Restoration

The Project will conduct post-construction restoration activities in accordance with the measures specified in the FERC Plan and Procedures as applicable. After a segment of pipe is installed, backfilled, and successfully tested, the Project will final-grade the right-of-way, temporary ATWS, and other disturbed areas, and construction debris will be disposed of properly. The Project will grade the surface of the right-of-way disturbed by construction activities to match original contours and to be compatible with surrounding drainage patterns, except at those locations where permanent changes in drainage will be required to prevent erosion, scour, and possible exposure of the pipeline. The Project will return segregated topsoil to its original horizons in agricultural areas and install temporary and permanent erosion and sediment control measures where necessary, including silt fencing, diversion trenches, and vegetation. The Project will also restore, to original or better condition, all private and public property impacted by the Project such as fences, gates, driveways, and roads that have been disturbed by the pipeline construction. More information on restoration activities is provided in Section 1.4.3.

Typical Wetland Pipeline Construction

The H-650 pipeline will cross wetlands in accordance with state and federal permits and the FERC Procedures. Pending site conditions, the Project may request alternative measures to these Procedures, and these would require approval by FERC prior to construction in these areas.

The Project will segregate the topsoil in wetlands where hydrologic conditions permit this practice. Segregated topsoil will be placed in the trench following subsoil backfilling. The Project will conduct restoration and monitoring of wetland crossings in accordance with the FERC Procedures to ensure successful wetland revegetation. In accordance with the FERC Procedures, fuel will not be stored within 100 feet of wetlands or other water bodies.

Hydrological conditions along the construction corridor in areas proposed for open ditch construction will likely dictate the use of either open ditch lay or open ditch push/pull lay methods. Selection of the most appropriate method will depend on site-specific weather conditions, inundation, soil saturation, and soil stability at the time of construction. The conventional open ditch lay method will be the most frequently used technique for installation of the pipeline in wetlands. The Project will use the push/pull method in inundated or saturated wetland areas where groundwater conditions preclude conventional construction. Selection of the push/pull method will be decided during construction by the construction supervisor and/or the Project representative depending on the conditions at the time of construction.

(a) Unsaturated Wetland Crossings

In crossing unsaturated wetlands (wetlands without standing water or saturated soils), construction will be similar to the typical upland construction described in Typical Upland Pipeline Construction Procedures above, with some exceptions, including that only one traffic lane will be provided for construction equipment. The Project will use low ground pressure equipment if normal construction equipment causes rutting or mixing of wetland topsoil and subsoil, or install temporary equipment mats to allow passage of equipment with minimal disturbance of the surface and vegetation. Trees will be cut to grade, but stumps will only be removed within 15 feet of the edge of the pipe trench, or where safety concerns dictate otherwise. Topsoil over the pipe trench will be segregated from subsoils. The Project will install and maintain erosion control measures to minimize sedimentation within the wetland. Trench plugs will be installed at the entry and exit points of wetlands and waterbodies to prevent the modification of subsurface hydrology.

(b) Saturated Wetland Crossings

For the purposes of this report, saturated wetlands include wetlands with standing water, but not those wetlands that are constantly or regularly completely submerged. Topsoil segregation will not be practical in saturated wetlands. Otherwise, construction will be similar as described for unsaturated wetlands to provide for anticipated widths of the pipeline trench and trench spoil areas. The Project will use equipment or timber mats to facilitate equipment movement through and work within the wetland. Equipment not associated with the pipeline construction within the wetland will be allowed to pass through the wetland when there is no other reasonable access, as provided in the FERC Procedures. The Project will use the push/pull lay method in inundated or saturated wetland areas where groundwater conditions preclude conventional construction. Upon completion of construction, the right-of-way will be restored and revegetated.

Typical Waterbody Crossings

The Project will conduct construction across waterbodies in accordance with the FERC Procedures. The normal trenching operation will skip the waterbody crossing, stopping on each side near the top of bank. The Project will install the waterbody section of the pipeline by one of the methods described below. In general, pipe will be bent and fabricated as the work progresses along the right-of-way so that the excavation of the waterbody crossing is completed prior to pipe installation by the tie-in crew. Locations and methods for waterbody crossings is provided in Appendix 2-A of Resource Report 2.

Construction methods at each waterbody will vary based upon the characteristics of the waterbody encountered and applicable regulatory approvals. Waterbody crossing methods will be conducted in accordance with both the FERC Procedures and federal and state permitting requirements. The Project will conduct crossings of minor perennial and intermittent streams in accordance with the FERC Procedures. Dry-ditch waterbody crossing methods include dam and pump, flume, conventional bore and horizontal directional drill (“HDD”). Appendix 2-A of Resource Report 2 includes a table with milepost crossing locations, crossing width measured at the time of the environmental survey, significance for fisheries or other aquatic resources as reported by each state, and proposed crossing method. The crossing method is subject to change depending upon the actual conditions encountered at the time of construction. Crossing methods are described below.

(a) Conventional Crossing

The Project will cross waterbodies with no discernable flow at the time of construction using the conventional crossing methods, unless otherwise required. The pipeline will be installed to a minimum of three feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of two feet of cover will be required. Trench spoil will be placed on the bank above the high water mark for use as backfill. A prefabricated segment of pipeline will be laid horizontally across the waterbody bed past the high banks on each side of the waterbody before raising in elevation to the normal trench level. If necessary, the pipeline may be weighted with concrete weights, and/or aggregate filled sacks to obtain sufficient negative buoyancy.

Compaction percentage of backfill will be equal to or above that of the adjacent undisturbed areas. Trench plugs consisting of sandbags or foam may also be used to keep backfill from sloughing in toward the center of the waterbody. The Project will restore waterbody banks to their original grades and remove and dispose of excavated material not required for backfill at an upland site.

The Project will follow the FERC Procedures to limit water quality and aquatic resource impacts during and following construction. The Project will schedule construction activities so that the pipeline trench is excavated immediately prior to pipe laying activities.

(b) Dam and Pump Crossing Method

The dam and pump method involves installation of temporary dams upstream and downstream of the proposed waterbody crossing. The temporary dams will typically be constructed using materials such as sandbags and plastic sheeting. Following dam installation, appropriately sized pumps will be used to dewater and transport the stream flow around the construction work area and trench. Pumps will be placed within secondary containment. Intake screens will be installed at the pump inlets to prevent entrainment of aquatic life, and energy dissipating devices will be installed at the pump discharge point to minimize erosion and streambed scour. Trench excavation and pipeline installation will then commence through the dewatered portion of the waterbody channel. Following completion of pipeline installation, backfill of the trench, and restoration of stream banks, the temporary dams will be removed, and flow through the construction work area will be restored. This method is generally only appropriate for those waterbody crossings where pumps can adequately transfer the stream flow volume around the work area and there are no concerns about the passage of sensitive species.

(c) Flume Crossing Method

The flume crossing method will consist of temporarily directing the flow of water through one or more flume pipes placed over the area to be excavated. This method will allow excavation of the pipe trench across the waterbody completely underneath the flume pipes without disruption of water flow in the stream. Stream flow will be diverted through the flumes by constructing two bulkheads and using sand bags or plastic dams to direct the stream flow through the flume pipes. The Project will remove bulkheads and flume pipes following completion of pipeline installation, backfill of the trench, and restoration of stream banks. This crossing method generally minimizes the duration of downstream turbidity by allowing excavation of the pipeline trench under relatively dry conditions.

(d) Conventional Bore Crossing Method

Some waterbodies crossed by the Project are directly associated with or adjacent to roads or railroads. Where these roads or railroads are to be crossed using a horizontal or conventional boring machine, the waterbody will typically be included within the length of the bore. Some elevated or channelized waterbodies, such as irrigation ditches, may also be successfully bored, depending upon the groundwater level in the area. To complete a horizontal or conventional bore, two pits will be excavated, one on each side of the feature to be bored. A boring machine will be lowered into one pit, and a horizontal hole will be bored to a diameter equal to the diameter of the pipe (or casing, if required) at the depth of the pipeline installation. The pipeline section and/or casing will then be pushed through the bore to the opposite pit. If additional pipeline sections are required to span the length of the bore, they will be welded to the first section of the pipeline in the bore pit before being pushed through the bore.

(e) Horizontal Directional Drilling

Horizontal directional drilling is a method that allows for trenchless construction across an area by pre-drilling a hole below the depth of a conventional pipeline lay and then pulling the pipeline through the pre-drilled borehole. Currently, the Project is proposing two HDDs for the Project: at the Dan River and Stoney Creek Reservoir crossings. *[Note: The Project is in the preliminary stages of the HDD evaluation process. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

The HDD method has been in use since the 1970s as a means to install pipelines across rivers and at shore approaches to eliminate pipeline exposure from erosion and scour and eliminate impacts to water quality from construction activities within the waterbody. Pipelines up to 60 inches in diameter have been successfully installed using this method. The length of pipeline that can be installed by HDD depends upon topography, soil conditions, geology, and pipe diameters and is limited by available technology and equipment sizes.

For most HDD crossings, electric-grid guide wires will be hand-laid across the land surface along the pipeline right-of-way to help guide the drill bit along the predetermined HDD route. In thickly vegetated areas, a swath approximately two to three feet wide may be cut across the land surface using hand tools to lay these electric-grid guide wires, resulting in minimal ground and vegetation disturbance. Following guide wire installation, a directional drilling rig will be set up and a small-diameter pilot hole will be drilled along a prescribed profile.

For HDD crossings, where a thickly vegetated riparian buffer exists, pumps for obtaining water for the drilling process and/or for hydrostatic testing could require that up to a 15-foot-wide swath of land be cleared on one side of the crossing to allow equipment access and to lay water pipe from the river to the drilling operation. This may occur over the pipe or temporary access may be utilized if it does less harm to the vegetation. The Project will consider the use of municipal water for its proposed HDDs but this is generally not a favorable option as the municipal sources (hydrants) are not located within close proximity of the HDD locations. Therefore, the use of municipal water to support a HDD would require an increase in heavy load vehicles on local roads as well as a greater extent of ATWS to store tank batteries and water trucks. In an effort to reduce the increase in heavy load vehicles in the Project area and minimize workspace and land impacts associated with the HDDs, the Project determined that the most feasible HDD water

sources are from either a locally drilled water well or withdrawals from perennial waterbodies crossed by the HDD (see Section 2.3.4 of Resource Report 2). Typical HDD installation plans are shown in Appendix 1-C1. *[Note: The Project will provide typical HDD plans in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]* Site-specific HDD plans and geotechnical investigations will be included in Appendix 6-C of Resource Report 6.

Electromagnetic sensors located on the tip of the drill bit will follow an electromagnetic field created by the guide wires along the prescribed path. Where guide wires cannot be used, bit tip positioning sensors will be used to guide the drill bit. In either case, once the pilot hole is completed, it will be enlarged, using reaming tools to provide access for the pipe. The reaming tools will be attached to the drill string at the exit point of the pilot hole and then rotated and drawn back to the drilling rig, thus progressively enlarging the pilot hole with each pass. During this process, drilling fluid consisting of bentonite clay and water will be continuously pumped into the hole to remove cuttings and maintain the integrity of the hole. Additional additives that are approved by agencies may be needed dependent upon viscosity readings. These additives will be determined by a mud engineer on site. Once the hole has been sufficiently enlarged, a prefabricated segment of pipe will be attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole to the drill rig, completing the crossing.

The primary advantage of the HDD method is that there is minimal planned disturbance of the surface between the entry and exit points of the HDD (limited to the temporary deployment of telemetry cable and water pipe), provided there is reasonable access to the entry and exit points for the drilling rig and fluids handling equipment. However, because it is necessary to prefabricate a section of pipe aboveground that is equal to the length of the HDD, and because existing surface features such as roads and railroads could restrict the length of the prefabricated section to less than that of the HDD, the HDD method may not be appropriate for every site condition encountered. Typical HDD installation plans are shown in Appendix 1-C1. *[Note: The Project will provide typical HDD plans in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]* Site-specific HDD plans and geotechnical investigations will be included in Resource Report 6.

Where the HDD and the adjacent right-of-way are in or near parallel alignment, the pull section will be prefabricated within the construction right-of-way to the greatest extent practical; minimal ATWS will be required for this pull section. However, if the adjacent right-of-way is not aligned with the HDD, it will not be possible to bend the pull section into the borehole, and an ATWS (sometimes referred to as a “false right-of-way”) may be required to accommodate the pullback section.

Although the HDD method is a proven technology for pipe installation, the potential exists for a HDD installation to fail for a number of reasons, including encountering soil conditions not conducive to boring, caving of the borehole, loss of the drill string in the borehole, loss of circulation, and pullback refusal. Many of these potential failures can be avoided or mitigated by making appropriate adjustments to the operation of the HDD equipment. If needed, the borehole can usually be moved to another, adjacent location.

Typical Road and Railroad Crossings

Road crossings will be maintained continuously using provisions such as steel plates or alternate access to minimize inconvenience to the public. Construction of the pipeline across hard surface roads will typically be installed through the roadbed by conventional bore as previously described for waterbody crossings. At points of access to the right-of-way from hard-surfaced roads, a stone pad will be installed as a construction

entrance to control mud and dirt tracking onto the highway. Most of the smaller, unpaved roads and driveways will be crossed by open trenching and then restored to pre-construction conditions. If an open-cut road requires extensive construction time, provisions will be made for temporary detours or other measures to allow safe traffic flow during construction. The pipeline will be buried to a depth of at least three feet below the road surface and will be designed to withstand anticipated external loadings. Road and railroad crossing locations are provided in Table 8.2.5 of Resource Report 8. Typical details of road and railroad crossings are provided in Appendix 1-C1.

Typical Foreign Pipeline Crossings

The Project will cross several transmission, gathering and distribution pipelines and flow lines in accordance with 49 CFR 192. The Project will cross under most existing foreign pipelines due to the size of the pipeline and soil cover and separation requirements. The larger spoil volumes from increased excavation depths at these pipeline crossings and the preference not to place spoil or construction equipment over existing pipelines will require ATWS at most crossings. The locations of known foreign pipelines and other identified underground utilities in relation to the proposed pipeline are listed in Appendix 1-I. While the pipelines are generally discernible in the field, some companies may not participate in the 811 notification system leaving the line operators unidentifiable. Experience shows that additional foreign lines or flow lines will likely be identified during the pre-construction surveys.

Precautions including the following will be taken to ensure that the existing pipelines are positively identified, safe working conditions are present and that the foreign pipelines are protected against damage during construction:

- One Call will be contacted to locate all known pipelines and utilities (Virginia and North Carolina 811);
- The existing pipelines will be precisely located prior to excavation using a hand-held magnetometer and/or by probing, as appropriate for actual conditions encountered;
- Right-of-way edges will be scanned prior to grading with Passive Inductive Locating equipment to ensure that no unknown foreign pipelines cross into the work area;
- The operators of the existing pipelines will be given adequate notice (48 hours) of the crossing and the opportunity to be present during work around their pipelines;
- No mechanized excavation will be allowed within three feet of existing pipelines; the excavations will be completed by hand;
- Construction equipment and spoil piles will be kept off the existing pipeline centerline, to the extent practicable. Should foreign lines require equipment crossing, the crossings will be made over timber mats or equivalent to displace the weight of the equipment;
- The existing pipelines will be temporarily and adequately supported for the length of the span exposed by the crossing excavation. Supports will not be removed until the soil under the piping has been compacted and can adequately support the pipeline;
- The existing pipelines will be inspected before and after installation of the Project to ensure there is no damage to the existing pipelines or their coatings that could compromise their integrity;

- The minimum separation distance between the pipelines specified by the U.S. Department of Transportation and the facility owner will be maintained; and
- Safety requirements of the foreign pipeline crossing operator will be followed.

The Project may require monitoring of excavation activities whenever a contractor is excavating over or near a foreign pipeline. A working combustible gas indicator (when crossing hydro-carbon lines) will be utilized at the work site, and appropriate safety and rescue equipment will be available based on Occupational Safety and Health Administration standards for working in excavations or confined spaces. In the event accidental damage occurs to a foreign pipeline during construction, the area will be inspected, the owner of the pipe notified, and the pipe repaired.

Typical Construction in Residential Areas

Site-specific plans for residential structures within 25 feet of construction work areas are included in Appendix 8-C of Resource Report 8. Section 8.2.3.6 of Resource Report 8 describes the measures that the Project will implement for residences located within 50 feet of the construction work space.

The Project will use additional measures such as high visibility safety fence or jersey barriers to prevent overnight access to the trench. *[Note: The Project continues to evaluate the pipeline alignment where residences have been identified within 25 feet of the Project workspace. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Following completion of major construction activities, the Project will restore the property in accordance with its Project-specific E&SCP. Property restoration will be in accordance with any agreements between the Project and the landowner. Additional details regarding residential construction, including proposed mitigation measures to be used in residential areas are provided in Resource Report 8.

Typical Construction in Commercial and Industrial Areas

Construction in high-density commercial and industrial areas will be accomplished by implementing specialized construction methods such as the drag-section or stove-pipe methods. These specialized methods reduce the amount of workspace needed for construction, the duration of construction activity in the immediate vicinity of commercial and industrial areas and the time the trench is left open. The pipeline trench will be excavated as the pipeline section is fabricated, inspected, and prepared for installation.

[Note: The Project continues to evaluate Project construction in commercial and industrial areas. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]

Typical Topsoil Segregation

The Project will conserve topsoil in actively cultivated and rotated cropland, improved pastureland, and non-saturated wetlands. In residential yards, the Project will either conserve topsoil or provide topsoil as an alternative to topsoil segregation and conservation. The topsoil and subsoil will be temporarily stockpiled in separate windrows on the construction right-of-way. Rock will not be used as upper backfill in rotated or permanent cropland. Additional information regarding topsoil segregation is provided in Resource Report 7.

1.4.1.2 Special Construction Procedures

Blasting

Where unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. At this time, the extent of blasting associated with construction of the Project is unknown. If required, the Project is committed to taking measures to prevent damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, or other water sources and will minimize the amount of blasting required to the extent practicable. Blasting will be conducted by highly trained contractors. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Where competent sandstone bedrock occurs in the stream bed, blasting may be used to reduce bedrock so that the trench can be excavated. Blasting will be conducted in accordance with the Project Blasting Plan (see Appendix 6-D of Resource Report 6) that is under development in consultation with applicable federal and state regulatory agencies. Pre- and post- blasting structural surveys will be conducted of occupied structures, water supply wells and water supply springs that will be specified in the Blasting Plan. Additional information on geologic resources and blasting, and depth to bedrock, is included in Resource Report 6 and Resource Report 7.

Steep Terrain

The Project will employ special construction techniques where the slopes typically exceed 30 to 35 percent. In rugged terrain with vertical slopes, temporary sediment barriers, such as silt sock and reinforced silt fences will be installed during clearing to prevent movement of sediment off the right-of-way. In addition, temporary slope breakers may be installed during grading in accordance with the FERC Plan and the Project-specific E&SCP to reduce water runoff or divert water to vegetated areas. Construction activities on rugged terrain will be similar to the typical construction described in Section 1.4.1.1; however,

The Project will use specialized construction methods to ensure the safety of equipment operators, construction personnel, and equipment. On steep slopes, various measures may be taken to properly control erosion and sedimentation on the right-of-way.

Karst Area

The Project continues to evaluate karst topography areas. Information on areas of potential karst geology is provided in Resource Report 6. *[Note: The Project continues to evaluate sinkholes and karst related features along the H-650 pipeline route. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Trench Dewatering

In uplands, the Project will remove water from the excavated trench prior to lowering the pipe into place. The water will be pumped from the trench to a location down gradient of the trench. The trench will be dewatered in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any waterbody or wetland. In accordance with the FERC Plan and Project-specific E&SCP, the Project will discharge storm water to an energy dissipation/filtration dewatering device, such as a filter bag or hay bale structure. The dewatering structure will be removed as soon as possible after completion of the dewatering activities. Trench plugs will be used where necessary to separate the upland trench from adjacent wetlands or waterbodies to maintain the existing subsurface hydrology conditions.

Winter Construction

The Project's current construction schedule includes clearing of vegetation and grading within the first quarter of 2020. The Project is developing a Winter Construction Plan (Appendix 1-J), which identifies BMPs for construction activities in frozen and snow-covered ground conditions. *[Note: The Project will provide a Winter Construction Plan in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

1.4.2 Aboveground Facilities Construction

Typical construction activities associated with the installation of the aboveground facilities are summarized below.

General

Construction activities and storage of construction materials and equipment will be confined within the designated workspace areas associated with the aboveground facilities. Debris and waste generated from construction will be disposed of as appropriate. Disturbed surface areas will be restored in a timely manner. The facilities will be constructed in accordance with the Project construction standards and specifications as more generally described in the paragraphs that follow.

Foundations

Excavation will be performed to accommodate the new reinforced concrete foundations for the compressors, meter stations, launcher and receiver facilities, filtration equipment, coolers, and buildings. Subsurface friction piles may be required to support the foundations, depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete poured and cured in accordance with applicable industry standards. Concrete batches for equipment buildings will be tested to verify compliance with minimum strength requirements. Backfill will be compacted in place, and excess soil will be used elsewhere or distributed around the site to improve grade.

Equipment

The compression, piping and other equipment will be shipped to the sites by truck. The equipment will be offloaded using cranes and/or front-end loaders. The equipment will then be positioned on the foundations, leveled, grouted where necessary, and secured with anchor bolts, as required. Non-screwed piping associated with the aboveground facilities will be welded, except where connected to flanged components. Welders and welding procedures will be qualified in accordance with API standards. Welds in gas piping systems will be examined using radiography, ultrasound, or other approved non-destructive examination methods to ensure compliance with code requirements. Aboveground piping surfaces will be cleaned and painted in accordance with the Project construction specifications. Paint inspection and cleanup will be conducted in accordance with regulatory requirements and best engineering practices.

Testing

Components in high-pressure natural gas service will be tested prior to placing in service. Pressure testing will follow all applicable federal and state requirements. Before being placed in service, controls and safety equipment and systems including emergency shutdown, relief valves, gas and fire detection, and engine over speed and vibration protection will be calibrated and tested.

1.4.3 Restoration

Following construction of the Project, the areas disturbed by construction will be restored to their original grades, condition, and use, to the greatest extent practicable. The Project will complete restoration in accordance with the FERC Plan and Procedures, the Project-specific E&SCP and applicable regulatory approvals and landowner agreements. Restoration will be considered successful if the disturbed surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the landowner), revegetation is successful, proper drainage has been restored, and the appropriate federal and state agencies approve. The Project will reseed areas disturbed by construction in accordance with proposed seed mixes developed for the Project.

1.4.3.1 Pipeline

Upon completion of the pipeline installation, the surface of the right-of-way disturbed during construction activities will be graded to match original contours and to be compatible with surrounding drainage patterns, except at those locations where permanent changes in drainage will be required to prevent erosion, scour, and possible exposure of the pipeline. Segregated topsoil will be replaced, and soils that have been compacted by construction equipment traffic will be decompacted. Permanent erosion control measures will be installed at this time. Temporary erosion control measures may be left in place, where appropriate, until sufficient vegetative cover is re-established to prevent significant erosion or sedimentation.

Uplands

In most upland locations, excluding actively cultivated cropland, herbaceous vegetative cover will be re-established by spreading a grass seed and hydro/straw-mulch mixture over the disturbed surface. The type of seed will be selected to match the mix required by applicable regulatory agencies, or as otherwise requested by the landowner. Depending upon the time of year, a temporary seed mix may be broadcast or drilled until a more permanent cover can be established. Steep slopes (e.g., stream banks) may require additional stabilization using erosion control fabric, revetments, or sod. Vegetation success in these areas will be monitored by the Project, and reseeded, fertilizing, hydroseed, or other supplemental revegetation measures may be implemented until the density and cover of non-nuisance vegetation is similar in density and cover to adjacent undisturbed lands.

Actively cultivated cropland may be left unseeded at the request of the landowner. Pasture will be reseeded with a similar species or mixture. Pasture revegetation will be considered successful when density and cover are similar to adjacent undisturbed portions of the same pasture. Residential and commercial lawns will be reseeded or sodded, depending upon the original grass variety and landowner agreements. Forested areas within temporary workspace areas will be allowed to revegetate naturally to a forested condition.

In uplands, routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands will not be done more frequently than every 3 years. However, to facilitate periodic corrosion/leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state.

Waterbodies

Cleanup and restoration activities commence as soon as practicable following completion of the waterbody crossing. Completed stream crossings using the flume or dam and pump methods will be stabilized before returning flow to the channel. Areas disturbed will be restored to pre-construction or better conditions.

Original streambed and bank contours will be re-established for surface water and groundwater flow, and mulch, jute thatching, or bonded fiber blankets will be installed on the stream banks, which are preferential to plastic erosion control blankets because they reduce wildlife entrapment and are biodegradable. Where the flume technique is used, stream banks will be stabilized before removing the flume pipes and returning flow to the waterbody channel.

Seeding of disturbed stream approaches will be completed in accordance with the FERC Procedures after final grading, weather and soil conditions permitting. Other Federal and State permit seeding requirements will be considered where applicable. Where necessary, slope breakers will be installed adjacent to stream banks to minimize the potential for erosion. Sediment barriers, such as silt fence and/or straw bales will be maintained across the right-of-way until permanent vegetation is established. Temporary equipment bridges will be removed following construction.

Wetlands

Original surface hydrology will be re-established in wetlands by backfilling the pipe trench and grading the surface with equipment operating from timber mats or equivalent or using low-ground-pressure tracked vehicles working in the spoil pile depending upon degree of soil saturation and the bearing capacity. Segregated topsoil will be replaced in unsaturated wetlands. Unsaturated wetlands will be allowed to revegetate naturally, as the seed bank will be maintained within the topsoil layer. Wetland revegetation will be considered successful when the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent wetland areas that were not disturbed by construction. Revegetation efforts will continue until wetland revegetation is successful based on the FERC Procedures and other applicable regulatory approvals. Restoration and mitigation for impacts to forested wetlands is included in Section 2.4.4 of Resource Report 2.

1.4.3.2 Aboveground Facilities

Aboveground facilities will be fenced. The areas inside the fence at the aboveground facilities will be permanently converted to industrial use. Most areas in and around the buildings, meters, and associated piping and equipment will be covered with an approved stabilization method (typically crushed rock or equivalent) to minimize the amount of maintenance required. Roads and parking areas may be crushed rock, concrete, or asphalt. Other ground surfaces will be seeded with a grass that is compatible with the climate and can be easily maintained. Temporary workspace areas outside the fence will be restored as described above for the pipeline right-of-way.

1.4.3.3 Access Roads

Previously existing access roads that were modified and used during construction will be returned to original or better condition upon completion of the pipeline facilities installation. Temporary access roads constructed specifically for the Project installation will be removed, the surface graded to original contours, and the land restored to its original use unless otherwise requested by the landowner. Temporary erosion control measures will be removed upon final stabilization and approval from applicable regulatory agencies and installation of permanent erosion control measures, if necessary.

1.4.3.4 Contractor Yards

Upon completion of construction, all temporary facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the contractor yards. Unless otherwise requested by the landowner, each

site will be graded to original contours and the land restored to its original use, to the greatest extent possible. The site will be revegetated, permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

1.4.4 Quality Assurance Measures

To ensure that construction of the proposed facilities will comply with measures identified in the FERC Certificate and applicable regulatory permits and clearances, the Project will include implementation details in its construction drawings and specifications. Copies of permit requirements, known conditions and related drawings will be added to the Construction Bid Package.

1.4.4.1 Environmental Training and Inspection

Consistent with the FERC Plan and Procedures and the Project's Project-specific E&SCP, environmental training will be given to the Project personnel and to contractor personnel whose activities may impact the environment during pipeline and aboveground facility construction. The level of training will be commensurate with the type of duties of the personnel. All construction personnel from the Chief Inspector, EI, craft inspectors, and contractor job superintendent to clearing crews, welders, equipment operators, and laborers will be given the appropriate level of environmental training. The training will be given prior to the start of construction and throughout the construction process, as needed. The training program will cover job-specific permit conditions, contaminated sediment and groundwater management, health and safety, company policies, cultural resource procedures, threatened and endangered species restrictions, the Spill Prevention Control and Countermeasures Plan, National Pollutant Discharge Elimination System, Stormwater Pollution Prevention Plan, and any other pertinent information related to the Project. In addition to the EIs, all other construction personnel will play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction.

To ensure quality assurance and compliance with mitigation measures, a Chief Inspector will represent the Project. The Chief Inspector can be assisted by a Lead Inspector, one or more craft inspectors, and Non-Destructive Evaluation technicians. In addition, there will be at least one Lead EI who will report to the Lead Inspector, who in turn reports to the Construction Manager at a level equivalent to the Chief Inspector. The EI's duties are consistent with those contained in Section II.B (Responsibilities of the Environmental Inspector) of the FERC Plan; the EI will be:

- Responsible for monitoring and documenting compliance with all mitigation measures required by the FERC's Order and any other grants, permits, certificates, or other authorizing documents;
- Responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract or any other authorizing document;
- Empowered to order correction of acts that violate the environmental conditions of the FERC's Order, or any other authorizing document (e.g., U.S. Army Corps of Engineers ["USACE"] Section 404 permit), including stop work authority;
- A full-time position separate from all other activity inspectors; and
- Responsible for maintaining status reports and training records.

Copies of the Construction Drawing Package will be distributed to inspectors and to contractors' supervisory personnel. If a contractor's performance is unsatisfactory, the terms of the contract will allow for work stoppage and will require the contractor to begin remedial work.

The Project engineering and construction departments are responsible for designing and constructing certificated facilities in compliance with regulatory and contractual requirements and agreements. If technical or management assistance is required, the responsible Project Construction Manager and/or Chief Inspector will request assistance from the appropriate company department. The operations department will be responsible for long-term Project maintenance and regulatory compliance once the Project is in-service.

1.4.5 Construction Schedule and Work Force

The order in which each facility will be constructed may vary, depending upon numerous factors, including the receipt of necessary authorizations, the capabilities of each contractor, available work force, and optimized logistics. The Project anticipates clearing to start in the first quarter of 2020 contingent upon receipt of necessary approvals, and pipeline construction will begin in early 2020 to achieve a target in-service date of December 2020.

A preliminary Construction Duration Schedule is provided in Table 1.4-2. The Project expects the construction workforce for 2020 to include approximately 900 qualified personnel.

Table 1.4-2		
Construction Schedule for Major Components of the MVP Southgate Project <u>a/</u>		
Component	Commence Activity	Complete Activity
Clearing	Q1 2020	Q1 2020
Pipeline Construction	Q1 2020	Q4 2020
Compressor Stations	Q1 2020	Q4 2020
Restoration	Q2 2020	Q4 2020
Hydrostatic Testing	Q4 2020	December 2020
<u>a/</u> Anticipated full in-service date of December 2020		

1.5 OPERATION AND MAINTENANCE

Following construction of the Project facilities, certain areas along the pipeline alignment (and at aboveground facilities) will have an associated permanent right-of-way or operational area. For pipeline facilities, the Project will maintain a typical permanent right-of-way of 50 feet in width. MLVs will be contained within the permanent right-of-way. Land requirements for the permanent right-of-way for pipeline facilities is included in Resource Report 8. Permanent access roads used for construction will also support ongoing pipeline operations. Land requirements for permanent access roads are listed in Appendix 1-F.

The Project will operate and maintain the Project and aboveground facilities in compliance with Federal regulations provided at 49 CFR Part 192, FERC regulations at 18 CFR § 380.15, and maintenance provisions of the FERC Plan and Procedures and its Project-specific E&SCP. The permanent easement

will predominantly be maintained with mechanized clearing. Herbicide treatment will only be used to control for invasive species, as necessary.

1.5.1 Pipeline

Following construction of the Project facilities, certain areas along the pipeline alignment (and at aboveground facilities) will have an associated permanent right-of-way or operational area. For pipeline facilities, the Project will maintain a typical permanent right-of-way of 50 feet in width. MLVs will be contained within the permanent right-of-way. Land requirements for permanent right-of-way for pipeline facilities is included in Resource Report 8. Permanent access roads used for construction will also support ongoing pipeline operations. Land requirements for permanent access roads is listed in Appendix 1-F.

Operational activity on the pipeline will be limited primarily to vegetation management within the permanent easement and inspection, repair, and cleaning of the pipeline. Periodic aerial and ground inspections by the Project will identify:

- soil erosion that may expose the pipe;
- dead vegetation that may indicate a leak in the line;
- conditions of the vegetation cover and erosion control measures;
- unauthorized encroachment on the right-of-way, such as buildings and other substantial structures; and
- other conditions that could present a safety hazard or require preventive maintenance or repairs.

A schedule for the maximum intervals between inspections/patrols by class area is provided in Table 1.5-1. The pipeline’s cathodic protection system will also be monitored and inspected in accordance with 49 CFR Part 192 requirements to ensure proper and adequate corrosion protection. The pipeline will be designed for internal inspection technology. In addition, periodic class change studies will also occur to identify areas of development.

Table 1.5-1	
Schedule for Major Components of the MVP Southgate Project <u>a/</u>	
Pipe Class	Inspection/Patrol Interval
Highway and Railroad Crossings	
Class 1 and 2	7.5 months but at least twice per year
Class 3	4.5 months but at least four per year
All Other Locations	
Class 1 and 2	15 months but at least once per year
Class 3	7.5 months but at least twice per year
<u>a/</u> Intervals comply with 49 CFR § 192.705. Regulations include intervals for Class 3 pipe	

Vegetation on the permanent right-of-way will be maintained by mowing, cutting, and trimming. In uplands, routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands will occur no more than once every three years. However, to facilitate periodic corrosion/leak surveys, the

Project may clear a corridor not exceeding 10 feet in width centered on the pipeline at a frequency necessary to maintain the 10-foot corridor in an herbaceous state.

In wetlands, routine vegetation mowing or clearing over the full width of the permanent right-of-way will not occur. However, to facilitate periodic corrosion/leak surveys, the Project may clear a corridor centered on the pipeline up to 10 feet in width at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees within 15 feet of the pipeline may be selectively cut and removed from the permanent right-of-way to ensure that root systems do not affect the exterior coating of the pipeline.

1.5.2 Aboveground Facilities

1.5.2.1 Compressor Station

Compressor station personnel will perform operation and maintenance of all equipment. Personnel will perform routine checks of the facilities including calibration of equipment and instrumentation, inspection of critical components, and scheduled and routine maintenance of equipment. Safety equipment, such as pressure relief devices and fire and gas detection systems will be tested for proper operation. Corrective actions will be taken if problems are identified.

The compressor station will be equipped with combustible gas and fire detection alarm systems, as well as an emergency shutdown system. Automatic emergency shutdown of the compressors, evacuation or venting of gas from the station piping, and isolation of the station from the main pipeline will occur following an incident. The compressor stations will also be equipped with relief valves or pressure protection devices to protect the station piping from overpressure if station or unit control systems fail. The stations will be unmanned with start/stop control capabilities controlled by the Project's Gas Control headquarters. A telemetry system will notify personnel locally and at the gas control headquarters of the activation of safety systems and alarms as appropriate. The Project will dispatch maintenance personnel as necessary to investigate and take proper corrective actions.

1.5.2.2 Meter Stations

Measurement technicians, will operate and maintain the new equipment. Site personnel will perform routine checks of the facilities, including calibration of equipment and instrumentation, inspection of critical components, and scheduled and preventative maintenance of equipment. Safety equipment, such as pressure reducing devices, will be tested for proper operation, per 49 CFR Part 192 requirements. Corrective actions will be taken if problems are identified.

The meter (interconnect) stations will be equipped with control valves or other over pressure-protection devices to protect the site piping from overpressure conditions. A telemetry system will notify personnel locally and of the activation of safety systems and alarms, which may in-turn instruct maintenance personnel to investigate and take proper corrective action.

1.6 FUTURE PLANS AND ABANDONMENT

The Project currently has no plans for either future expansion or abandonment of the facilities. Should the Project propose any future expansion or abandonment of Project facilities, the Project will seek the appropriate authorizations from FERC and other federal and state agencies as applicable.

1.7 PERMITS AND APPROVALS

Applicable federal, state, and local permits and approvals, responsible agencies, and the anticipated schedule for filing applications or documentation for these permits and approvals for the Project are summarized in Table 1.7-1. Appendix 1-K contains agency correspondence to date.

Table 1.7-1			
Anticipated Permits and Consultations for the MVP Southgate Project			
Agency	Permit/ Approval/ Consultation <u>a</u>/	Anticipated Submittal/Initiation Date	Anticipated Permit Receipt/ Completion Date
Federal			
Federal Energy Regulatory Commission	Natural Gas Act, Section 7; Certificate for construction and operation of interstate natural gas pipeline.	November 2018	December 2019
U.S. Army Corps of Engineers Norfolk District Wilmington District	Section 404 Permit for impacts on waters of the U.S., including wetlands Section 10 Permit for activities affecting navigation	November 2018	November 2019
U.S. Fish and Wildlife Service Virginia North Carolina	Consultation under Section 7 of ESA for potential impacts on federally protected species Consultation regarding impacts on migratory birds and eagles	May 2018	March 2019
Virginia			
Virginia Department of Historic Resources, Division of Review and Compliance ("SHPO")	Consultation and clearance regarding potential impacts on pre-historic and historic resources eligible for listing on the National Register of Historic Places	May 2018	December 2019
Virginia Marine Resources Commission	Permit for encroachment to state-owned subaqueous lands	November 2018	August 2019
Virginia Department of Environmental Quality ("VDEQ"), Water Division	Section 401 Water Quality Certification and Water Protection Permit for impacts to non-404 regulated wetlands or waters	November 2018	November 2019
VDEQ, Water Division	Virginia Pollution Discharge Elimination System (VPDES) permit for discharge of construction stormwater	March 2019	December 2019
VDEQ, Water Division	General Permit No. VAG83 (Petroleum Contaminated Sites, Groundwater Remediation and Hydrostatic Tests GP	February 2020	March 2020
VDEQ, Air Division	VADEQ Article 6 Minor New Source Air Quality Permit	November 2018	June 2019
Virginia Department of Conservation and Recreation, Division of Natural Heritage	Consultation for state threatened and endangered species	May 2018	March 2019
Virginia Department of Game and Inland Fisheries	Consultation for state protected wildlife species	May 2018	March 2019

Table 1.7-1			
Anticipated Permits and Consultations for the MVP Southgate Project			
Agency	Permit/ Approval/ Consultation <u>a/</u>	Anticipated Submittal/Initiation Date	Anticipated Permit Receipt/ Completion Date
Virginia Department of Transportation	Road bonds and crossing permits	[TBD] Prior to Construction	[TBD] Prior to Construction
North Carolina			
North Carolina Department of Environmental Quality (“NCDEQ”), Division of Water Resources	401 Water Quality Certification, Isolated/non-404 wetlands and water permit, and Buffer authorization	November 2018	September 2019
NCDEQ, Division of Air Quality	Minor New Source Permit	November 2018	April 2019
NC Sedimentation Control Commission	Erosion and Sediment Control Plans	April 2019	May 2019
NCDEQ, Division of Energy, Mineral and Land Resources	General Permit NCG010000 to discharge stormwater under the NPDES for Construction Activities	March 2019	August 2019
NCDEQ, Natural Heritage Program	Consultation for state threatened and endangered species	May 2018	March 2019
North Carolina Wildlife Resources Commission	Consultation for state threatened and endangered species	May 2018	March 2019
North Carolina Department of Cultural Resources (“SHPO”)	Consultation and clearance regarding potential impacts on pre-historic and historic resources eligible for listing on the National Register of Historic Places	May 2018	December 2019
North Carolina Department of Transportation	Road bonds and crossing permits	[TBD] Prior to Construction	[TBD] Prior to Construction
<u>a/</u> Consultations will occur continuously throughout the development of the Project.			

1.8 AFFECTED STAKEHOLDERS

The Project has developed and implemented a comprehensive Public, Stakeholder, and Agency Participation Plan that outlines a commitment to engage actively with stakeholders currently and throughout the life of the Project and identifies the following activities to be conducted by the Project to ensure successful ongoing communication with all stakeholders (Appendix 1-L). These engagement activities include:

- holding Community Open Houses to provide Project information to all interested stakeholders;
- continuing to identify and hold meetings with local associations, affected public groups, and other non-governmental organizations (“NGOs”) concerning the Project;
- continuing to meet with state and local government representatives to seek input, and provide updates;

- continuing to meet frequently with state and federal agencies for guidance during permitting and development of the FERC Resource Reports and respond rapidly to any requests for information;
- providing Project information and updates via periodic newsletters sent via hardcopy and made available electronically on the Project website listed below;
- periodically updating the publicly available website providing pertinent information about the Project (www.mvpsouthgate.com); and
- establishing additional channels of communication including the Project Information Line (833-MV-SOUTH) and mail@mvpsouthgate.com.

A copy of this Plan was filed with FERC on May 3, 2018 as part of the Project's Pre-Filing request letter. *[Note: The Project will provide an updated version of the Public, Stakeholder and Agency Participation Plan in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

1.8.1 Public Participation

The Project is committed to the early identification and resolution of stakeholder issues and concerns related to the proposed Project. The Project believes that successful resolution of issues is best achieved by involving the appropriate stakeholders at the earliest possible stage of a project and prior to filing its application with FERC. As such, the Project has conducted and will continue to conduct extensive outreach to inform stakeholders about the Project and provide available updates. Early in the stakeholder outreach process, the Project established a Project website (www.mvpsouthgate.com) that provides information about the Project, updates on regulatory proceedings, copies of regulatory filings, and contact information for the public to use to raise questions and concerns.

Efforts to identify stakeholders was focused on federal, state, and local elected officials; federal, state, and local regulatory agencies; Native American tribes; landowners; economic development agencies/chambers of commerce; local law enforcement agencies; local media outlets; NGOs; and the community at large. Pursuant to 18 CFR §157.21, the Project submitted a comprehensive stakeholder list concurrent with this filing in Appendix 1-M. The Project has continued to develop and maintain a contact management system to track contact with these stakeholders in a manner that assists in the identification and resolution of emerging issues and concerns.

The Project sent letters to permitting agencies and agencies that require consultation in April 2018 notifying them of its plan to use the FERC pre-filing process and invite them to participate in the pre-file process. Copies of the submitted pre-filing notices are provided in Appendix 1-K. The Project also contacted stakeholders in May 2018, including landowners, to inform them of the pre-filing process timeline and invite them to attend the community Open Houses. Additionally, letters explaining the Project have been sent to a list of environmental NGOs and other NGOs to assure an appropriate, accurate, and complete baseline of information is provided. Copies of the letters are provided in Appendix 1-K. Ongoing efforts to make additional contact with the environmental NGOs and other NGOs will continue.

In June 2018, the Project planned and conducted three community Open Houses in locations along the route:

- Alamance County, North Carolina on June 25, 2018 at the Palladium Event Center, 1272 Plaza Drive, Burlington, NC 27215;
- Rockingham County, North Carolina on June 26, 2018 at the Reidsville Event Center, 223 S Scales Street, Reidsville, NC 27320; and
- Pittsylvania County, Virginia on June 28, 2018 at Olde Dominion Agriculture Complex, 19783 US 29, Chatham, VA, 24531.

Approximately 300 stakeholders attended these Open Houses. Comments were focused on purpose and need for the project; stream crossings and construction techniques. Route selection was a topic of discussion at each open house. The Project's Project team met with each landowner or interested stakeholder to explain the proposed route and take suggestions and comments.

As part of its commitment to keeping stakeholders informed, the Project has committed to periodically creating and distributing, via traditional mail and electronic technologies, Project newsletters that inform stakeholders about the Project in general, what has recently occurred, and what to expect next. The first of these newsletters is planned for distribution in August 2018.

In addition, the Project has and will continue to provide copies of the filing materials, including resource reports, to participating federal agencies, county offices, and public libraries along the proposed pipeline route and to certain state offices so the public will have the opportunity to view the materials and to provide comments. Copies will be provided to the following libraries in the Project area:

- May Memorial Library – Burlington, North Carolina;
- Reidsville Library - Reidsville, North Carolina; and
- Pittsylvania County Public Library - Chatham, Virginia.

1.8.1.1 FERC Scoping Sessions

The Project will support and attend FERC-sponsored scoping sessions in August 2018. Three meetings are scheduled:

- Rockingham County, North Carolina on August 20, 2018 at Reidsville Event Center, 223 S. Scales Street, Reidsville, North Carolina 27320
- Pittsylvania County, Virginia on August 21, 2018 at Olde Dominion Agricultural Complex, 19783 US-29, Chatham, Virginia 24531
- Alamance County, on August 23, 2018 at Vailtree Event and Conference Center, 1567 Bakatsias Lane, Haw River, North Carolina 27258

FERC will provide information on the regulatory process and provide stakeholders an opportunity to ask questions and provide comments. Upon completion of the scoping process, the Project will provide responses to comments received during the scoping period either within the final Environmental Report or as a stand-alone submittal.

1.8.2 Landowner Notification

The names and addresses of landowners whose property will be crossed by the Project are provided in Appendix 1-M. This list of landowners will be continually updated and maintained throughout the Project. These landowners were contacted beginning in April 2018 to request access for civil and environmental surveys for the pipeline route, access roads, staging areas and aboveground facility sites.

Throughout the course of the Project, landowners and stakeholders will be kept informed about Project permitting developments, construction, and restoration through various means, such as Project notification letters and newsletters. In April 2018, in accordance with Section 157.6(d) of the Commission's regulations (18 CFR § 157.6(d)), the Project provided the required notification of the Project to the directly affected and abutting properties affected by the construction work areas. The landowner notification letters also provided information regarding procedures to follow in the event that the landowner has any concerns or problems during construction. In accordance with Section 157.6(d) of the Commission's regulations (18 CFR § 157.6(d)), the Project will provide the required notification of the Project to the directly affected and abutting properties affected by the construction work areas. The Project will implement a Landowner Complaint Resolution Process which outlines these procedures. The Project has provided this plan in Appendix 1-L.

1.8.3 Agency Outreach

In addition to public outreach efforts with landowners and governmental officials, the Project has been conducting an extensive planning and consultation process with federal and state regulatory agencies, resource agencies, and Native American Tribes. The consultation process has involved meetings, letter requests for resource information, and telephone discussions and emails. Project agency correspondence to date are provided in Appendix 1-K.

1.9 NON-JURISDICTIONAL FACILITIES

Non-jurisdictional facilities are those facilities related to the Project that are constructed, owned, and operated by others that are not subject to FERC jurisdiction. When making this determination, FERC requires applicants to address four factors to determine whether FERC environmental review is needed for Project-related non-jurisdictional facilities. These factors are:

- (i) whether or not the regulated activity comprises "merely a link" in a corridor type project (e.g., a transportation or utility transmission project);
- (ii) whether there are aspects of the non-jurisdictional facility in the immediate vicinity of the regulated activity, which uniquely determine the location and configuration of the regulated activity;
- (iii) the extent to which the entire project will be within the Commission's jurisdiction; and
- (iv) the extent of cumulative Federal control and responsibility.

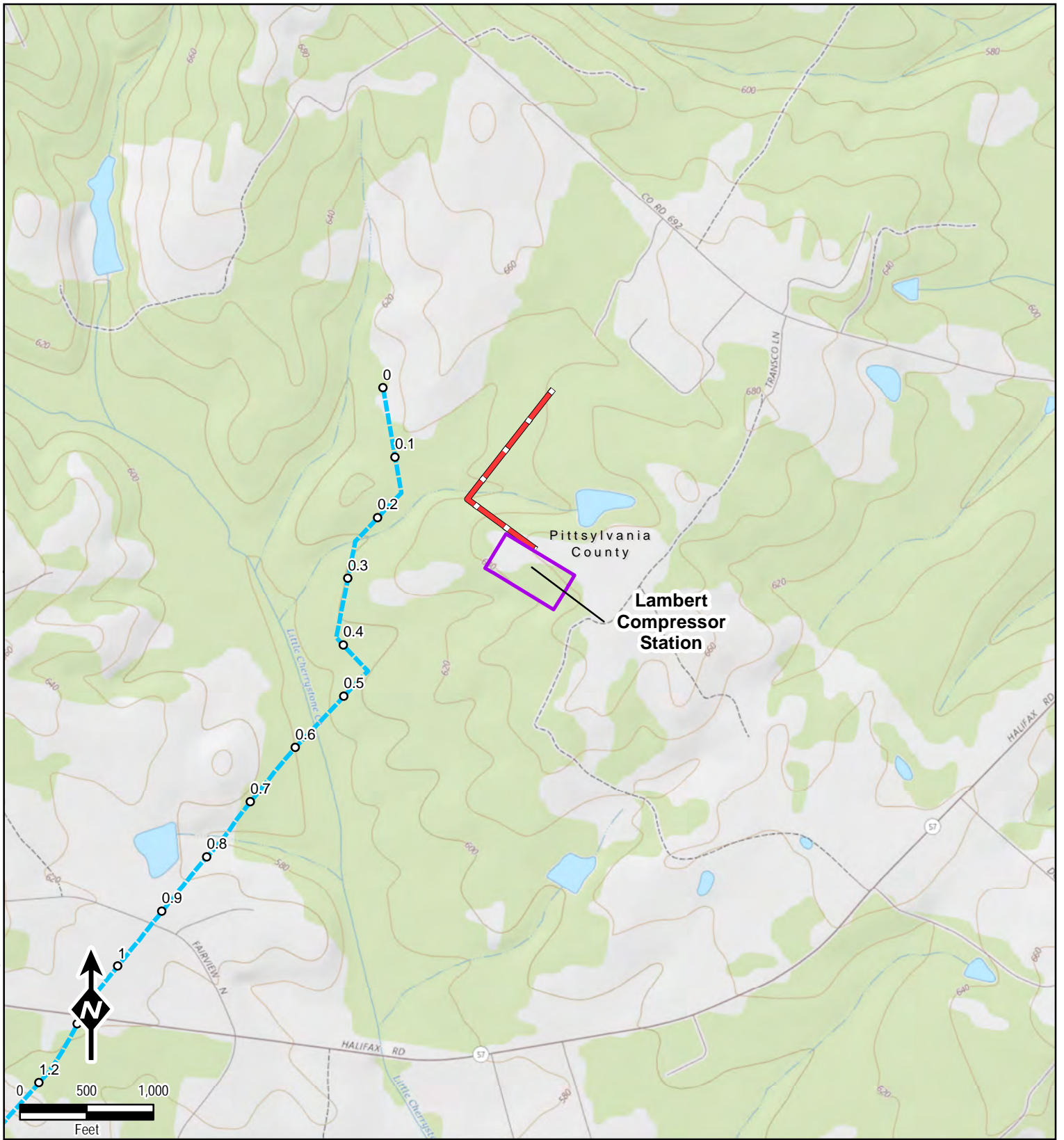
As discussed in Section 1.2.2.5, electric powerlines will be required for the Lambert and Russell compressor stations. Electric services from the local distribution company will also supply the interconnects (meter stations), MLVs, and cathodic protection sites. In addition, PSNC Energy intends to make minor improvements to their existing Dan River and Haw River delivery points not part of this application. Table

1.9-1 below provides information for proposed non-jurisdictional facilities. Figure 1.9-1 shows the electric powerlines that will be required for the compressor stations and interconnects.

Table 1.9-1		
Electric Service Facilities to Support the MVP Southgate Project		
Company/Owner	Public Service Company of North Carolina; dba PSNC Energy	Various
Type of Facility	Interconnect Facilities	Electrical Service
Dimensions	Minor improvements to existing facilities within fence line	Lambert Compressor Station will require an approximate 0.3-mile-long power line. Russell Compressor Station will require an approximate 0.2-mile-long power line. Electric powerlines will be constructed and maintained within an approximate 50-foot-wide right-of-way for ground beds, mainline valves, and interconnects.
Federal Permits/Status	Not Applicable	Not Applicable
Local and State Permits/Status	Not Applicable	Not Applicable
Required Environmental Reviews	NC DENR Erosion and Sedimentation Control Permit	Not Applicable

The Project continues to negotiate with potential customers which may result in the construction of other non-jurisdictional facilities. *[Note: The Project continues to evaluate potential non-jurisdictional facilities associated with the Project and will provide additional information regarding non-jurisdictional facilities including application of the four-factor test, if necessary, in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

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Legend

- Proposed Pipeline Route
- Electric Utility Connection
- Compressor Station
- Meter Station
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 1,000 feet
When Printed 8.5x11





Figure 1.9-1

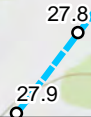
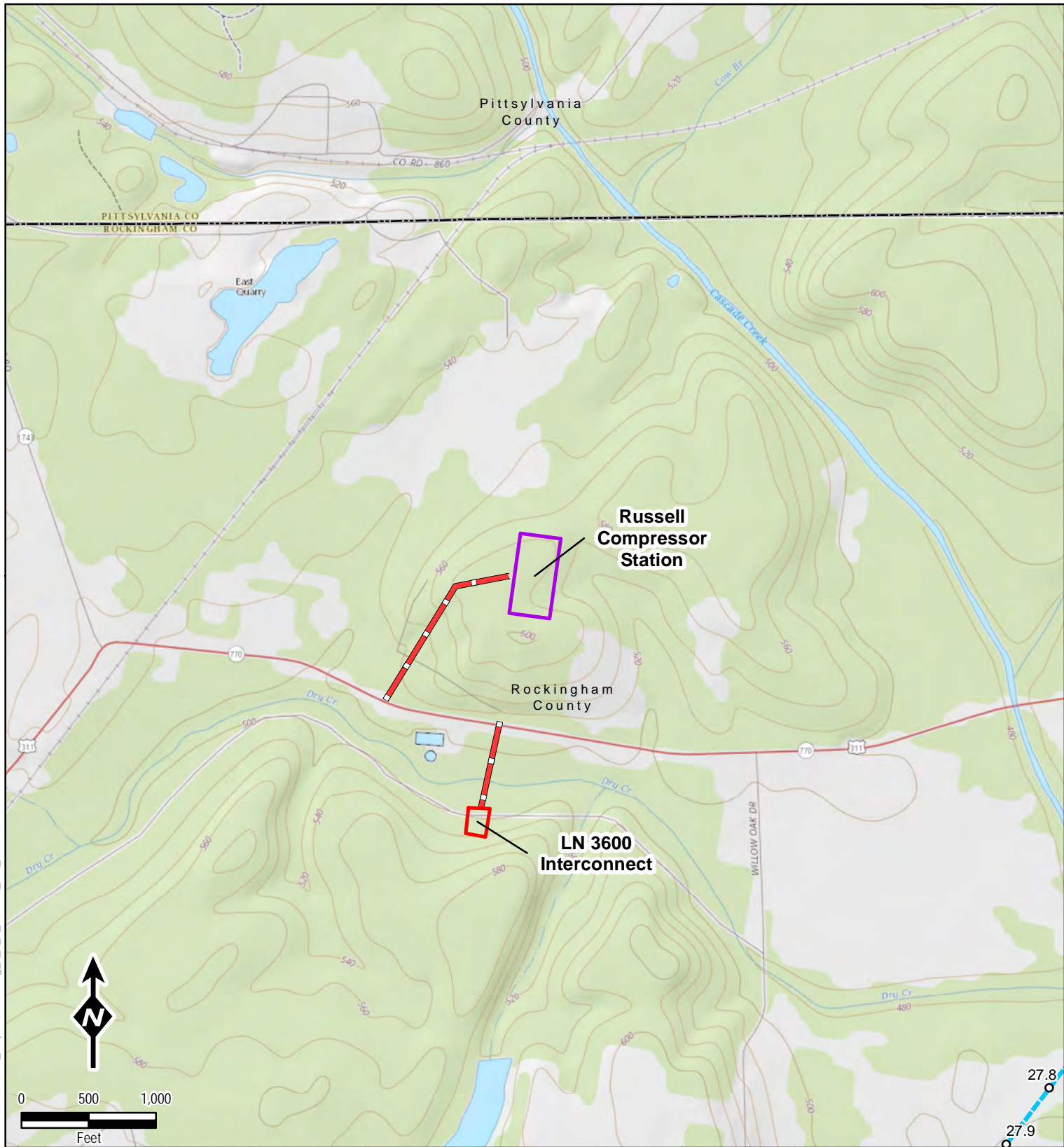
Electric Utilities For Compressor Stations and Interconnects

Sheet 1 of 4



600 Willowbrook Ln
West Chester, PA 19382

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Legend

- Proposed Pipeline Route
- Electric Utility Connection
- Compressor Station
- Meter Station
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 1,000 feet
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 1.9-1

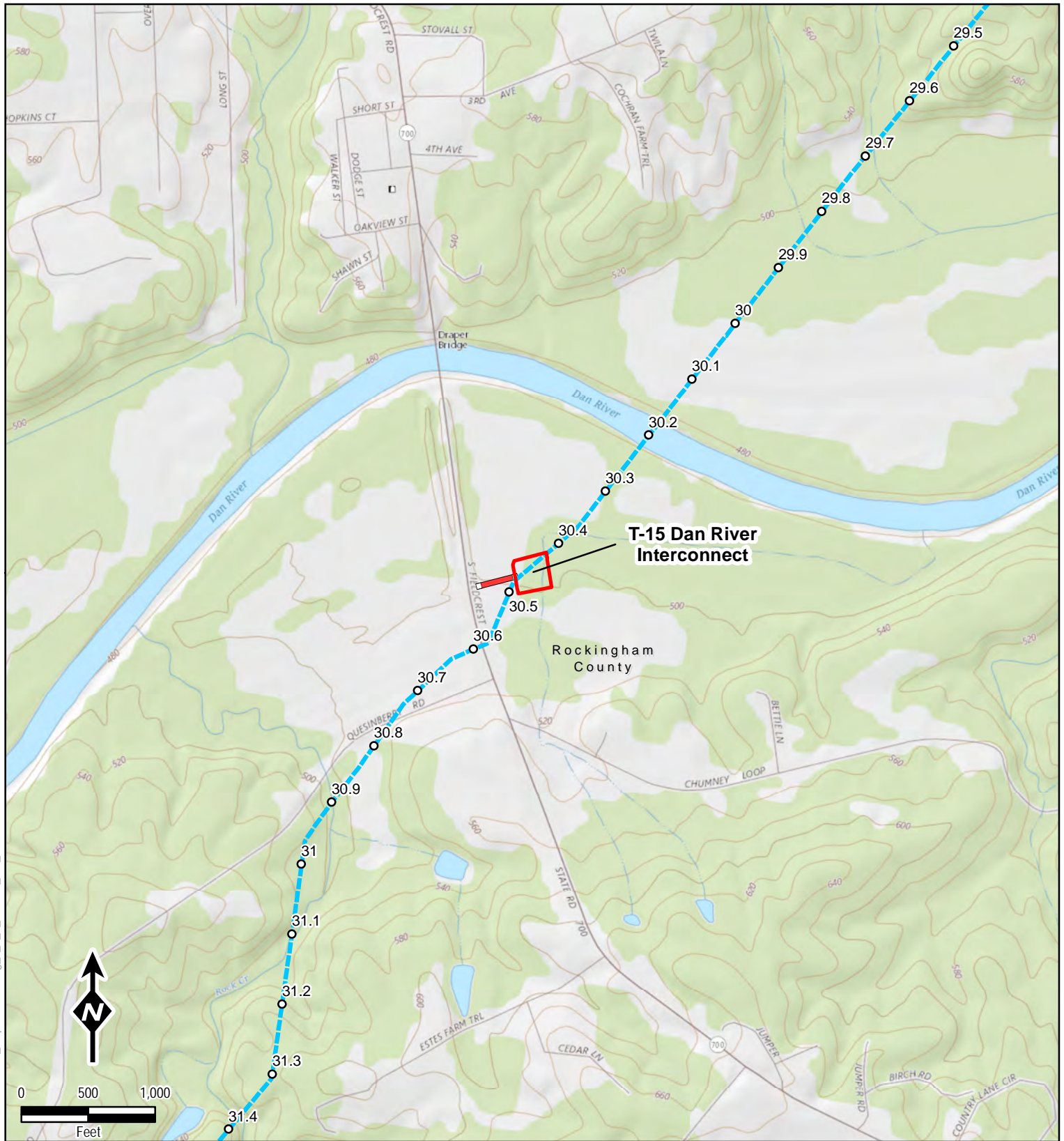
Electric Utilities For Compressor Stations and Interconnects

Sheet 2 of 4

TRC
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Legend

- Proposed Pipeline Route
- Electric Utility Connection
- Compressor Station
- Meter Station
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 1,000 feet
When Printed 8.5x11

Mountain Valley
PIPELINE LLC

Figure 1.9-1

Electric Utilities For Compressor
Stations and Interconnects

Sheet 3 of 4

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Legend

- Proposed Pipeline Route
- Electric Utility Connection
- Compressor Station
- Meter Station
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 1,000 feet
When Printed 8.5x11

Mountain Valley
PIPELINE, LLC

Figure 1.9-1

Electric Utilities For Compressor
Stations and Interconnects

Sheet 4 of 4

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1.10 CUMULATIVE IMPACTS

The Council on Environmental Quality regulations that implement the National Environmental Policy Act define cumulative effects as “the impact on the environment which results from the incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions” (40 CFR § 1508.7). Cumulative effects include both direct and indirect, or induced, effects that would result from the Project, as well as the effects from other projects (past, present, and reasonably foreseeable future actions) not related to or caused by the Project. Cumulative impacts may result when the environmental effects associated with a Project are added to temporary (construction-related) or permanent (operations-related) impacts associated with other past, present, or reasonably foreseeable future projects. Although the individual impact of each separate project might not be significant, the additive or synergistic effects of multiple projects could be significant. The cumulative effects analysis evaluates the magnitude of cumulative effects on natural resources such as wetlands, water quality, floodplains, and threatened and endangered species, as well as cumulative effects on land use, socioeconomics, air quality, noise, and cultural resources. The Council on Environmental Quality regulations (40 CFR § 1508.8) also require that the cumulative effects analysis consider the indirect effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

The purpose of the cumulative impacts analysis is to identify and describe cumulative impacts that would potentially result from implementation of the Project. Inclusion of actions within the analysis is based on identifying commonalities of impacts from other actions to potential impacts that would result from the Project. To avoid unnecessary discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, the cumulative impacts analysis for the Project will be conducted using the following guidelines:

- A project must impact a resource category potentially affected by the Project. For the most part, these projects are located in the same general area that would be directly affected by construction of the Project. The effects of more distant projects are in most cases not assessed, because their impacts would tend to be localized and not contribute significantly to the impacts of the Project. Potential cumulative impacts on air quality and watersheds, however, were considered on a broader, more regional basis.
- The distance into the past and future which other projects could potentially cumulatively impact the area of the Project was based on whether the impacts are short-term, long-term, or permanent. Most of the impacts related to the other Projects would occur during the construction phase, and would be short-term impacts. Timing will be evaluated based on the submittal date of the Project’s certificate application and the proposed in-service date. “Past” projects were identified as those where impacts from construction and/or operation of the completed project continue to affect resources. “Present” projects are those currently under construction. Projects will be determined to be “reasonably foreseeable” when information about the project is publicly available.

Projects meeting one or more of the criteria listed below are considered in this cumulative analysis. These criteria define the projects’ regions of influence, which were used in this analysis to describe the general area for which the projects could potentially contribute to cumulative impacts. The region of influence varies depending on the resource being discussed. Specifically, the cumulative impacts analysis for the Project includes:

- Minor projects, such as residential development, small commercial development, and small transportation projects within 0.25 mile of the Project area;
- Major projects, such as large commercial, industrial, transportation and energy development projects within a 10-mile corridor of the Project area (5 miles of the Project centerline). This includes natural gas well permitting and development projects;
- Major projects within watersheds crossed by the Project. Watershed boundaries are identified using the HUC – 10, or 5th Level Watershed; and
- Projects with potential to result in longer-term impacts on air quality (for example natural gas pipeline compressor stations) located within air quality control regions crossed by the other Projects and organized by county. If the other projects are near the county border, the adjoining county will also be reviewed.

Projects older than 5 years will not be evaluated unless they have ongoing air emissions.

An assumption related to identifying projects to include in the cumulative impact analysis is that information necessary to compile the analysis is available to the public from various local, county, state, and federal sources, and is up to date and accurate. The level of information available varies considerably based on the source. For example, information is available to interested parties in a variety of formats regarding natural gas exploration and production, and current and future natural gas related projects; however, providing an informed cumulative impact analysis requires the gathering of pertinent information from a number of different sources for an individual project. Where publicly available information does not include estimates of disturbance or environmental impacts associated with identified projects the quantitative impacts could not be determined. In these instances, the Project will use a qualitative comparison for the cumulative impacts assessment.

The following are sources of projects included in this evaluation:

- Federal Agencies – Information on projects pending before the FERC (either in the Pre-filing Process or with a filed Certificate application) is available through FERC’s eLibrary system. USACE regional websites provide information regarding recently approved permits and pending USACE permits that are available for public comment. Available information varies by website but a brief description of the activity requiring the permit and the applicant is provided.
- State Agencies – Information on projects recently reviewed or under review for the Virginia and North Carolina state agencies. Available information varies by agency; however, projects that are publically posted will be included.
- County Agencies – County and local government websites are possible sources of information about natural gas or energy-related projects. In addition, each county has been contacted directly for information related to potential developments within 0.5 mile from the proposed pipeline corridor. In cases where individual counties do not maintain a comprehensive list for planned development, the individual townships have also been contacted.
- Private Companies – Information on projects listed by their owners and developers on their public websites is included.

Projects with potential cumulative impacts on resources within the Project area are listed in Table 1.10-1 and shown in Figure 1.10-1.

Table 1.10-1

Projects with Potential Cumulative Impacts

Project	Description	County/ State	Shared Watershed (5 th Level/ HUC10)	Shared Air Quality Control Region	Approximate Distance from Project	Direction	Status	Potential/ Anticipated Impacts	Potential Permits
Energy Projects									
Atlantic Coast Pipeline Project	An approximately 550-mile, 42-inch natural gas pipeline is proposed by four energy companies that have entered into a joint venture: Dominion, Duke Energy, Piedmont Natural Gas and AGL Resources. The capacity of the pipeline is projected to be 1.5 billion cubic feet/day.	Various- WV, VA, NC	N/A	81.143 Central Virginia	100 miles	East	Under Construction. In-service Q4 2019	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Air and Noise	FERC, State and Local
Reidsville Energy Center	NTE Energy is developing and plans to construct, own and operate the Reidsville Energy Center, an approximately 500 MW natural gas electric generating facility in Rockingham County, North Carolina.	Rockingham, NC	NA	81.150 Northern Piedmont	12 miles	West	Construction to start 2018	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Air and Noise	FERC, State and Local
Virginia Southside Expansion	100 miles of new 24-inch diameter pipeline extending from the Transco mainline in Pittsylvania County, Va., and into Halifax, Charlotte, Mecklenburg, and terminating in Brunswick County, Va. Also construction of a 21,800 hp compressor station in Pittsylvania County, VA.	Pittsylvania County, VA	Cherrystone Creek-Banister River, Stinking River-Banister River	81.143 Central Virginia	2 miles	North	In-service September 2015	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Air and Noise	FERC, State and Local
Transco Southeastern Trail	Transco Southeastern Trail expansion project will consist of 7.7 miles of 42-in. pipeline looping facilities in Virginia, horsepower additions at existing compressor stations in Virginia, and piping and valve modifications on other existing facilities in South Carolina, Georgia, and Louisiana to allow for bidirectional flow. Compressor Station 165 upgrade in Chatham, VA within Pittsylvania County, VA.	Various; Pittsylvania County, VA	Cherrystone Creek-Banister River	81.143 Central Virginia	<5 miles	West	FERC Application Filed April 2018	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Air and Noise	FERC, State and Local

Table 1.10-1

Projects with Potential Cumulative Impacts

Project	Description	County/ State	Shared Watershed (5 th Level/ HUC10)	Shared Air Quality Control Region	Approximate Distance from Project	Direction	Status	Potential/ Anticipated Impacts	Potential Permits
Mountain Valley Pipeline	Natural gas pipeline system that spans approximately 303 miles from northwestern West Virginia to southern Virginia	Various; ends at Pittsylvania, VA	Cherrystone Creek-Banister River	81.143 Central Virginia	0 miles	North	Under Construction	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Land Use, Air and Noise	FERC, State and Local
Transco Appalachian Connector	Williams has proposed to link up its Transco pipeline system directly into the Marcellus/Utica via the Appalachian Connector Project. From Clarington OH to Chatham, VA.	Various; ends at Pittsylvania, VA	Cherrystone Creek – Banister River	81.143 Central Virginia	3 miles	West	In Development	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Air and Noise	FERC, State and Local
Transportation Projects									
U.S. Route 29 South	Replacement of structurally deficient bridge.	Pittsylvania County, VA	Cascade Creek-Dan River	81.143 Central Virginia	7 miles	Southeast	Completed 2017	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife	State and Local
Route 58 over Route 311	About 3.3 million in upgrades to the intersection of Berry Hill Road and U.S. 58 West of Danville to accommodate traffic for the nearby Berry Hill Road industrial Park	Pittsylvania County, VA	Wolf Island Creek-Dan River	81.143 Central Virginia	2 miles	East	Planning	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
Berry Hill Road	Reconstruction of Berry Hill Road in order to accommodate more traffic-23.7 million	Pittsylvania County, VA	Wolf Island Creek-Dan River, Cascade Creek-Dan River	81.143 Central Virginia	2 miles	East	Planning	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
Stony Mill Road	The construction of a single lane roundabout at the intersection of Stony Mill Road and Tunstall High Road- 2.2 million	Pittsylvania County, VA	Wolf Island Creek-Dan River	81.143 Central Virginia	0.5 mile	East	Planning	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
Mount Cross Road	A two-phase plan to widen Mount Cross Road to the city limits, making the road a five-lane section with a two-way center turn lane with a new park and ride lot and sidewalk -17 million	Pittsylvania County, VA	Wolf Island Creek-Dan River	81.143 Central Virginia	5 miles	East	Planning	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local

Table 1.10-1

Projects with Potential Cumulative Impacts

Project	Description	County/ State	Shared Watershed (5 th Level/ HUC10)	Shared Air Quality Control Region	Approximate Distance from Project	Direction	Status	Potential/ Anticipated Impacts	Potential Permits
Climax Road	Widening Climax Road to a minimum of 20 feet to accommodate traffic-1.3 million	Pittsylvania County, VA	N/A	81.143 Central Virginia	12 miles	Northwest	Planning	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
U. S. Route 29 South over Norfolk Southern Railroad	Replacement of the structurally deficient bridge on U.S. Route 29 South over Norfolk Southern Railroad with approaches on this Principal Rural Arterial roadway in Pittsylvania County	Pittsylvania County, VA	Cherrystone Creek-Banister River	81.143 Central Virginia	10 miles	East	Complete 2017	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife	State and Local
Future I-73	Construction of a 9.4-mile, four-lane interstate from Joseph M. Bryan Boulevard/Airport Parkway interchange to U.S. 220 near the Haw River	Guilford, NC	Reedy Fork	81.150 Northern Piedmont	25 miles	West	Complete October 2017	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife	State and Local
Greensboro Urban Loop	Completion of the Greensboro Urban Loop to help relieve I-40 congestion at I-85 Business and U.S. routes 29, 70, 220 and 421	Guilford, NC	Reedy Fork	81.150 Northern Piedmont	10 miles	West	Under Construction	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Air and Noise	State and Local
Big Mill Farm/Hopkins Road Improvements	Proposed widening of Big Mill Farm Road and Hopkins Road in Kernersville from Business 40/U.S. 421 to West Mountain Street (N.C. 66) and construction of an interchange at Business 40/U.S. 421	Forsyth, NC	NA	81.150 Northern Piedmont	33 miles	West	In Development	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
Macy Grove Road Improvements	Proposed improvements and an extension to Macy Grove Road in Forsyth and Guilford counties	Forsyth/Guilford, NC	Reedy Fork	81.150 Northern Piedmont	32 miles	West	In Development	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
NC 119 Relocation	Proposed relocation of a portion of N.C. 119 in Mebane – from I-85 to existing the N.C. 119 near Mrs. White Lane	Alamance, NC	Back Creek- Haw River	81.150 Northern Piedmont	5 miles	East	In Development	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
N.C. 62 Widening - Ramada Road to U.S. 70	Proposed widening an approximately 1-mile stretch of N.C. 62 to improve traffic flow and safety	Alamance, NC	Back Creek- Haw Rive	81.150 Northern Piedmont	4 miles	West	In Development	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local

Table 1.10-1

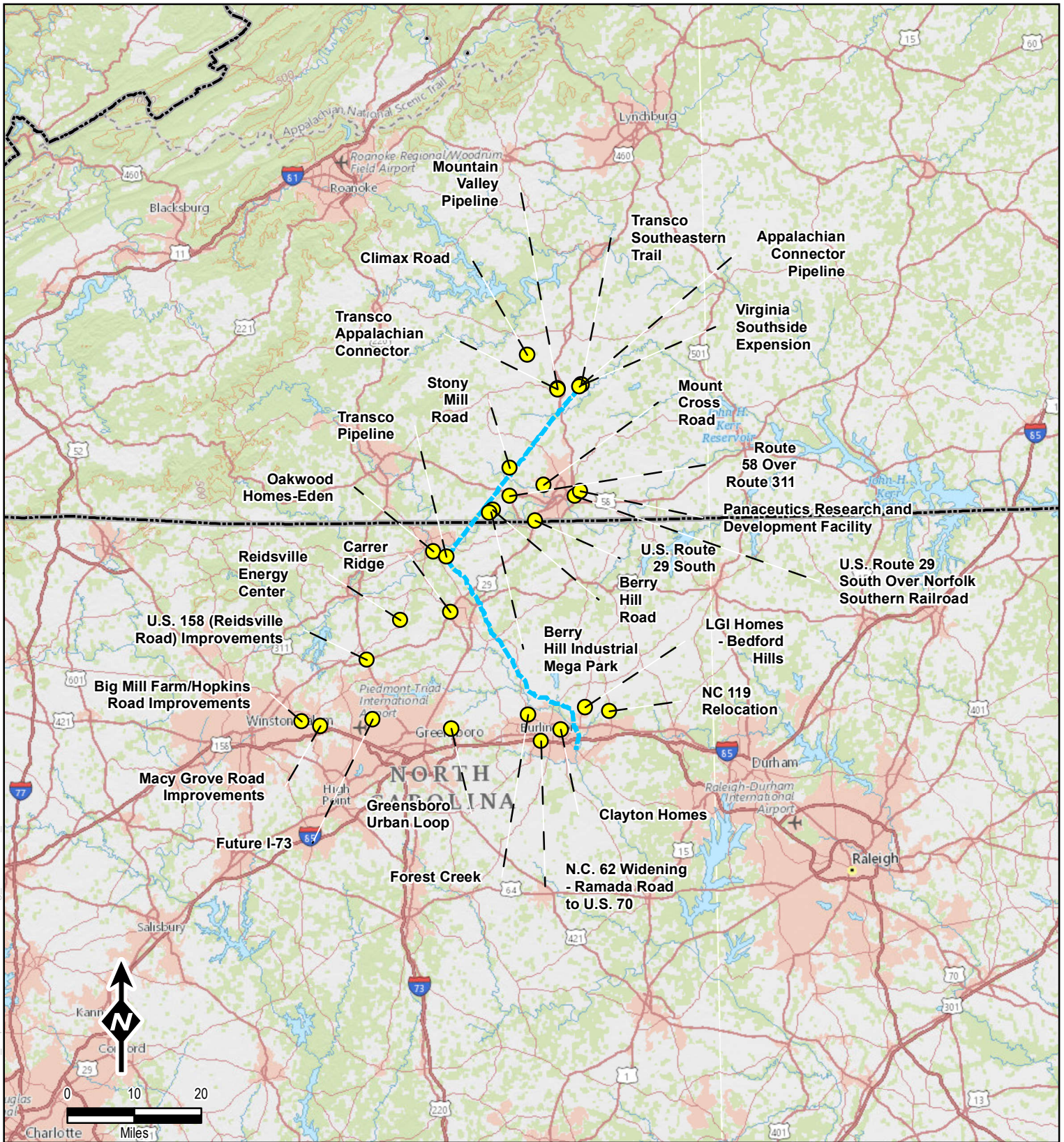
Projects with Potential Cumulative Impacts

Project	Description	County/ State	Shared Watershed (5 th Level/ HUC10)	Shared Air Quality Control Region	Approximate Distance from Project	Direction	Status	Potential/ Anticipated Impacts	Potential Permits
U.S. 158 (Reidsville Road) Improvements	Proposed 18.8-mile widening of U.S. 158 from U.S. 421/Business 40 in Winston-Salem to U.S. 220 in Guilford County	Guilford, NC	Headwaters Haw River	81.150 Northern Piedmont	18 miles	West	In Development	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
Commercial, Industrial, Residential Projects									
Berry Hill Industrial Park	A 3,500 acres mega-park owned by Danville and Pittsylvania Counties through the Regional Industrial Facilities Act. Phase I activities began in March 2017 and include approximately 133 acres of site preparation. Schedule for additional phases is unknown.	Pittsylvania County, VA	Wolf Island Creek-Dan River, Cascade Creek-Dan River	81.143 Central Virginia	1.3 miles	East	In Development	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife, Land Use, Air and Noise	State and Local
Panaceutics Research and Development Facility	Panaceutics, a manufacturer of personalized medicine and nutrition solutions, will invest \$5.8 million to establish a research and development and high-tech manufacturing facility in the Ringgold East Industrial Park in Pittsylvania County, Virginia.	Pittsylvania, VA	Hogans Creek-Dan River	81.143 Central Virginia	10 miles	East	Under Construction	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
Oakwood Homes-Eden	New construction mobile home park at S Van Buren Rd. Eden, NC; approx. 18 new homes	Rockingham, NC	Cascade Creek-Dan River	81.150 Northern Piedmont	2 miles	West	Under Construction	No resources expected to be cumulatively affected given the unknown construction timeframe	State and Local
Carter Ridge	Carter Ridge new construction homes, Carter Ridge Drive, Reidsville, NC	Rockingham, NC	NA	81.150 Northern Piedmont	5 miles	West	Under Construction	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife	State and Local
Clayton Homes-Burlington	New construction housing development single family homes off S Graham Hopedale Rd, Burlington	Alamance, NC	Back Creek-Haw River	81.150 Northern Piedmont	2.5 miles	West	Under Construction	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife	State and Local
LGI Homes- Bedford Hills	New construction housing development single family homes near 111 Pillow Ln., Burlington, NC	Alamance, NC	Back Creek-Haw River	81.150 Northern Piedmont	1.5 miles	East	Under Construction	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife	State and Local

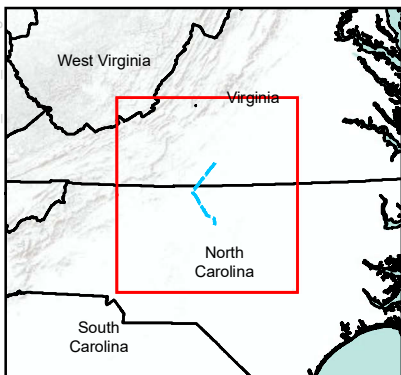
Table 1.10-1

Projects with Potential Cumulative Impacts

Project	Description	County/ State	Shared Watershed (5th Level/ HUC10)	Shared Air Quality Control Region	Approximate Distance from Project	Direction	Status	Potential/ Anticipated Impacts	Potential Permits
Forest Creek	New construction housing development 5 new homes in development	Alamance, NC	Back Creek- Haw River	81.150 Northern Piedmont	3.5 miles	Southwest	Under Construction	Soils and Sediments, Water Resources and Wetlands, Vegetation and Wildlife	State and Local



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- Legend**
- Cumulative Impact Locations
 - Proposed Pipeline Route
 - State Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 20 miles
When Printed 8.5x11





Figure 1.10-1

Projects with Potential Cumulative Impacts



600 Willowbrook Ln
West Chester, PA 19382

1.10.1 Potential Cumulative Impact on Resources within the Project Area

Soils and Geology – The facilities associated with the Project are expected to have a temporary but direct impact on near-surface geology, soils, and sediments. Clearing and grading associated with construction of the Project and the other projects listed in Table 1.10-1 could accelerate the soil erosion process and, without adequate protection, could result in discharge of sediment to adjacent waterbodies and wetlands. Since the direct effects will be localized and limited primarily to the period of construction, cumulative impacts on geology, soils, and sediments will only occur if other projects are constructed at the same time and general location as the proposed Project facilities. The construction schedules of some of the projects listed in Table 1.10-1 coincide with the schedule proposed for the Project. The Project will implement the provisions of the FERC Plan and Procedures and its Project-specific E&SCP to establish a baseline for minimizing the potential for erosion as a result of water or wind action and to aid in reestablishing vegetation after construction. In addition, disturbance associated with construction activities will be minimized and mitigated through the application of BMP's that are incorporated in the Project-specific E&SCP. Should hazardous materials or contaminated soils and/or sediments be encountered during construction, they will be disposed of at fully licensed and permitted disposal facilities in accordance with applicable state and federal laws and regulations. As a result, the cumulative effect on geological resources, soils, and sediments are expected to be temporary and minor.

Water Resources and Wetlands – Cumulative effects on groundwater resources are expected to be temporary and limited to areas that are affected by each project listed in Table 1.10-1. Impacts on groundwater could include turbidity, reduced water levels, and contamination. Construction activities such as blasting could negatively impact wells close to the Project; however, the Project will implement the measures described in its Water Resources Identification and Testing Plan (see Appendix 2-E of Resource Report 2). Cumulative effects on surface water resources affected by the Project would be limited to waterbodies that are affected by other projects located within the same major watersheds. No permanent diversions or dams are planned, so any impacts from construction on surface waters would be temporary. The greatest potential impacts of pipeline construction on surface waters would result from an increase in sediment loading to surface waters and an increase in internal sediment loading due to channel/floodplain instability as a result of a change in erosion deposition patterns. Each of the project proponents will minimize these effects by implementing wetland and waterbody construction and mitigation measures, including erosion control measures by complying with applicable federal and state permit requirements. Construction of the Project facilities will result in temporary impacts to wetlands. However, each proponent for the projects listed in Table 1.10-1 that affects wetlands will be required by the terms and conditions of their respective Section 404 permits to provide compensatory mitigation for unavoidable wetland impacts. The cumulative effect on water resources and wetlands will be temporary and minor.

Vegetation and Wildlife – The Project traverses deciduous forest, evergreen forest, mixed deciduous-evergreen forest, scrub-shrub land, herbaceous upland, wetlands, and agricultural lands. Cumulative impacts on vegetation and wildlife in conjunction with other projects can be expected. When projects are constructed at or near the same time, the combination of construction activities could have a cumulative impact on vegetation and wildlife in the immediate area. Clearing and grading and other construction activities associated with the projects will result in the removal of vegetation, alteration of wildlife habitat, displacement of wildlife, and other secondary effects such as forest fragmentation and establishment of invasive plant species.

The total amount of vegetation that may be affected by these projects could appear significant but is still relatively minor compared to the abundance of similar vegetation cover types and wildlife habitats in the Project area. In addition, for some of the projects listed in Table 1.10-1 impacts on vegetation will be temporary. As part of each project's permit conditions, mitigation measures should be implemented to minimize the potential for erosion, revegetate disturbed areas, increase the stabilization of site conditions, and control the spread of noxious weeds. Therefore, the degree and duration of the cumulative impact on vegetation and terrestrial wildlife from these projects will be minimized.

Land Use – The Project and several other projects listed in Table 1.10-1 will result in both temporary and permanent modifications to existing land uses. The H-650 pipeline is located parallel to or collocated with existing utility corridors, trails, and roads for approximately 47 percent (34 miles) of the proposed alignment. New permanent effects on land use will be minimal because 70 percent of the land affected by construction of the Project facilities will be allowed to revert to pre-construction uses following construction, except for the habitat conversion of forest to open within 15 feet of the pipeline along the permanent right-of-way to ensure that root systems do not affect the exterior coating of the pipeline.

Following construction, the majority of affected areas will be restored and relinquished back to the landowner without restrictions. Some new restrictions will be imposed on the new (no greater than 50-foot-wide) permanent right-of-way, but primarily these will be limited to activities such as deep excavations or the construction of new, permanent structures or planting of trees that could threaten the integrity of the pipeline or preclude the Project's ability to maintain the pipeline. Because a relatively small area of land used by the Project will be converted to another land use type and because construction will be short term, the cumulative effect on land use will be temporary and minor.

Cultural Resources – Past disturbances to cultural resources in the Project area are typically related to urban development, accidental disturbances, intentional destruction or vandalism, lack of awareness of historic value, and construction, maintenance, and operations associated with existing infrastructure. Federally regulated projects will include mitigation measures designed to avoid or minimize additional direct impacts on cultural resources. Non-federal actions will need to comply with any identification procedures and mitigation measures required by the states of Virginia and North Carolina. Cumulative effects on cultural resources are not anticipated.

Socioeconomics – The Project and the projects listed in Table 1.10-1 will generate temporary construction jobs. The local supply of construction workers needed for these projects may be derived from workers employed in the area, which will provide a direct economic benefit to those individuals and the communities in which they reside. The non-local laborers could represent an increase in the percent of the total population in the Project area (assuming half the construction workers are non-local); however, the existing local infrastructure and housing availability in the Project area is expected to be sufficient to provide for the needs of non-local workers. There will be both short and long term positive cumulative economic benefits from these projects. Taxes generated from operation of the projects will result in an annual tax revenue increase. Permanent employment will also increase as a result of the operation of many of these projects, with the cumulative benefit of potentially lowering local unemployment rates.

Air Quality – Construction equipment and vehicles emit air pollutants in the immediate vicinity of construction, and fugitive dust emissions are generated by soil excavation and other construction activities.

Table 9.2-11 of Resource Report 9, presents the list of the major existing and reasonably foreseeable future projects that may cumulatively or additively impact air quality that could be affected by the construction

and operation of the Project along with an approximate distance from the nearest Project facility. Operation of the existing and reasonably foreseeable major air emissions sources listed in Table 9.2-11 will have air emissions associated with them; however, the other sources of air emissions from operation of these recent or planned projects are or will be controlled in accordance with state and federal air pollution laws and regulations.

The existing and proposed offsite major air emissions sources are or will be operated in compliance with all applicable state and federal air regulations; including, stack testing, recordkeeping, reporting, and monitoring requirements in order to establish compliance with federally enforceable emissions standards. Because operation of the Project along with the other existing and proposed major Title V projects/facilities, will be regulated by the Virginia Department of Environmental Quality and North Carolina Department of Environmental Quality through the air permitting process, the cumulative effect of operation of the Project with other projects is not expected to result in adverse air quality impacts.

Noise Quality – Construction activities also have the potential to produce an increase in noise levels. Similar to potential cumulative air quality impacts, cumulative impacts from construction noise from the Project and the other projects listed in Table 1.10-1 also depends on the type of construction activities that are taking place at the same time and how close in proximity the construction activities are occurring. Because the noise generated by construction activities will be temporary and localized, construction activities for the Project along with the other projects are not expected to result in significant adverse noise impacts.

The design of the proposed compressor stations will include noise abatement measures, as applicable, to ensure the off-site impact of the noise generated by operation of the compressor station is in compliance with all applicable noise standards, including the FERC sound level limits.

Conclusion – The majority of cumulative impacts would be temporary and minor when considered in combination with past, present, and reasonably foreseeable activities.

Some long-term cumulative benefits to the community would be realized from the increased tax revenues. Short-term cumulative benefits would also be realized through jobs and wages and purchases of goods and materials. There is also the potential that the Project would contribute to a cumulative improvement in regional air quality if a portion of the natural gas associated with the Project displaces the use of other more polluting fossil fuels.

The primary factors associated with the MVP Southgate Project that will minimize its contribution to cumulative impacts are as follows:

- The impacts resulting from the Project pipeline facilities will primarily be short-term and constitute temporary impacts associated with construction;
- Approximately 47 percent of the Project pipeline facilities will be parallel to existing utility corridors and other rights-of-way; thereby minimizing impacts associated with construction;
- The Project has been designed to avoid and minimize impacts to the extent practicable and will implement various plans and techniques to ensure potential impacts are further minimized (e.g., Project-specific E&SCP); and

- The Project will contribute to a cumulative improvement in regional air quality if a portion of the natural gas associated with the Project displaces the use of other more polluting fossil fuels.

In addition, significant long-term cumulative benefits to the communities in the Project area will also be realized from increased tax revenues, and short-term cumulative benefits will also be realized through jobs and wages and purchases of goods and materials for the Project.

1.11 REFERENCES

Federal Energy Regulatory Commission (FERC). 2013. Upland Erosion Control, Revegetation and Maintenance Plan. May 2013.

Federal Energy Regulatory Commission (FERC). 2013. Wetland and Waterbody Construction and Mitigation Procedures. May 2013.

Gulf Interstate Engineering. 1999. Temporary Right-of-Way Width Requirements for Pipeline Construction. Prepared for the INGAA Foundation, Inc. Available online at: <http://www.ingaa.org/File.aspx?id=19105>.

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-A

Alignment Sheets and Full Size USGS Quadrangle Maps

(Provided Under Separate Cover)

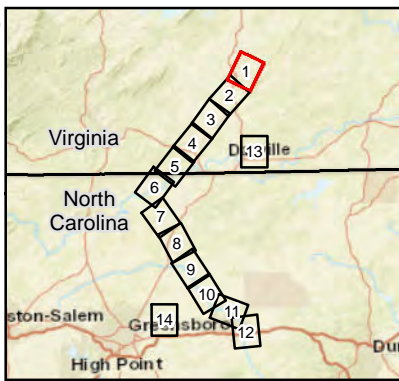
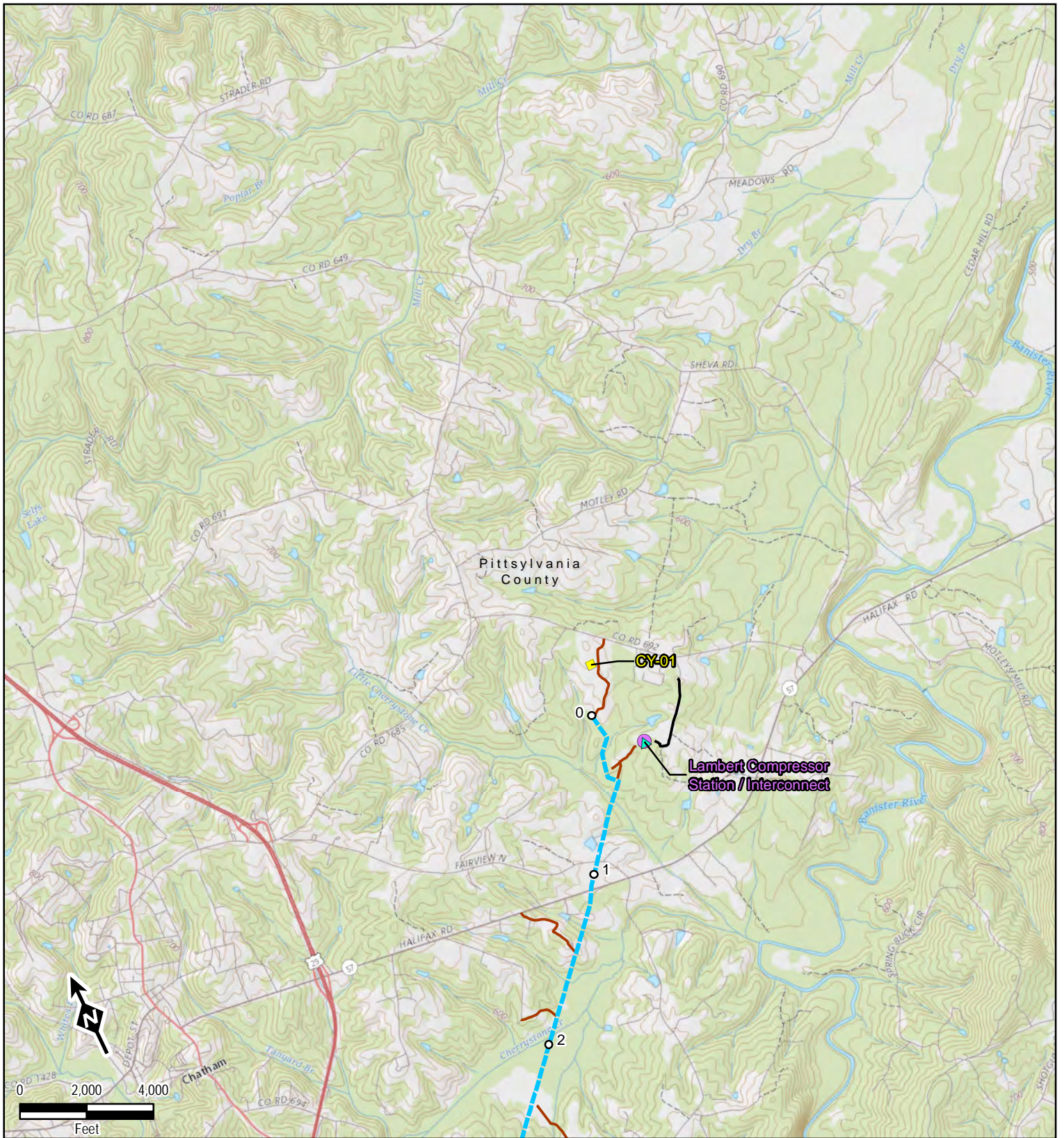
MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-B

USGS 7.5-Minute Topographic Map Excerpts



Legend

- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- ▲ Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

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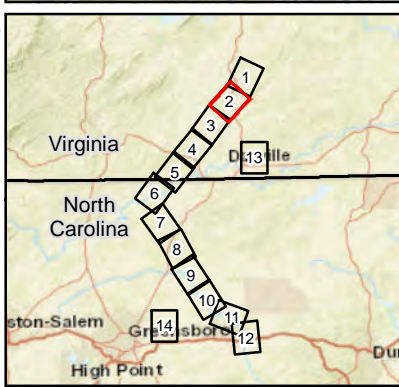
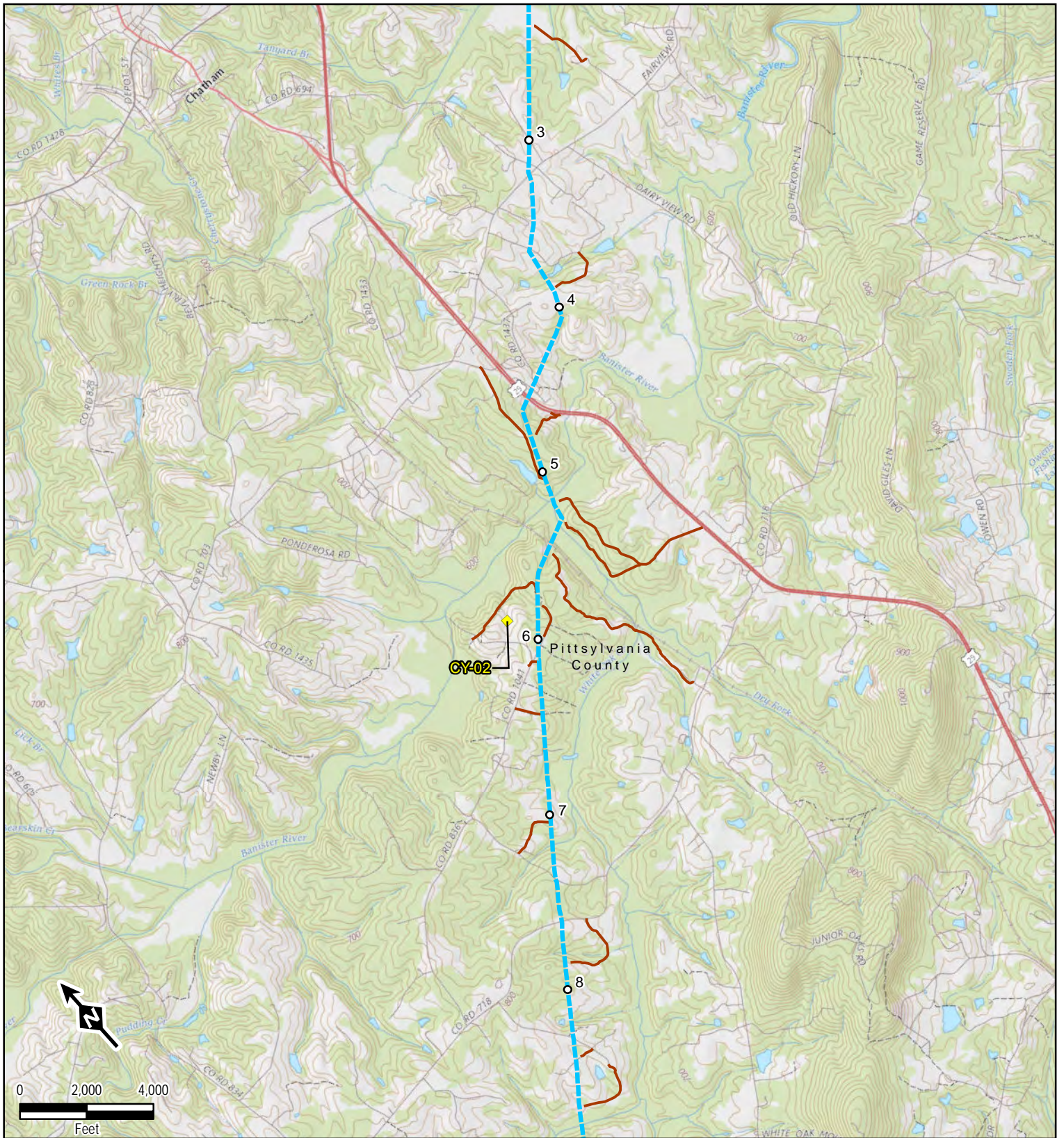
Appendix 1-B

USGS Quadrangle Excerpts
Sheet 1 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

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Legend

- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- ▲ Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
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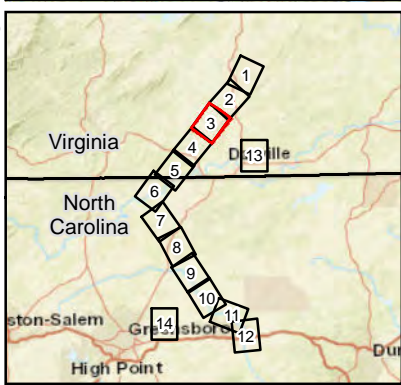
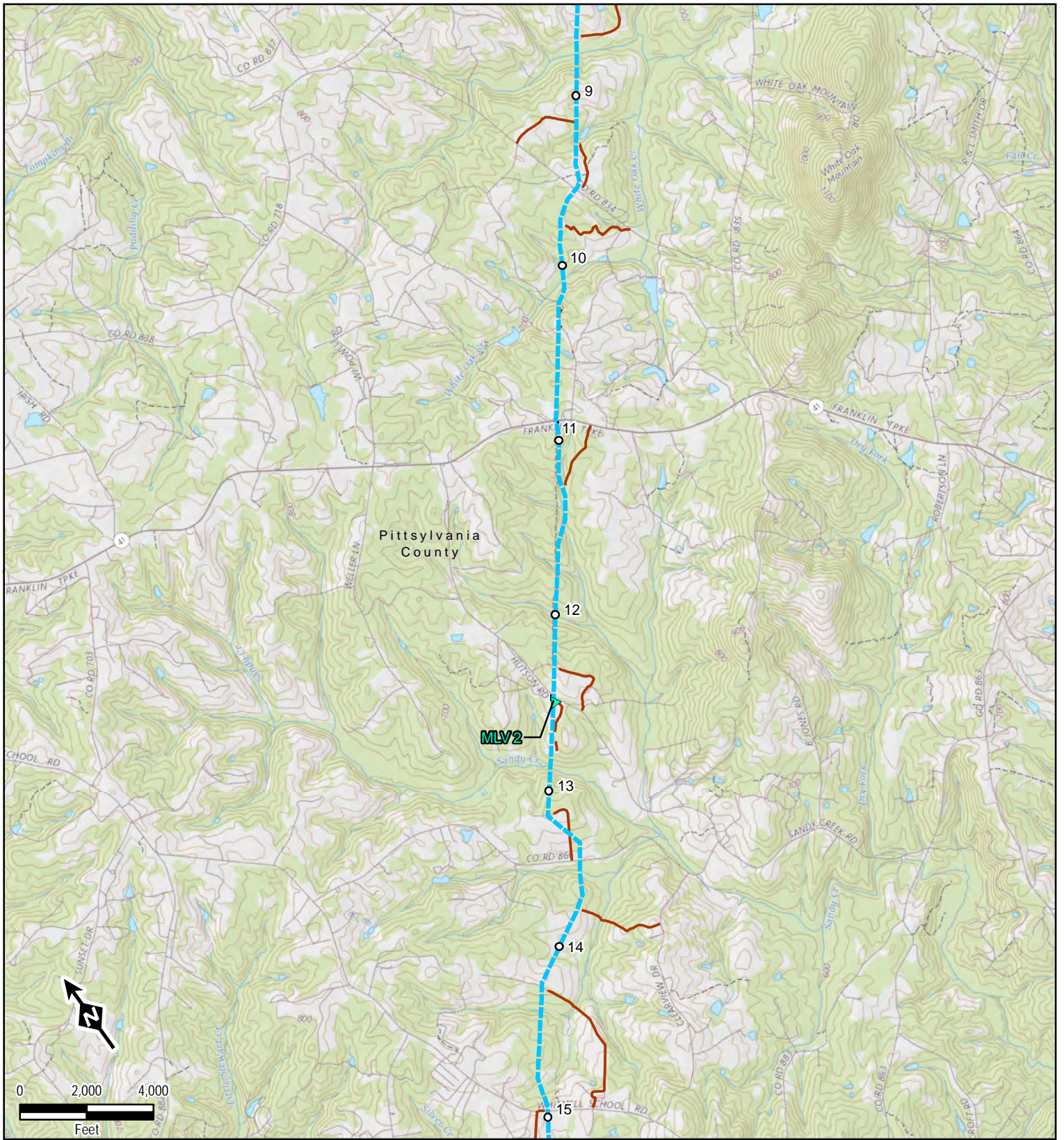
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Appendix 1-B

USGS Quadrangle Excerpts
Sheet 2 of 14

TRC
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Legend

- Mileposts
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- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

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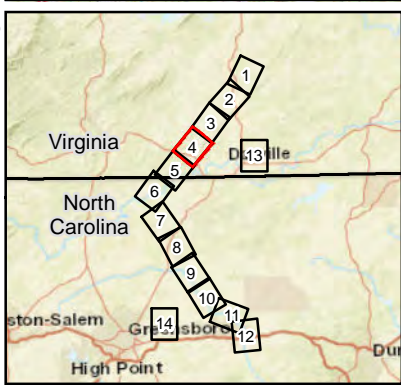
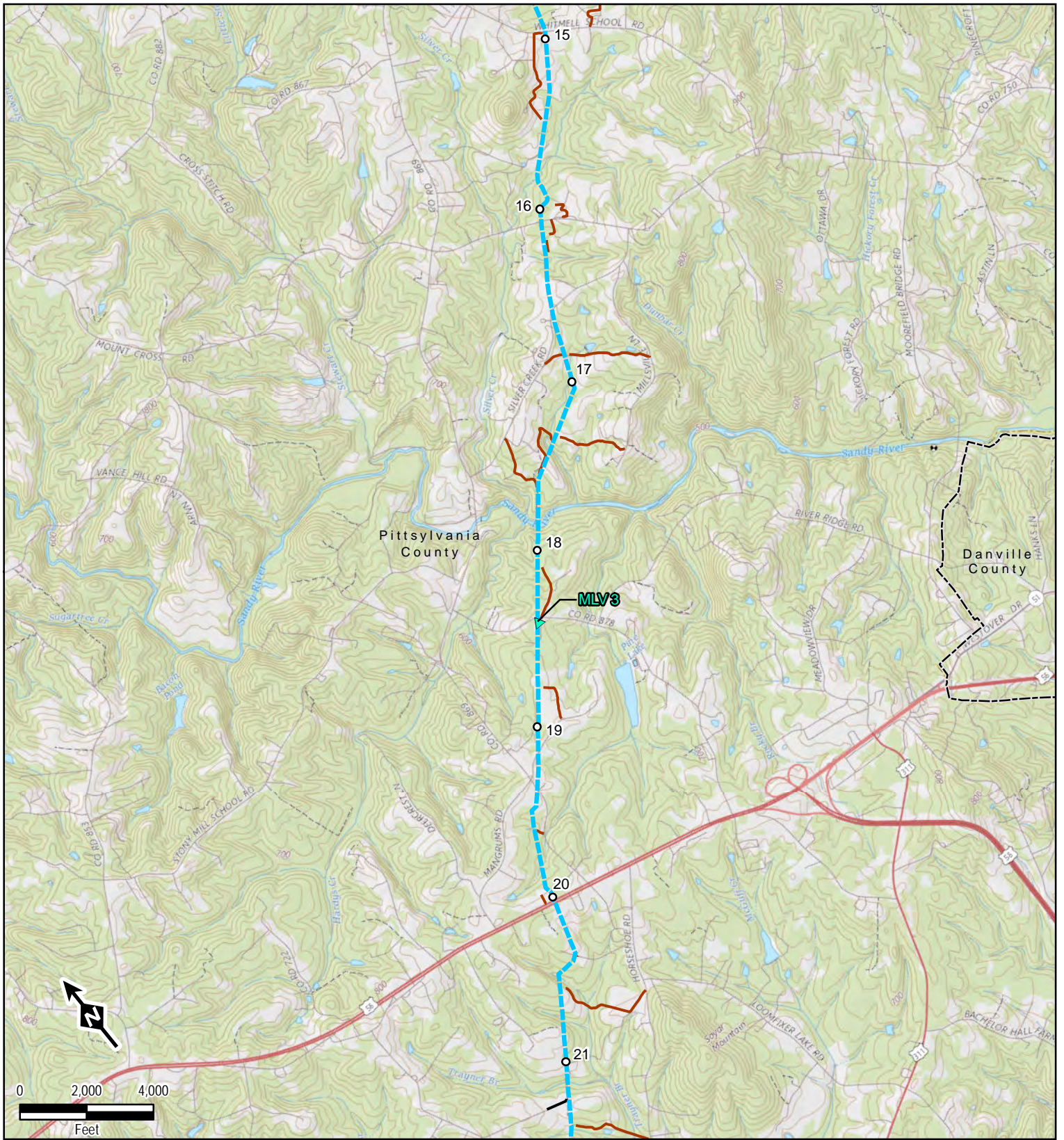
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Appendix 1-B

USGS Quadrangle Excerpts
Sheet 3 of 14

TRC
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Legend

- Mileposts
- Compressor Station
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- - - State Boundary
- - - County Boundary

Data Sources: ESRI, USGS, TRC, EQT

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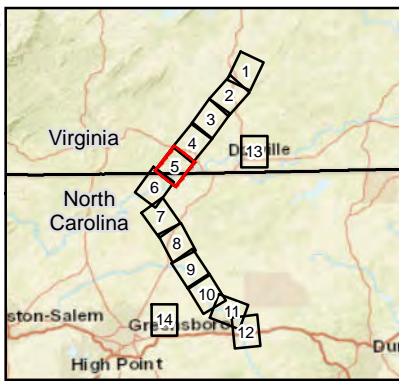
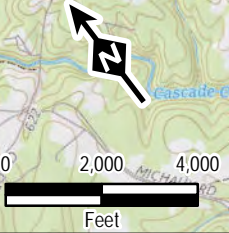
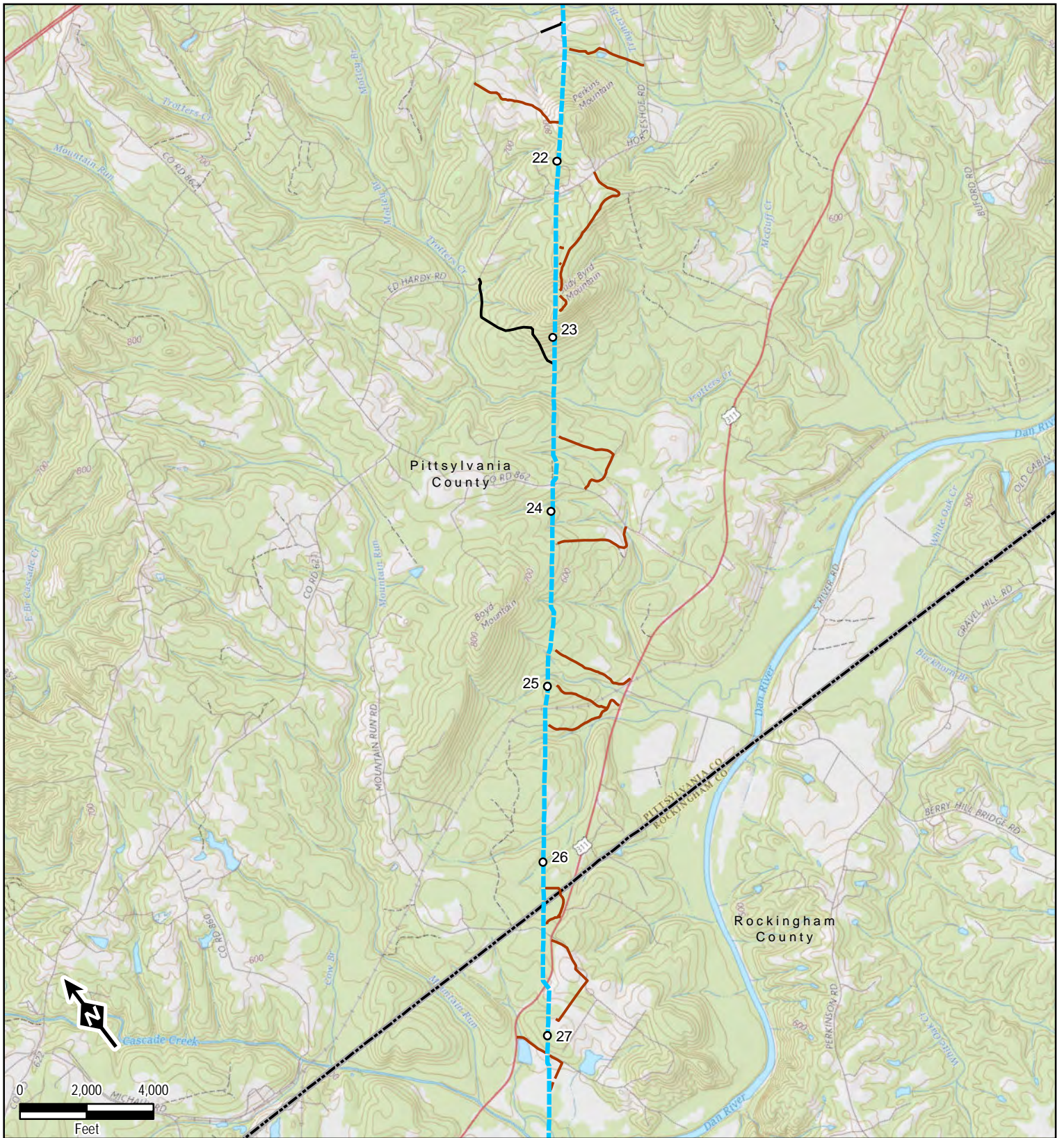
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Appendix 1-B

USGS Quadrangle Excerpts
Sheet 4 of 14

TRC
Results you can rely on

600 Willowbrook Ln
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Legend

- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- ▲ Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

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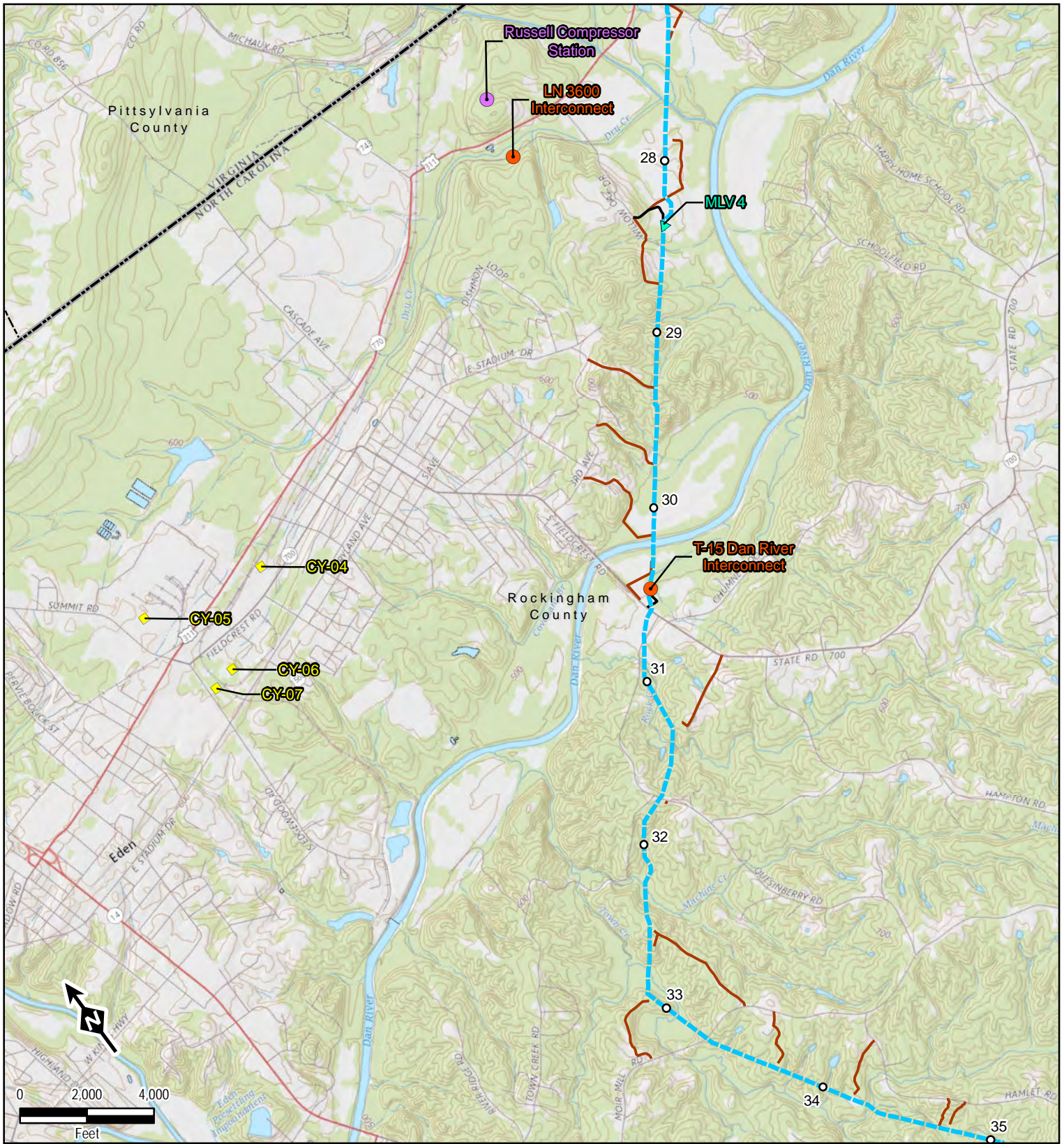
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Appendix 1-B

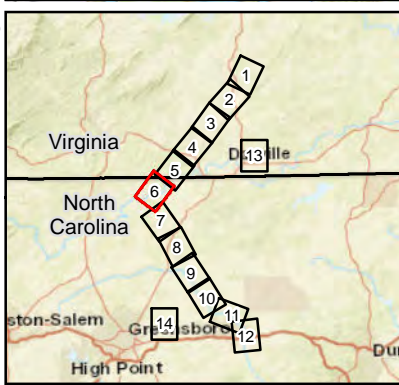
USGS Quadrangle Excerpts
Sheet 5 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382



S:\1-PROJECTS\INEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\IRR\1\Appendix_1B_USGS_Excerpts.mxd



Legend

- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- ▲ Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

Mountain Valley PIPELINE LLC

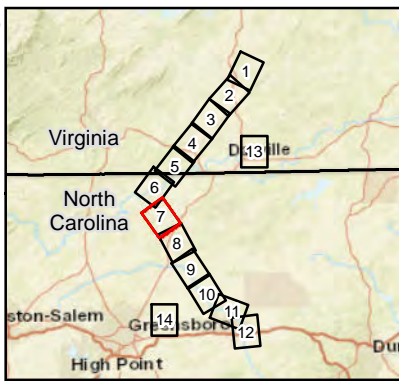
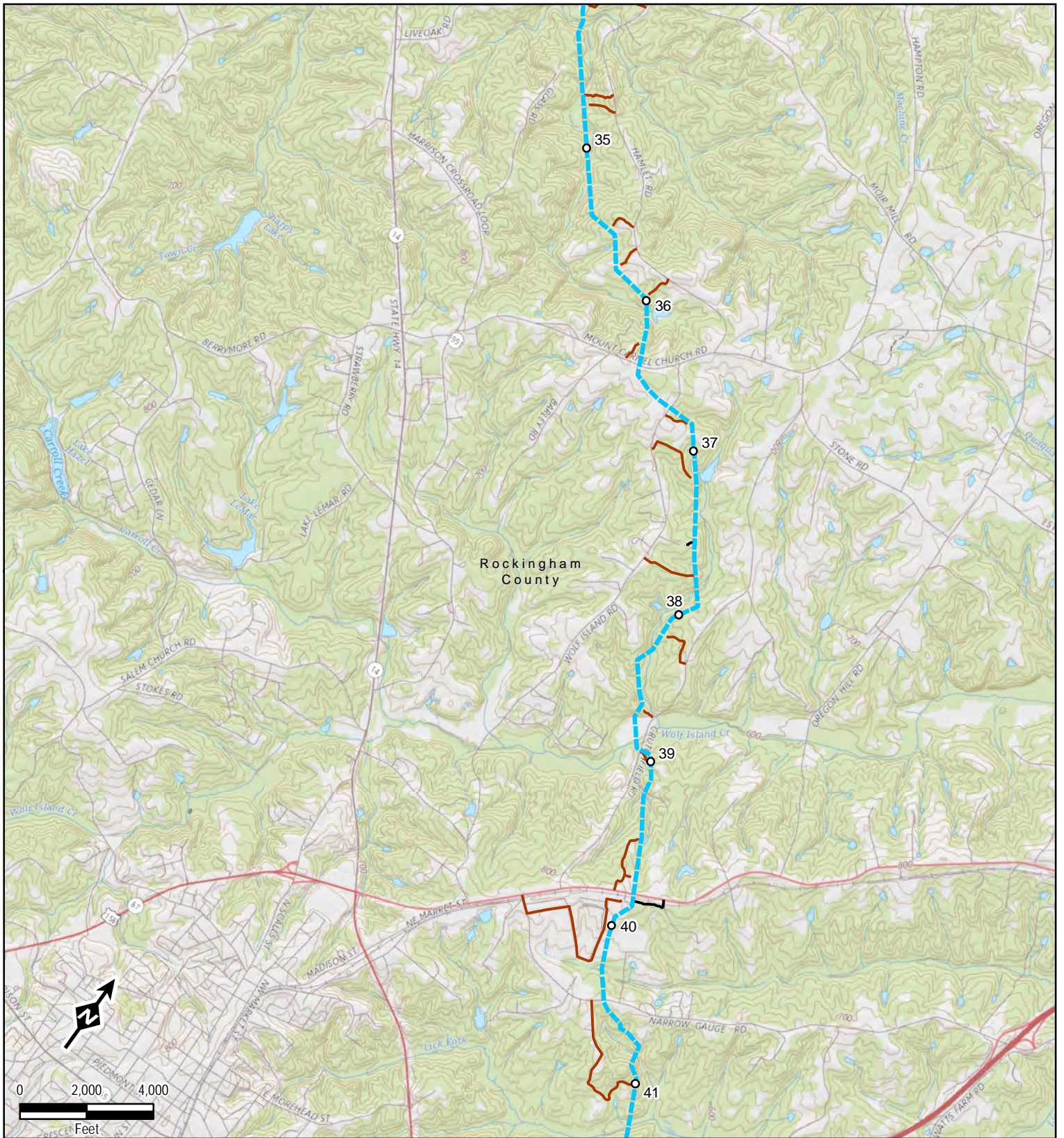
Appendix 1-B

USGS Quadrangle Excerpts
Sheet 6 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

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Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

Mountain Valley
PIPELINE LLC

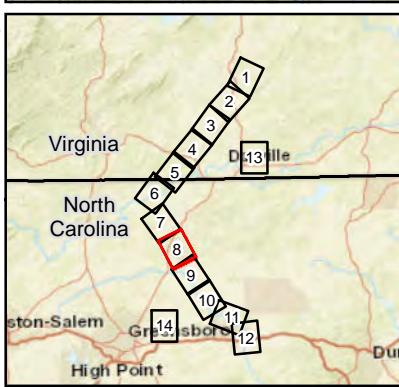
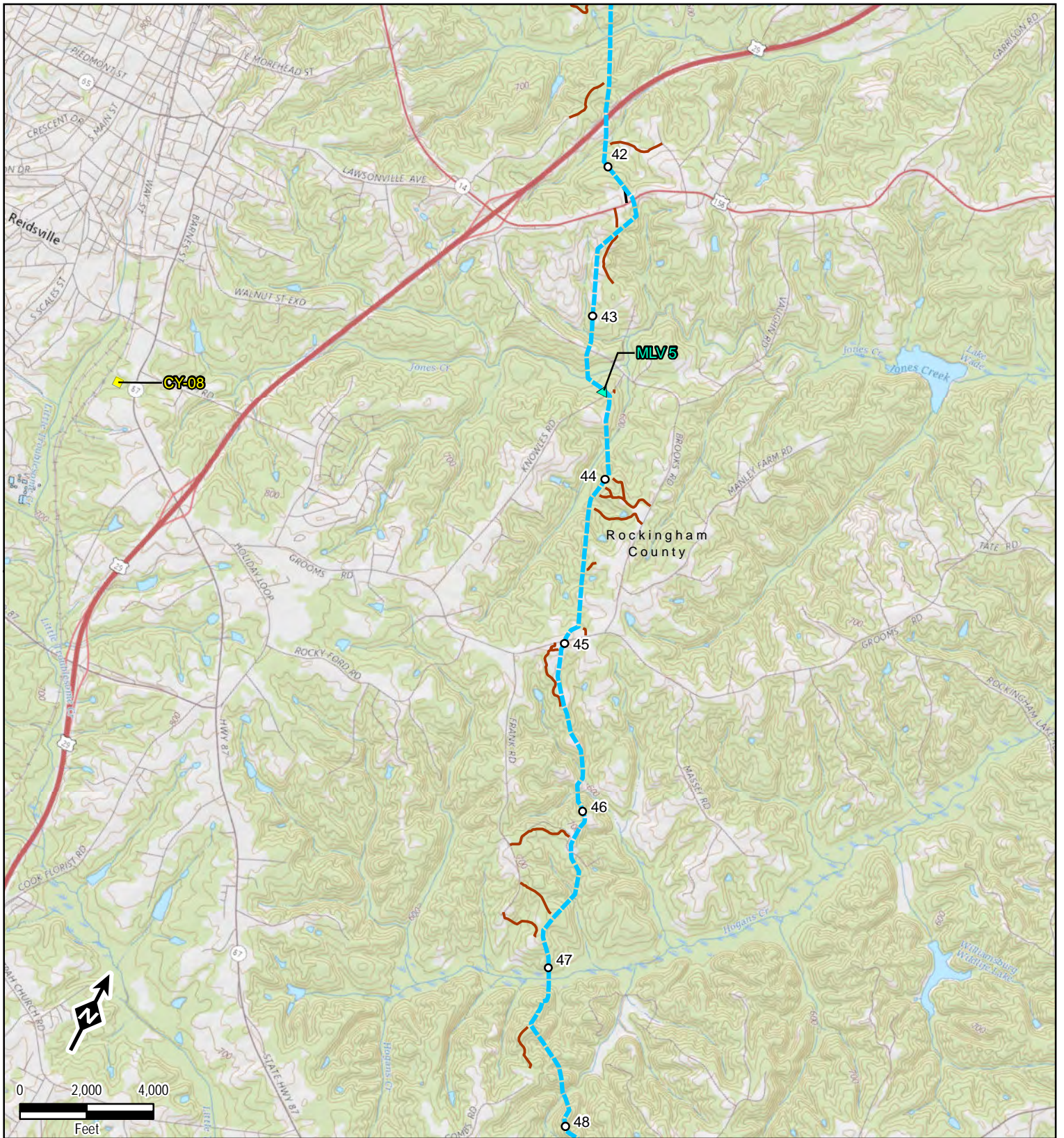
Appendix 1-B

USGS Quadrangle Excerpts
Sheet 7 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERRA\300423_MVP_Southgate\6-MXD\Resource_Reports\IRR1\Appendix_1B_USGS_Excerpts.mxd



Legend

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- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

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Mountain Valley PIPELINE LLC

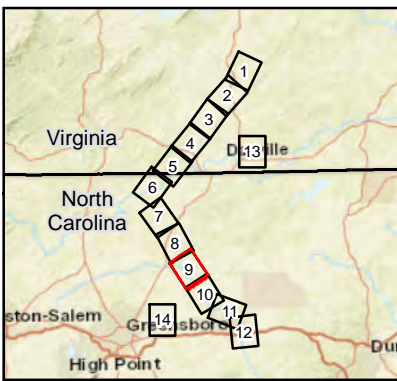
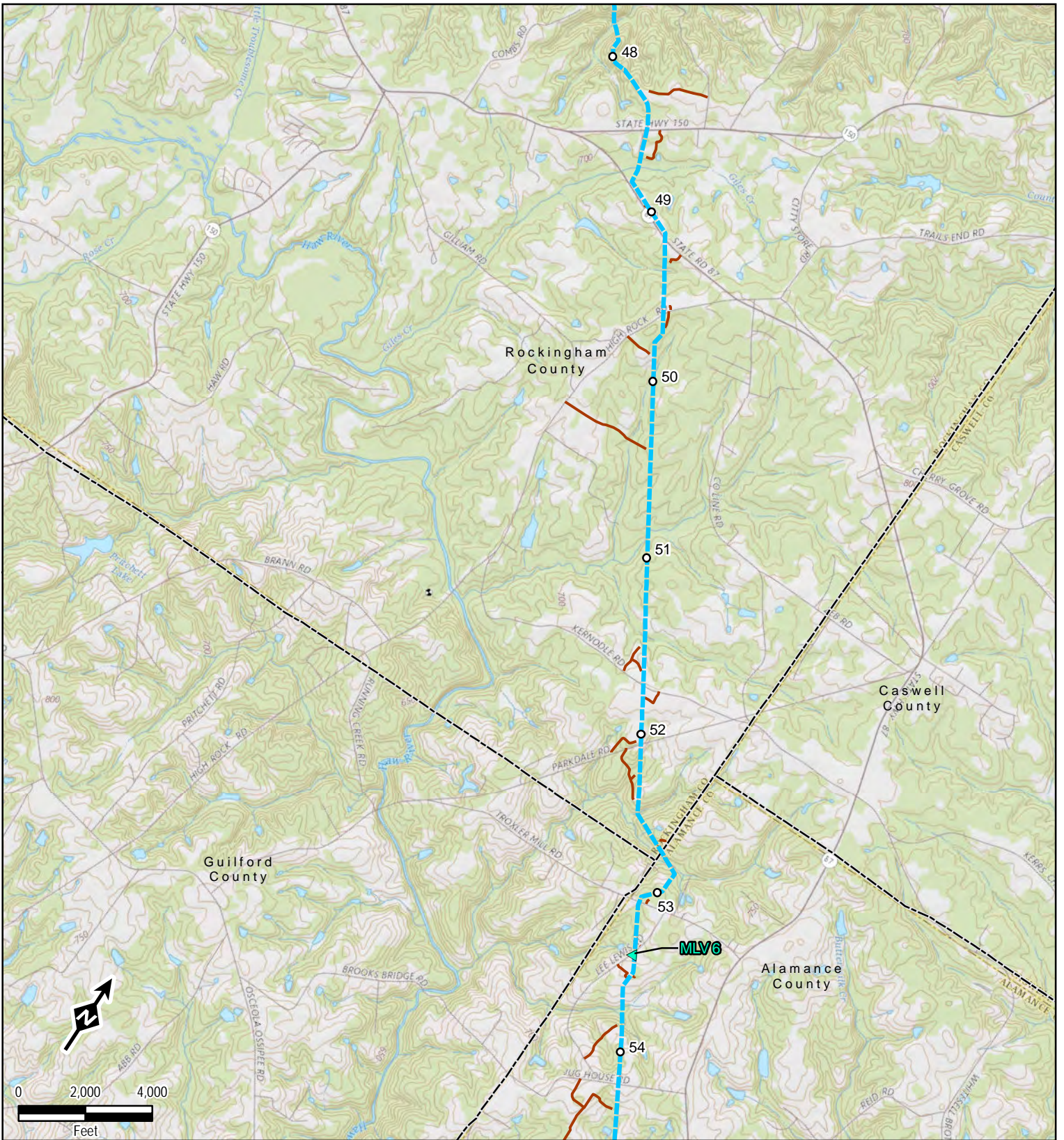
Appendix 1-B

USGS Quadrangle Excerpts
Sheet 8 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR1\Appendix_1B_USGS_Excerpts.mxd



Legend

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- ▲ Valve Site
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- Proposed Pipeline Route
- ▭ State Boundary
- ▭ County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

Mountain Valley PIPELINE LLC

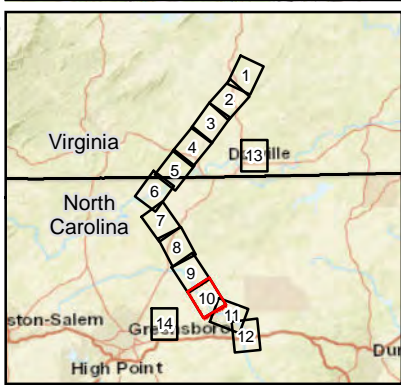
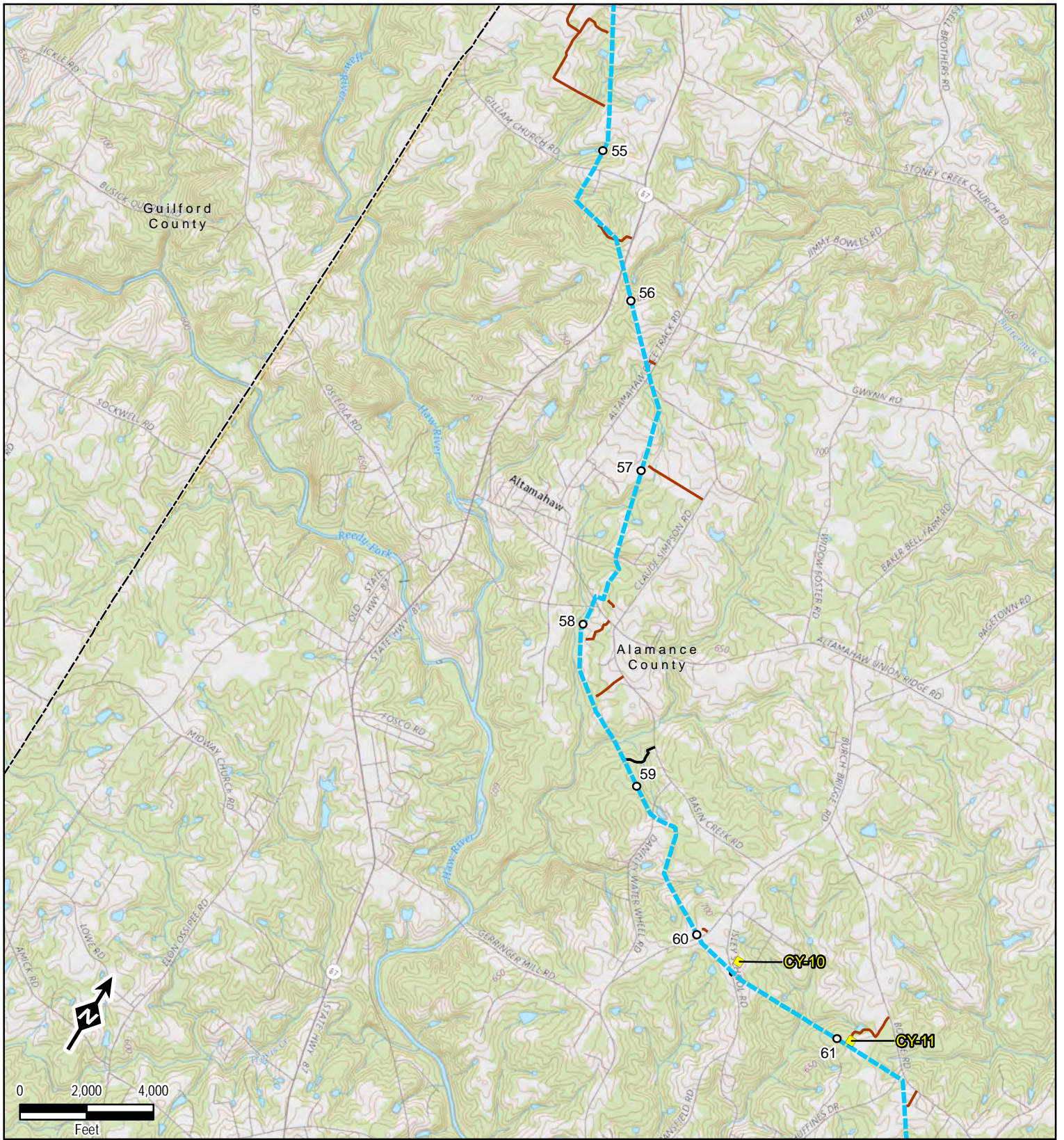
Appendix 1-B

USGS Quadrangle Excerpts
Sheet 9 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\IRR1\Appendix_1B_USGS_Excerpts.mxd



Legend

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- Compressor Station
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- Temporary Access Road
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Data Sources: ESRI, USGS, TRC, EQT

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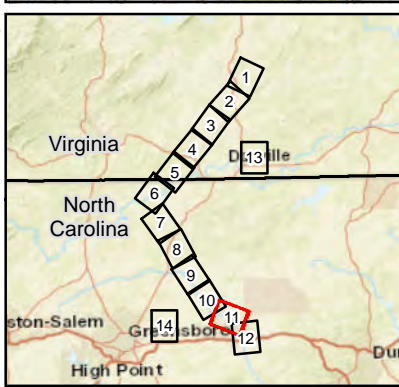
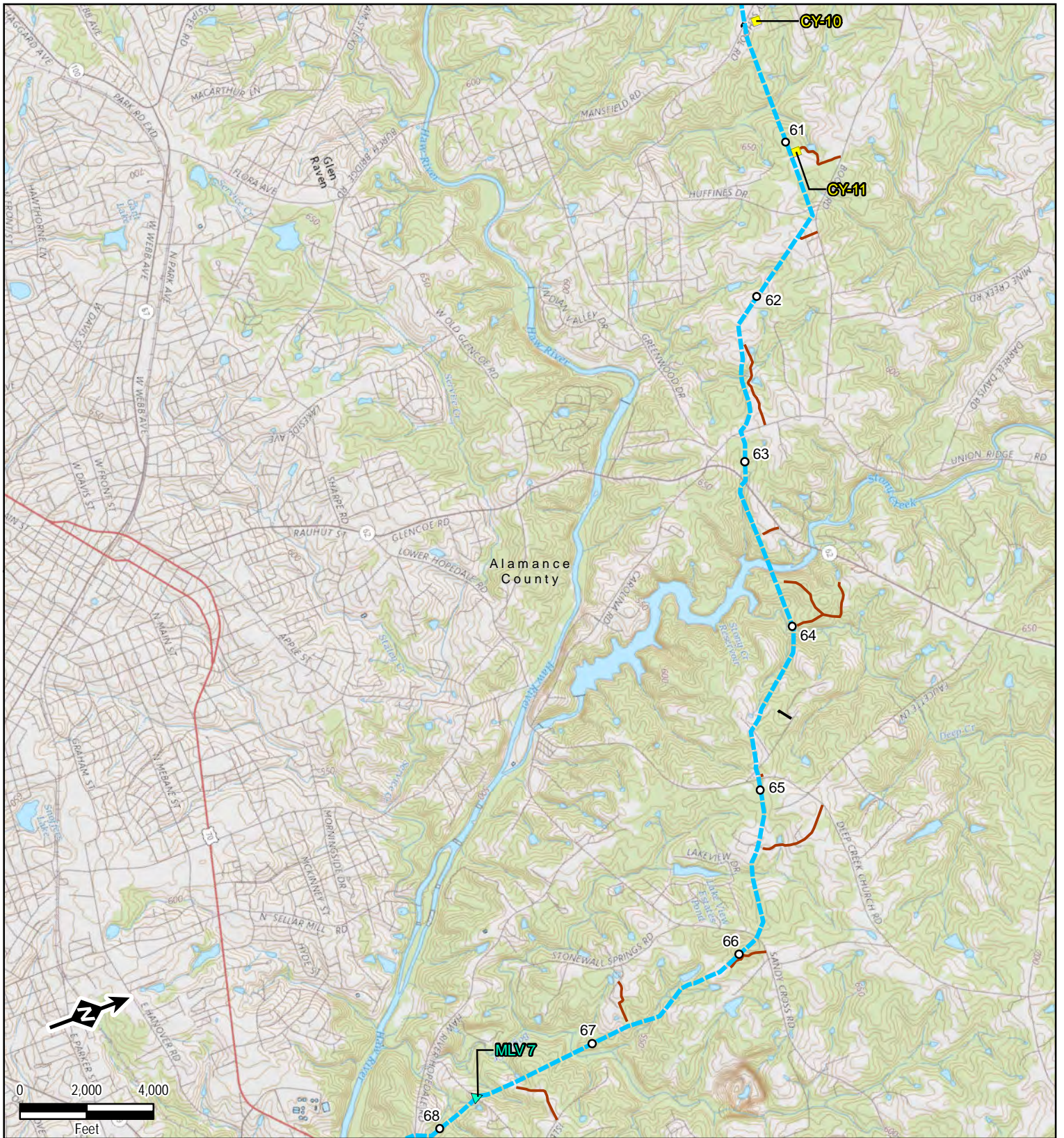
Mountain Valley PIPELINE LLC

Appendix 1-B

USGS Quadrangle Excerpts
Sheet 10 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382



Legend

- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- ▲ Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

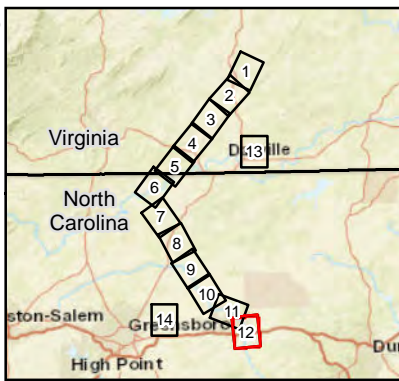
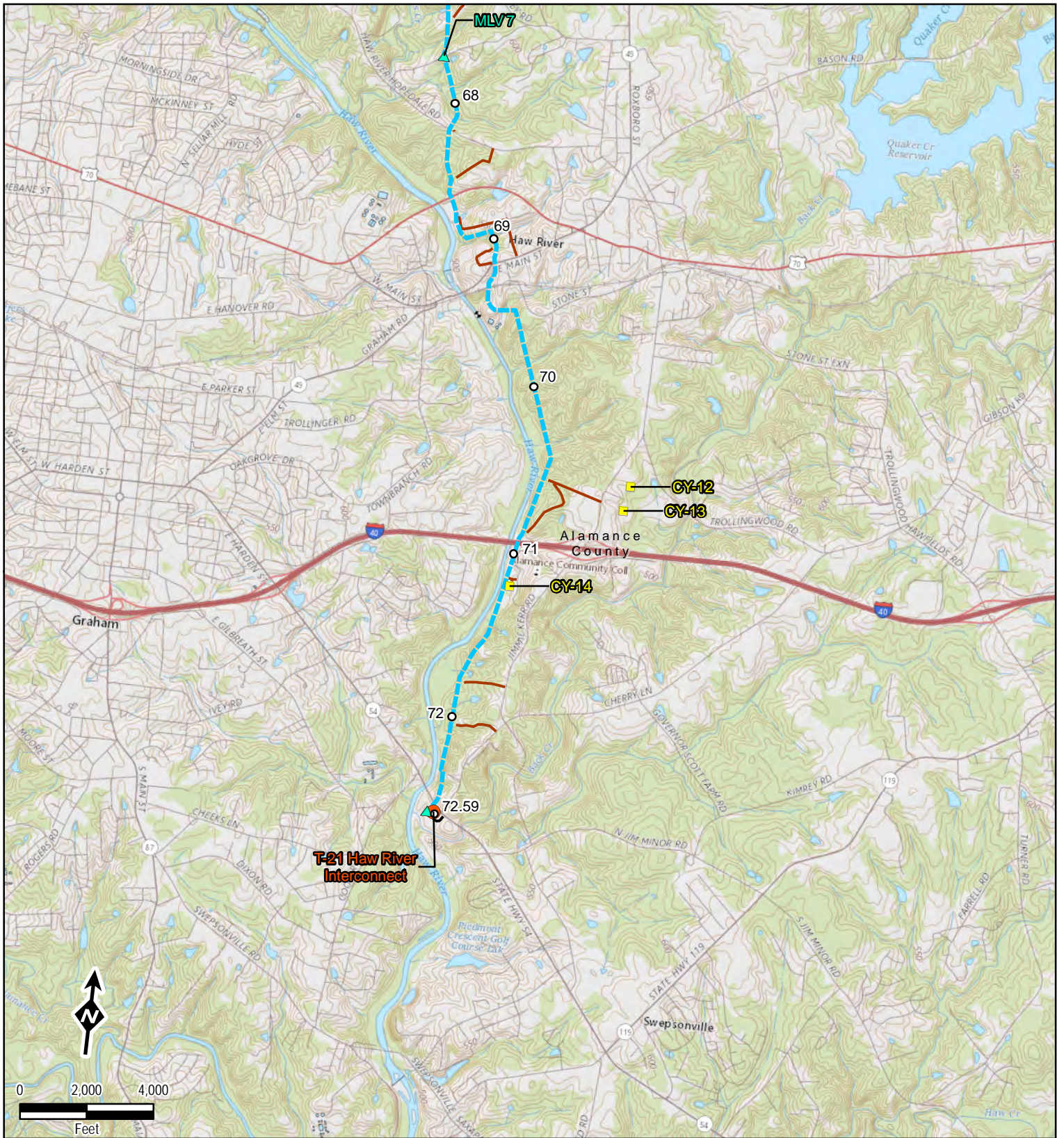
Mountain Valley PIPELINE LLC

Appendix 1-B

USGS Quadrangle Excerpts
Sheet 11 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382



Legend

- Mileposts
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- Meter Station
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- Temporary Access Road
- Proposed Pipeline Route
- ▭ State Boundary
- ▭ County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

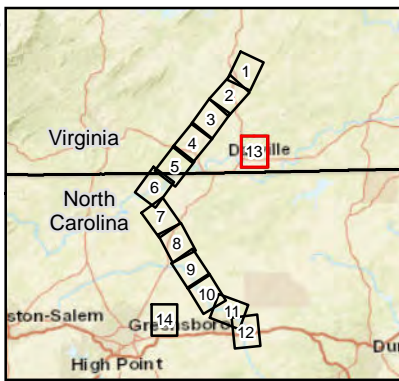
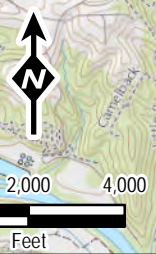
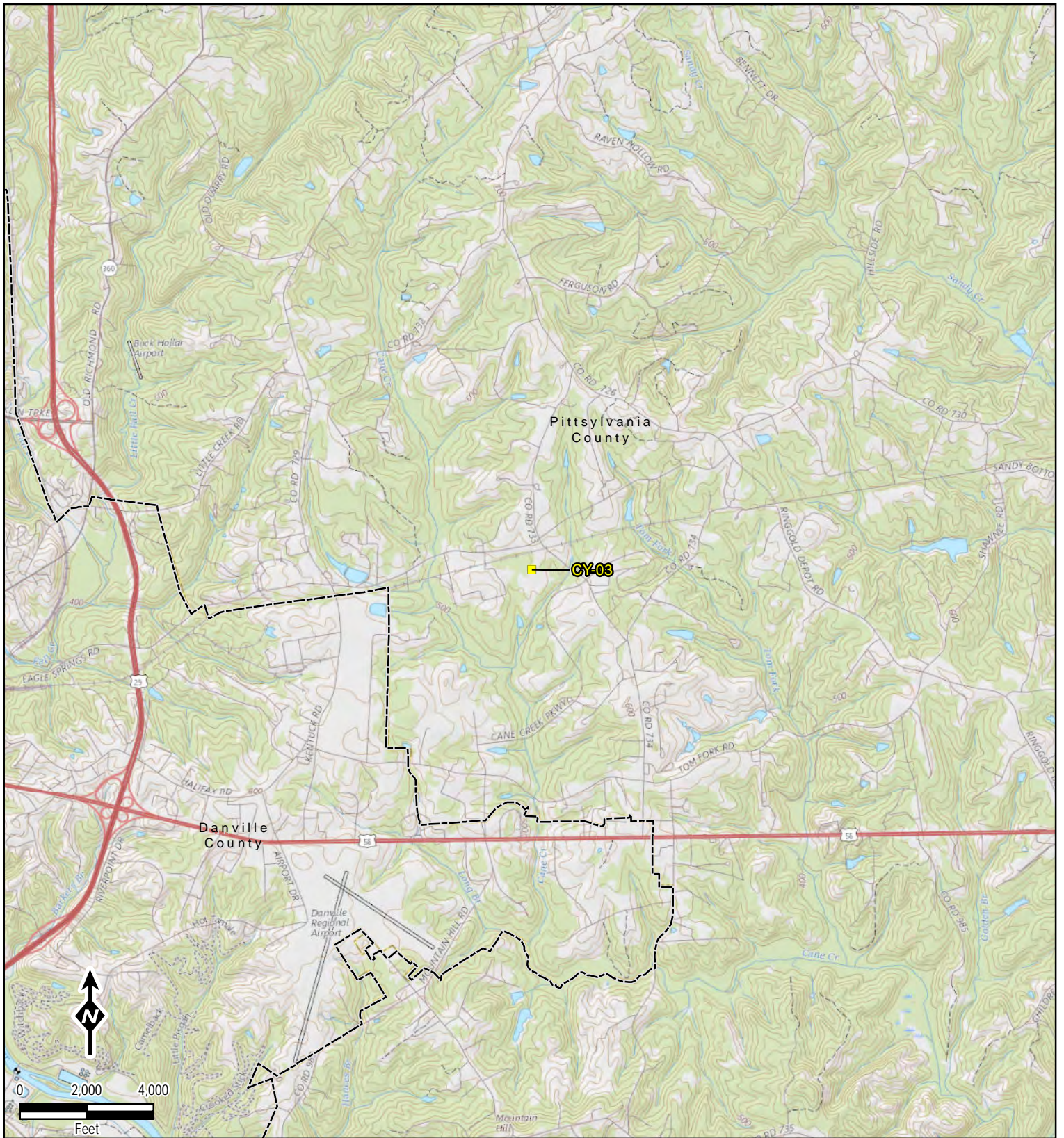
Mountain Valley PIPELINE LLC

Appendix 1-B

USGS Quadrangle Excerpts
Sheet 12 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382



Legend

○ Mileposts	— Permanent Access Road
● Compressor Station	— Temporary Access Road
■ Contract Yard	— Proposed Pipeline Route
● Meter Station	— State Boundary
▲ Valve Site	— County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

Mountain Valley PIPELINE LLC

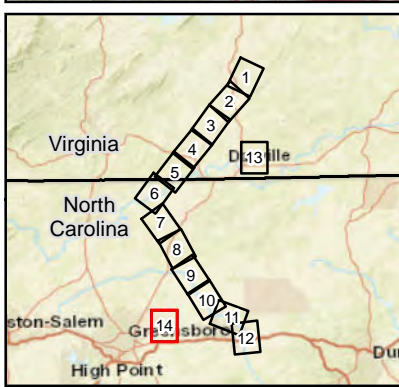
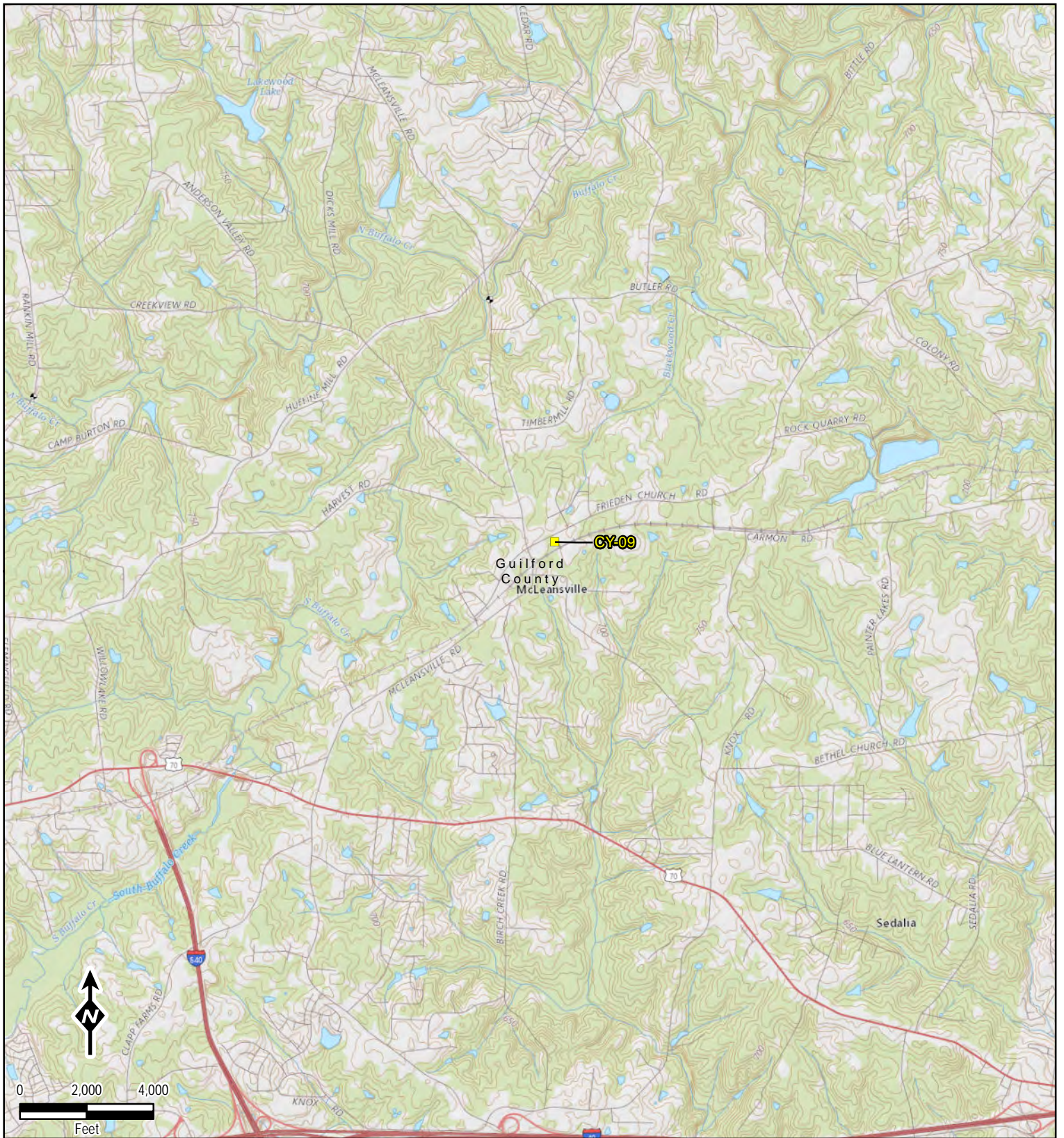
Appendix 1-B

USGS Quadrangle Excerpts
Sheet 13 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\IRR1\Appendix_1B_USGS_Excerpts.mxd



Legend

○ Mileposts	— Permanent Access Road
● Compressor Station	— Temporary Access Road
■ Contract Yard	— Proposed Pipeline Route
● Meter Station	▭ State Boundary
▲ Valve Site	▭ County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Appendix 1-B

USGS Quadrangle Excerpts
Sheet 14 of 14

TRC
Results you can rely on

600 Willowbrook Ln
West Chester, PA 19382

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-C1

Typical Drawings



MVP SOUTHGATE PROJECT

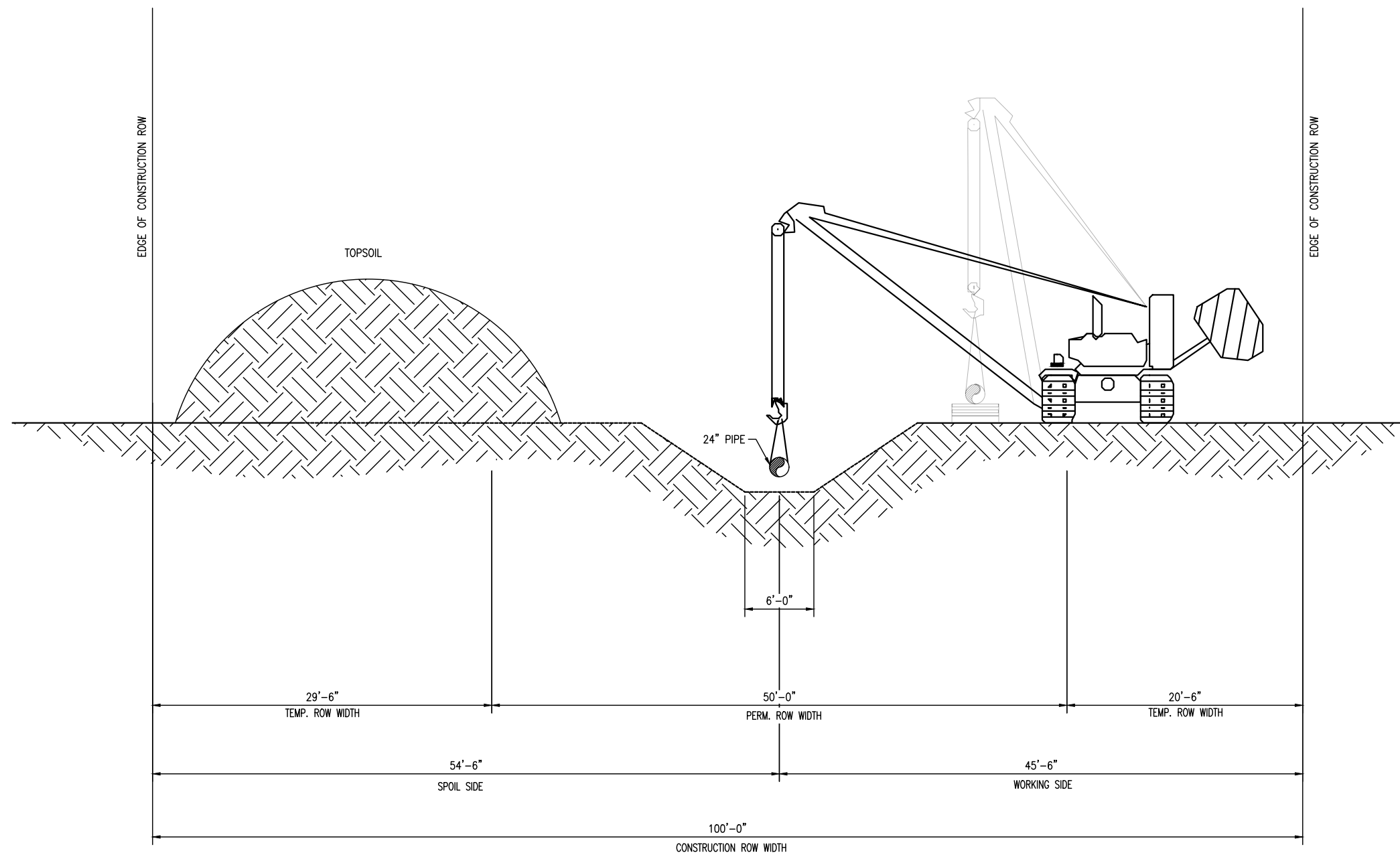
PROPOSED 24" H-650 PIPELINE ENGINEERING SERVICES DESIGN; JOB NUMBERS 300423 CONSTRUCTION TYPICAL DRAWINGS

DRAWING NO.	DRAWING TITLE	REV.
MVP-1	MAINLINE CONSTRUCTION NON-PARALLEL CONSTRUCTION NO TOP SOIL SEGREGATION	P
MVP-3	MAINLINE CONSTRUCTION NON-PARALLEL CONSTRUCTION NO TOP SOIL SEGREGATION 100' R.O.W.	P
MVP-5	MAINLINE CONSTRUCTION ROAD CROSSING BORED 100' R.O.W.	P
MVP-7	MAINLINE CONSTRUCTION RAILROAD CROSSING BORED 100' R.O.W.	P
MVP-9	MAINLINE CONSTRUCTION WATERBODY CROSSING OPEN CUT - FLUME	P
MVP-10	MAINLINE CONSTRUCTION TYPICAL DIRECTIONAL DRILL ENTRY SITE PLAN & PROFILE	P
MVP-11	MAINLINE CONSTRUCTION TYPICAL DIRECTIONAL DRILL EXIT SITE PLAN & PROFILE	P
MVP-12	MAINLINE CONSTRUCTION HORIZONTAL DIRECTIONAL DRILL (HDD)	P
MVP-13	MAINLINE CONSTRUCTION PARALLEL TO POWER LINES 100' R.O.W.	P
MVP-15	MAINLINE CONSTRUCTION PARALLEL TO POWER LINES 100' R.O.W.	P
MVP-17	MAINLINE CONSTRUCTION PARALLEL TO FOREIGN LINES 100' R.O.W.	P
MVP-19	MAINLINE CONSTRUCTION CLEAN WATER DIVERSION WITHOUT PLUNGE POOL 7% SLOPE 100' R.O.W.	P
MVP-21	ENVIRONMENTAL DETAIL CLEAN WATER DIVERSION WITH PLUNGE POOL 7% SLOPE 100' R.O.W.	P
MVP-23	ENVIRONMENTAL DETAIL CLEAN WATER DIVERSION WITH PLUNGE POOL 25% SLOPE 100' R.O.W.	P
MVP-25	MAINLINE CONSTRUCTION ROAD CROSSING BORED WITH PARALLEL PIPELINES 100' R.O.W.	P
MVP-27	MAINLINE CONSTRUCTION RAILROAD CROSSING BORED WITH PARALLEL PIPELINES 100' R.O.W.	P
MVP-29	MAINLINE CONSTRUCTION WATERBODY CROSSING WITH PARALLEL PIPELINES OPEN CUT - FLUME	P
MVP-SG-17	SLOPE BREAKER/RIGHT-OF-WAY DIVERSION/WATERBAR	P1
MVP-SG-17.1	SLOPE BREAKER/RIGHT-OF-WAY DIVERSION/WATERBAR	P1
MVP-SG-17.2	SLOPE BREAKER/RIGHT-OF-WAY DIVERSION/WATERBAR	P1
MVP-SG-17.3	WATERBAR END TREATMENT PERPENDICULAR TO SLOPE EXAMPLE	P1
MVP-SG-17.4	WATERBAR END TREATMENT CROSS SLOPE EXAMPLE	P1
MVP-SG-17.7	WATERBAR END TREATMENT DETAIL	P1
MVP-SG-19	EROSION CONTROL STRAW MULCH (STM)	P1
MVP-SG-20	TYPICAL TRENCH BREAKER REQUIREMENTS	P1
MVP-SG-24	SIDEHILL LOW-POINTS DRAIN TYPICAL	P1

DRAWING NO.	DRAWING TITLE	REV.
MVP-SG-24	SIDEHILL LOW-POINTS DRAIN TYPICAL	P1
MVP-SG-31	MAINLINE CONSTRUCTION STEEP HILL PARALLEL CONSTRUCTION NO TOP SOIL SEGREGATION	P1
MVP-SG-32	MAINLINE CONSTRUCTION STEEP HILL STOVE PIPE CONSTRUCTION NO TOP SOIL SEGREGATION	P1
MVP-SG-35	TRENCH BREAKER DAYLIGHT DRAIN	P1
MVP-SG-36A	CUTOFF DRAIN-SIDEHILL	P1
MVP-SG-36B	CUTOFF DRAIN-SIDEHILL	P1
MVP-SG-37	CUTOFF DRAIN-PLANAR	P1
MVP-SG-38A	TRANSVERSE TRENCH DRAIN	P1
MVP-SG-38B	TRANSVERSE TRENCH DRAIN	P1
MVP-SG-39	ROCK LINED SWALE	P1
MVP-SG-40	RIP-RAP NATURAL DRAIN	P1
MVP-SG-41	RIP-RAP SLOPE BREAKERS	P1
MVP-SG-42A	GEOGRID-SIDEHILL	P1
MVP-SG-42B	GEOGRID-PLANAR	P1
MVP-SG-42C	GEOGRID-NOTES	P1
MVP-SG-43A	TRENCH BREAKER PASS-THROUGH DRAIN	P1
MVP-SG-43B	TRENCH BREAKER PASS-THROUGH DRAIN	P1
MVP-SG-44A	SLIDE MITIGATION HIGHWALL REVETMENT SIDE VIEW	P1
MVP-SG-44B	SLIDE MITIGATION HIGHWALL REVETMENT FRONT VIEW AND DRAIN DETAIL	P1
MVP-SG-45	STEEP SLOPE REVETMENT	P1
MVP-SG-46	BROW DITCH DETAIL	P1
MVP-SG-47	TIMBER MAT AND PIPE BUNDLE TEMPORARY STREAM CROSSING	P1
MVP-SG-48	TIMBER MAT AND JERSEY BARRIER TEMPORARY STREAM CROSSING	P1
MVP-SG-49	MOBILE BRIDGE	P1
MVP-SG-50	MODULAR TEMPORARY BAILEY BRIDGE	P1
MVP-SG-53	WETLAND CROSSING TYPICAL FOR USACE NORFOLK (VA) DISTRICT	P1

G:\PROJECTS\300423 - NEXTERA MVP SOUTHGATE\CA - CADD\PIPELINE DRAWINGS\TYPICALS\TYPICAL COVER.DWG

		DRAWING TITLE:					
		MOUNTAIN VALLEY PIPELINE SOUTHGATE PROJECT PROPOSED H-650 PIPELINE CONSTRUCTION TYPICALS					
PROJECT ID	300423	FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
DRAWING SCALE	NTS	MVP	VA/NC	H-650	-	1	P1



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
								P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS

ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER

06/11/18
DATE

ELECTRICAL DESIGN ENGINEER

DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

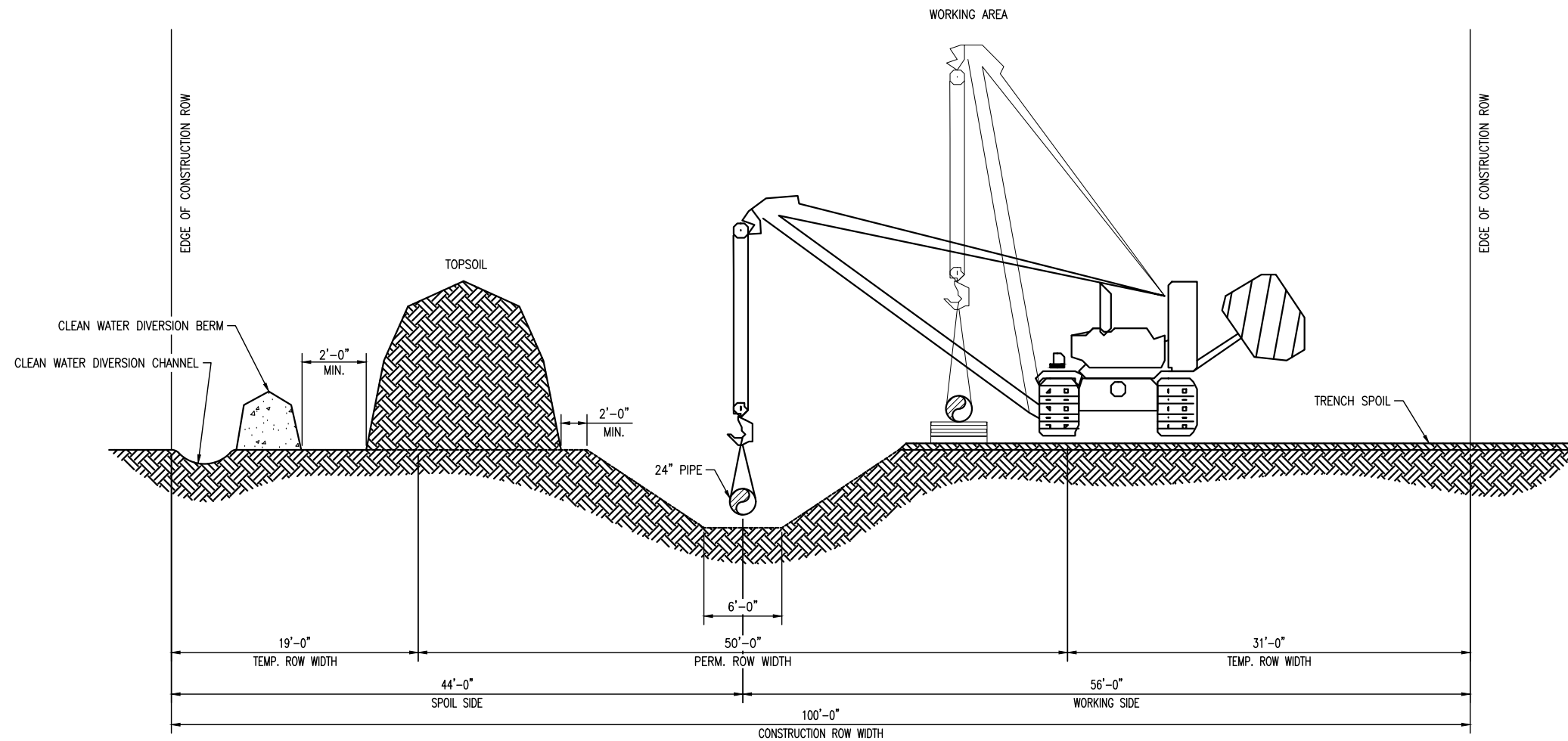
Mountain Valley
PIPELINE, LLC

DESIGN ENGINEERING

PROJECT ID: -----

DRAWING SCALE:
3/16" = 1'-0"

DRAWING TITLE: MAINLINE CONSTRUCTION NON-PARALLEL CONSTRUCTION NO TOP SOIL SEGREGATION					
FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	1	1	P



- NOTE:
1. DRAWING DEPICTS SOIL SWELL OF 20% AND ROCK SWELL OF 40%.
 2. DRAWING ASSUMES TYPE "C" SOIL.

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DRAWING NUMBER	DRAWING TITLE												
								P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

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ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER

06/11/18
DATE

ELECTRICAL DESIGN ENGINEER
DATE

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DESIGN ENGINEERING

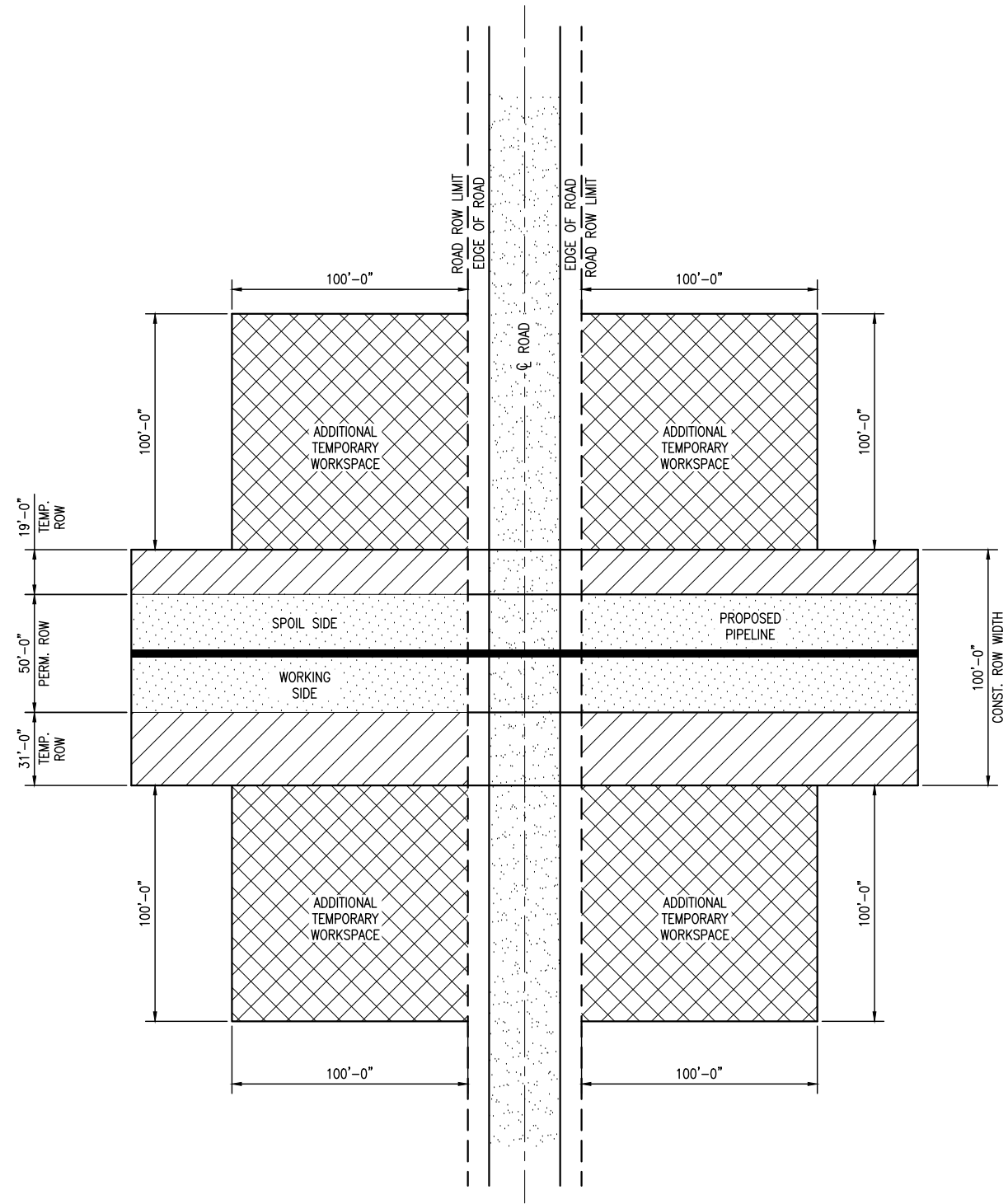
PROJECT ID: -----

DRAWING SCALE: 3/16" = 1'-0"

DRAWING TITLE:

**MAINLINE CONSTRUCTION
NON-PARALLEL CONSTRUCTION
WITH TOP SOIL SEGREGATION
100' RIGHT OF WAY**

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	3	1	P



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
								P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

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ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

ELECTRICAL DESIGN ENGINEER DATE

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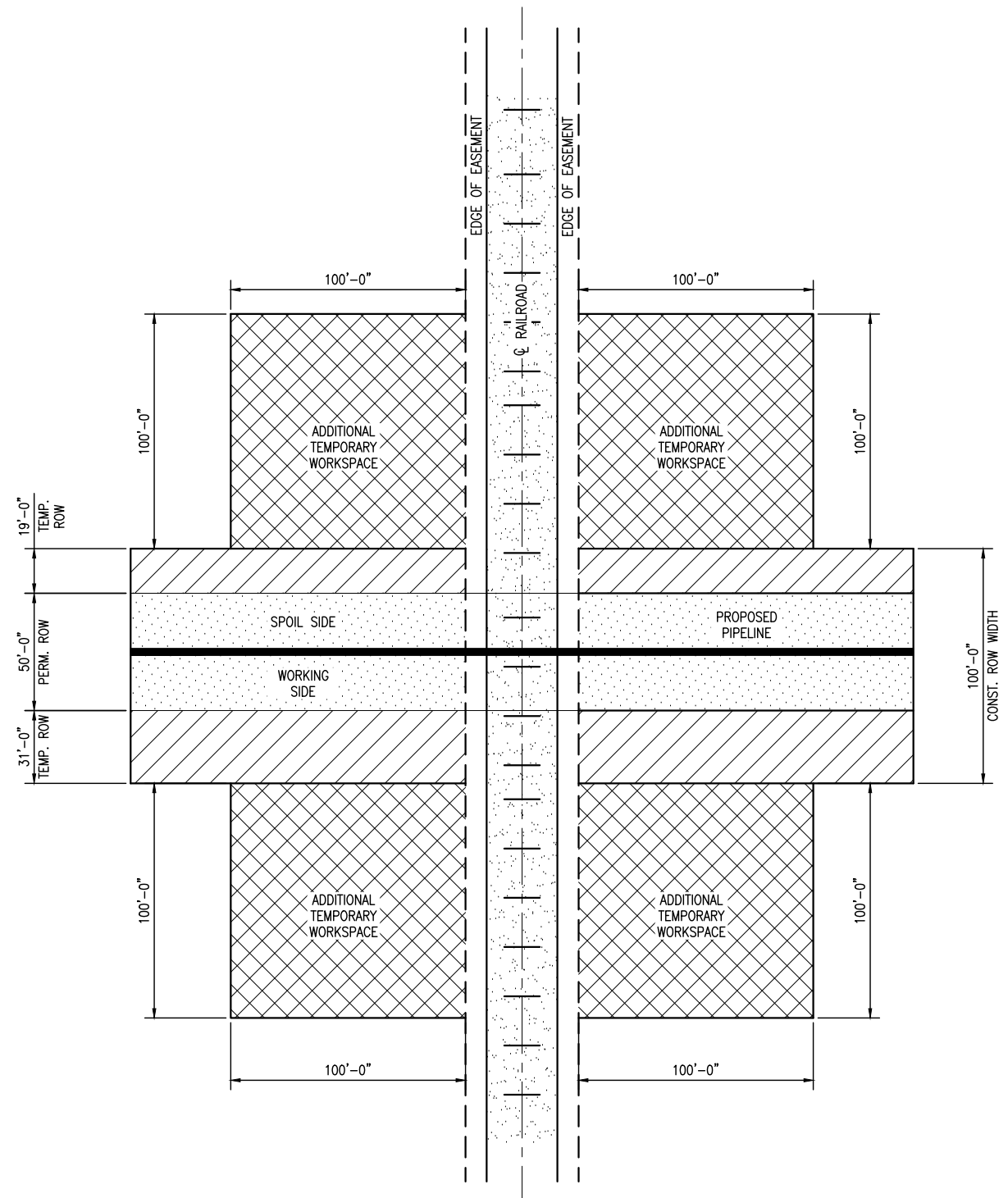
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PROJECT ID: -----

DRAWING SCALE: 1/32" = 1'-0"

DRAWING TITLE: MAINLINE CONSTRUCTION ROAD CROSSING BORED 100' RIGHT OF WAY

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	5	1	P



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
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ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER

06/11/18
DATE

ELECTRICAL DESIGN ENGINEER
DATE

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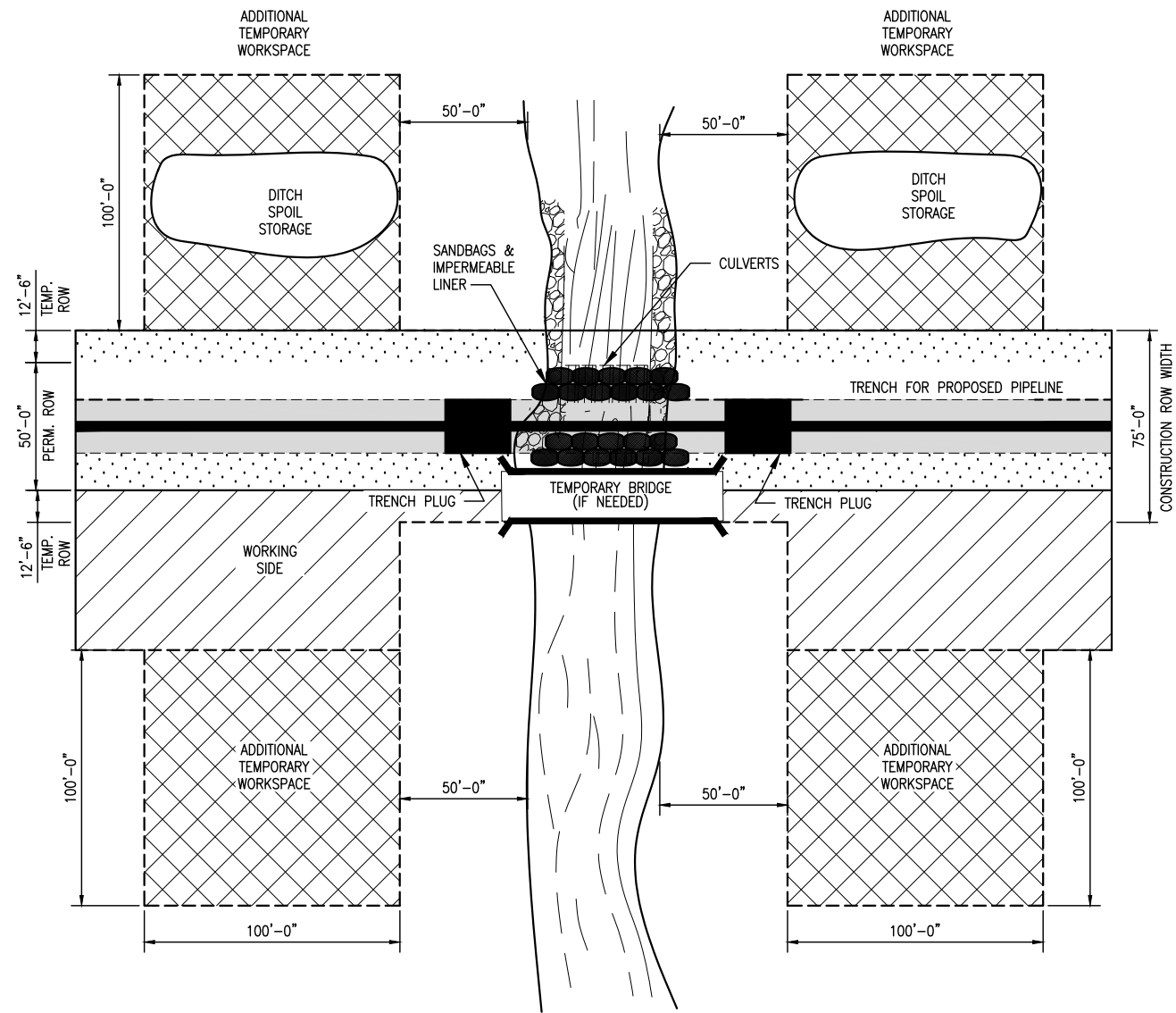
Mountain Valley
PIPELINE, LLC

DESIGN ENGINEERING

PROJECT ID: -----

DRAWING SCALE:
1/32" = 1'-0"

DRAWING TITLE: MAINLINE CONSTRUCTION RAILROAD CROSSING BORED 100' RIGHT OF WAY					
FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	7	1	P



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM


REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
								P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

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ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER
DATE: 06/11/18

ELECTRICAL DESIGN ENGINEER
DATE:

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.



DESIGN ENGINEERING

PROJECT ID: ----

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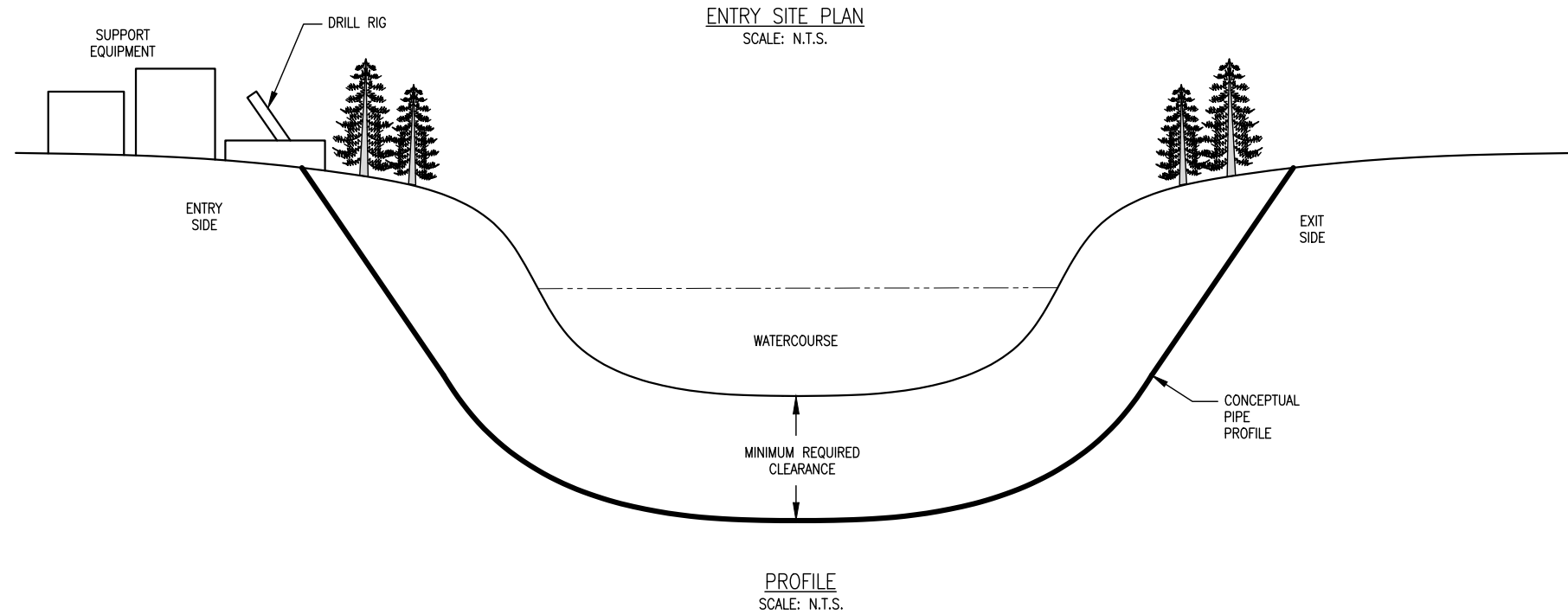
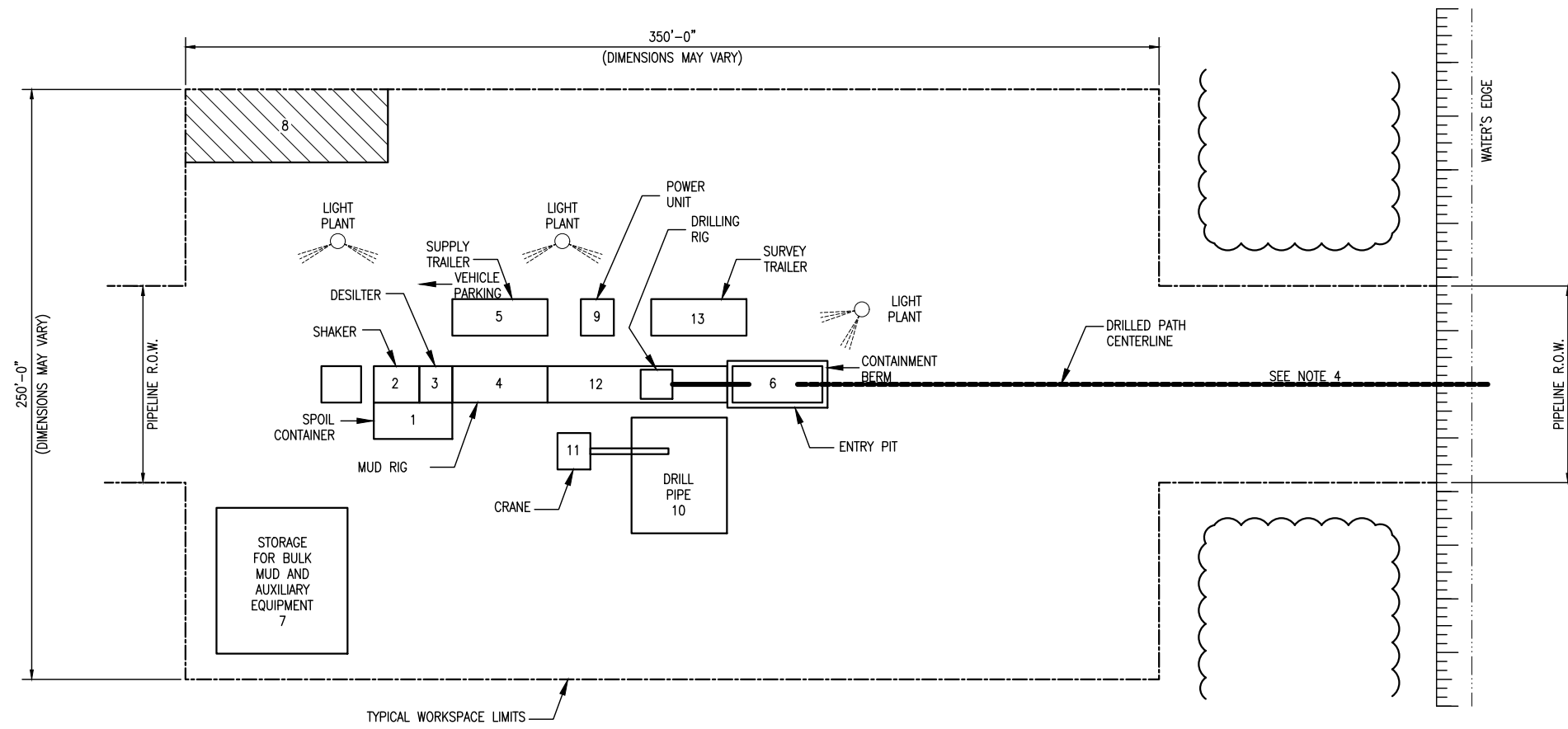
DRAWING TITLE:

**MAINLINE CONSTRUCTION
WATERBODY CROSSING
OPEN CUT - FLUME**

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	9	1	P

EQUIPMENT:

1. SPOIL CONTAINER: 8' X 20'
2. SHAKER: 8' X 12'
3. DESILTER: 8' X 8'
4. MUD RIG: 8' X 25'
5. SUPPLY TRAILER: 8' X 25'
6. ENTRY PIT: 8' X 20'
7. STORAGE: 30' X 30'
8. VEHICLE PARKING: 15' X 50'
9. POWER UNIT: 8' X 10'
10. DRILL PIPE: 30' X 30'
11. CRANE: 8' X 8'
12. DRILLING RIG: 8' X 45'
13. SURVEY TRAILER: 8' X 25'



NOTES:

1. EQUIPMENT ORIENTATION MAY VARY DEPENDING ON CONTRACTOR OR SITE CONDITIONS.
2. EQUIPMENT TO BE SUPPORTED ON THE GROUND SURFACE OR TIMBER MATS AS CONDITIONS DICTATE.
3. SILT FENCE, BERMS AND/OR STRAW BALE BARRIER TO BE USED AS REQUIRED TO PREVENT IMPACTS FROM OCCURRING OUTSIDE OF PROJECT LIMITS.
4. HAND CLEARED ACCESS PATH WILL BE USED TO OBTAIN WATER FROM SOURCE WHERE PERMITTED.
5. ENTRANCE & EXIT ANGLES VARY BY LOCATION. REFER TO BORE PROFILE FOR DETAILED INFORMATION.

GENERAL NOTES:

1. PIPE DEPTHS MAY VARY.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE							P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS

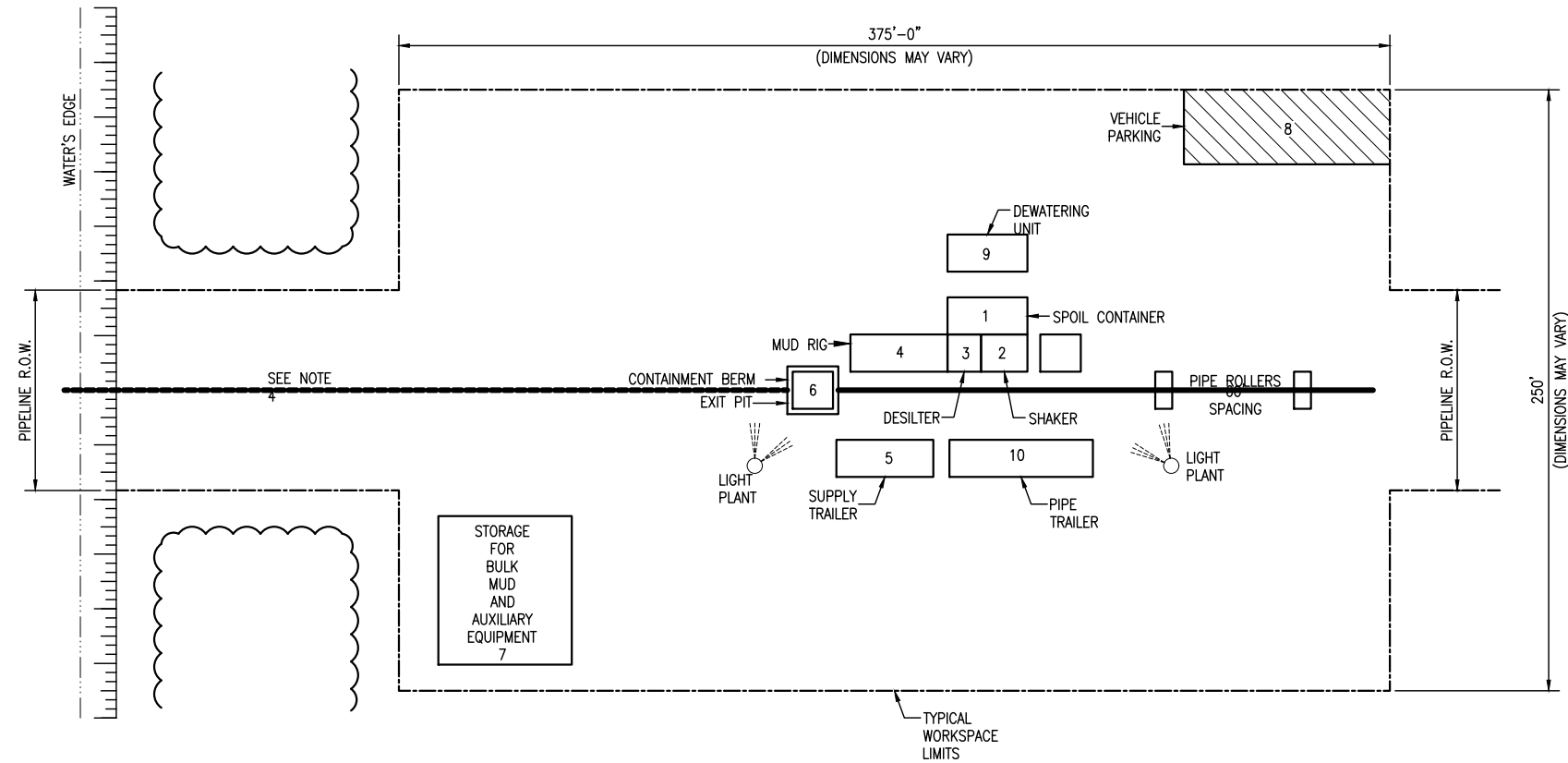
ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

ELECTRICAL DESIGN ENGINEER DATE

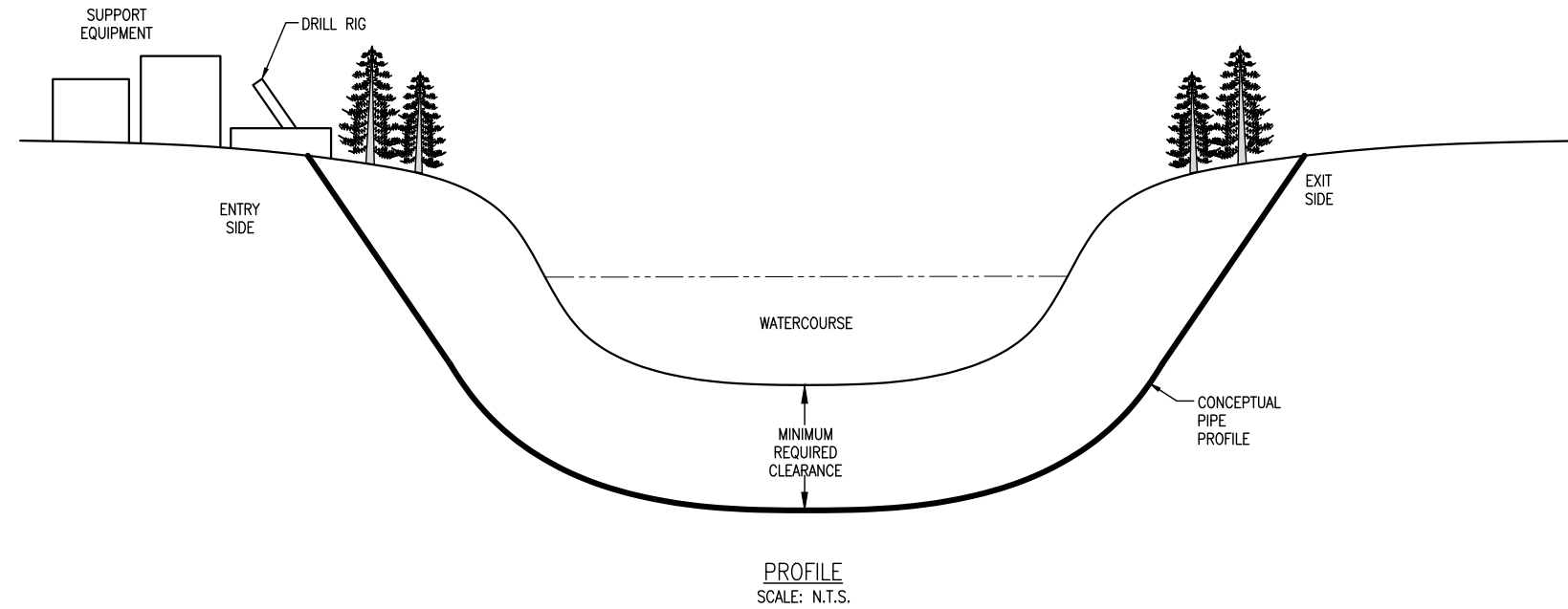
NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

	DRAWING TITLE: MAINLINE CONSTRUCTION TYPICAL DIRECTIONAL DRILL ENTRY SITE PLAN & PROFILE					
	DESIGN ENGINEERING	PROJECT ID: ----	FACILITY: MVP	STATE: VA	IDENTIFICATION: H-650	
DRAWING SCALE: NTS				SERIES: 10	SHEET: 1	REVISION: P

- EQUIPMENT:**
1. SPOIL CONTAINER: 8' X 20'
 2. SHAKER: 8' X 12'
 3. DESILTER: 8' X 8'
 4. MUD RIG: 8' X 25'
 5. SUPPLY TRAILER: 8' X 25'
 6. EXIT PIT: 8' X 10'
 7. STORAGE: 30' X 30'
 8. VEHICLE PARKING: 15' X 50'
 9. DEWATERING UNIT: 8' X 20'
 10. PIPE TRAILER: 8' X 40'



EXIT SITE PLAN
SCALE: N.T.S.



PROFILE
SCALE: N.T.S.

- NOTES:**
1. EQUIPMENT ORIENTATION MAY VARY DEPENDING ON CONTRACTOR OR SITE CONDITIONS.
 2. EQUIPMENT TO BE SUPPORTED ON THE GROUND SURFACE OR TIMBER MATS AS CONDITIONS DICTATE.
 3. SILT FENCE, BERMS AND/OR STRAW BALE BARRIER TO BE USED AS REQUIRED TO PREVENT IMPACTS FROM OCCURRING OUTSIDE OF PROJECT LIMITS.
 4. HAND CLEARED ACCESS PATH WILL BE USED TO OBTAIN WATER FROM SOURCE WHERE PERMITTED.

- GENERAL NOTES:**
1. PIPE DEPTHS MAY VARY.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE							P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS

ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER

06/11/18
DATE

ELECTRICAL DESIGN ENGINEER
DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

Mountain Valley PIPELINE, LLC

DESIGN ENGINEERING

PROJECT ID: ----

DRAWING SCALE: 1/32" = 1'-0"

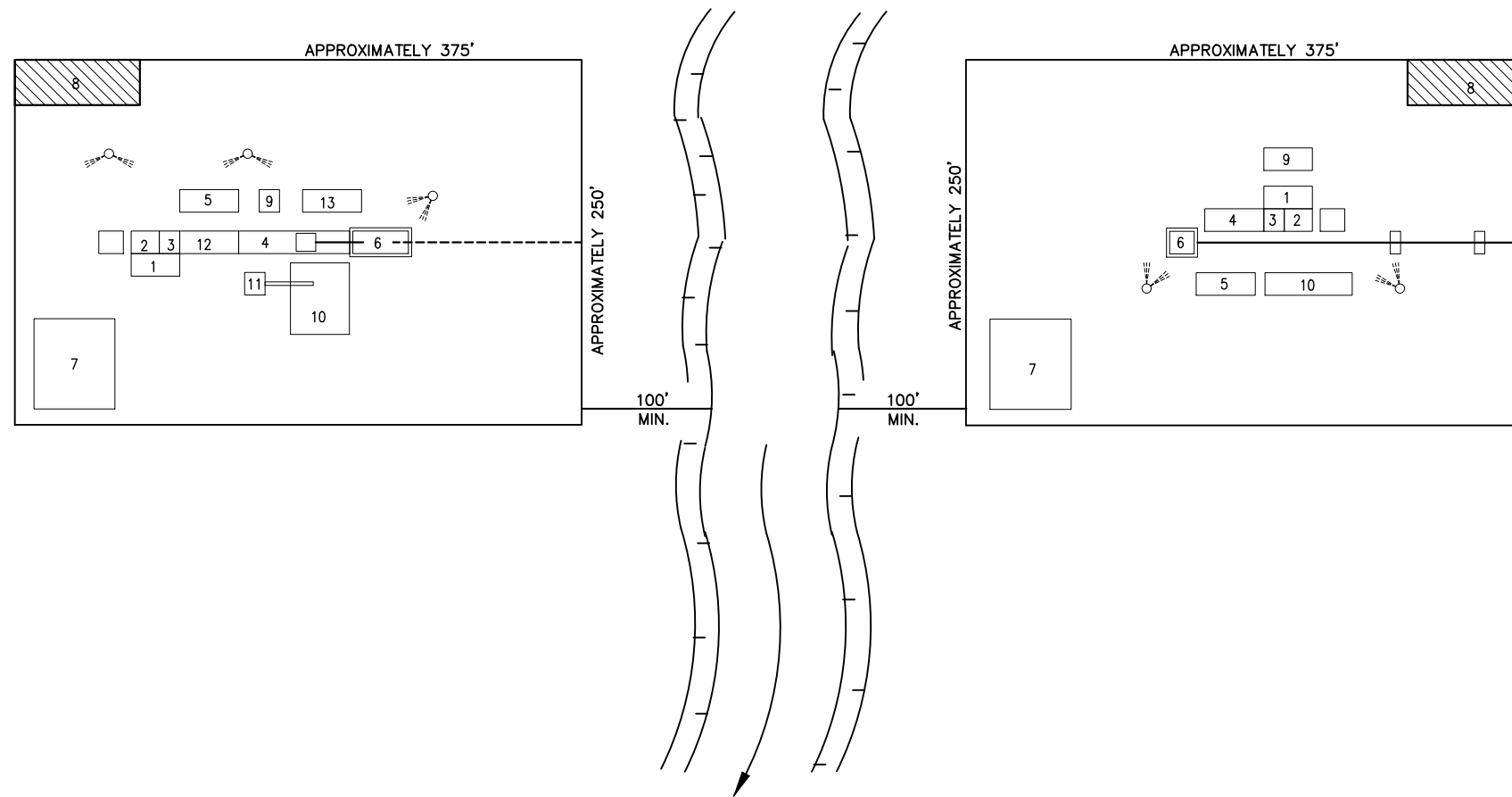
DRAWING TITLE: MAINLINE CONSTRUCTION TYPICAL DIRECTIONAL DRILL EXIT SITE PLAN & PROFILE

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	11	1	P

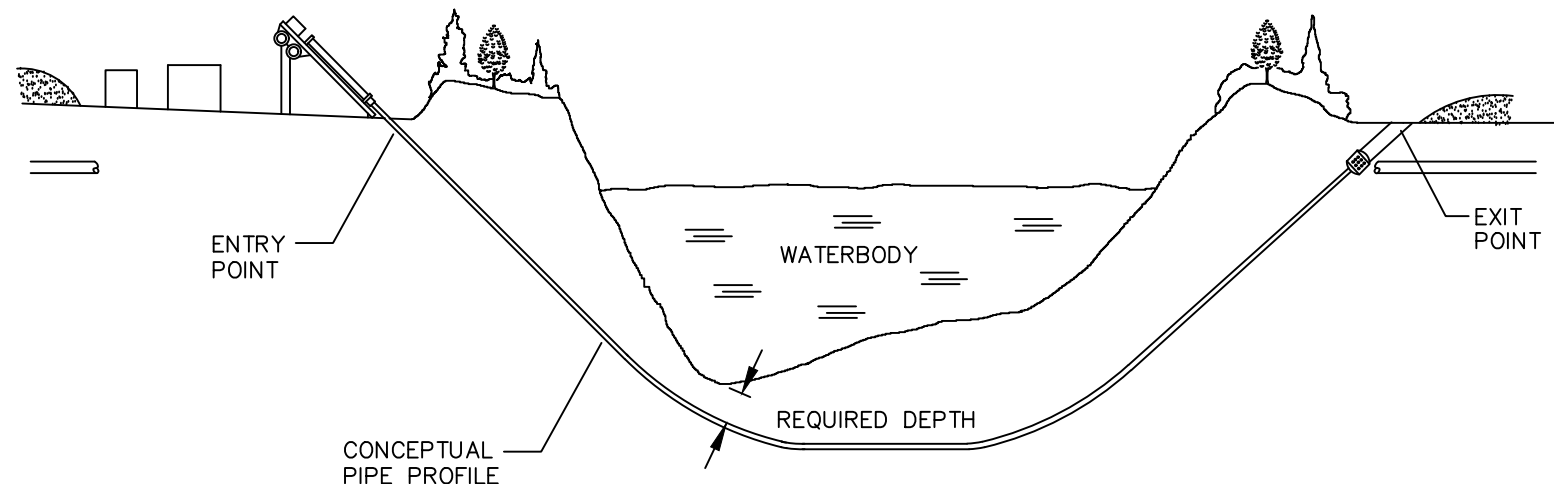
EQUIPMENT:

1. SPOIL CONTAINER: 8' X 20'
2. SHAKER: 8' X 12'
3. DESILTER: 8' X 8'
4. MUD RIG: 8' X 25'
5. SUPPLY TRAILER: 8' X 25'
6. EXIT PIT: 8' X 10'
7. STORAGE: 30' X 30'
8. VEHICLE PARKING: 15' X 50'
9. DEWATERING UNIT: 8' X 20'
10. PIPE TRAILER: 8' X 40'

HORIZONTAL DIRECTIONAL DRILL METHOD 7



PLAN



PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE EDGE OF THE WATERCOURSE. DO NOT CLEAR OR GRADE WITHIN THE 100 FOOT ZONE.
2. ENSURE THAT ONLY BENTONITE BASED DRILLING MUD IS USED. DO NOT ALLOW THE USE OF ANY ADDITIVES TO THE DRILLING MUD WITHOUT THE APPROVAL OF COMPANY INSPECTOR.
3. INSTALL SUITABLE DRILLING MUD TANKS OR SUMPS TO PREVENT CONTAMINATION OF WATERCOURSE.
4. INSTALL BERMS DOWNSLOPE FROM THE DRILL ENTRY AND ANTICIPATED EXIT POINTS TO CONTAIN ANY RELEASE OF DRILLING MUD.
5. DISPOSE OF DRILLING MUD IN ACCORDANCE WITH THE APPROPRIATE REGULATORY AUTHORITY REQUIREMENTS.
6. A SEDIMENT BARRIER SHALL BE PLACED ON THE DOWN SLOPE SIDE OF RIGHT-OF-WAY, PER THE PROJECT NARRATIVE.

NOTES:

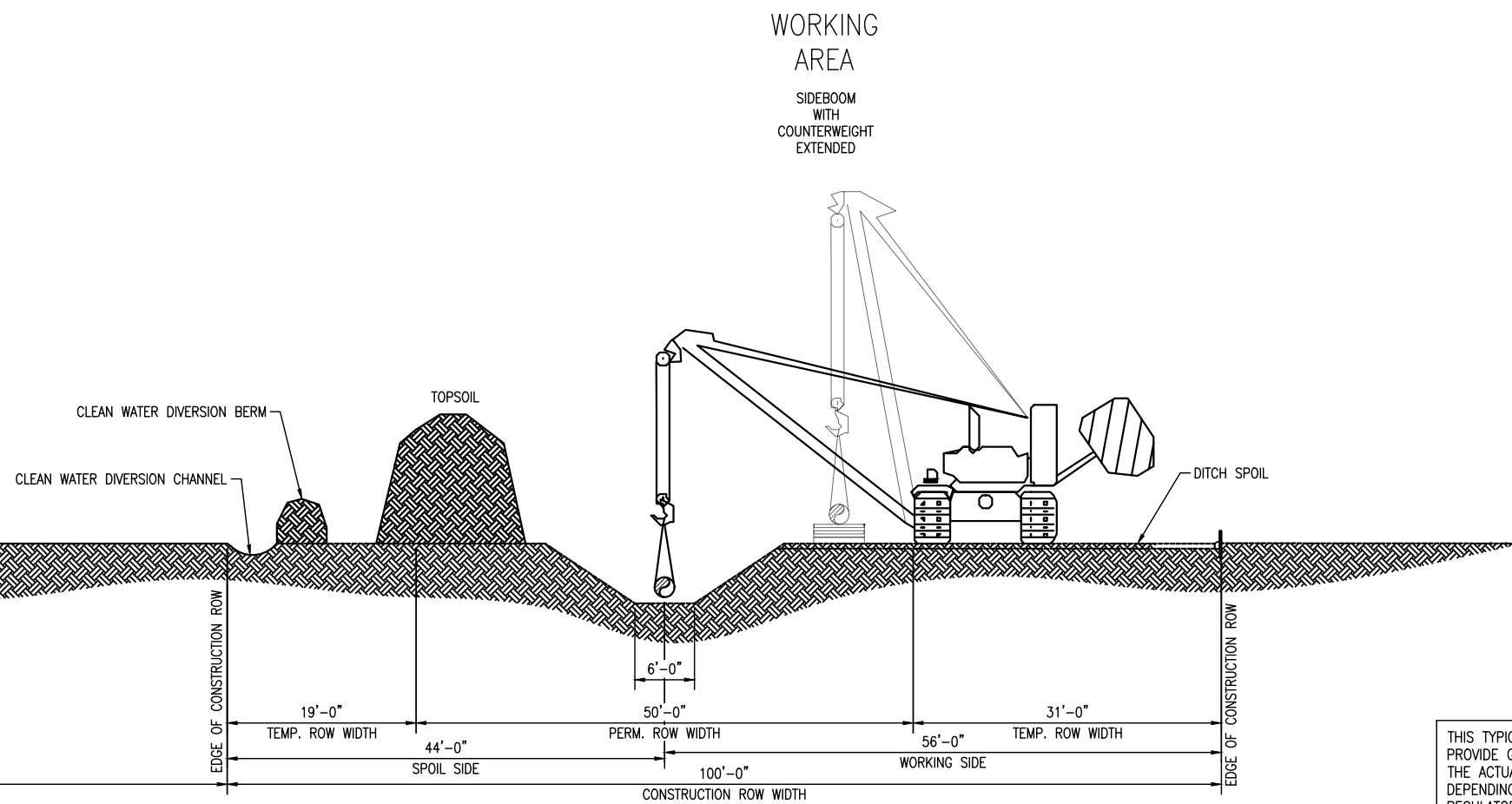
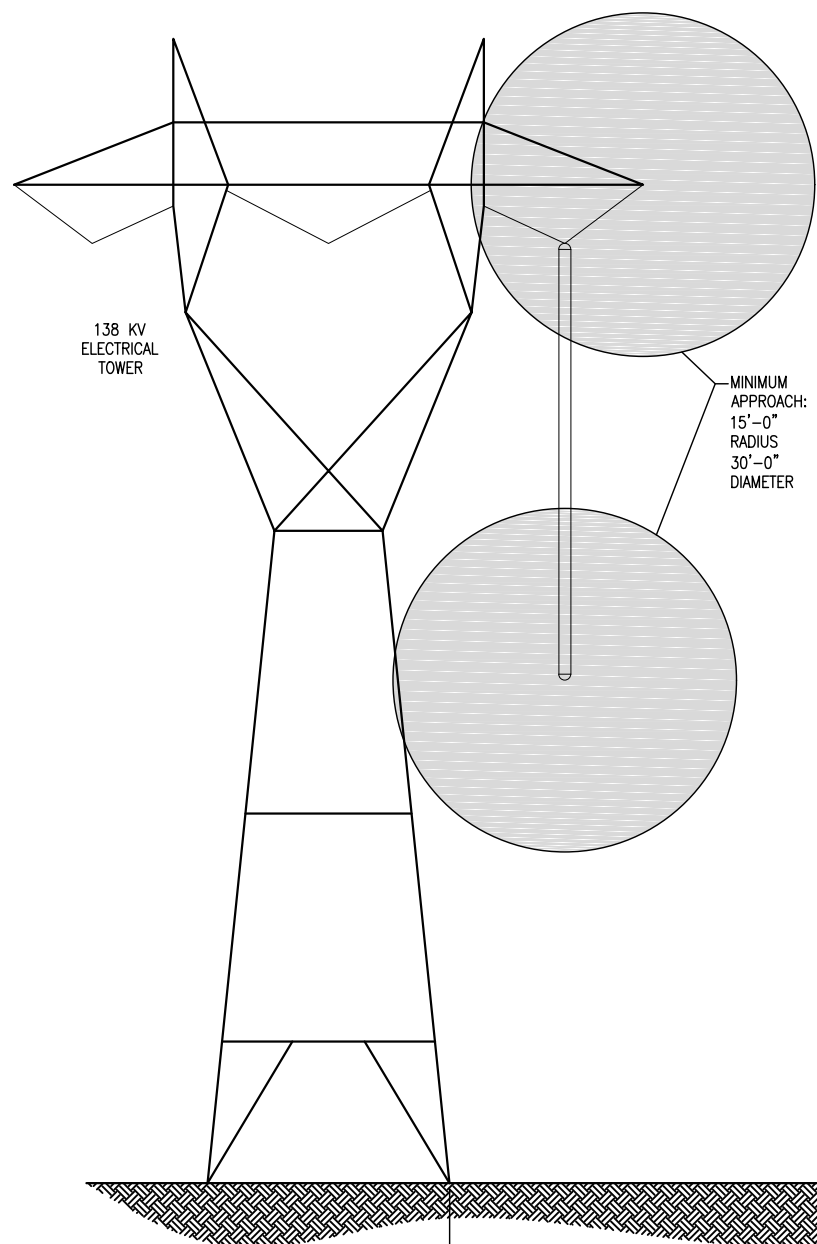
1. EQUIPMENT ORIENTATION MAY VARY DEPENDING ON CONTRACTOR OR SITE CONDITIONS.
2. EQUIPMENT TO BE SUPPORTED ON THE GROUND SURFACE OR TIMBER MATS AS CONDITIONS DICTATE.
3. SILT FENCE, BERMS AND/OR STRAW BALE BARRIER TO BE USED AS REQUIRED TO PREVENT IMPACTS FROM OCCURRING OUTSIDE OF PROJECT LIMITS.
4. HAND CLEARED ACCESS PATH WILL BE USED TO OBTAIN WATER FROM SOURCE WHERE PERMITTED.
5. ENTRANCE & EXIT ANGLES VARY BY LOCATION. REFER TO BORE PROFILE FOR DETAILED INFORMATION.

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DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD	TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS	 DESIGN ENGINEERING PROJECT ID: ----	DRAWING TITLE:						
DRAWING NUMBER	DRAWING TITLE															MAINLINE CONSTRUCTION HORIZONTAL DIRECTIONAL DRILL (HDD)						
								P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF				FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
																	MVP	VA	H-650	12	1	P
														DRAWING SCALE:								
														1/64" = 1'-0"								
														NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.								



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DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE							P	05/07/18	PRELIMINARY FOR REVIEW			

TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS

ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER

06/11/18
DATE

DESIGN ENGINEERING

ELECTRICAL DESIGN ENGINEER

DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

Mountain Valley
PIPELINE, LLC

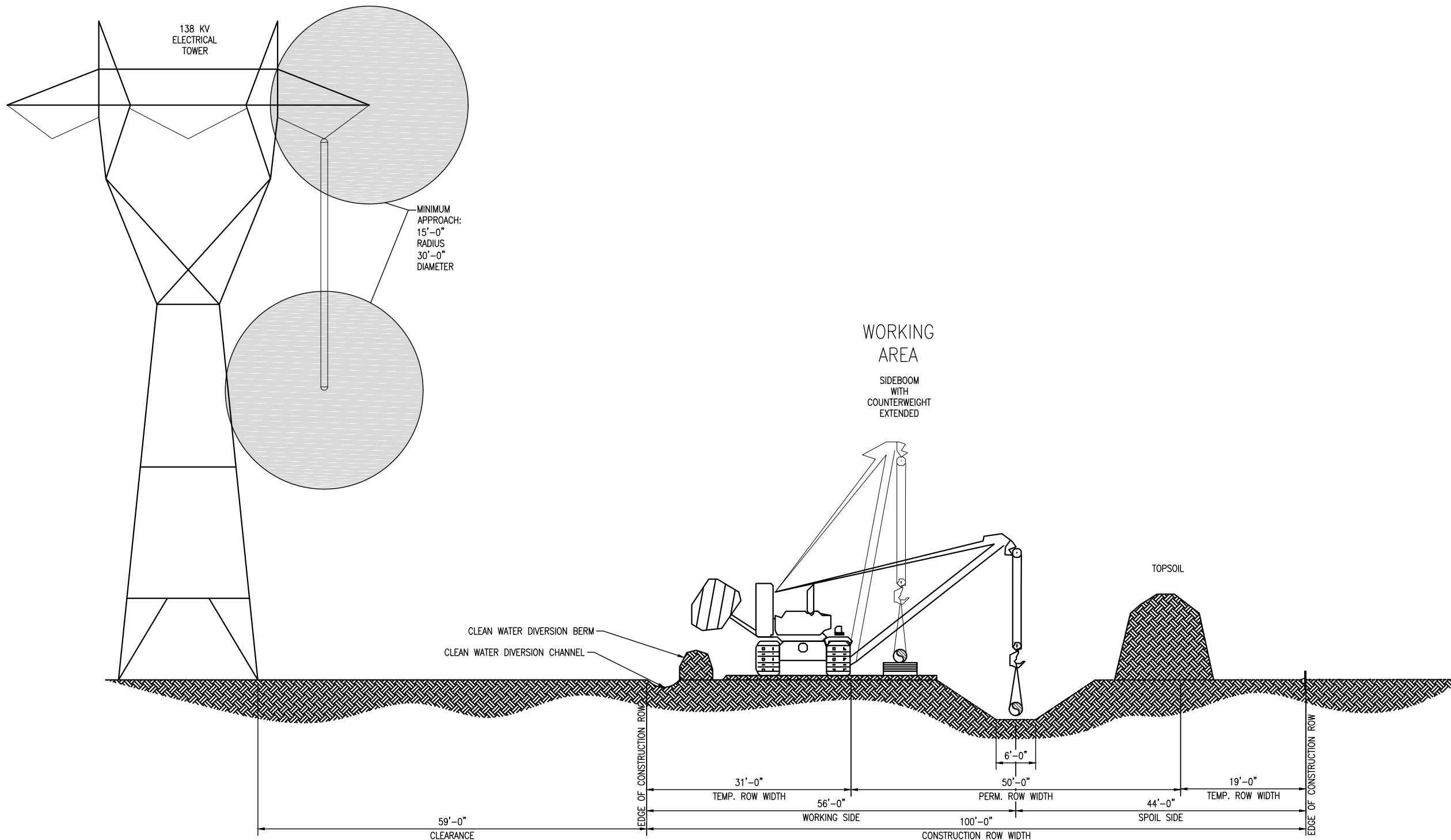
DESIGN ENGINEERING

PROJECT ID: -----

DRAWING SCALE: 1/8" = 1'-0"

DRAWING TITLE:
MAINLINE CONSTRUCTION
PARALLEL TO POWER LINES
100' RIGHT OF WAY

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	13	1	P



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DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
								P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

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ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

ELECTRICAL DESIGN ENGINEER DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

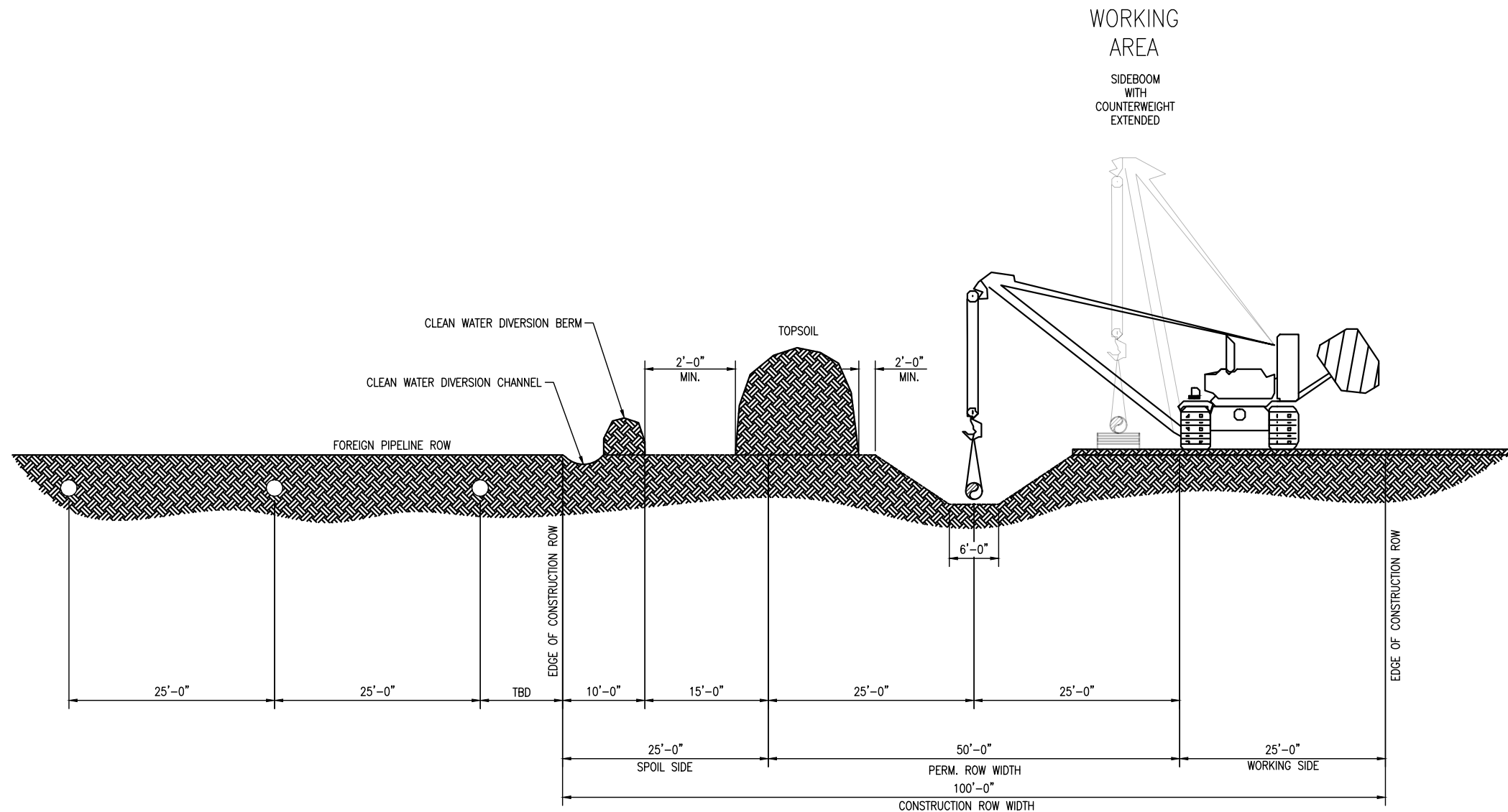
Mountain Valley
PIPELINE, LLC

DESIGN ENGINEERING

PROJECT ID: -----

DRAWING SCALE: 1/8" = 1'-0"

DRAWING TITLE: MAINLINE CONSTRUCTION PARALLEL TO POWER LINES 100' RIGHT OF WAY					
FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	15	1	P



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DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION			BY	CHK	APPD	NO.	DATE	REVISION			BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE																
									P	05/07/18		PRELIMINARY FOR REVIEW		JIL	AAL	NFF	


TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS

ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER

06/11/18
DATE

ELECTRICAL DESIGN ENGINEER
DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.



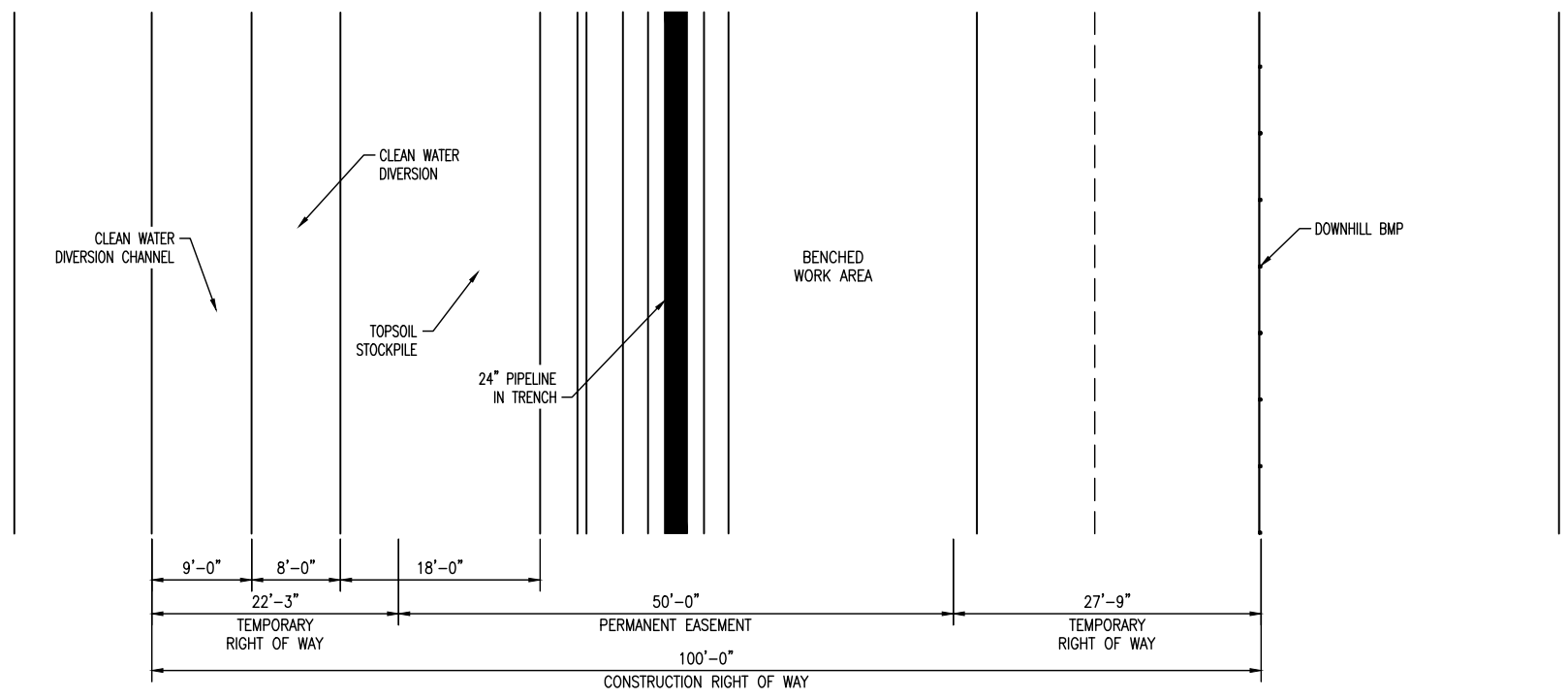
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DRAWING TITLE:

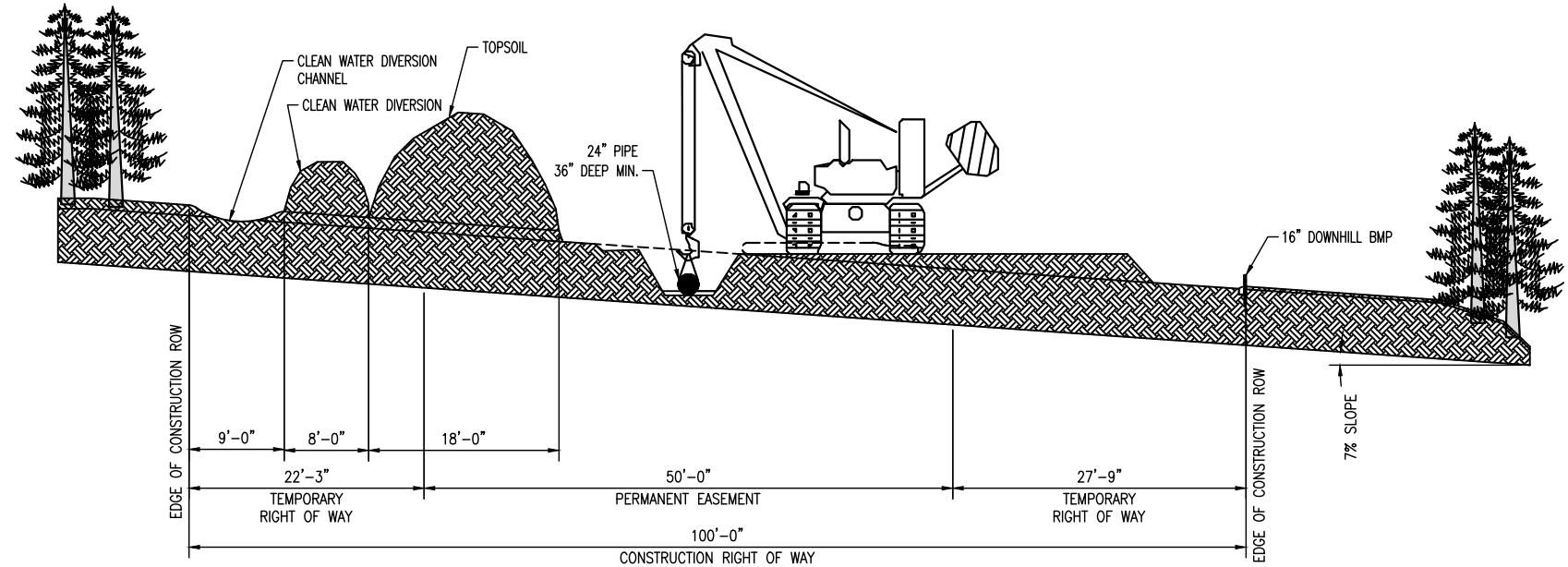
**MAINLINE CONSTRUCTION
PARALLEL TO FOREIGN LINES
100' RIGHT OF WAY**

PROJECT ID	FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
-----	MVP	VA	H-650	17	1	P

DRAWING SCALE: 1/8" = 1'-0"



PLAN VIEW



XS VIEW

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DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

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DRAWING NUMBER	DRAWING TITLE	P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF						

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ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

ELECTRICAL DESIGN ENGINEER DATE

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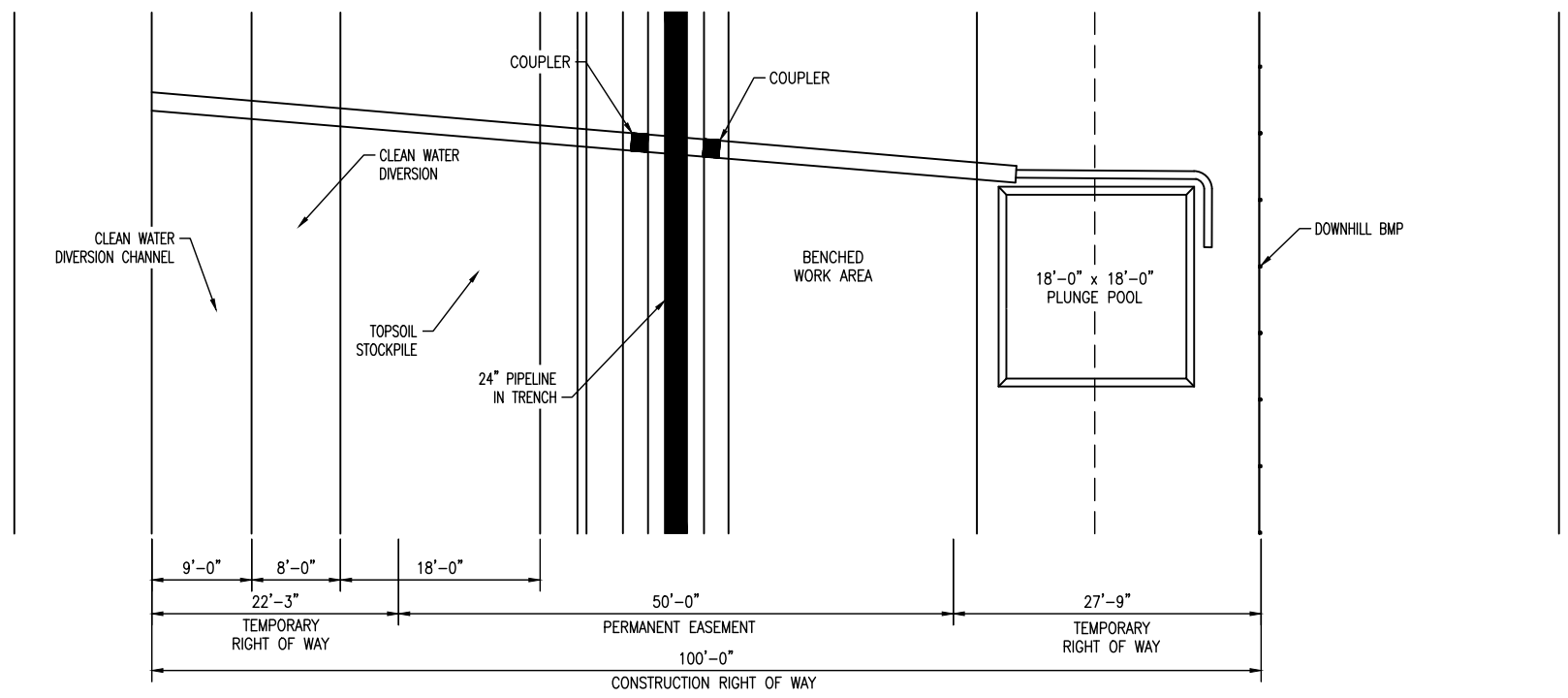
Mountain Valley
PIPELINE, LLC
DESIGN ENGINEERING

PROJECT ID: -----

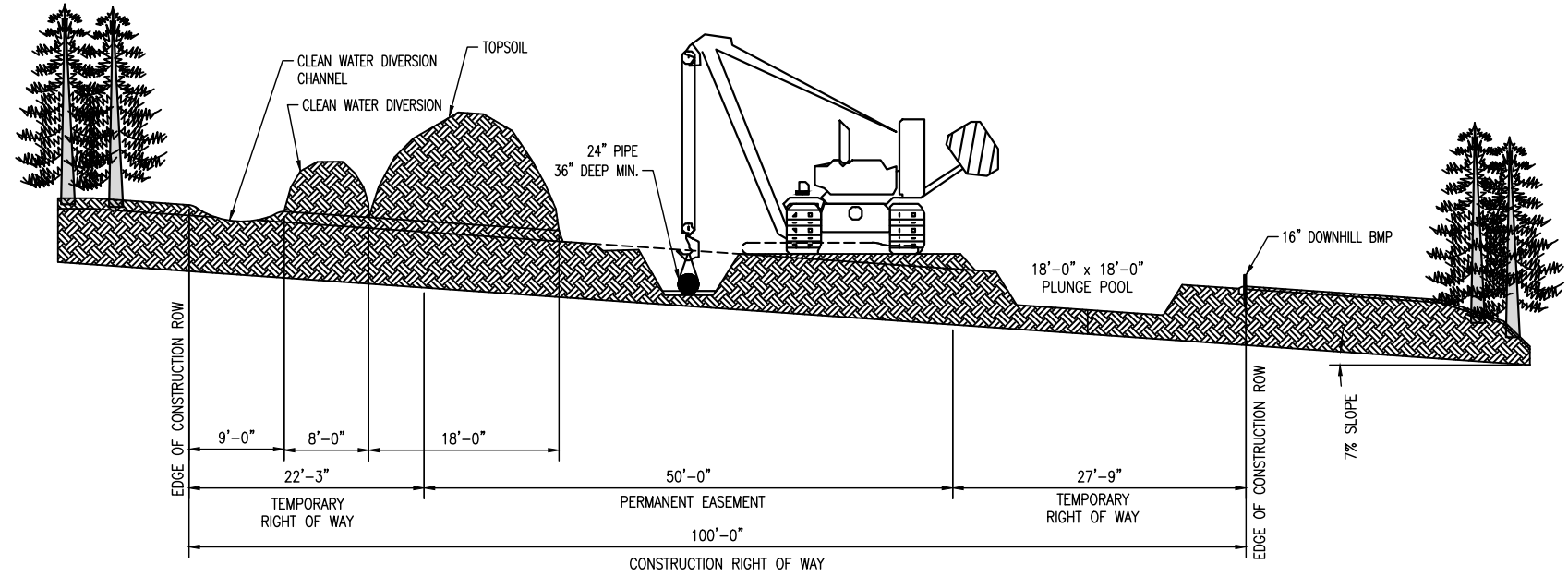
DRAWING SCALE: 3/32" = 1'-0"

DRAWING TITLE:
MAINLINE CONSTRUCTION
CLEAN WATER DIVERSION WITHOUT PLUNGE POOL
7% SLOPE
100' RIGHT OF WAY

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	19	1	P



PLAN VIEW



XS VIEW

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE							P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

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ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

ELECTRICAL DESIGN ENGINEER DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

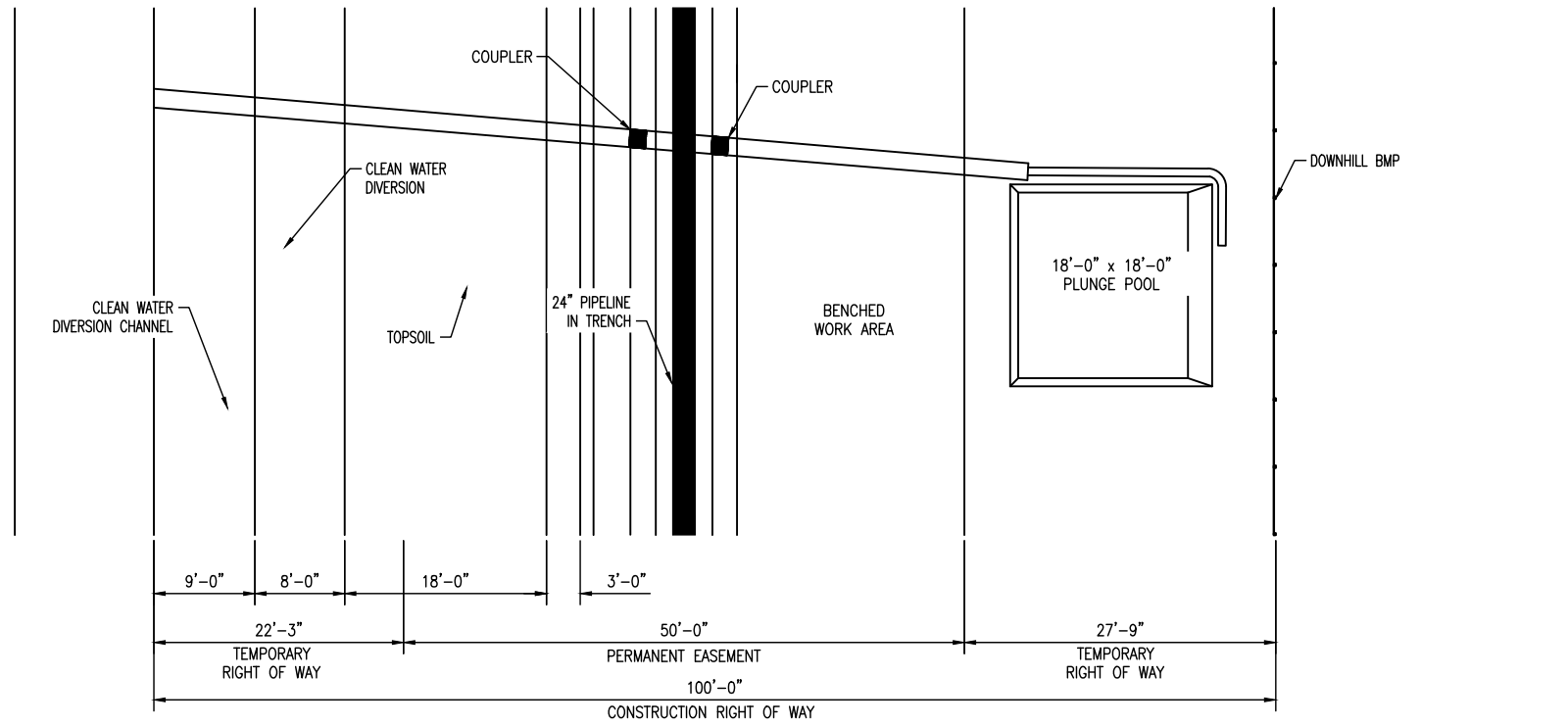
Mountain Valley PIPELINE, LLC
DESIGN ENGINEERING

PROJECT ID: -----

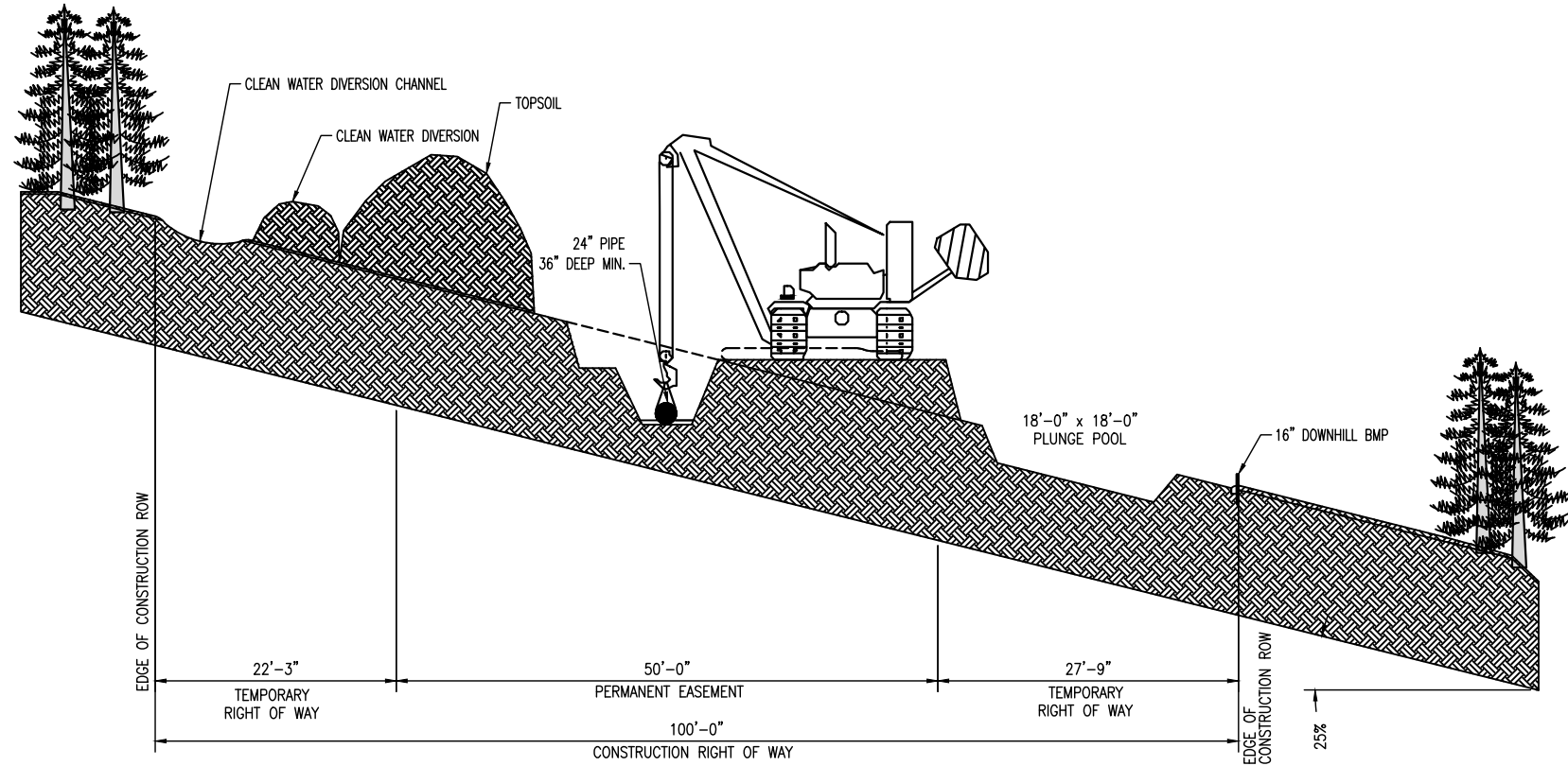
DRAWING SCALE: 3/32" = 1'-0"

DRAWING TITLE:
ENVIRONMENTAL DETAIL
CLEAN WATER DIVERSION WITH PLUNGE POOL
7% SLOPE
100' RIGHT OF WAY

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	21	1	P



PLAN VIEW



XS VIEW

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DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:06 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
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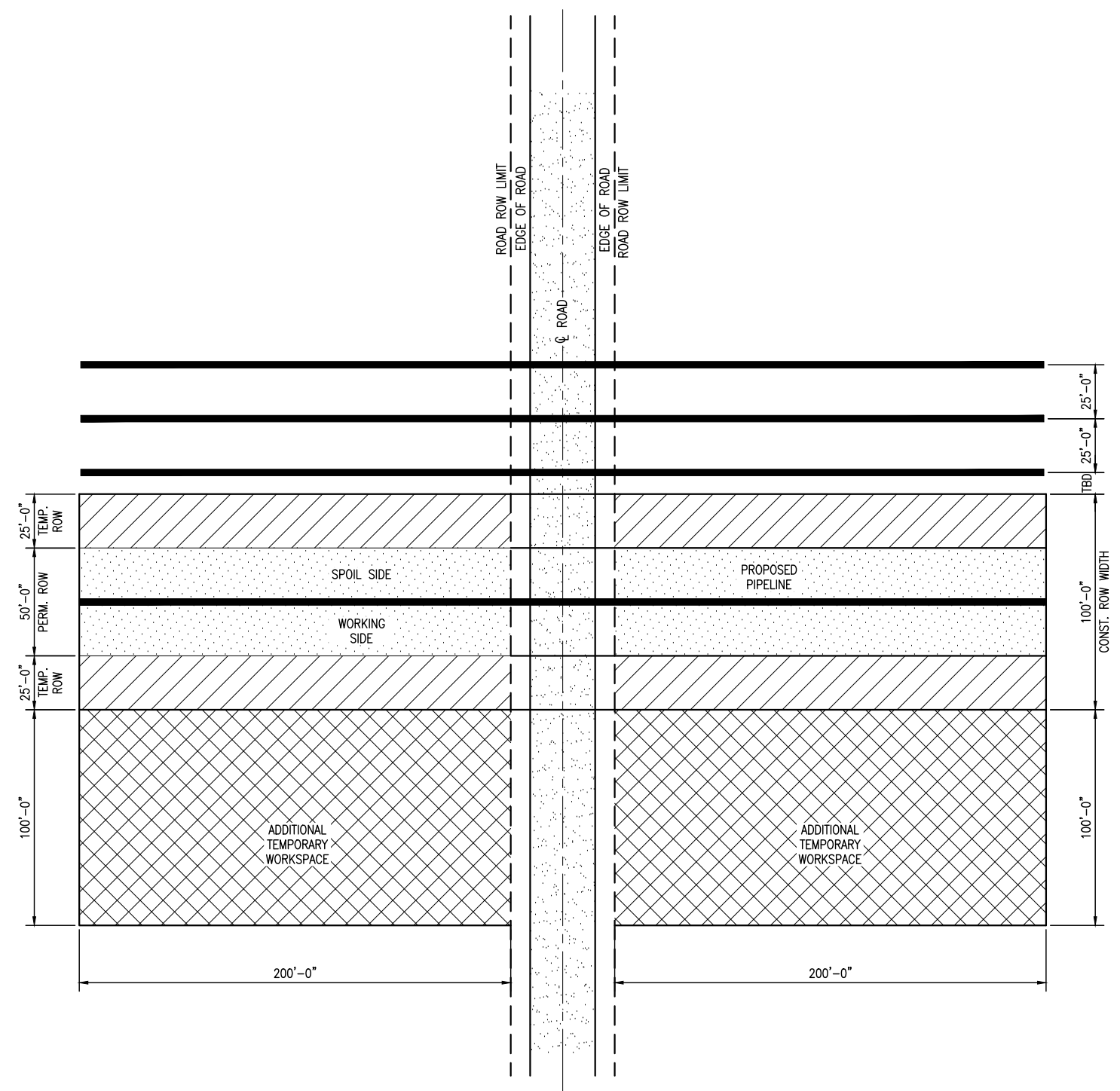
TO THE BEST OF MY KNOWLEDGE, ALL COMPONENTS OF THIS DRAWING ARE DESIGNED IN ACCORDANCE WITH APPLICABLE GUIDELINES AND SPECIFICATIONS

ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

ELECTRICAL DESIGN ENGINEER DATE

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

		DRAWING TITLE: MAINLINE CONSTRUCTION CLEAN WATER DIVERSION WITH PLUNGE POOL 25% SLOPE 100' RIGHT OF WAY			
DESIGN ENGINEERING PROJECT ID: _____		FACILITY	STATE	IDENTIFICATION	SERIES
DRAWING SCALE: 3/32" = 1'-0"		MVP	VA	H-650	23
		SHEET	REVISION		
		1	P		



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:07 PM

REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
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ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

ELECTRICAL DESIGN ENGINEER DATE

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DESIGN ENGINEERING

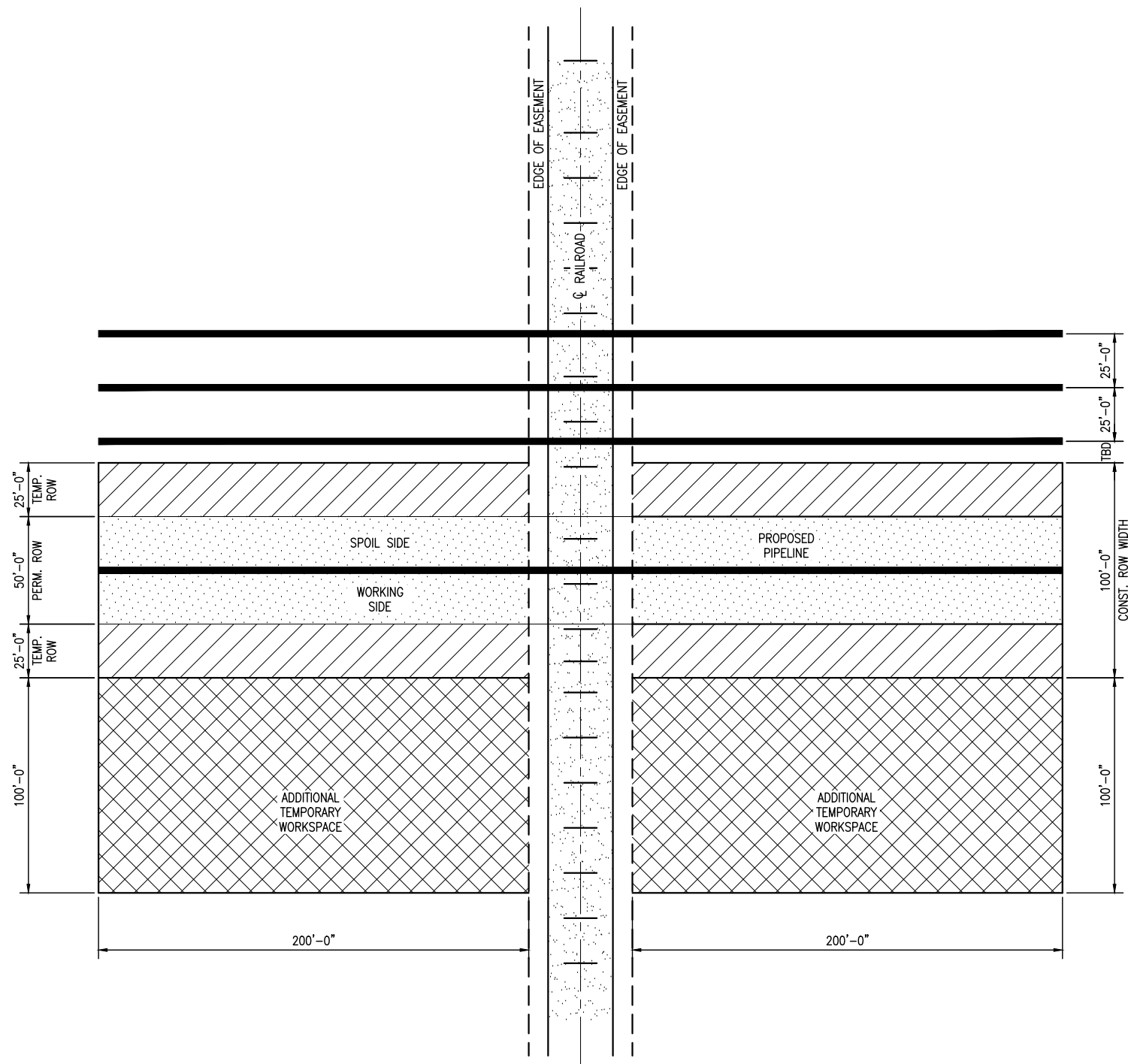
PROJECT ID: _____

DRAWING SCALE: 1/32" = 1'-0"

DRAWING TITLE:

**MAINLINE CONSTRUCTION
ROAD CROSSING BORED WITH PARALLEL PIPELINES
100' RIGHT OF WAY**

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	25	1	P



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:07 PM


REFERENCE DRAWINGS		NO.	DATE	REVISION	BY	CHK	APPD	NO.	DATE	REVISION	BY	CHK	APPD
DRAWING NUMBER	DRAWING TITLE												
								P	05/07/18	PRELIMINARY FOR REVIEW	JIL	AAL	NFF

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ALINA LAWRENCE 06/11/18
MECHANICAL DESIGN ENGINEER DATE

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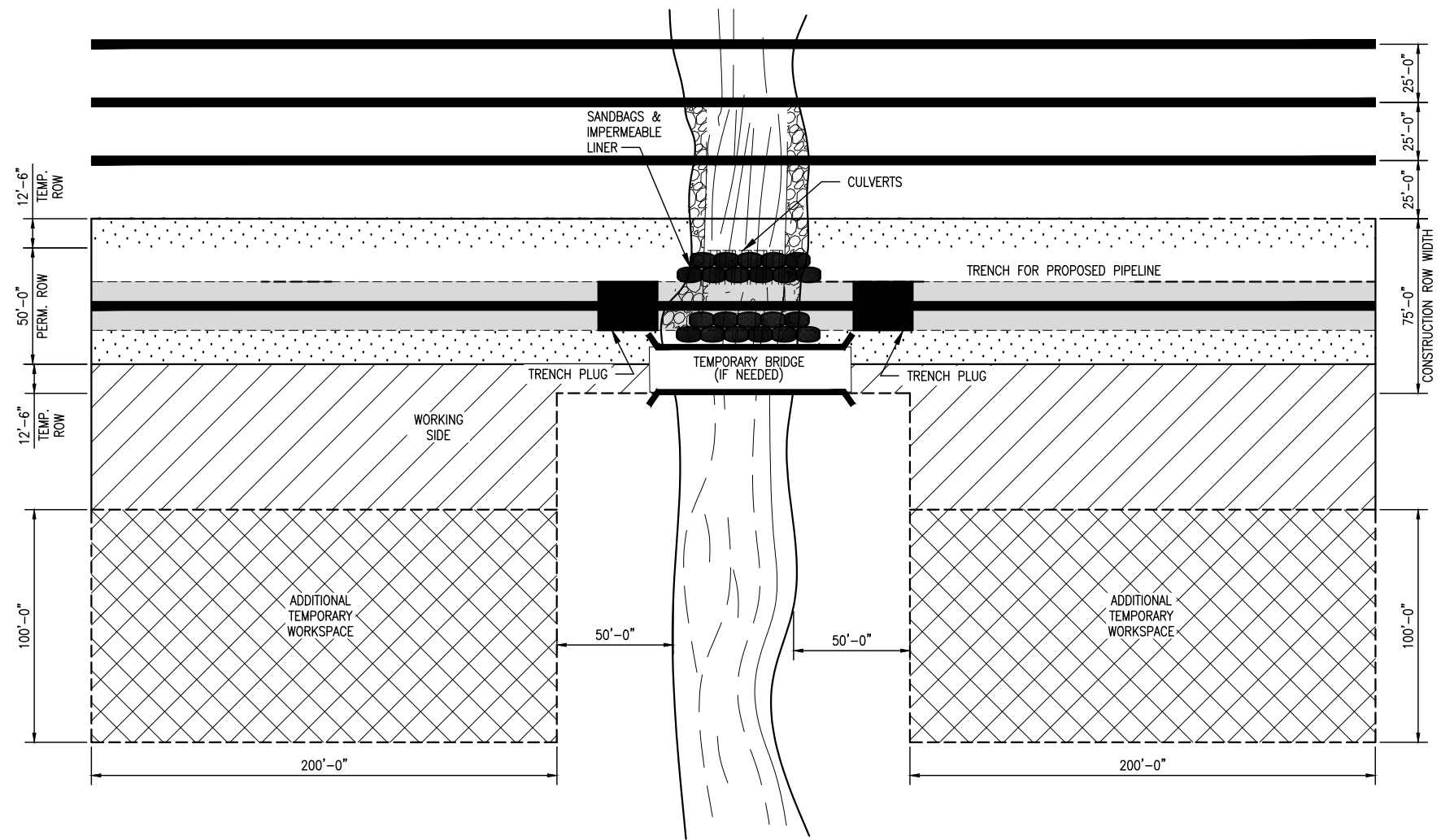
DESIGN ENGINEERING

PROJECT ID: _____

DRAWING SCALE: 1/32" = 1'-0"

DRAWING TITLE:
**MAINLINE CONSTRUCTION
RAILROAD CROSSING BORED WITH PARALLEL PIPELINES
100' RIGHT OF WAY**

FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	27	1	P



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "C" SOIL

Plotted by: McCarthy, Matthew (Contractor) on: August 13, 2018 - 1:07 PM

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ALINA LAWRENCE
MECHANICAL DESIGN ENGINEER
DATE: 06/11/18

ELECTRICAL DESIGN ENGINEER
DATE: _____

NOTE: ANY CHANGES TO THE DESIGN SHOWN ON THIS DRAWING MUST BE APPROVED BY THE DESIGN ENGINEER.

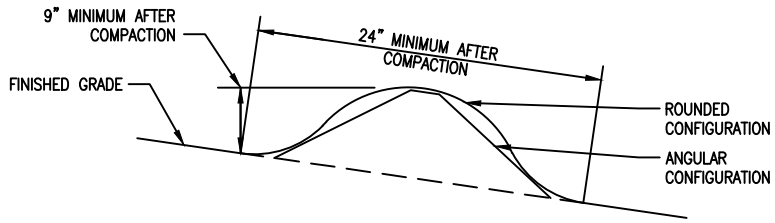
Mountain Valley
PIPELINE, LLC

DESIGN ENGINEERING

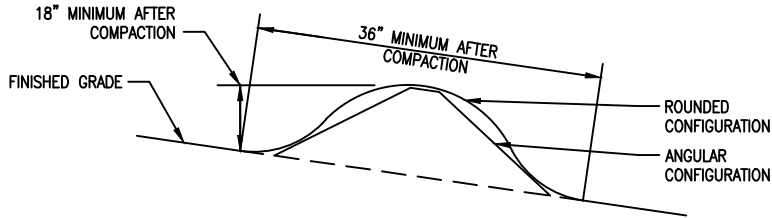
PROJECT ID: ----

DRAWING SCALE:
1/8" = 1'-0"

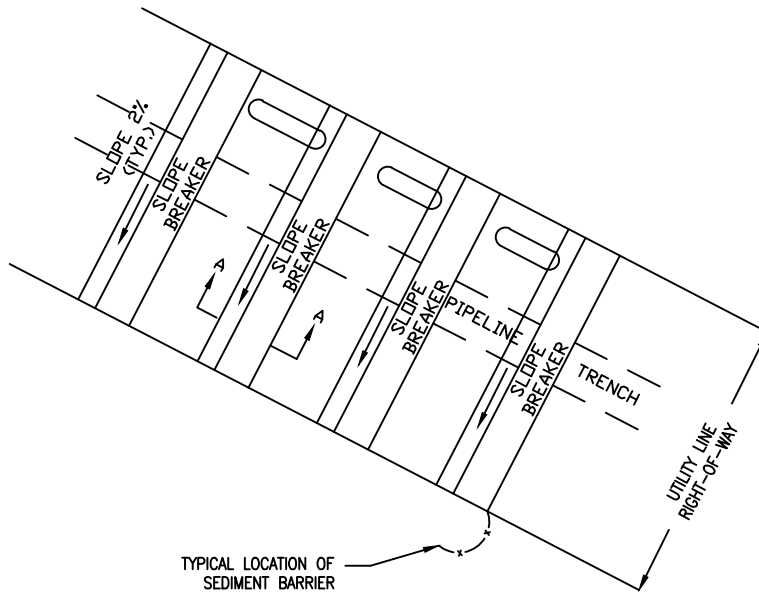
DRAWING TITLE: MAINLINE CONSTRUCTION WATERBODY CROSSING WITH PARALLEL PIPELINES OPEN CUT - FLUME					
FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
MVP	VA	H-650	29	1	P



SECTION A-A
(TEMPORARY INSTALLATION)



SECTION A-A
(PERMANENT INSTALLATION)



SKETCH

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1

JOB NO.

PROJECT ID:

H-650-TYP



TYPICAL CONSTRUCTION DETAIL

SLOPE BREAKER/RIGHT-OF-WAY
DIVERSION/WATERBAR

DRAWING NO.
MVP-SG-17.1

REV.
P1

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

¹ PERMANENT SLOPE BREAKERS WILL BE INSTALLED AS NEEDED BASED ON FIELD CONDITIONS.

² PERMANENT SLOPE BREAKERS WILL BE INSTALLED 25 FEET FROM EACH WATERBODY BOUNDARY REGARDLESS OF SLOPE CONDITIONS.

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

NOTES:

WATERBARS SHALL BE INSPECTED WEEKLY (DAILY ON ACTIVE ROADS) AND AFTER EACH RUNOFF EVENT. DAMAGED OR ERODED WATERBARS SHALL BE RESTORED TO ORIGINAL DIMENSIONS WITHIN 24 HOURS OF INSPECTION

MAINTENANCE OF WATERBARS SHALL BE PROVIDED UNTIL ROADWAY, SKIDTRAIL, OR RIGHT-OF-WAY HAS ACHIEVED PERMANENT STABILIZATION

WATERBARS ON RETIRED ROADWAYS, SKIDTRAILS, AND RIGHT-OF-WAYS SHALL BE LEFT IN PLACE AFTER PERMANENT STABILIZATION HAS BEEN ACHIEVED

SUMP FILTERS TO BE INSTALLED AT END OF WATERBARS. REFER TO SUMP FILTER DETAIL ON SHEET 0.09 FOR MORE DETAIL.

OUTLET PROTECTION/COMPOST FILTER SOCK SHOULD BE INSTALLED AT THE OUTLET OF ALL WATERBARS.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

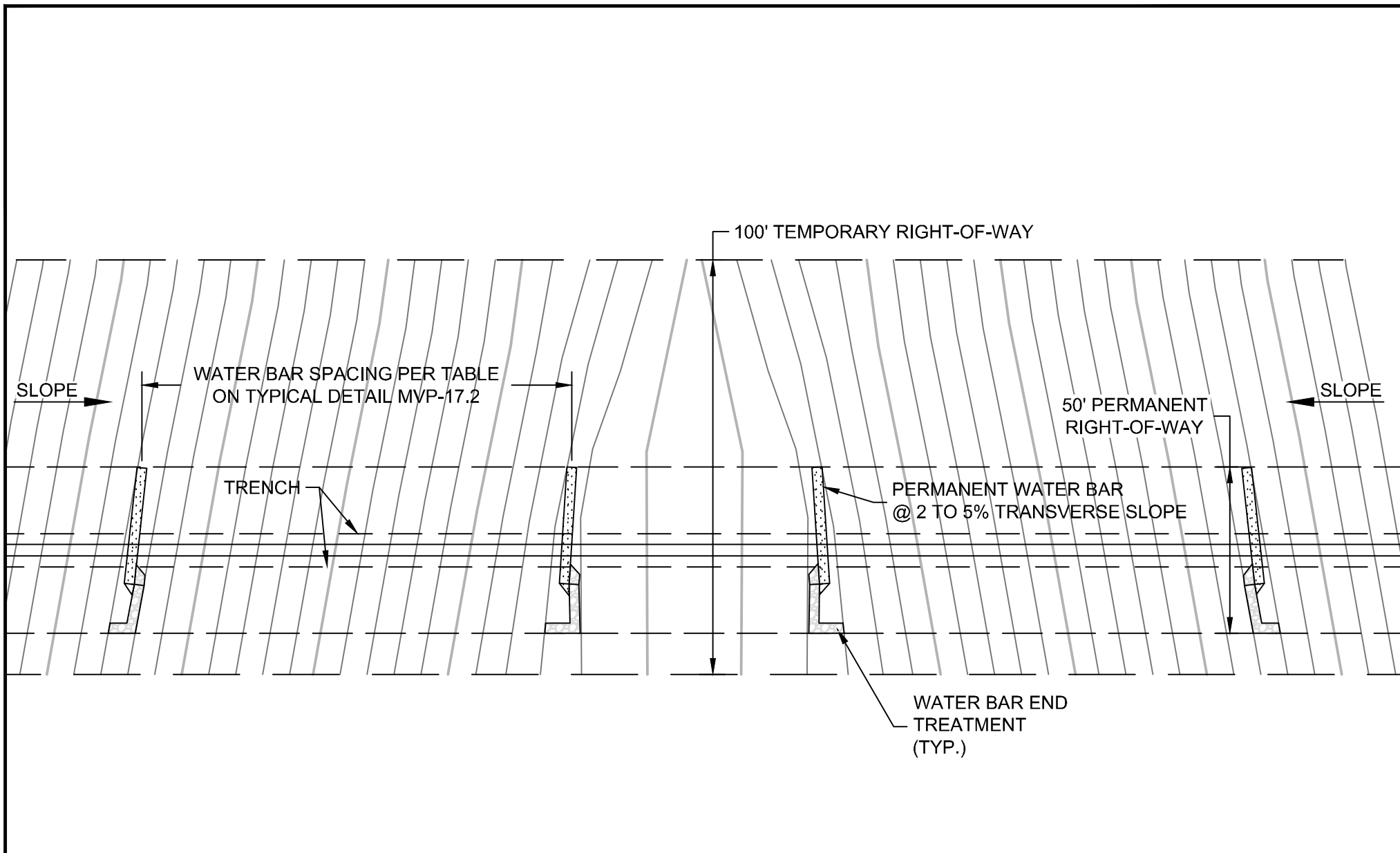


TYPICAL CONSTRUCTION DETAIL

SLOPE BREAKER/RIGHT-OF-WAY
DIVERSION/WATERBAR

DRAWING NO.
MVP-SG-17.2

REV.
P1



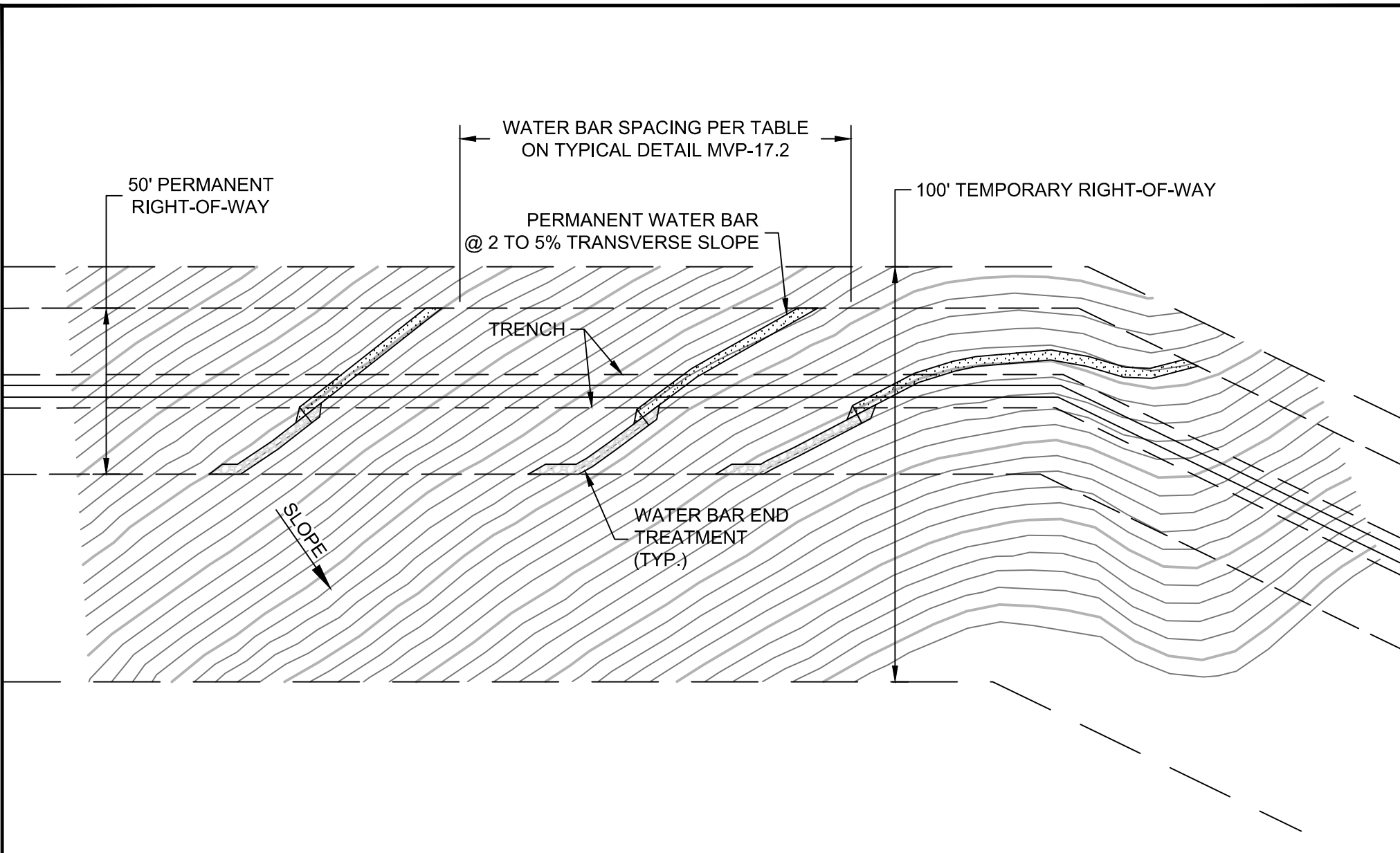
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

WATERBAR END TREATMENT
PERPENDICULAR TO SLOPE EXAMPLE

DRAWING NO.	REV.
MVP-SG-17.3	P1

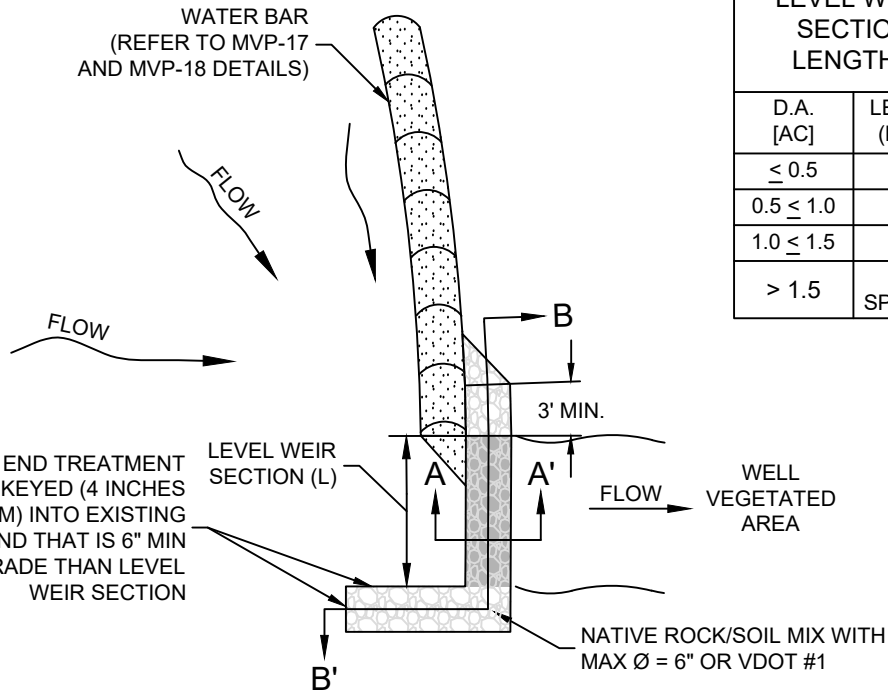


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CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



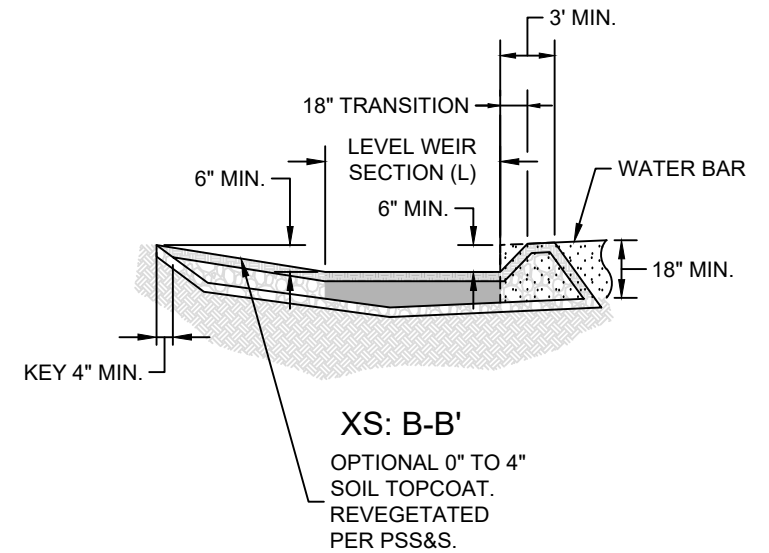
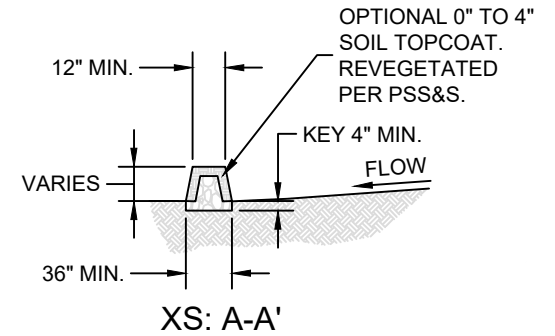
TYPICAL CONSTRUCTION DETAIL	
WATERBAR END TREATMENT CROSS SLOPE EXAMPLE	
DRAWING NO.	REV.
MVP-SG-17.4	P1

WATER BAR
(REFER TO MVP-17
AND MVP-18 DETAILS)



WATER BAR END TREATMENT
TO BE KEYED (4 INCHES
MINIMUM) INTO EXISTING
GROUND THAT IS 6" MIN
HIGHER GRADE THAN LEVEL
WEIR SECTION

LEVEL WEIR SECTION LENGTHS	
D.A. [AC]	LENGTH (L) [FT]
≤ 0.5	10
$0.5 \leq 1.0$	15
$1.0 \leq 1.5$	20
> 1.5	SITE SPECIFIC



DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

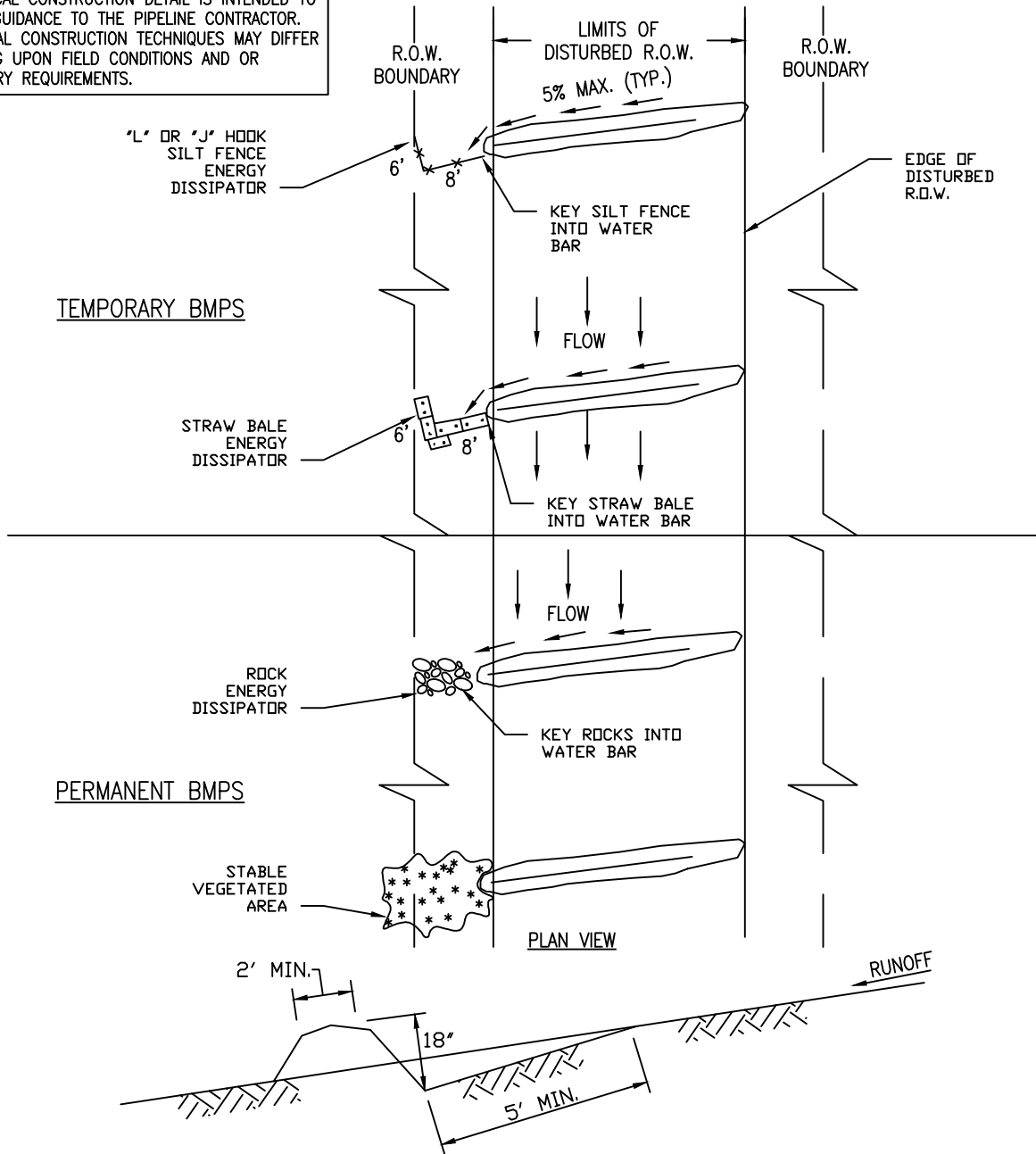


TYPICAL CONSTRUCTION DETAIL

WATERBAR END
TREATMENT DETAIL

DRAWING NO.	REV.
MVP-SG-17.7	P1

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.



NOTES:

1. SLOPE BREAKERS SHALL BE CONSTRUCTED OF COMPACTED NATIVE SOIL AND INSTALLED AT LOCATIONS AS SHOWN ON THE CONSTRUCTION DRAWINGS OR AS DIRECTED BY THE COMPANY'S INSPECTOR.
2. SLOPE BREAKERS SHALL BE ORIENTED AS SHOWN OR OTHER PATTERN AS DIRECTED BY THE COMPANY'S INSPECTOR TO DIRECT THE WATER OFF THE R.O.W.
3. SLOPE BREAKERS SHALL BE CONSTRUCTED AT A 5% MAXIMUM GRADIENT ACROSS THE SLOPE.
4. THE SLOPE BREAKERS SHALL BE 18" DEEP (AS MEASURED FROM THE TROUGH TO THE TOP OF THE SLOPE BREAKER). THE TROUGH WILL BE A MINIMUM OF 5' WIDE ACROSS THE WIDTH OF THE RIGHT-OF-WAY.
5. THE OUTLET OF THE SLOPE BREAKER MUST FREELY DISCHARGE RUNOFF OFF FROM THE DISTURBED RIGHT-OF-WAY INTO A STABLE, WELL VEGETATED AREA OR INTO AN ENERGY DISSIPATER.
6. WHERE SLOPE BREAKERS EXTEND BEYOND THE EDGE OF THE CONSTRUCTION R.O.W. DIRECT RUNOFF INTO STABLE, WELL VEGETATED AREAS, THESE LOCATIONS MUST BE APPROVED BY THE COMPANY'S INSPECTOR.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1

JOB NO.
PROJECT ID:
H-650-TYP



TYPICAL CONSTRUCTION DETAIL

SLOPE BREAKER/RIGHT-OF-WAY DIVERSION/WATERBAR

DRAWING NO.
MVP-SG-17

REV.
P1

STRAW MULCH

1. STRAW MULCH SHALL BE INSTALLED AT LOCATIONS IDENTIFIED ON THE CONSTRUCTION DRAWING AND/OR AS DIRECTED BY THE COMPANY'S INSPECTOR TO PROTECT SOIL FROM EROSION. AREAS TARGETED FOR STRAW MULCH INCLUDE THE FOLLOWING:
 - 10-40% SLOPES WITH LESS THAN 40% SURFACE COVER.
 - 0-10% SLOPES WITH SOILS RATED BY APPLICABLE COUNTY AS HIGH IN WIND ERODIBILITY AND LESS THAN 40% SURFACE COVER AND IF DIRECTED BY COMPANY'S INSPECTOR.
2. WHEAT, OAT, BARLEY, RYE OR FLAX STRAW WILL BE USED, WHERE APPROPRIATE, DEPENDING UPON AVAILABILITY.
3. ONLY CERTIFIED "NOXIOUS WEED-FREE" STRAW MULCH SHALL BE APPLIED AT A RATE OF:
 - 1,780 TO 2,225 LB/AC WHEAT, OAT, BARLEY OR RYE STRAW
 - 2,670 TO 3,560 LB/AC FLAX STRAW
4. AREAS WHERE RESPREAD TOPSOIL EXHIBITS AN ADEQUATE COVER FROM RESPREAD OF PLANT DEBRIS AND COARSE FRAGMENTS, MULCH RATES MAY BE REDUCED OR ELIMINATED BY THE COMPANY'S INSPECTOR.

STRAW CRIMPING

1. STRAW CRIMPING WILL BE UTILIZED ON NONCULTIVATED, WIND EROSION PRONE SOILS, AND ON CULTIVATED, WATER EROSION PRONE SOILS AS IDENTIFIED ON THE ALIGNMENT SHEETS, UNLESS OTHERWISE DIRECTED BY THE COMPANY'S INSPECTOR. STRAW CRIMPING AT ADDITIONAL LOCATIONS IDENTIFIED BY THE COMPANY'S INSPECTOR MAY BE REQUIRED.
2. EQUIPMENT SPECIFICALLY DESIGNED TO CRIMP STRAW (SUCH AS A STRAW MULCH CRIMPER MANUFACTURED BY FINN CORPORATION OR AN APPROVED EQUIVALENT) SHALL BE USED TO CRIMP STRAW FIBERS TO A DEPTH OF TWO TO THREE INCHES. STEEP SLOPES INACCESSIBLE WITH A CRIMPER SHALL BE CRIMPED BY TRACKING WITH A CRAWLER RUNNING PERPENDICULAR TO THE SLOPE. DISCS SHALL NOT BE ALLOWED FOR CRIMPING EXCEPT AS STATED IN NOTE 3.

WHERE EXCESSIVE STONINESS IS ENCOUNTERED TO THE EXTENT THAT THE SPECIALIZED CRIMPING EQUIPMENT IS NOT USEABLE, ATTEMPT TO ANCHOR THE STRAW BY INCORPORATION WITH AN AGRICULTURAL DISC OR CULTIVATOR. WHERE FROZEN GROUND CONDITIONS ARE ENCOUNTERED TO THE EXTENT THAT THE CRIMPING OPERATION IS NOT FEASIBLE, SPREAD STRAW AT DOUBLE THE NORMAL RATE.

CRIMP OR ANCHOR STRAW INTO THE SOIL TO AN APPROXIMATE DEPTH OF 2". STRAW SHOULD STAND
3. VERTICALLY 2" TO 8" OUT OF THE GROUND IN ROWS SPACED APPROXIMATELY 6" APART.
4. IN HIGHLY ERODIBLE SANDY LOCATIONS, WHERE DIRECTED BY THE COMPANY'S INSPECTOR, DOUBLE THE STRAW APPLICATION RATE AND MAKE TWO PASSES TO ANCHOR THE STRAW, ONE PASS PERPENDICULAR TO THE OTHER OR CRISS-CROSSED.
5. STRAW FOR CRIMPING WILL BE APPROVED BY COMPANY AND THE LANDOWNERS AND OCCUPANTS OR APPROPRIATE REGULATORY AUTHORITIES WHERE APPLICABLE. CRITERIA FOR THE SELECTION OF STRAW IS AS FOLLOWS:
 - FOR EACH LOT OF BALES, TO THE EXTENT FEASIBLE, THE FIELD WHERE THE BALES WERE OBTAINED WILL BE INSPECTED BEFORE IT IS HARVESTED, OR THE STUBBLE WILL BE INSPECTED IMMEDIATELY AFTER HARVEST AND A SAMPLE OF GRAIN WILL BE INSPECTED FOR WEED SEEDS.
 - THE STRAW MUST HAVE BEEN HARVESTED WITH A CONVENTIONAL COMBINE, NOT A ROTARY COMBINE.
 - THE STRAW MUST HAVE A MINIMUM FIBRE LENGTH OF 8", 12" IS PREFERRED.
 - THE STRAW MUST BE FREE OF NOXIOUS OR RESTRICTED WEEDS AND UNDESIRABLE SPECIES WHICH WOULD HAMPER RECLAMATION EFFORTS.
 - TO THE EXTENT FEASIBLE, BALES OBTAINED FROM LOW LYING WEEDY AREAS WILL BE IDENTIFIED AND AVOIDED.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

EROSION CONTROL
STRAW MULCH
(STM)

DRAWING NO.

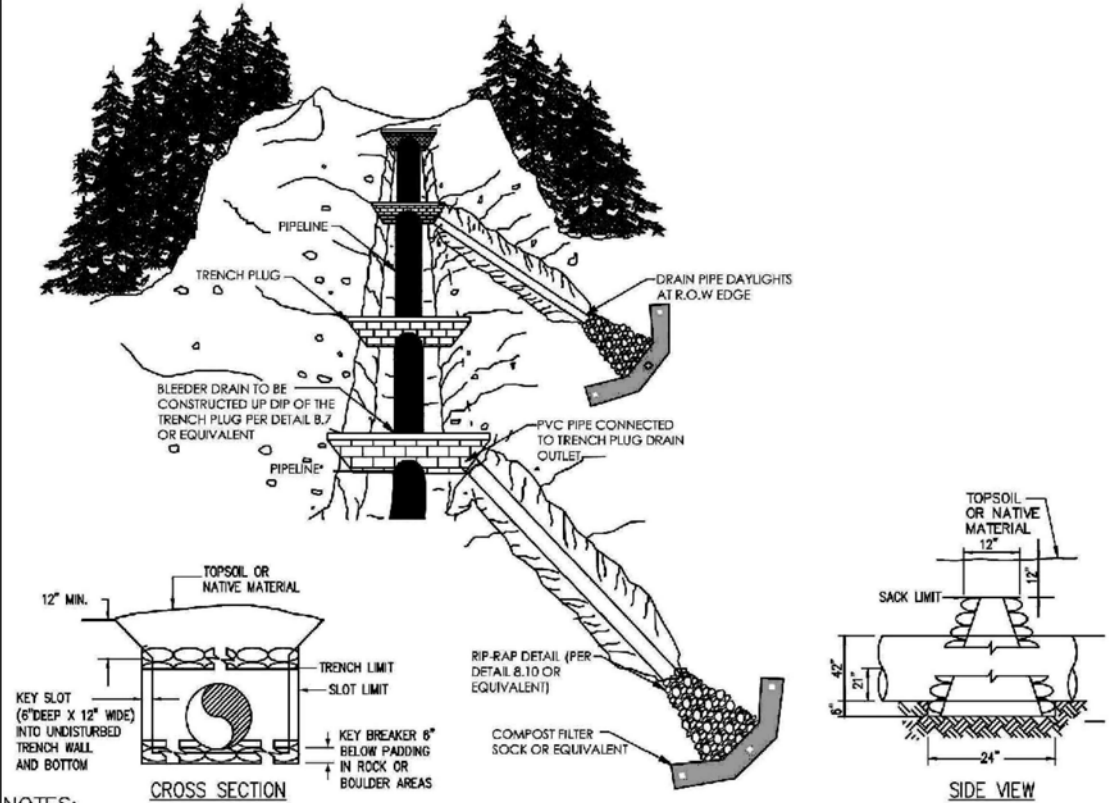
MVP-SG-19

REV.

P1

SLOPE %	DISTANCE	PLUG MATERIAL
0% - 5%	SEE NOTE 6	CONCRETE FILLED SACKS
5% - 15%	500 FT	SANDBAGS OR CONCRETE FILLED SACKS
15% - 25%	300 FT	SANDBAGS OR CONCRETE FILLED SACKS
25% - 35%	200 FT	SANDBAGS OR CONCRETE FILLED SACKS
35% - 100%	100 FT	SANDBAGS OR CONCRETE FILLED SACKS
> 100%	50 FT	CONCRETE FILLED BAGS (WETTED)

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.



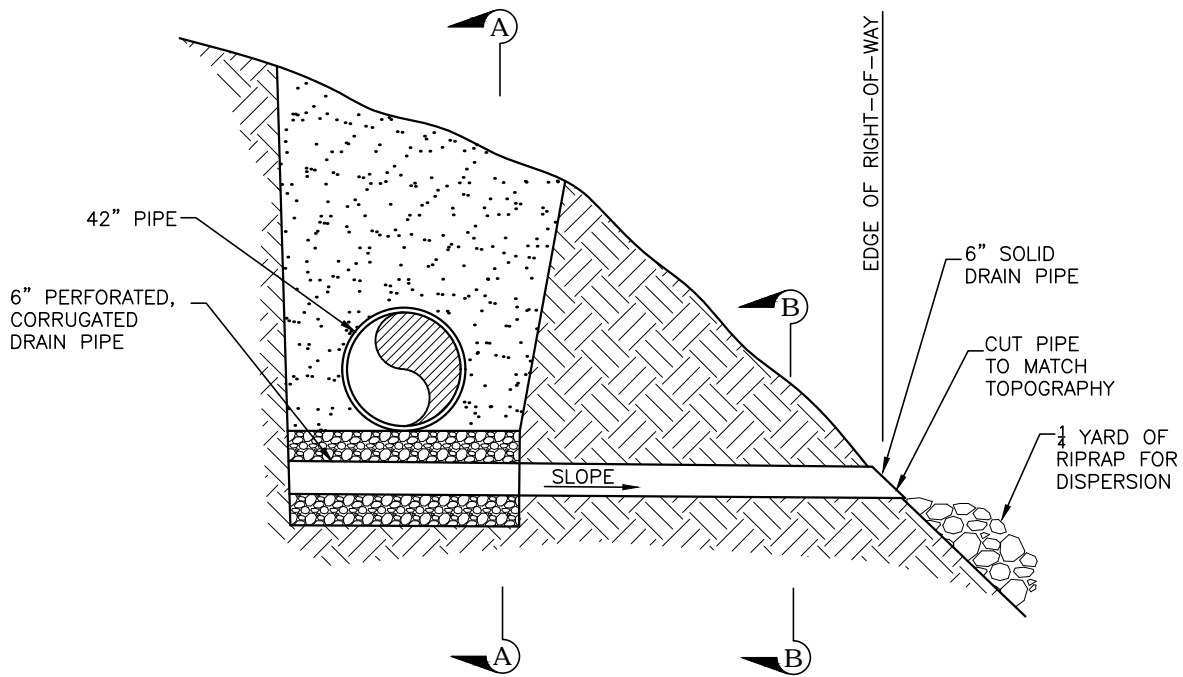
- NOTES:**
- TRENCH BREAKERS SHALL BE INSTALLED:
 - ON SLOPES ALONG THE TRENCH LINE WHERE THE NATURAL DRAINAGE PATTERN, PROFILE, AND TYPE OF BACKFILL MATERIAL MAY RESULT IN LOSS OF BACKFILL MATERIAL OR ALTERATION OF THE NATURAL PATTERN;
 - AT THE BASE OF SLOPES ADJACENT TO WATERBODIES AND WETLANDS;
 - WHERE NEEDED TO AVOID DRAINING A WETLAND;
 - ON UPLAND SLOPES, AT THE SAME SPACING AS SLOPE BREAKERS AND UP SLOPE OF SLOPE BREAKERS;
 - IN CULTIVATED LAND AND RESIDENTIAL AREAS WHERE PERMANENT SLOPE BREAKERS ARE NOT TYPICALLY INSTALLED, AT THE SAME SPACING AS IF PERMANENT SLOPE BREAKERS WERE REQUIRED.
 - MATERIALS APPROPRIATE FOR USE AS PERMANENT TRENCH BREAKERS INCLUDE SANDBAGS OR CONCRETE FILLED SACKS. TOPSOIL SHALL NOT BE USED FOR TRENCH BREAKERS.
 - TRENCH BREAKERS INSTALLED AT WATERBODY AND WETLAND CROSSINGS SHALL BE CONSTRUCTED OF IMPERVIOUS MATERIALS (CONCRETE FILLED SACKS).
 - BREAKER SPACING AND CONFIGURATION MAY BE CHANGED AS DIRECTED BY MVP. DEPTH OF DITCH MAY VARY WITH SITE CONDITIONS.
 - ALL MATERIALS SHALL BE SUPPLIED BY CONTRACTOR.
 - TRENCH BREAKERS ARE REQUIRED AT ALL WATERBODY CROSSINGS REGARDLESS OF TRENCH SLOPE. OTHERWISE NOTE REQUIRED AT SLOPES < 5%.
 - SINGLE TRENCH BREAKERS WILL BE A MINIMUM WIDTH OF 24" AND DOUBLE TRENCH BREAKERS WILL BE A MINIMUM WIDTH OF 36".
 - FOR SUBSURFACE AND TRENCH BREAKER DRAINAGE DETAILS INCLUDING THOSE FOR STEEP SLOPES, SEE LANDSLIDE MITIGATION TYPICAL DETAILS.
 - FOR SLOPES EXCEEDING 50%, CONCRETE FILLED SACKS ARE REQUIRED UNLESS OTHERWISE APPROVED BY MVP.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

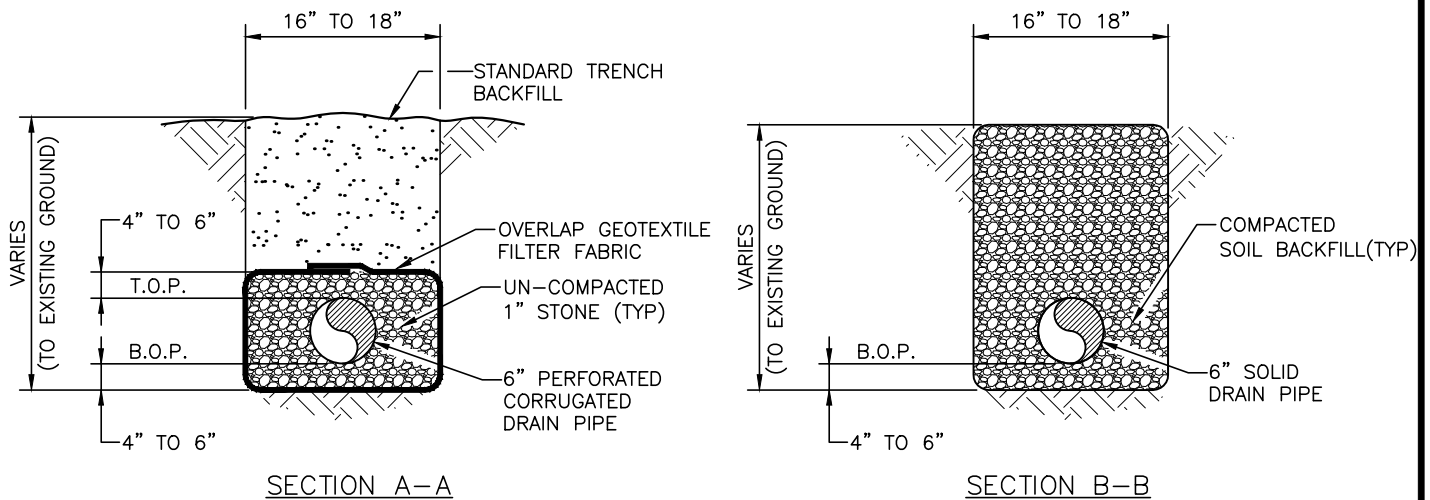
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL	
TYPICAL TRENCH BREAKER REQUIREMENTS	
DRAWING NO.	REV.
MVP-SG-20	P1



MAINLINE CROSS SECTION



SECTION A-A

SECTION B-B

NOTES

1. LOW POINT DITCH DRAINS SHALL BE INSTALLED AT LOCATIONS SPECIFIED IN THE APPROVED EROSION & SEDIMENTATION CONTROL PLAN, AND AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
2. FILL STONE SHOULD BE 1" AGGREGATE WITHOUT FINES, CRUSHER RUN WITHOUT FINES, OR EQUIVALENT.
3. DRAIN PIPE TO BE CONNECTED USING STANDARD PIPE COLLARS.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

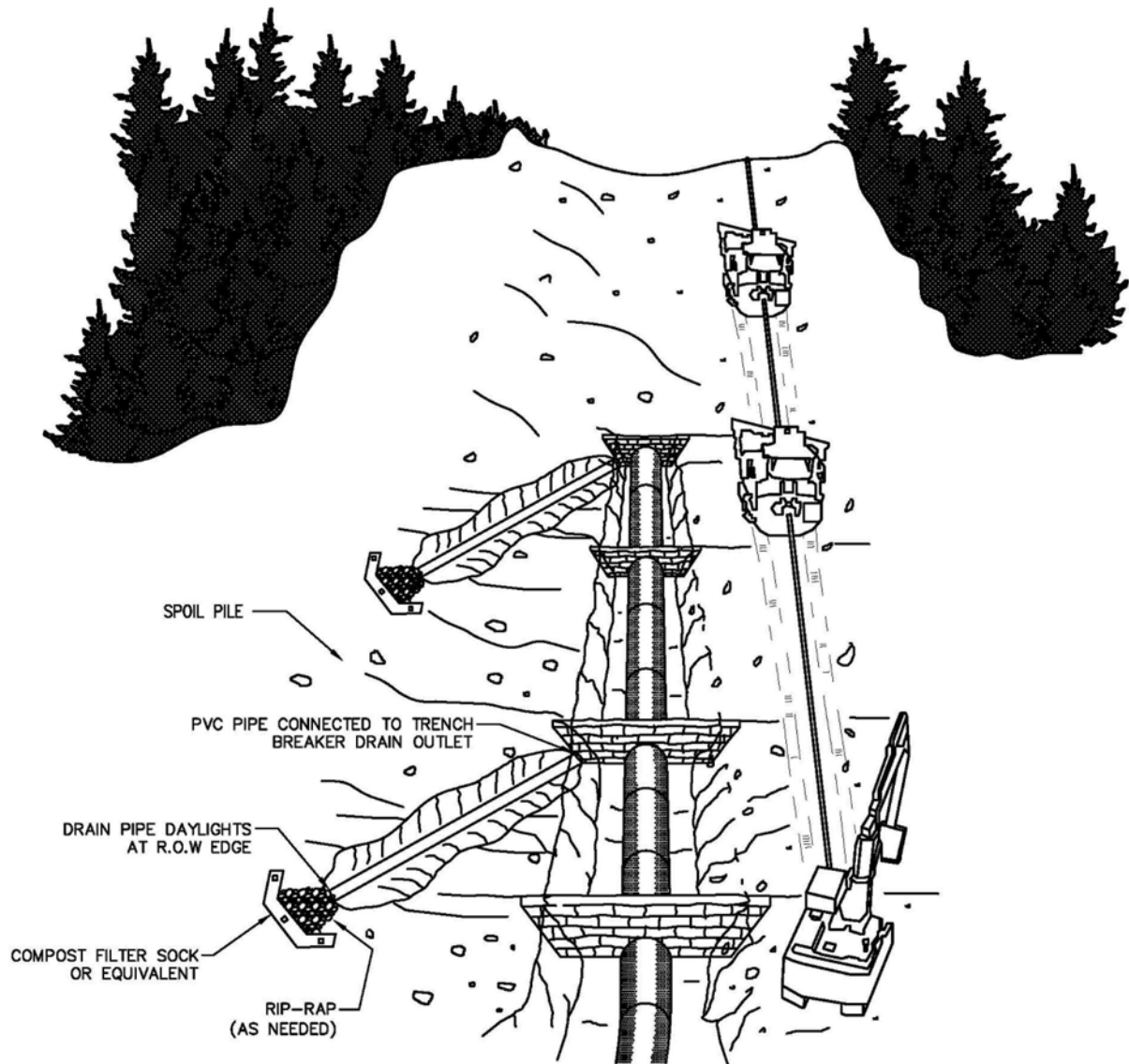
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

SIDEHILL LOW-POINT DRAIN
TYPICAL

DRAWING NO.	REV.
MVP-SG-24	P1



NOTES:

1. WINCHES MAY BE REQUIRED FOR MOVING EQUIPMENT AND MATERIAL, AND DURING CONSTRUCTION ON STEEP LONGITUDINAL SLOPES.
2. WINCHES WILL EITHER BE FIXED WINCHES OR TRACKED EQUIPMENT WITH WINCHES.
3. WINCHES WILL TYPICALLY BE REQUIRED FOR SLOPES OF 30% (17°) AND UP.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "B" SOIL

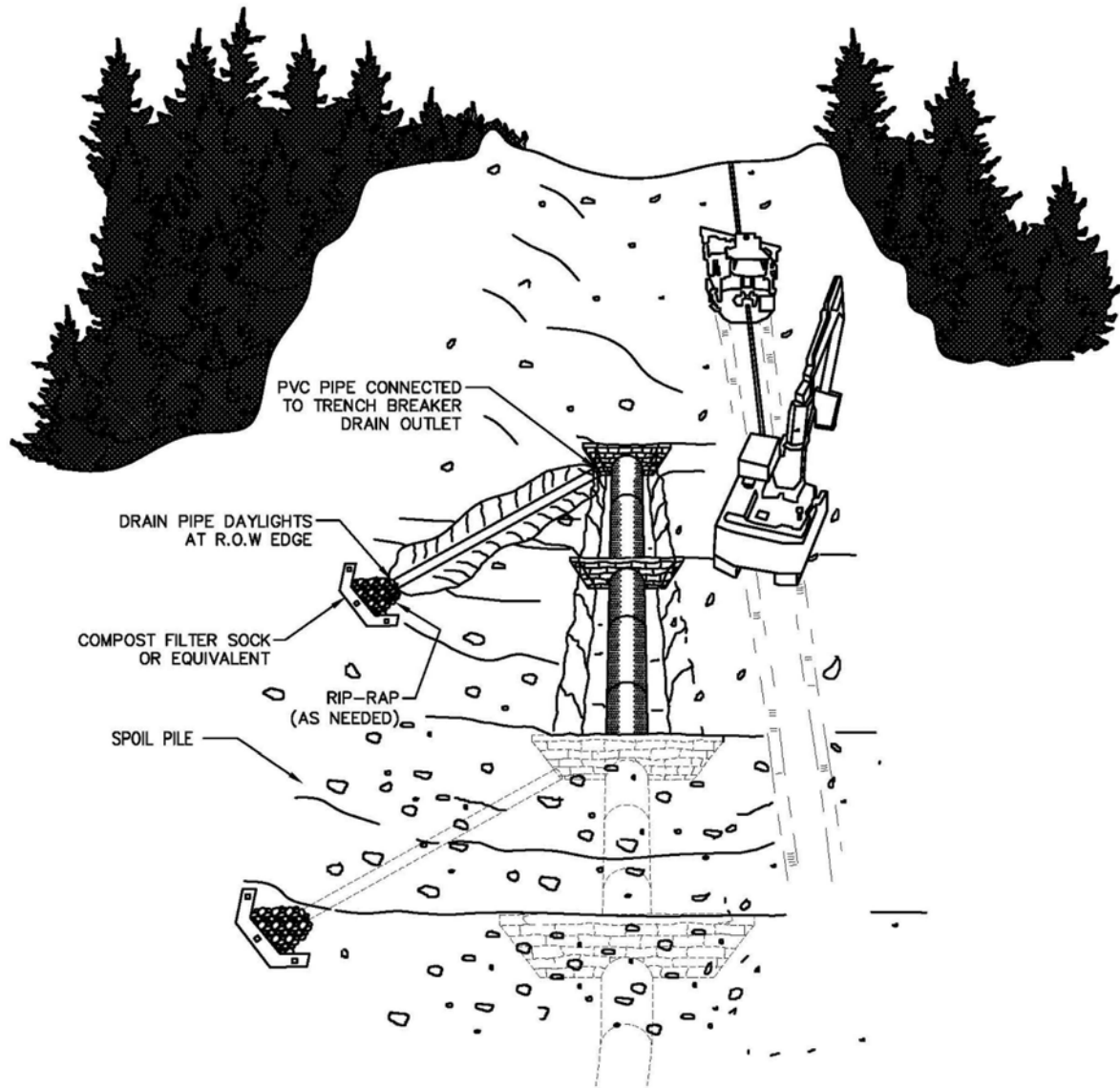
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

MAINLINE CONSTRUCTION
 STEEP HILL PARALLEL CONSTRUCTION
 NO TOP SOIL SEGREGATION

DRAWING NO.	REV.
MVP-SG-31	P1



NOTES:

1. WINCHES MAY BE REQUIRED FOR MOVING EQUIPMENT AND MATERIAL, AND DURING CONSTRUCTION ON STEEP LONGITUDINAL SLOPES.
2. WINCHES WILL EITHER BE FIXED WINCHES OR TRACKED EQUIPMENT WITH WINCHES.
3. WINCHES WILL TYPICALLY BE REQUIRED FOR SLOPES OF 30% (17') AND UP.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWING ASSUMES TYPE "B" SOIL

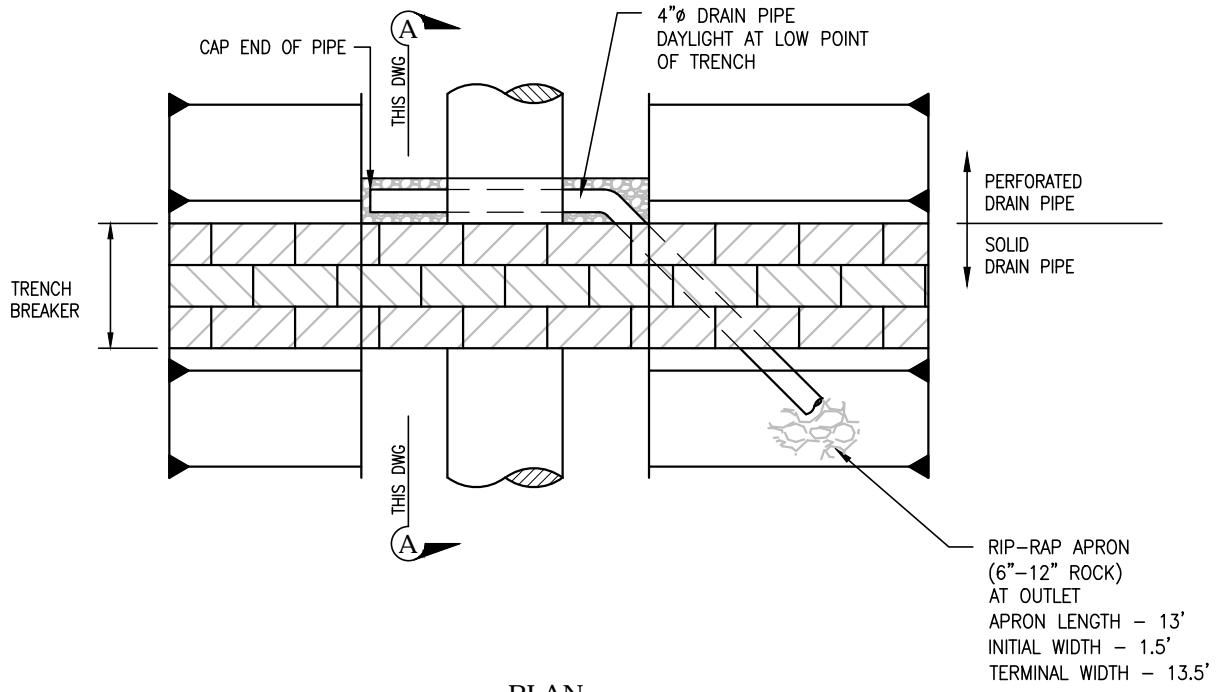
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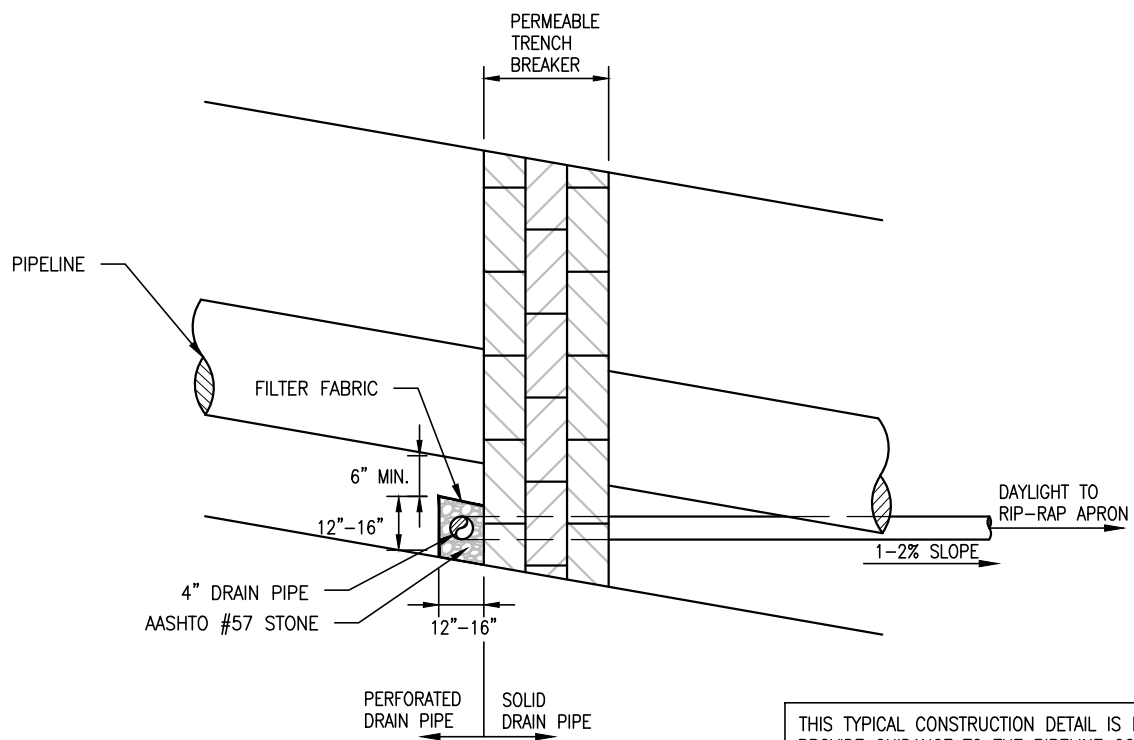
TYPICAL CONSTRUCTION DETAIL

MAINLINE CONSTRUCTION
 STEEP HILL STOVE PIPE CONSTRUCTION
 NO TOP SOIL SEGREGATION

DRAWING NO.	REV.
MVP-SG-32	P1



PLAN
SCALE: NOT TO SCALE



SECTION A-A
SCALE: NOT TO SCALE

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Plotted by: Stanley on: August 14, 2018 - 12:39 PM

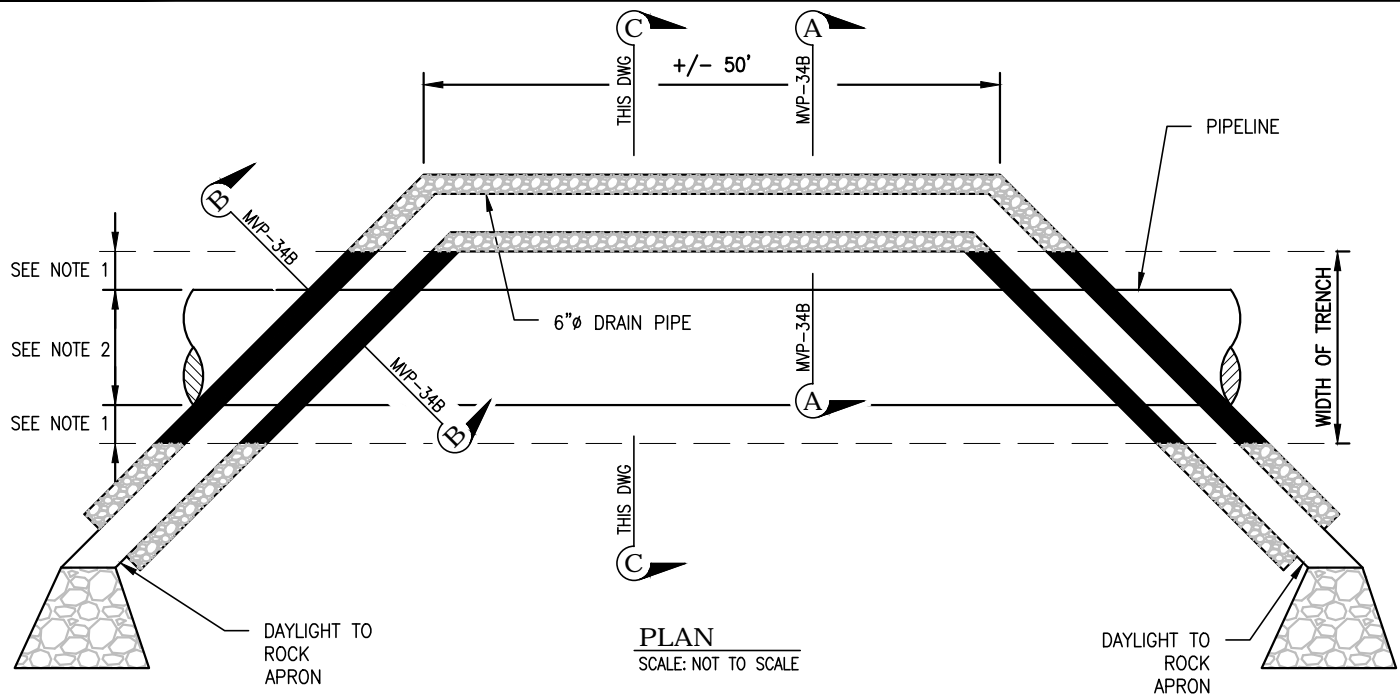
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H-650-TYP			



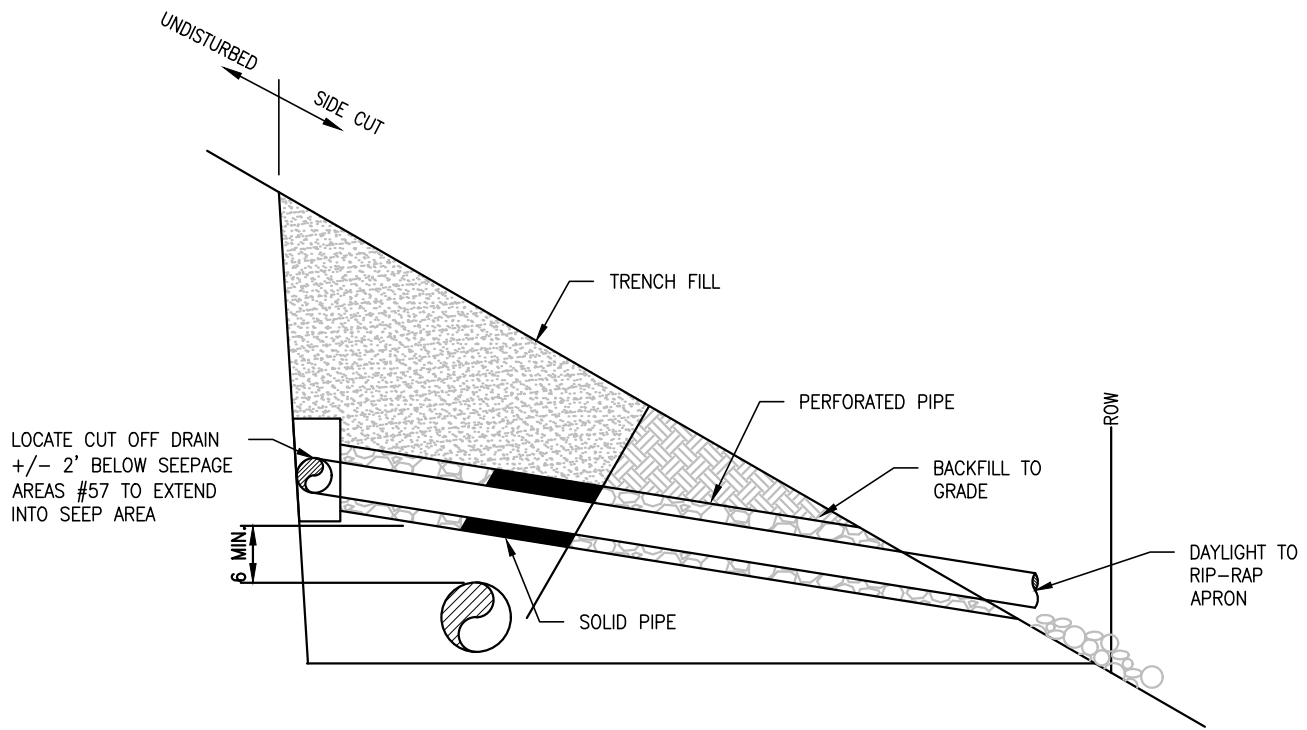
TYPICAL CONSTRUCTION DETAIL

TRENCH BREAKER DAYLIGHT DRAIN

DRAWING NO.	REV.
MVP-SG-35	P1



PLAN
SCALE: NOT TO SCALE



SECTION C-C
SCALE: NOT TO SCALE

NOTES:

1. PERFORATED PIPE SURROUNDED BY #57 STONE.
2. SOLID PIPE (IN TRENCH) SURROUNDED BY TRENCH BACKFILL.

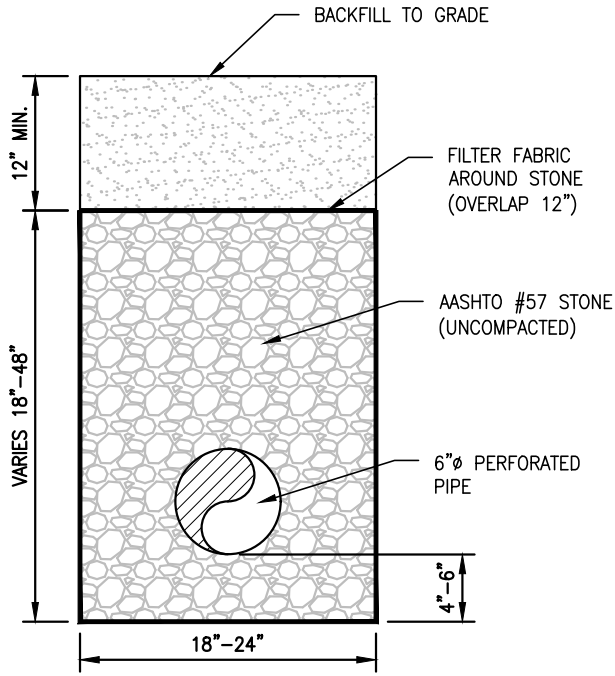
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Plotted by: Sample, Stanley on: August 14, 2018 - 12:39 PM

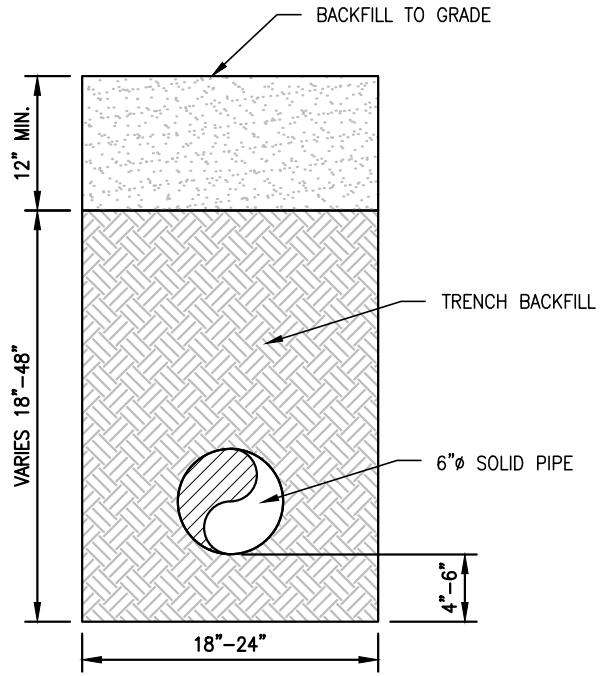
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SCALE	N.T.S.	SHEET	1 OF 2
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL		
CUTOFF DRAIN-SIDEHILL		
DRAWING NO.	MVP-SG-36A	REV.
		P1



SECTION A-A
SCALE: NOT TO SCALE
FROM MVP-34A



SECTION B-B
SCALE: NOT TO SCALE
FROM MVP-34A

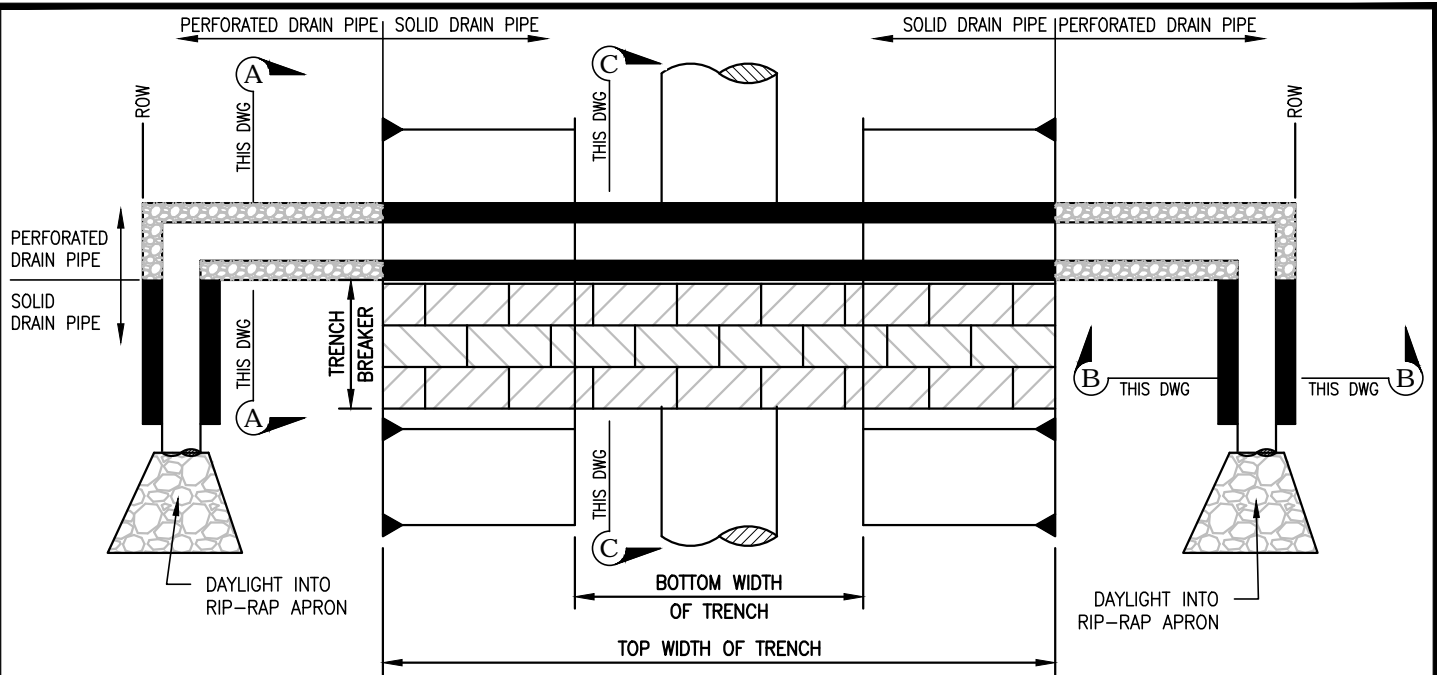
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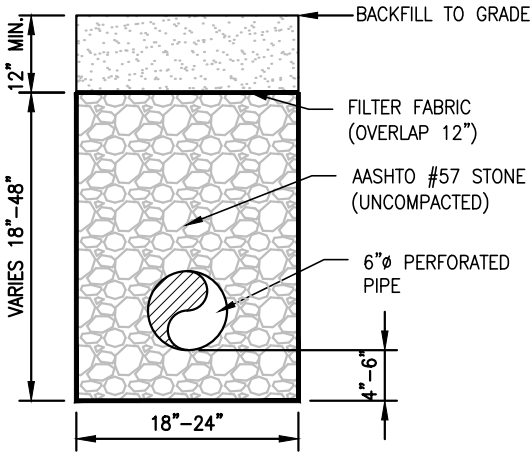
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JOB NO.			
PROJECT ID:			
H-650-TYP			



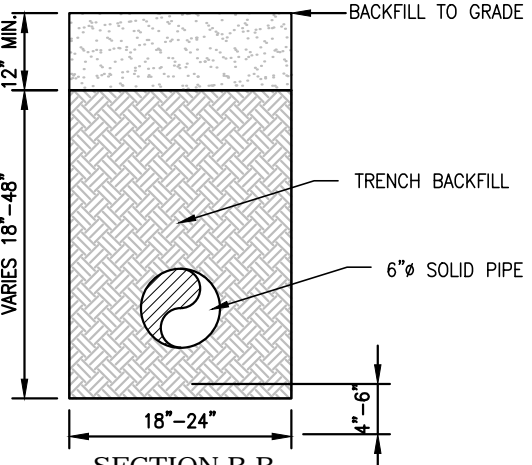
TYPICAL CONSTRUCTION DETAIL		
CUTOFF DRAIN-SIDEHILL		
DRAWING NO.	MVP-SG-36B	REV.
		P1



PLAN
SCALE: NOT TO SCALE

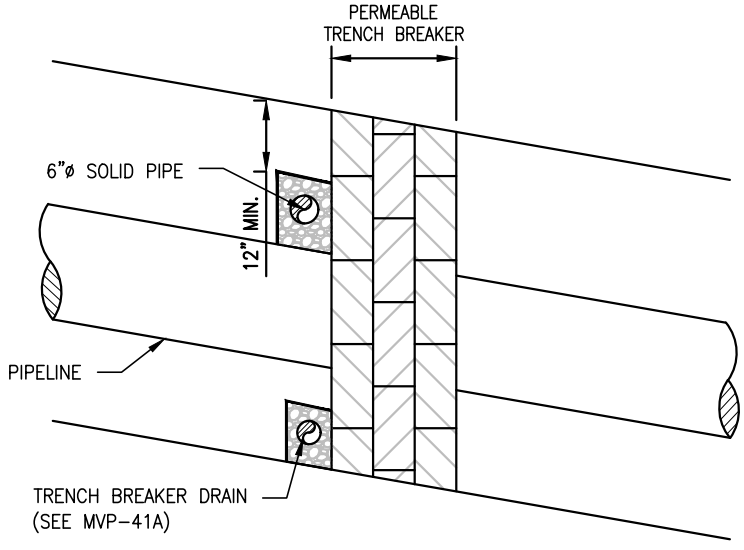


SECTION A-A
SCALE: NOT TO SCALE



SECTION B-B
SCALE: NOT TO SCALE

NOTES:
1. EACH CUTOFF DRAIN SHALL UTILIZE A TRENCH BREAKER DRAIN (SEE DETAIL 1) TO DRAIN THE TRENCH.



SECTION C-C
SCALE: NOT TO SCALE

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Plotted by: Sample, Stanley on: August 14, 2018 - 12:39 PM

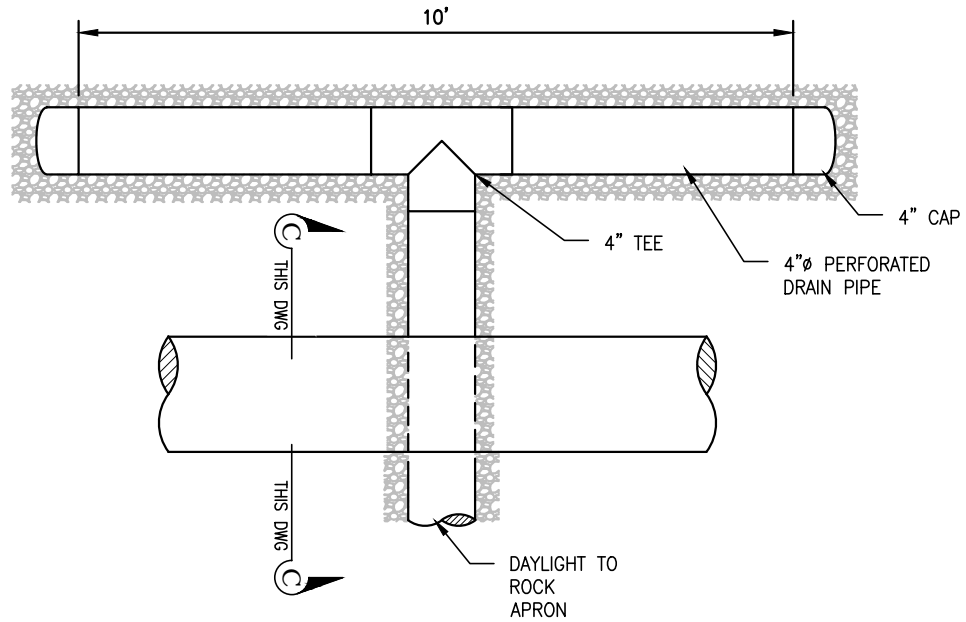
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PROJECT ID:			
H-650-TYP			



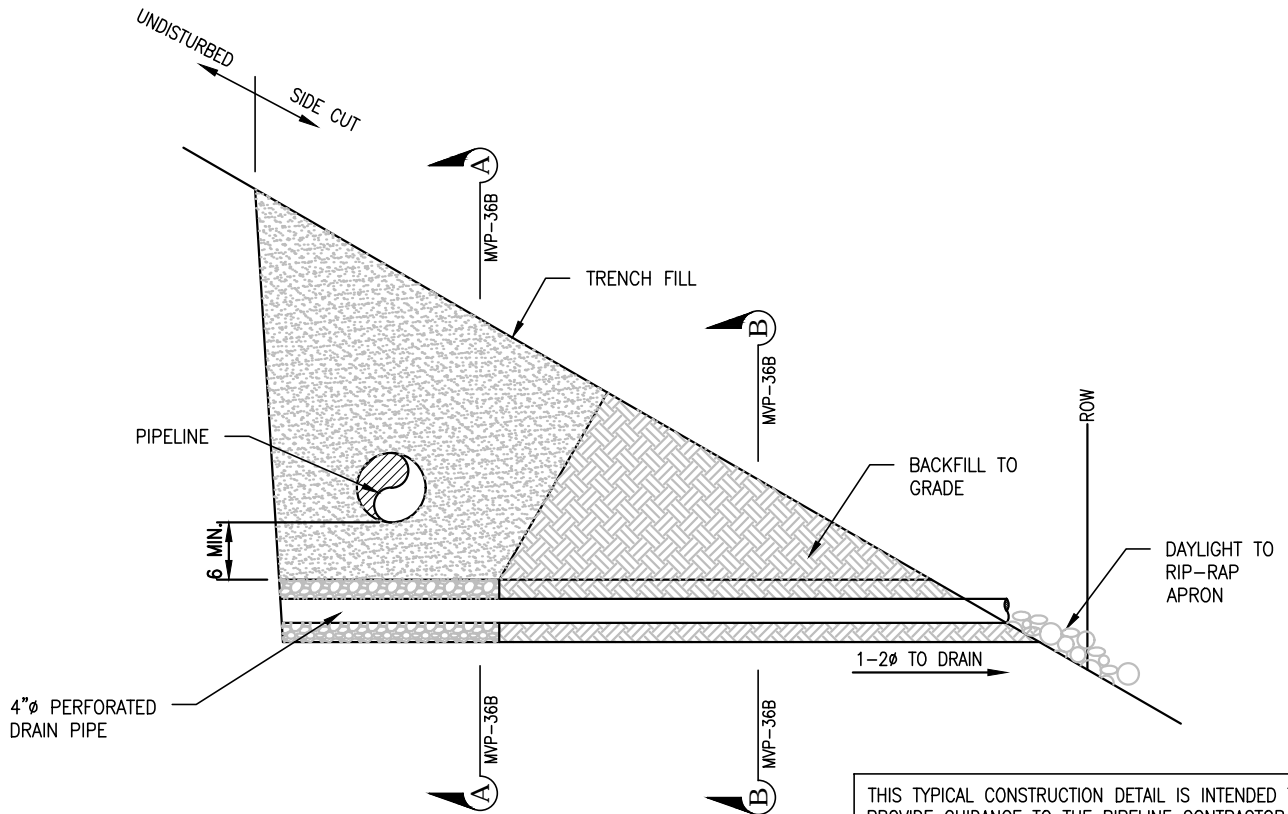
TYPICAL CONSTRUCTION DETAIL

CUTOFF DRAIN-PLANAR

DRAWING NO.	REV.
MVP-SG-37	P1



PLAN
SCALE: NOT TO SCALE



C-C
SCALE: NOT TO SCALE

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Plotted by: Sample, Stanley on: August 14, 2018 - 12:39 PM

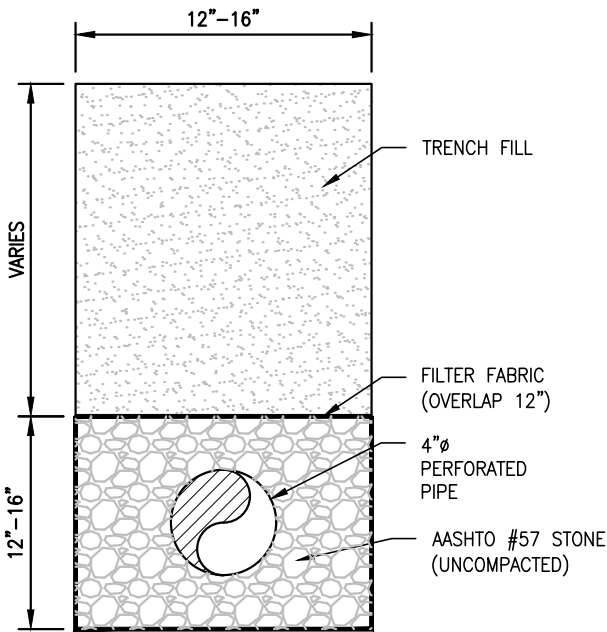
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 2
JOB NO.			
PROJECT ID:			
H-650-TYP			



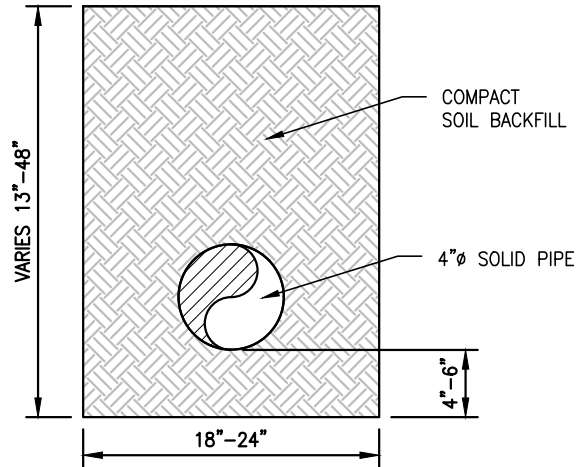
TYPICAL CONSTRUCTION DETAIL

TRANSVERSE TRENCH DRAIN

DRAWING NO.	REV.
MVP-SG-38A	P1



SECTION A-A
SCALE: NOT TO SCALE
FROM MVP-36A



SECTION B-B
SCALE: NOT TO SCALE
FROM MVP-36A

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Plotted by: Sample, Stanley on: August 14, 2018 - 12:39 PM

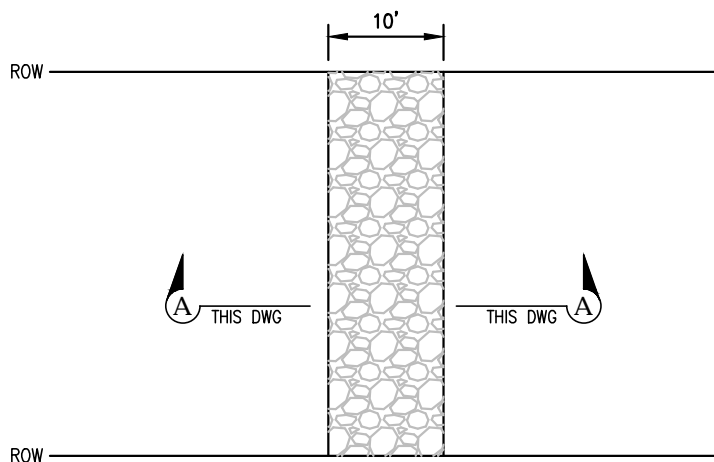
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CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	2 OF 2
JOB NO.			
PROJECT ID:			
H-650-TYP			



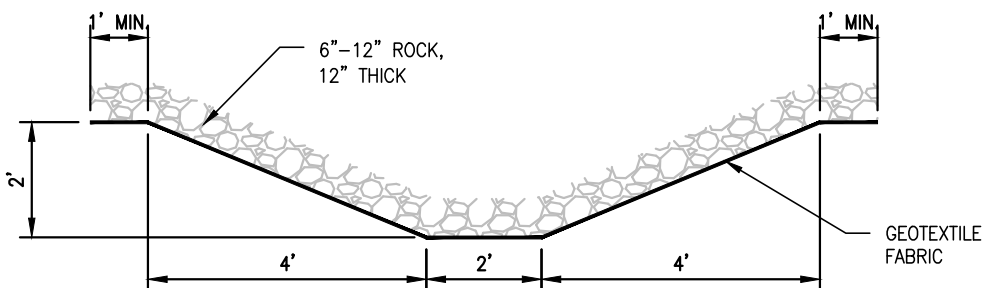
TYPICAL CONSTRUCTION DETAIL

TRANSVERSE TRENCH DRAIN

DRAWING NO.	REV.
MVP-38B	P1



PLAN
SCALE: NOT TO SCALE



SECTION A-A
SCALE: NOT TO SCALE

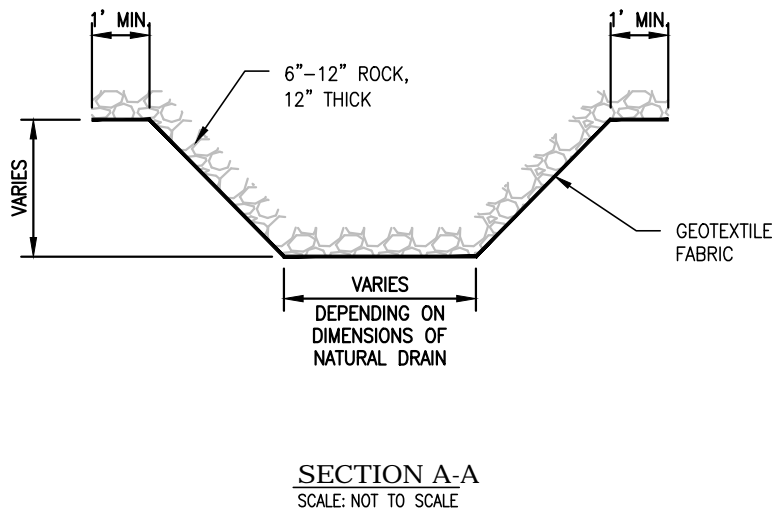
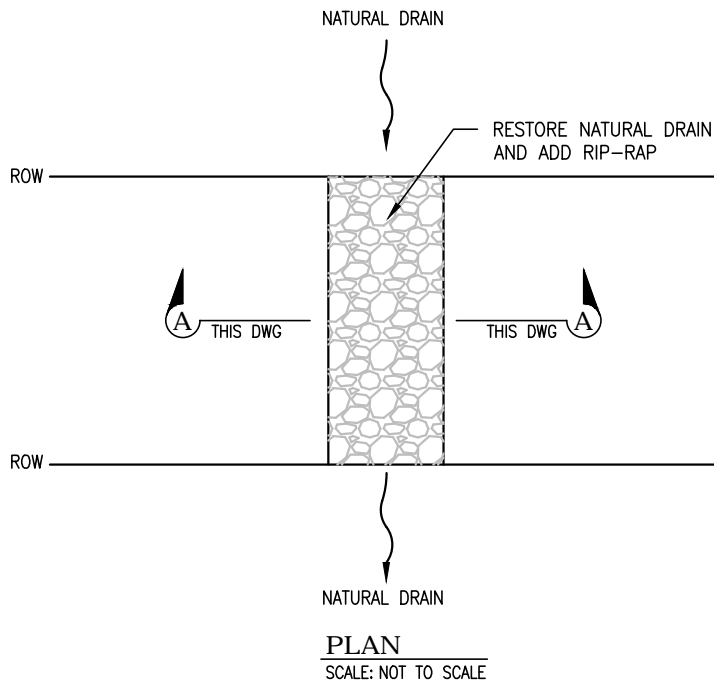
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Plotted by: Sample, Stanley on: August 14, 2018 - 12:39 PM

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL		
ROCK LINED SWALE		
DRAWING NO.	MVP-SG-39	REV.
		P1



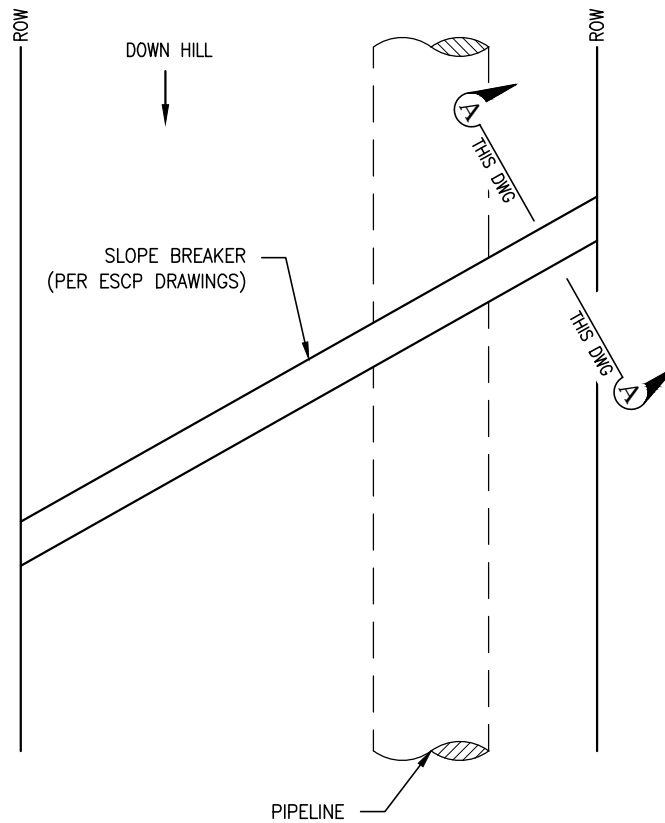
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Plotted by: Sample, Stanley on: August 14, 2018 - 12:39 PM

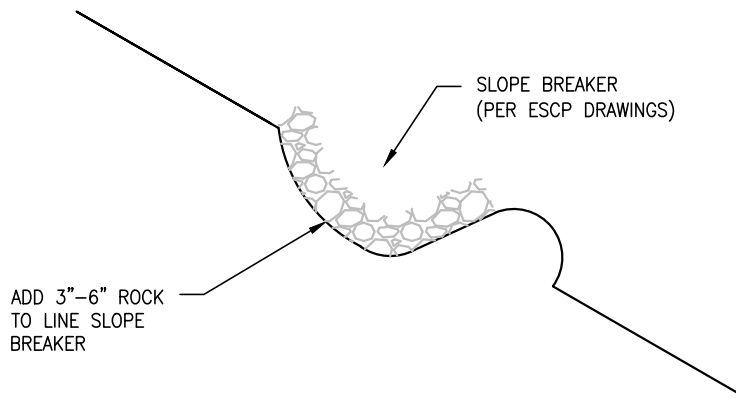
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CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL		
RIP-RAP NATURAL DRAIN		
DRAWING NO.	MVP-SG-40	REV.
		P1



PLAN
SCALE: NOT TO SCALE



SECTION A-A
SCALE: NOT TO SCALE

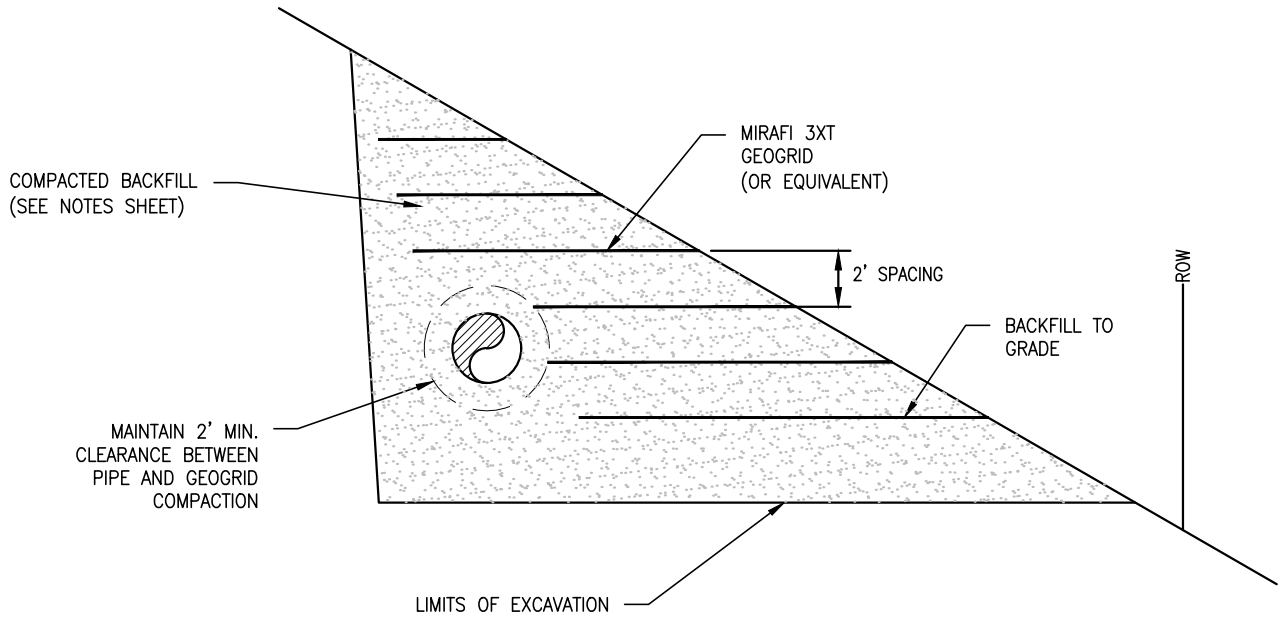
THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Plotted by: Sample, Stanley on: August 14, 2018 - 12:39 PM

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL		
RIP-RAP SLOPE BREAKERS		
DRAWING NO.	MVP-SG-41	REV.
		P1



THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Plotted by: Sample, Stanley on: August 14, 2018 - 12:40 PM

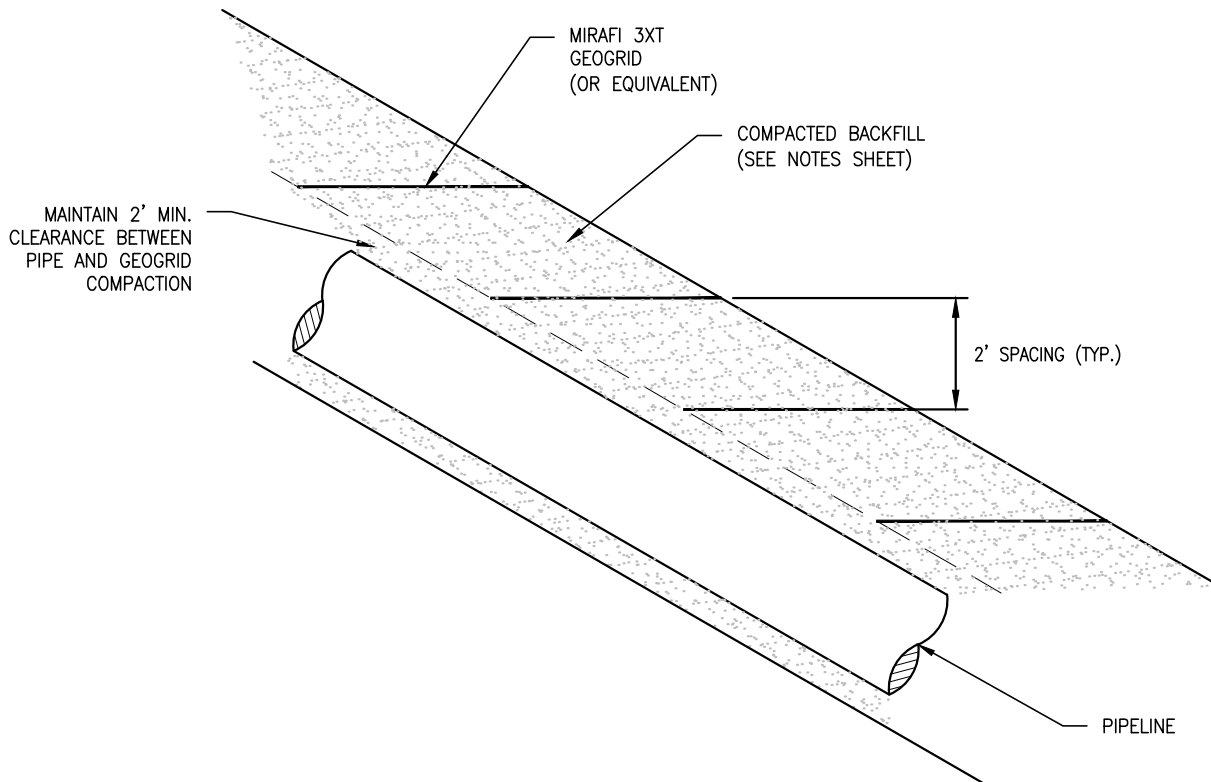
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CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 3
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

GEOGRID-SIDEHILL

DRAWING NO.	REV.
MVP-SG-42A	P1



SECTION VIEW
SCALE: NOT TO SCALE

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

Plotted by: Sample, Stanley on: August 14, 2018 - 12:58 PM

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	2 OF 3
JOB NO.			
PROJECT ID:			
H-650-TYP			



SLIDE MITIGATION DETAIL	
GEOGRID-PLANAR	
DRAWING NO.	REV.
MVP-SG-42B	P1

COMPACTION NOTES

- 1) ALL ROCKS LARGER THAN 6 INCHES IN SIZE, AND MORE THAN 10 PERCENT BY VOLUME SHOULD BE REMOVED AND PROPERLY DISPOSED FROM THE BACKFILL MATERIAL.
- 2) THE SUBGRADE AT THE BASE OF THE EXCAVATION SHOULD BE PROOFROLLED WITH A PNEUMATIC TIERED ROLLER OR VEHICLE.
- 3) THE EXCAVATED AREA SHALL BE BACKFILLED WITH THE CLEANED EXCAVATED SOIL MATERIAL AND COMPACTED IN PLACE.
- 4) BACKFILL OPERATIONS SHALL BE PERFORMED WHEN SOIL IS SUITABLE FOR COMPACTION (I.E., NOT IMMEDIATELY FOLLOWING A LARGE RAIN, SNOW, OR ICE EVENT). FROZEN FILL SHALL NOT BE USED.
- 5) THE BACKFILL SHALL BE PLACED IN COMPACTED LIFTS NO GREATER THAN 12 INCHES.
- 6) MAINTAIN A MINIMUM 2FT CLEARANCE BETWEEN COMPACTION ACTIVITY AND THE GAS PIPELINE.

GRAVEL DRAIN NOTES

- 1) GEOTEXTILE FABRIC SHALL BE TENCATE MIRAFI 140N OR APPROVED EQUIVALENT.
- 2) THE GEOTEXTILE FABRIC SHALL BE STORED UNDAMAGED PURSUANT TO MANUFACTURERS RECOMMENDATIONS.
- 3) DO NOT OPERATE CONSTRUCTION EQUIPMENT DIRECTLY ON THE GEOTEXTILE FABRIC.
- 4) DRAINAGE AGGREGATE SHALL MEET THE REQUIREMENTS OF AASHTO NO. 57 STONE.
- 5) DRAINAGE AGGREGATE SHALL NOT BE COMPACTED.

GEOGRID NOTES

- 1) GEOGRID REINFORCEMENT SHALL BE TENCATE MIRAFI 3XT OR APPROVED EQUIVALENT.
- 2) THE GEOGRID MATERIAL SHALL BE STORED UNDAMAGED PURSUANT TO MANUFACTURERS RECOMMENDATIONS.
- 3) GEOGRID SHALL BE PLACED HORIZONTALLY ON THE BACKFILL WITH THE PRINCIPAL STRENGTH DIRECTION PERPENDICULAR TO THE FACE OF THE SLOPE. ADJACENT PIECES OF PRIMARY GEOGRID SHALL NOT OVERLAP BUT ARE TO BE BUTTED SIDE TO SIDE.
- 4) REMOVE ALL SLACK IN THE GEOGRID MATERIAL AND ANCHOR AS NECESSARY WITH PINS, OR BAGS TO PREVENT SLACK FROM DEVELOPMENT DURING FILL PLACEMENT AND COMPACTION.
- 5) FILL IS TO BE PLACED AND SPREAD DIRECTLY ON THE GEOGRID MATERIAL WITH RUBBER TIERED EQUIPMENT ONLY. SPEEDS ARE TO BE KEPT SLOW WITH AS FEW STOPS AND TURNS AS PRACTICAL.
- 6) DO NOT OPERATE TRACKED EQUIPMENT DIRECTLY ON THE GEOGRID MATERIAL.
- 7) MAINTAIN A MINIMUM 2FT CLEARANCE BETWEEN GEOGRID MATERIAL AND THE GAS PIPELINE.

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

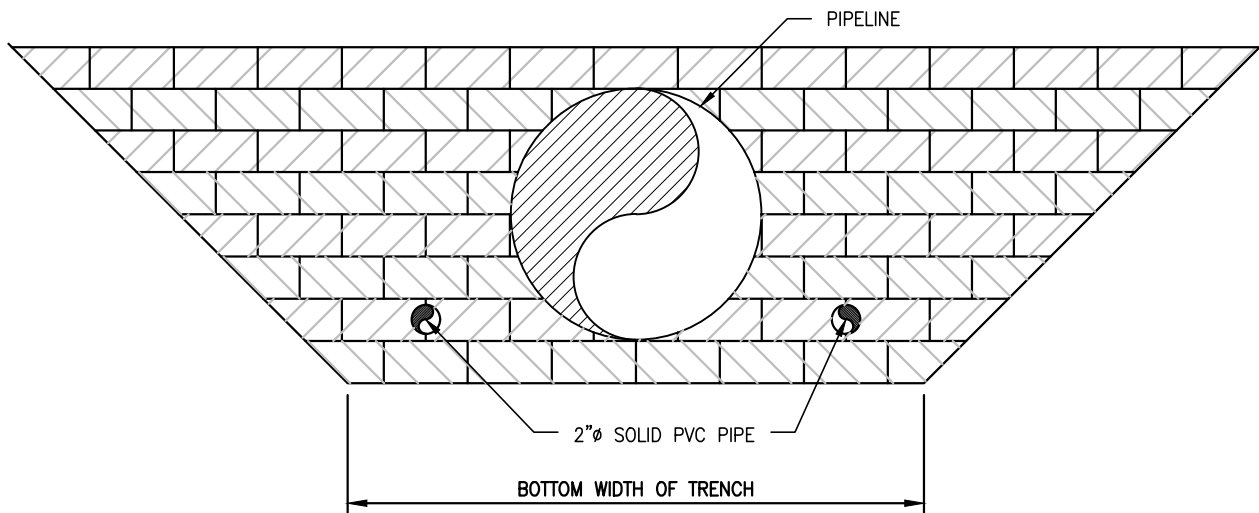
Plotted by: Sample, Stanley on: August 14, 2018 - 12:40 PM

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
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SCALE	N.T.S.	SHEET	3 OF 3
JOB NO.			
PROJECT ID:			
H-650-TYP			

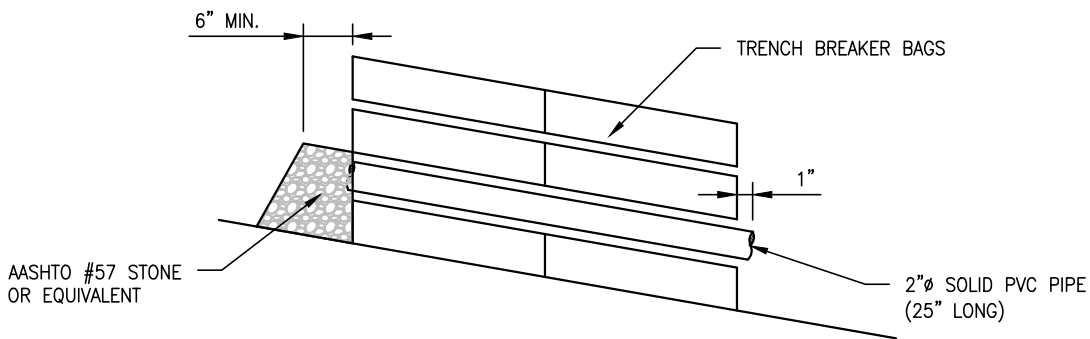


TYPICAL CONSTRUCTION DETAIL

GEOGRID NOTES	
DRAWING NO.	REV.
MVP-SG-42C	P1



FRONT VIEW
SCALE: NOT TO SCALE



SECTION VIEW
SCALE: NOT TO SCALE

NOTES:

1. PLACE PVC DRAIN PIPE ON FIRST LAYER OF TRENCH BREAKER BAGS.
2. PLACE PVC DRAIN PIPE EQUADISTANT FROM THE OUTSIDE EDGE OF THE 30" GAS PIPE AND THE BOTTOM LIMITS OF THE TRENCH.
3. EXTEND PVC PIPE THROUGH ENTIRE TRENCH BREAKER AND EXTEND APPROX. 1" PAST END OF BREAKER.
4. AASHTO#57 STONE SHALL BE PLACED TO A MINIMUM 6" THICKNESS UPSLOPE OF THE DRAIN PIPE.

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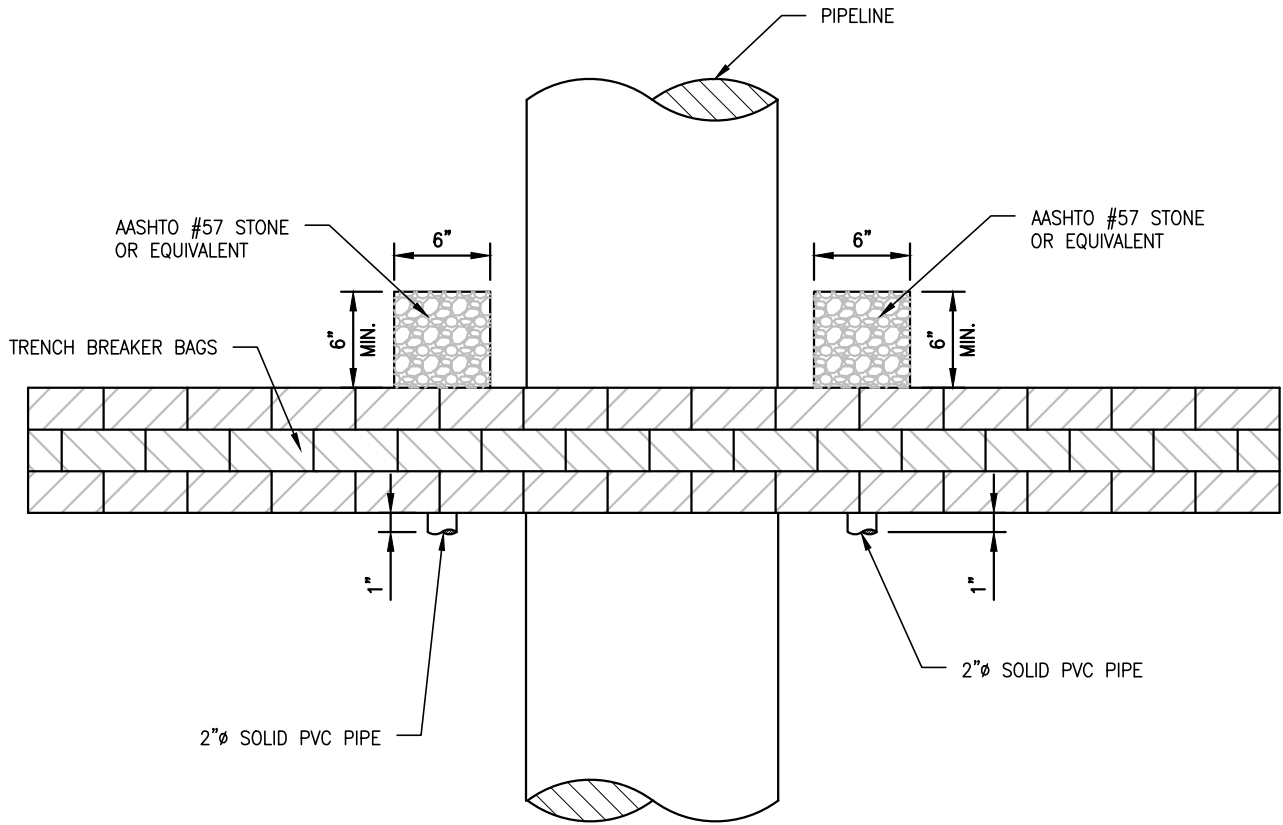
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CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 2
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

TRENCH BREAKER PASS-THROUGH DRAIN		
DRAWING NO.	MVP-SG-43A	REV.
		P1



PLAN VIEW
SCALE: NOT TO SCALE

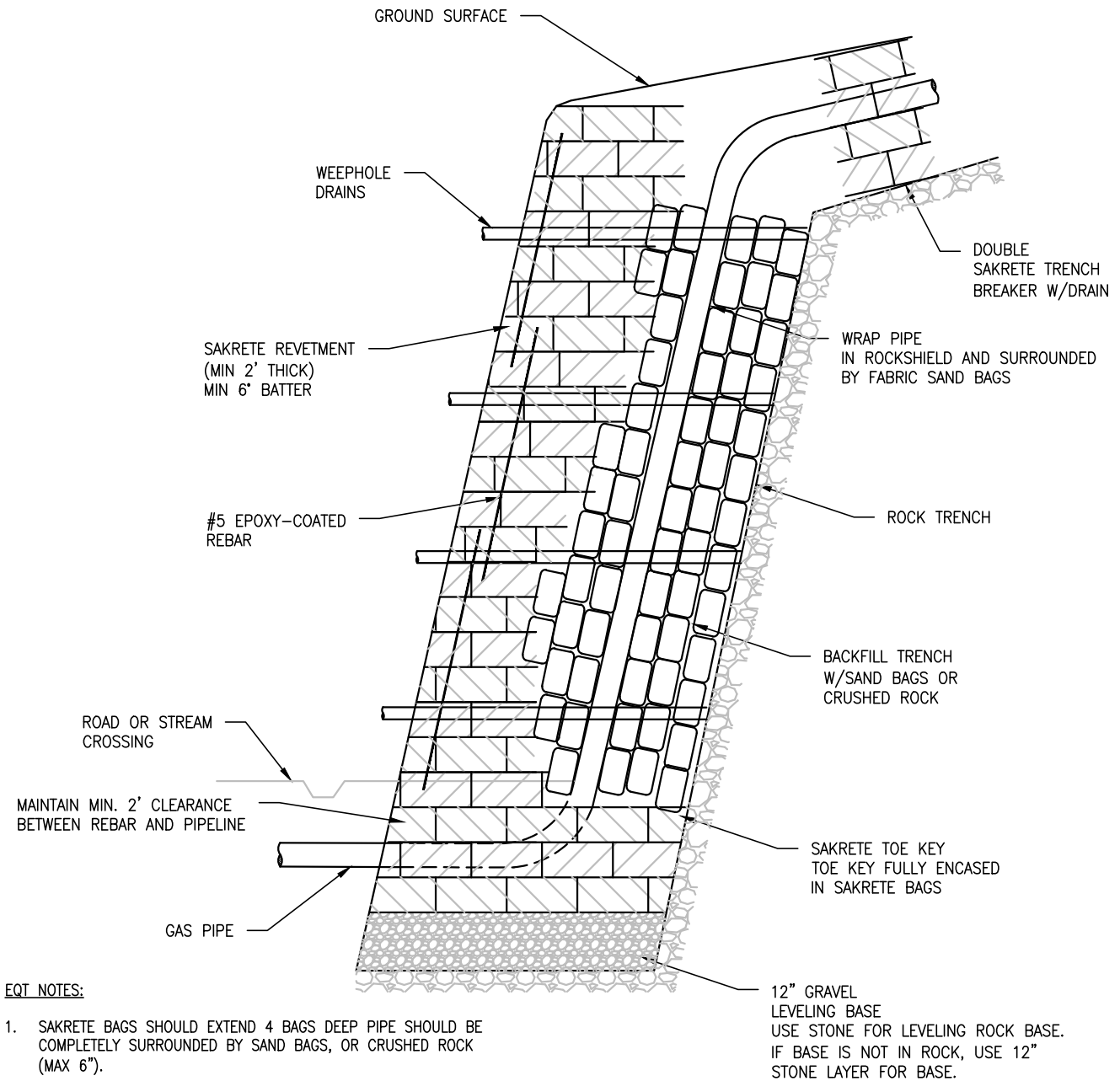
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Plotted by: Sample, Stanley on: August 14, 2018 - 12:40 PM

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	2 OF 2
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL		
TRENCH BREAKER PASS-THROUGH DRAIN		
DRAWING NO.	MVP-SG-43B	REV.
		P1



EQT NOTES:

1. SAKRETE BAGS SHOULD EXTEND 4 BAGS DEEP PIPE SHOULD BE COMPLETELY SURROUNDED BY SAND BAGS, OR CRUSHED ROCK (MAX 6").
2. SAKRETE BAGS SHOULD BE STAGGERED IN A MASONRY FASHION. THE FACE OF THE WELL SHALL BE INCLINED 6"-10" FROM VERTICAL.
3. #5 REBAR SHOULD BE DRIVEN THROUGH THE SAKRETE BAGS (SEE DETAIL 1).
4. 2"Ø PVC WEEPHOLE DRAINS SHALL BE INSTALLED EVERY 15 FT.

SIDE VIEW
SCALE: NOT TO SCALE

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Plotted by: Sample, Stanley on: August 14, 2018 - 12:40 PM

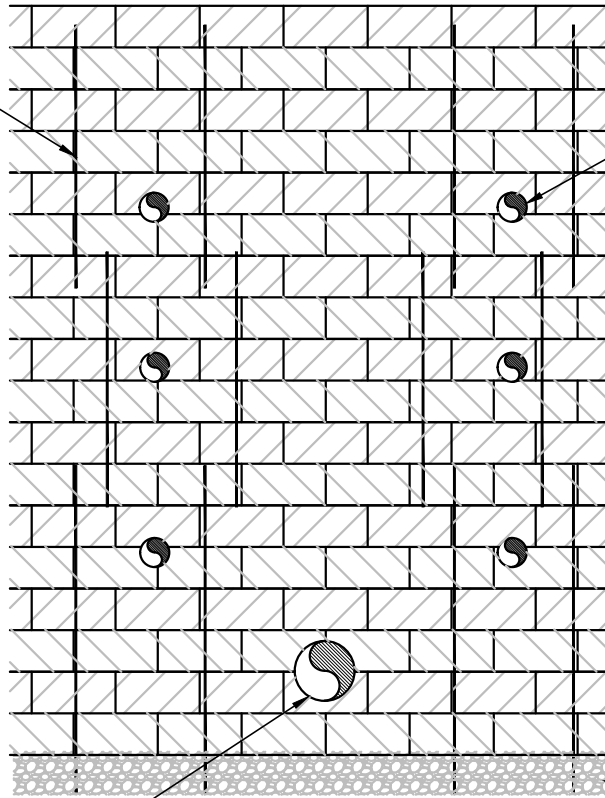
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 2
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL	
SLIDE MITIGATION HIGHWALL REVETMENT SIDE VIEW	
DRAWING NO.	REV.
MVP-SG-44A	P1

#5 EPOXY-COATED REBAR DRIVEN INTO PLACE. OVERLAP REBAR MIN. 3 BAGS. SPACE REBAR 12" HORIZONTALLY.

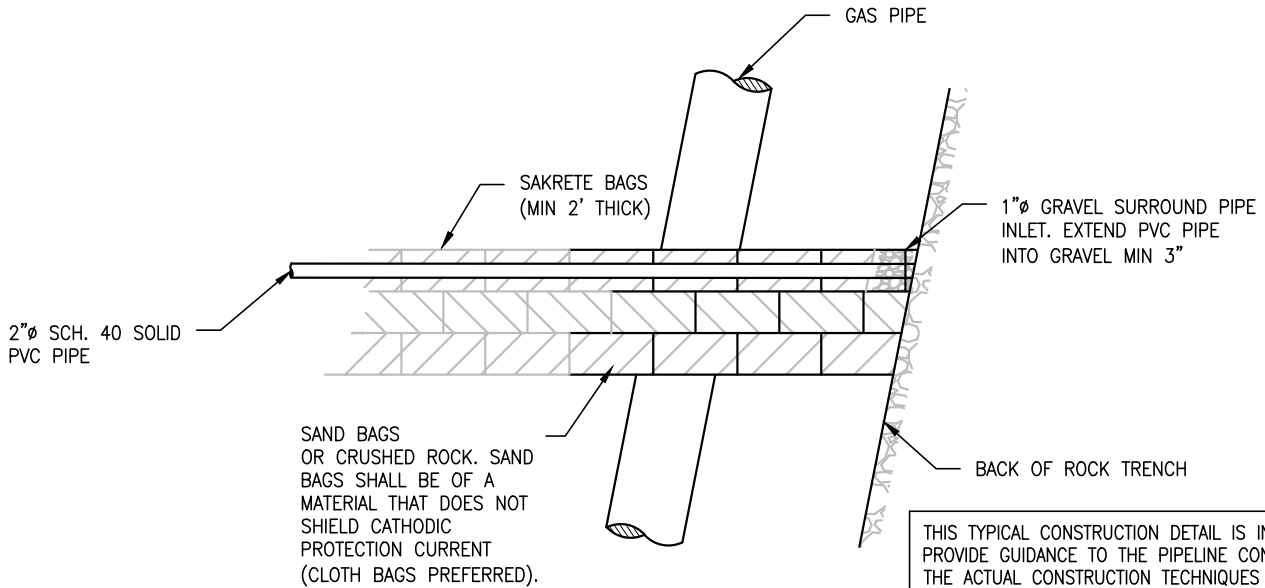
2"Ø PVC WEEPHOLE DRAINS (SEE DETAIL #2)



GAS PIPE (SPACE REBAR TO MAINTAIN MIN. 2' CLEARANCE FROM PIPELINE)

12" STONE LEVELING BASE

FRONT VIEW
SCALE: NOT TO SCALE



2"Ø SCH. 40 SOLID PVC PIPE

SAKRETE BAGS (MIN 2' THICK)

1"Ø GRAVEL SURROUND PIPE INLET. EXTEND PVC PIPE INTO GRAVEL MIN 3"

SAND BAGS OR CRUSHED ROCK. SAND BAGS SHALL BE OF A MATERIAL THAT DOES NOT SHIELD CATHODIC PROTECTION CURRENT (CLOTH BAGS PREFERRED).

BACK OF ROCK TRENCH

DRAIN DETAIL
SCALE: NOT TO SCALE

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Plotted by: Sample, Stanley on: August 14, 2018 - 12:40 PM

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SCALE	N.T.S.	SHEET	2 OF 2

JOB NO.
PROJECT ID:
H-650-TYP

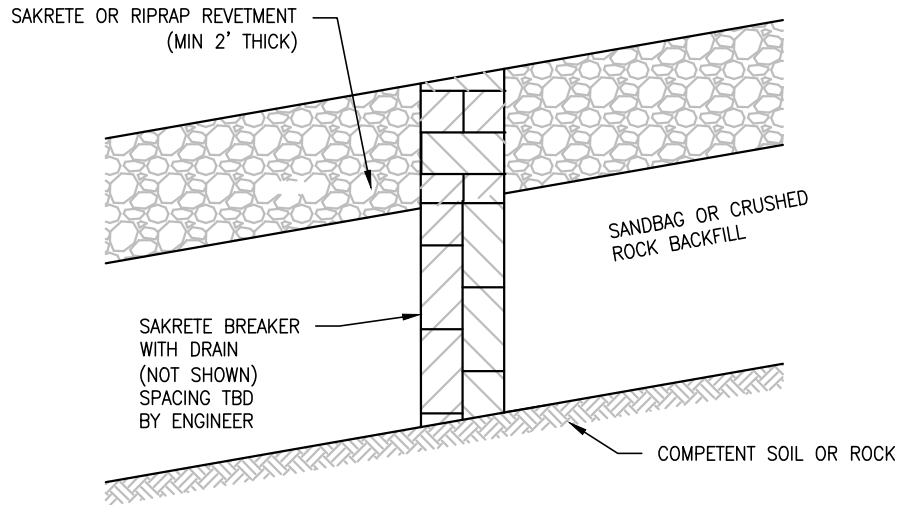


TYPICAL CONSTRUCTION DETAIL

SLIDE MITIGATION
HIGHWALL REVETMENT
FRONT VIEW AND DRAIN DETAIL

DRAWING NO.
MVP-SG-44B

REV.
P1



SIDE VIEW
SCALE: NOT TO SCALE

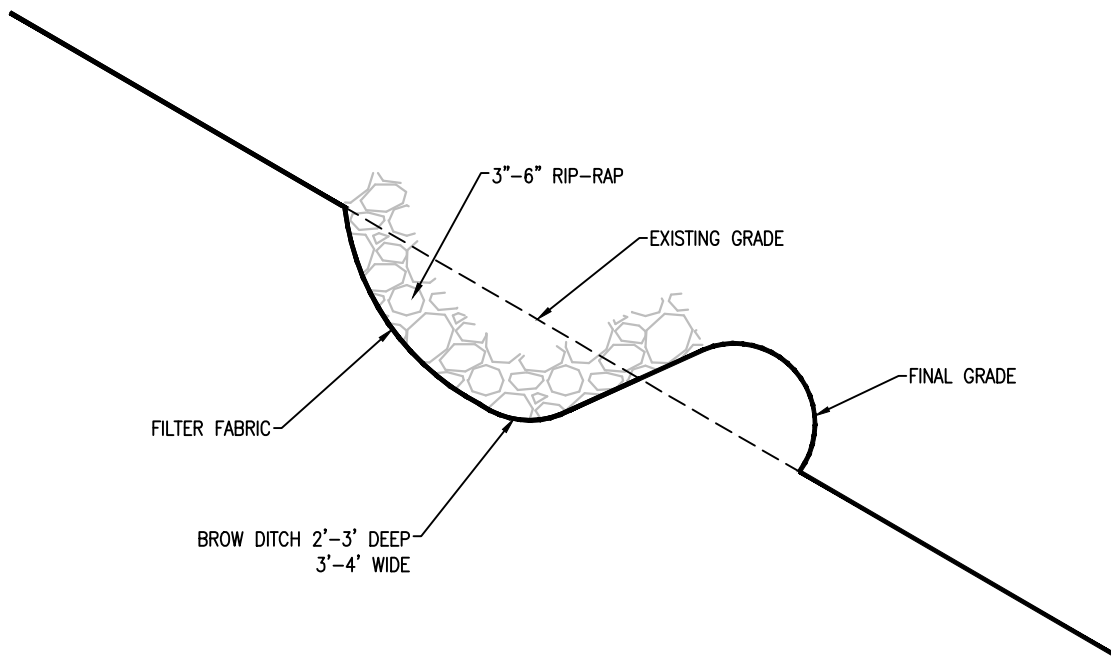
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL	
STEEP SLOPE REVETMENT	
DRAWING NO.	REV.
MVP-SG-45	P1



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DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

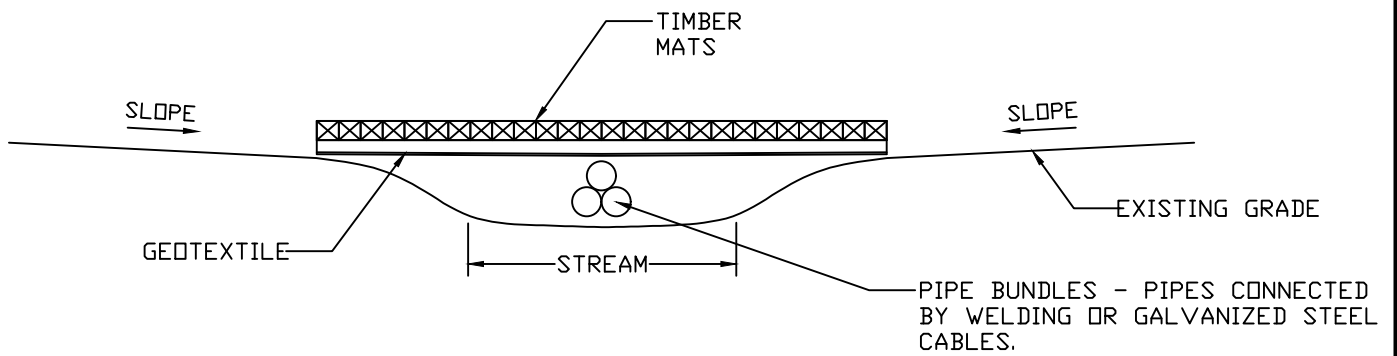


TYPICAL CONSTRUCTION DETAIL

BROW DITCH DETAIL

DRAWING NO.	REV.
MVP-SG-46	P1

Plotted by: Sample, Stanley on: August 14, 2018 - 12:40 PM



NOTE:

CFS TO BE INSTALLED AT THE END OF EACH WORKING DAY.

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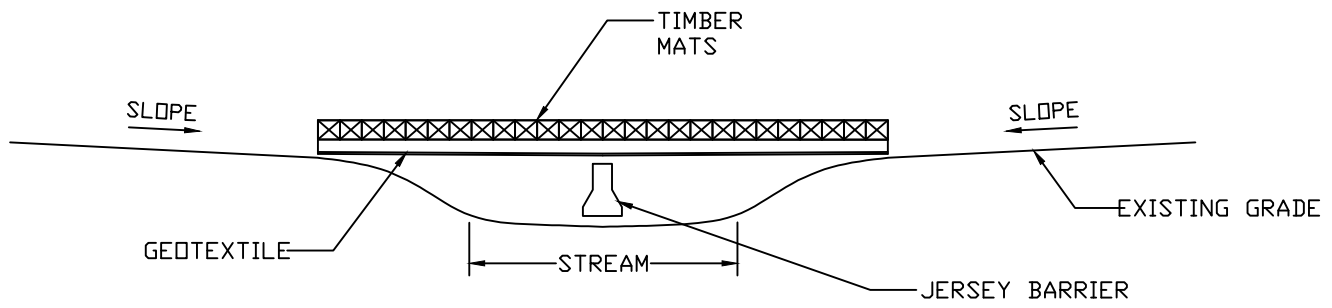
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

TIMBER MAT AND PIPE BUNDLE
TEMPORARY STREAM CROSSING

DRAWING NO.	REV.
MVP-SG-47	P1



NOTE:

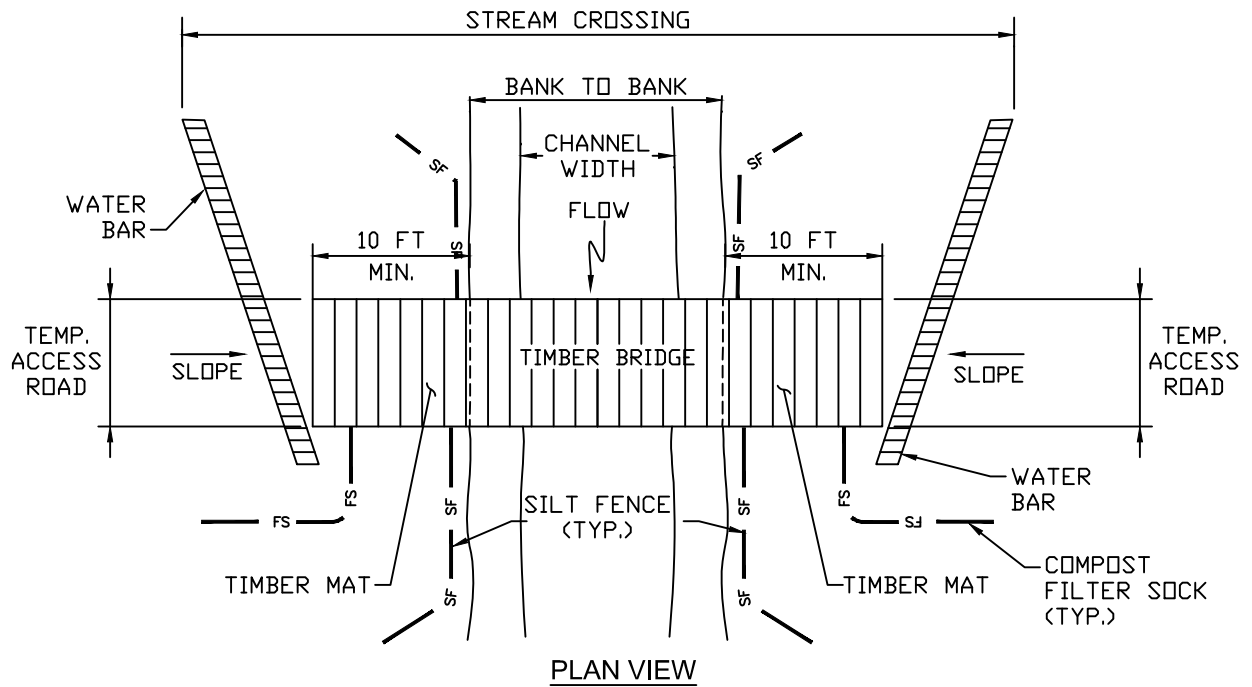
CFS TO BE INSTALLED AT THE END OF EACH WORKING DAY.

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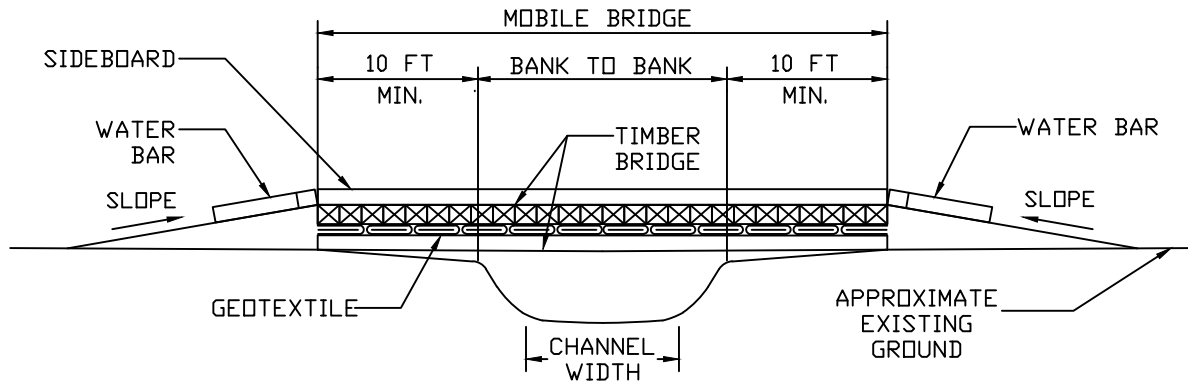
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APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL	
TIMBER MAT AND JERSEY BARRIER TEMPORARY STREAM CROSSING	
DRAWING NO.	REV.
MVP-SG-48	P1



PLAN VIEW



CROSS SECTION - MOBILE BRIDGE

NOTES:

1. INSTALL WATER BARS OR SILT FENCE AT APPROACHES TO STREAM CROSSING AND COMPOST FILTER SOCKS ALONG STREAM BANKS. INSTALL COMPOST FILTER SOCK AT OUTLET OF WATER BARS.
2. MAINTAIN SURFACE OF TEMPORARY EQUIPMENT CROSSING TO PREVENT SOIL DISCHARGES TO STREAM.
3. APPROACHES TO CROSSINGS ARE NOT TO EXCEED A DEPTH OF 6 INCHES ABOVE ORIGINAL GRADE.
4. GEOTEXTILE LINER TO COME UP ON THE SIDES OF THE BRIDGE A MINIMUM OF 18".
5. SIDEBOARDS TO BE ATTACHED TO THE UPPER DECK. GEOTEXTILE TO BE WRAPPED AROUND SIDEBOARDS PRIOR TO FASTENING.

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DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1

JOB NO.

PROJECT ID:

H-650-TYP



TYPICAL CONSTRUCTION DETAIL

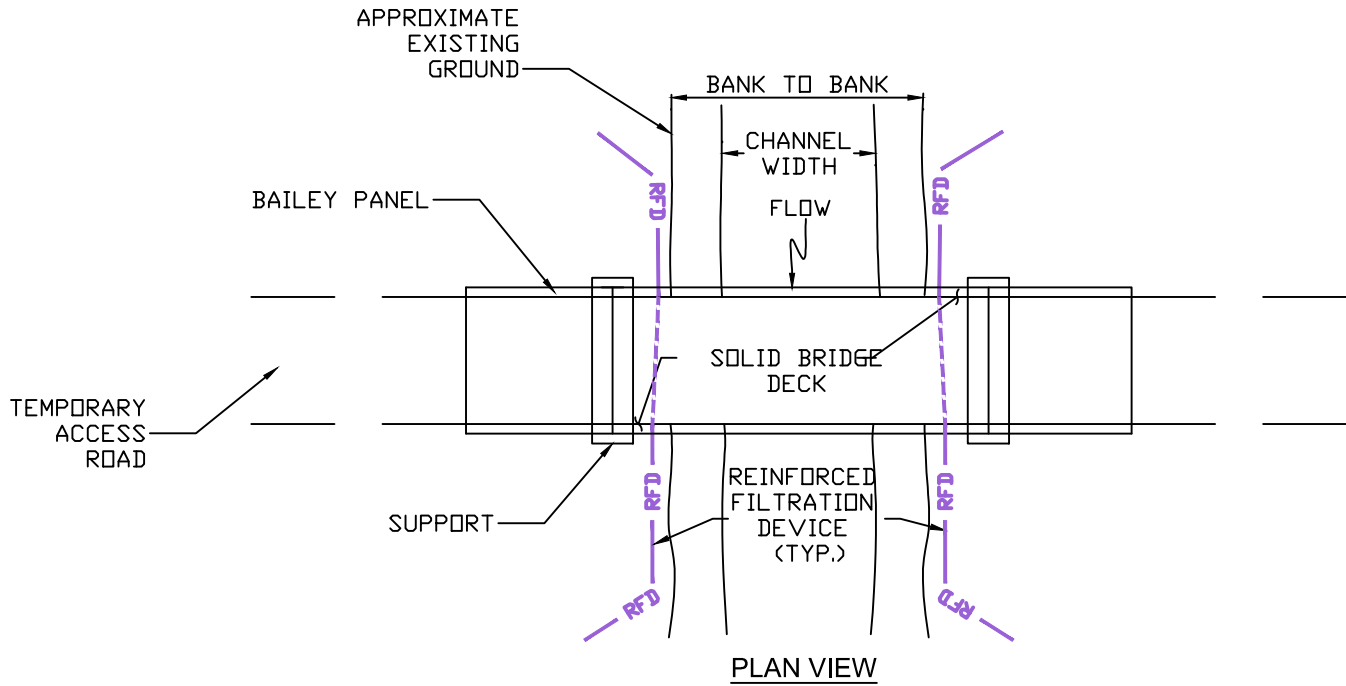
MOBILE BRIDGE

DRAWING NO.

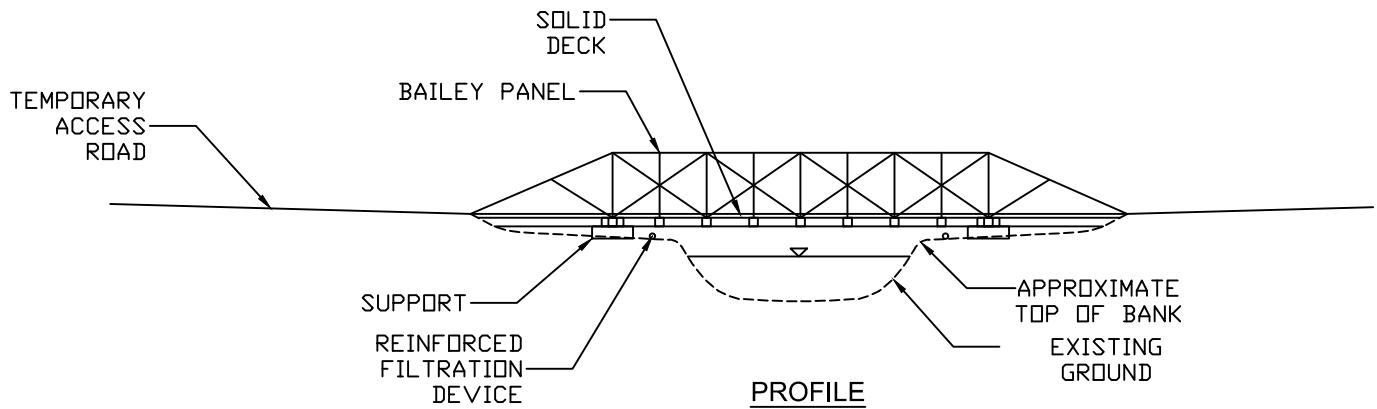
MVP-SG-49

REV.

P1



PLAN VIEW



PROFILE

THIS TYPICAL CONSTRUCTION DETAIL IS INTENDED TO PROVIDE GUIDANCE TO THE PIPELINE CONTRACTOR. THE ACTUAL CONSTRUCTION TECHNIQUES MAY DIFFER DEPENDING UPON FIELD CONDITIONS AND OR REGULATORY REQUIREMENTS.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

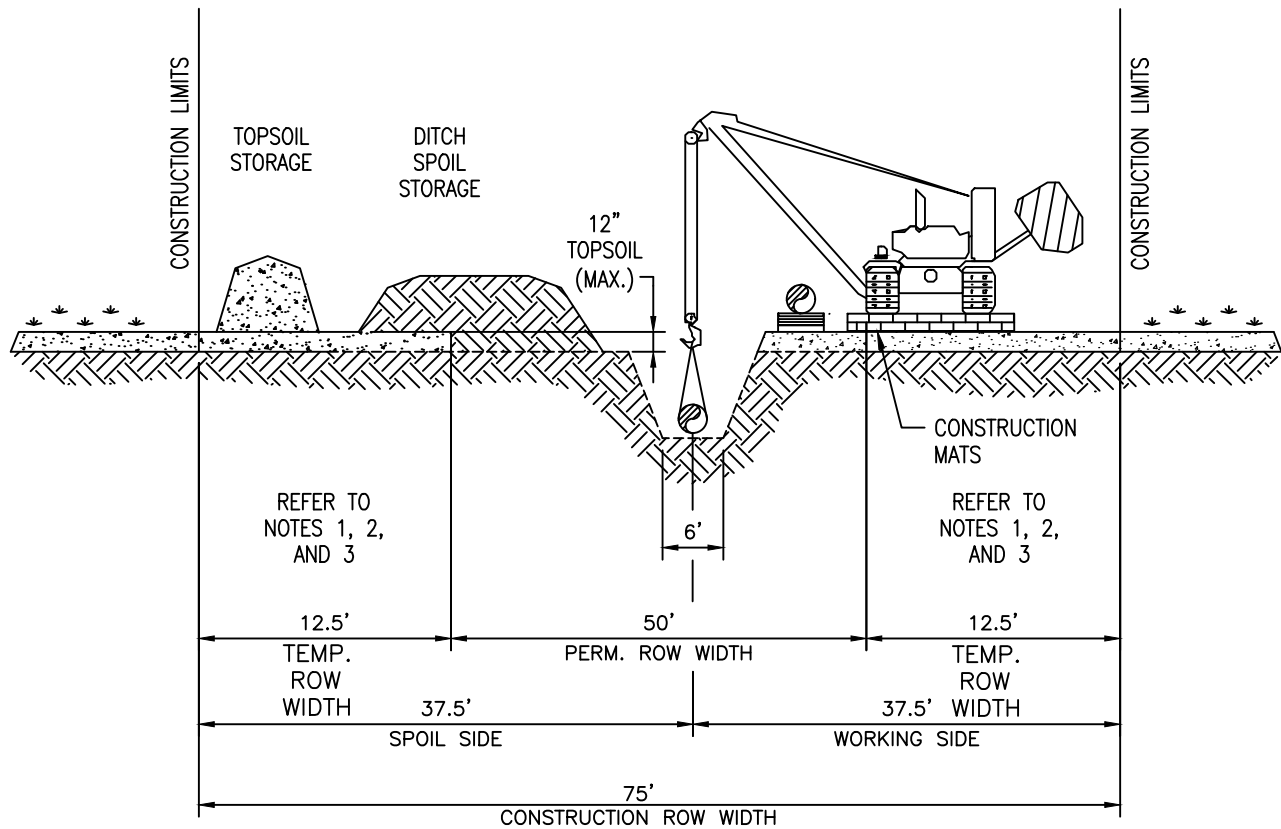


TYPICAL CONSTRUCTION DETAIL

MODULAR TEMPORARY
BAILEY BRIDGE

DRAWING NO.
MVP-SG-50

REV.
P1



NOTES:

1. TOPSOIL SEGREGATION/REMOVAL WILL ONLY BE CONDUCTED WITHIN THE PERMANENT EASEMENT AT ALL WETLAND CROSSINGS IN VIRGINIA.
2. GRUBBING ACTIVITIES SHALL BE LIMITED TO THE PERMANENT EASEMENT AT ALL WETLAND CROSSINGS IN VIRGINIA. OUTSIDE OF THE PERMANENT EASEMENT, WETLAND VEGETATION SHALL ONLY BE REMOVED AT OR ABOVE THE GROUND SURFACE. WOODY VEGETATION WITHIN THE TEMPORARY EASEMENT SHALL BE CUT AT GROUND SURFACE WITH THE STUMPS TO REMAIN IN-PLACE.
3. WETLAND CROSSINGS IN VIRGINIA SHALL BE CONDUCTED IN ACCORDANCE WITH NWP12 GENERAL AND NORFOLK DISTRICT REGIONAL CONDITIONS.

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DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



TYPICAL CONSTRUCTION DETAIL

WETLAND CROSSING TYPICAL FOR USACE NORFOLK (VA) DISTRICT

DRAWING NO.	REV.
MVP-SG-53	P1



MVP SOUTHGATE PROJECT

PROPOSED 24" H-650 PIPELINE
 ENGINEERING SERVICES DESIGN; JOB NUMBERS 300423
 ENVIRONMENTAL TYPICAL DRAWINGS

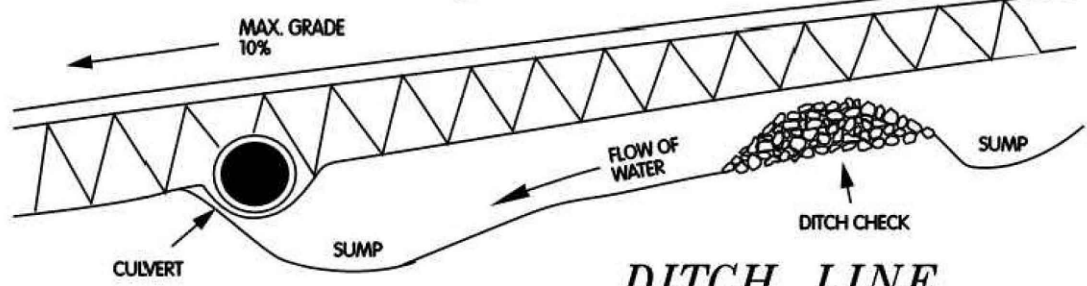
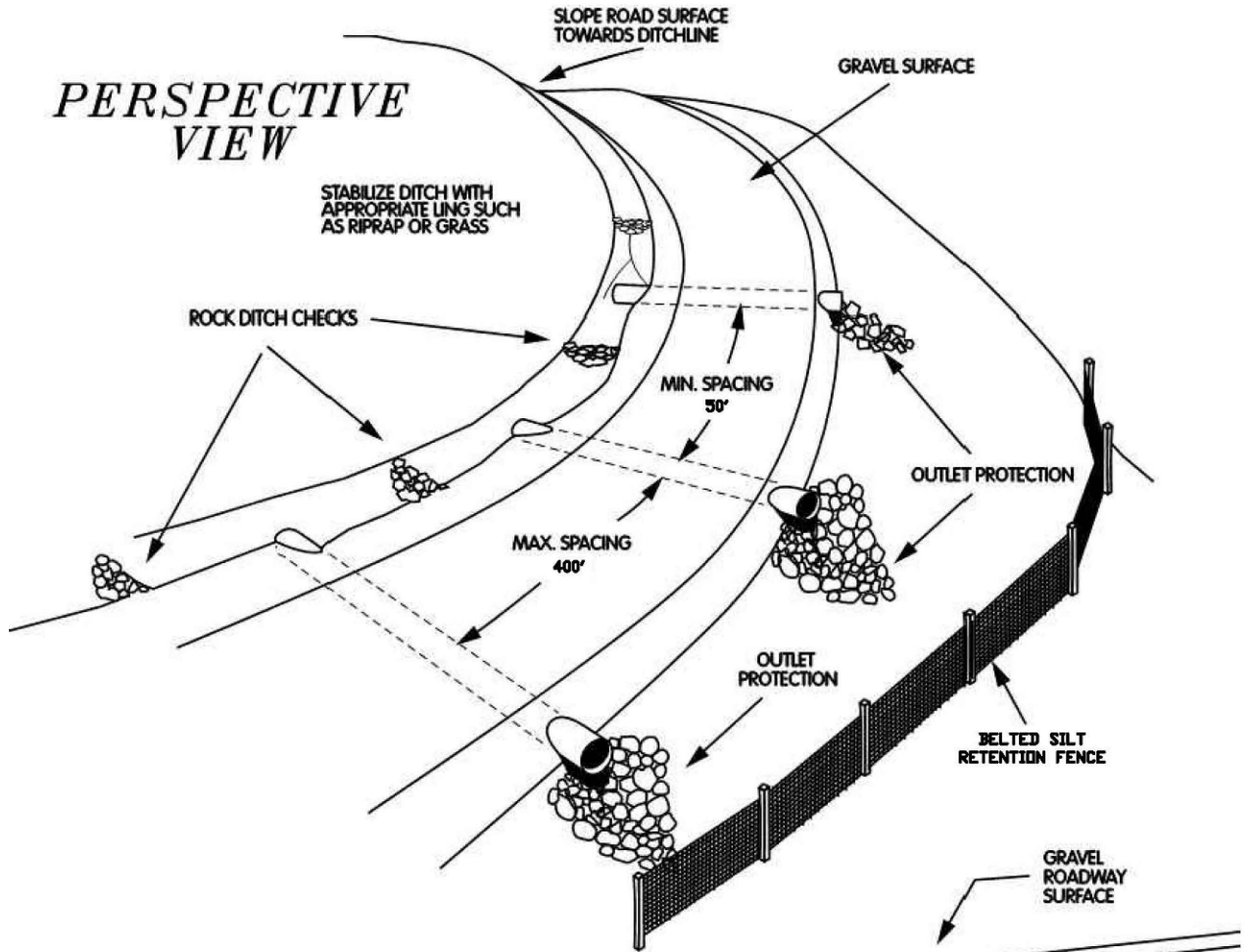
DRAWING NO.	DRAWING TITLE	REV.
MVP-SG-ES6	PROPOSED ACCESS ROAD TYPICAL LAYOUT	P1
MVP-SG-ES8	DAM AND PUMP	P1
MVP-SG-ES9.1	BELTED SILT RETENTION FENCE (BSRF)	P1
MVP-SG-ES9.2	SUPER SILT FENCE	P1
MVP-SG-ES9.3	STACKED COMPOST FILTER SOCK DETAIL CROSS SECTION VIEW	P1
MVP-SG-ES11.1	FOREST REGENERATION WOODY SEED MIX AND APPLICATION RATES	P1
MVP-SG-ES11.10	TEMPORARY EROSION CONTROL SEED MIX	P1
MVP-SG-ES13.2	COFFERDAM STREAM CROSSING METHOD	P1
MVP-SG-ES14	WATER DEFLECTOR	P1
MVP-SG-ES17	ROCK FILTER OUTLET	P1
MVP-SG-ES19	WATERBAR	P1
MVP-SG-ES20	ROCK CONSTRUCTION ENTRANCE WITH WASH RACK	P1
MVP-SG-ES25	RIPRAP STREAMBANK PROTECTION WITH OPTIONAL LIVE STAKES	P1
MVP-SG-ES33	GAP GRADED GRAVEL DETAIL FOR MAINLINE VALVE PADS & PERMANENT ACCESS ROADS	P1
MVP-SG-ES34	PROPOSED ACCESS ROAD TYPICAL SECTION	P1
MVP-SG-ES35	TRENCH DETAIL	P1
MVP-SG-ES37	TIMBER MAT/WETLAND CROSSING	P1
MVP-SG-ES38	DIVERSION DIKE/WATERBARS WITH COMPOST	P1
MVP-SG-ES41	MODULAR TEMPORARY BAILEY BRIDGE	P1

DRAWING NO.	DRAWING TITLE	REV.
MVP-SG-ES42	TYPICAL SUMP FILTER	P1
MVP-SG-ES43.1	TURBIDITY CURTAIN DETAIL	P1
MVP-SG-ES43.2	TURBIDITY CURTAIN DETAIL	P1
MVP-SG-ES43.3	TURBIDITY CURTAIN DETAIL	P1
MVP-SG-ES43.4	TURBIDITY CURTAIN DETAIL	P1
MVP-SG-ES43	TURBIDITY CURTAIN DETAIL	P1
MVP-SG-ES45.1	MULCHING	P1
MVP-SG-ES45.2	MULCHING	P1
MVP-SG-ES45.3	MULCHING	P1
MVP-SG-ES45.4	MULCHING	P1
MVP-SG-ES45.5	MULCHING	P1
MVP-SG-ES45	MULCHING	P1
MVP-SG-ES46.1	TOPSOILING & SOIL HANDLING	P1
MVP-SG-ES46.2	TOPSOILING & SOIL HANDLING	P1
MVP-SG-ES46.3	TOPSOILING & SOIL HANDLING	P1
MVP-SG-ES46	TOPSOILING & SOIL HANDLING	P1
MVP-SG-ES49	TIMBER MAT BRIDGE STREAM CROSSING	P1
MVP-SG-ES54	TEMPORARY VEHICLE PULL OFF DETAIL	P1

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		DRAWING TITLE:					
		MOUNTAIN VALLEY PIPELINE SOUTHGATE PROJECT PROPOSED H-650 PIPELINE ENVIRONMENTAL TYPICALS					
PROJECT ID	300423	FACILITY	STATE	IDENTIFICATION	SERIES	SHEET	REVISION
DRAWING SCALE	NTS	MVP	VA/NC	H-650	-	2	P1

PERSPECTIVE VIEW

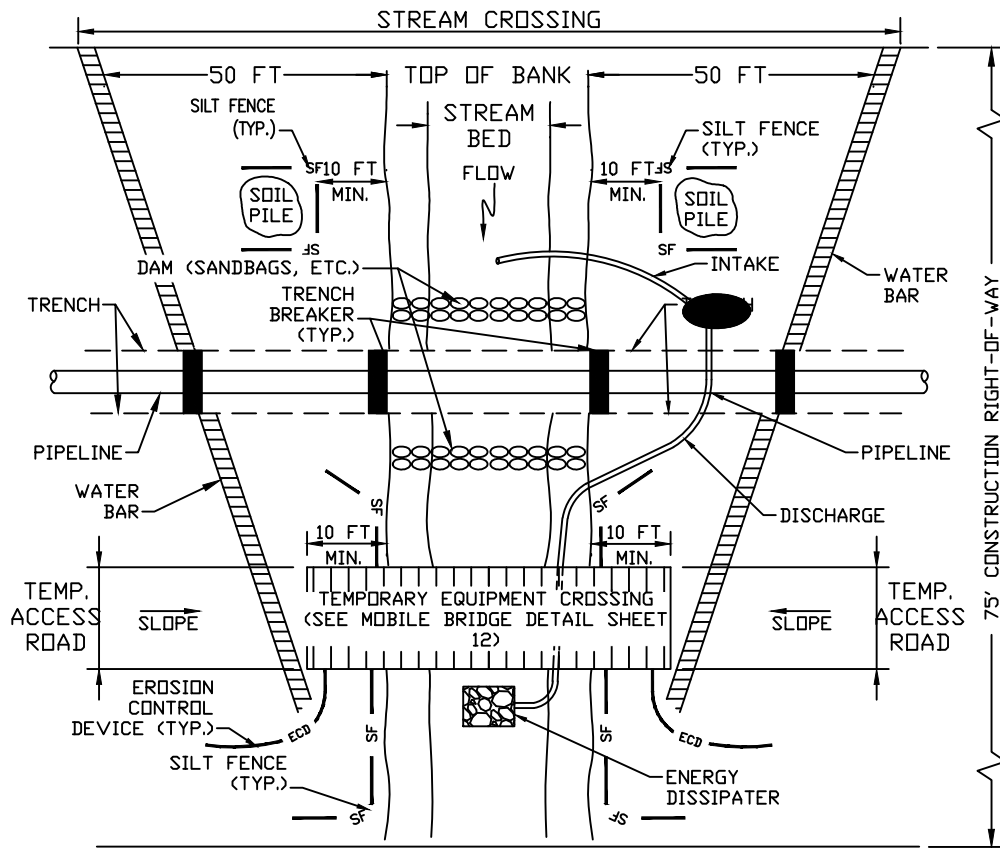


DITCH LINE CROSS SECTION

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
PROPOSED ACCESS ROAD TYPICAL LAYOUT	
DRAWING NO.	REV.
MVP-SG-ES6	P1



PLAN VIEW

NOTES:

1. INSTALL EROSION CONTROL DEVICES, TRENCH BREAKERS, PUMP, ENERGY DISSIPATER, AND DAMS BEFORE TRENCHING STREAM.
2. PUMP MUST BE OF SUFFICIENT CAPACITY TO CONVEY NORMAL AND/OR EXISTING STREAM FLOW OVER TRENCH. A BACK-UP PUMP OF EQUAL CAPACITY MUST BE AVAILABLE ON-SITE DURING CONSTRUCTION OF THE PIPELINE CROSSING. PUMPS WILL BE PLACED WITHIN SECONDARY CONTAINMENT.
3. PLACE SOIL PILES A MINIMUM OF 10 FEET FROM TOP OF BANK.
4. INSTALL WATER BARS AT APPROACHES TO STREAM CROSSING AND EROSION CONTROL DEVICES, SILT FENCE, OR SUPER SILT FENCE (AS INDICATED ON PLAN SHEETS).
5. MAINTAIN SURFACE OF TEMPORARY EQUIPMENT CROSSING TO PREVENT SOIL DISCHARGES TO STREAM.
6. APPROACHES TO CROSSINGS ARE NOT TO EXCEED A DEPTH OF 6 INCHES ABOVE ORIGINAL GRADE.
7. RESTORE AREA TO ORIGINAL CONTOURS.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

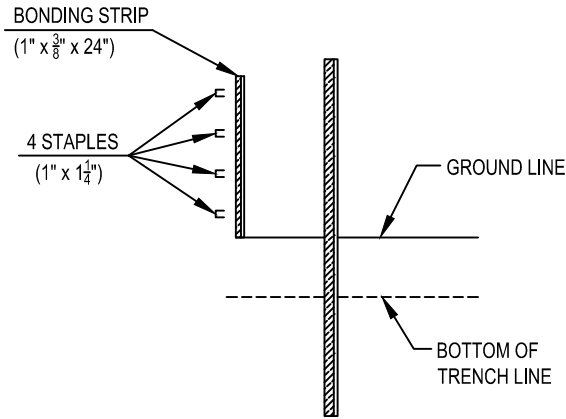


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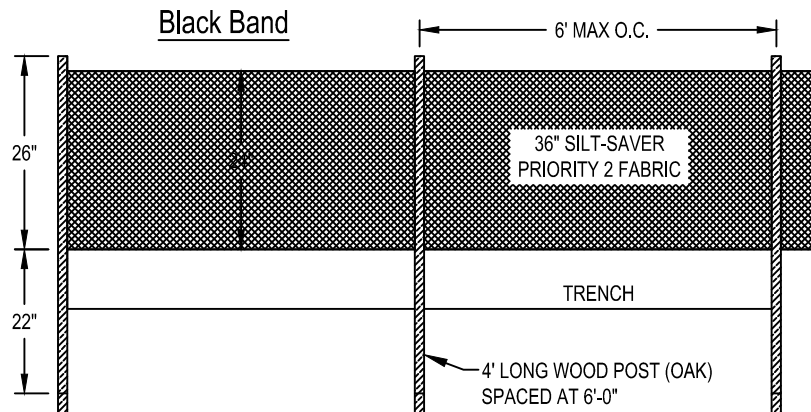
STREAM CROSSING
DAM AND PUMP

DRAWING NO.
MVP-SG-ES8

REV.
P1



POST (OAK)
 (1-3/4" X 1-1/4" X 48")



FRONT ELEVATION

PRIORITY 2
 TAKEN FROM SILT-SAVER, INC OR EQUAL

NOTES:

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

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL

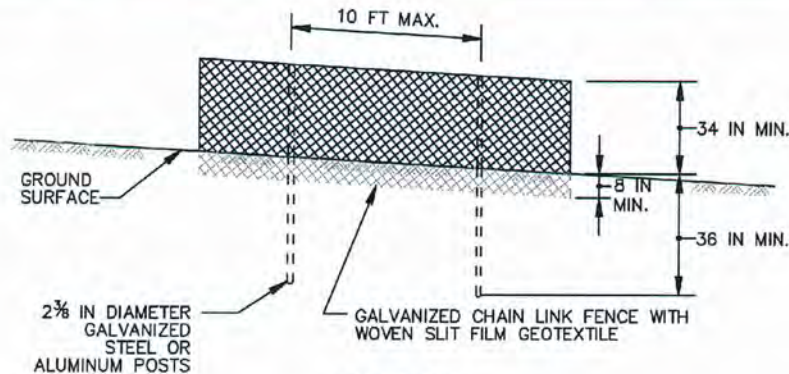
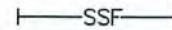
BELTED SILT RETENTION
 FENCE (BSRF)

DRAWING NO.
 MVP-SG-ES9.1

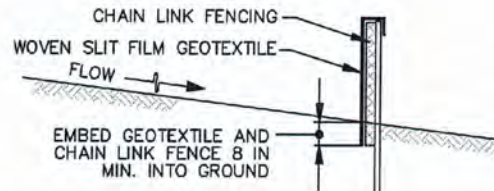
REV.
 P1

DETAIL E-3 SUPER SILT FENCE

STANDARD SYMBOL



ELEVATION



CROSS SECTION

CONSTRUCTION SPECIFICATIONS

1. INSTALL 2³/₈ INCH DIAMETER GALVANIZED STEEL POSTS OF 0.095 INCH WALL THICKNESS AND SIX FOOT LENGTH SPACED NO FURTHER THAN 10 FEET APART. DRIVE THE POSTS A MINIMUM OF 36 INCHES INTO THE GROUND.
2. FASTEN 9 GAUGE OR HEAVIER GALVANIZED CHAIN LINK FENCE (2³/₈ INCH MAXIMUM OPENING) 42 INCHES IN HEIGHT SECURELY TO THE FENCE POSTS WITH WIRE TIES OR HUG RINGS.
3. FASTEN WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS, SECURELY TO THE UPSLOPE SIDE OF CHAIN LINK FENCE WITH TIES SPACED EVERY 24 INCHES AT THE TOP AND MID SECTION. EMBED GEOTEXTILE AND CHAIN LINK FENCE A MINIMUM OF 8 INCHES INTO THE GROUND.
4. WHERE ENDS OF THE GEOTEXTILE COME TOGETHER, THE ENDS SHALL BE OVERLAPPED BY 6 INCHES, FOLDED, AND STAPLED TO PREVENT SEDIMENT BY PASS.
5. EXTEND BOTH ENDS OF THE SUPER SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SUPER SILT FENCE.
6. PROVIDE MANUFACTURER CERTIFICATION TO THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL CHAIN LINK FENCING AND GEOTEXTILE.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1

JOB NO.
PROJECT ID:
H-650-TYP



TYPICAL CONSTRUCTION DETAIL

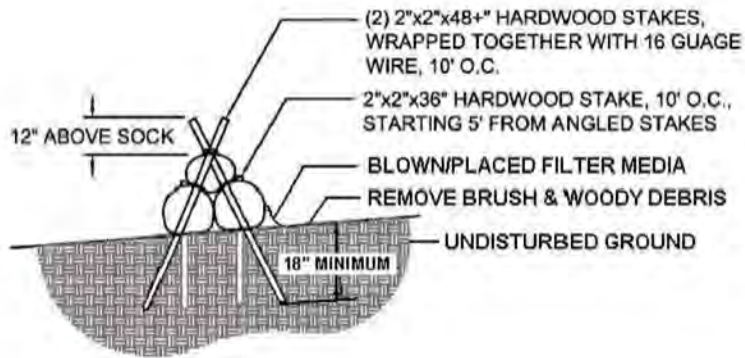
SUPER SILT FENCE

DRAWING NO.

MVP-SG-ES9.2

REV.

P1



NOTES:

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

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL

STACKED COMPOST FILTER SOCK
DETAIL CROSS SECTION VIEW

DRAWING NO.	MVP-SG-ES9.3
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REV.	P1
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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>Pinus virginiana</i>	Virginia Pine	0.3
<i>Prunus serotina</i>	Black Cherry	0.3
<i>Amelanchier canadensis</i>	Canadian Serviceberry	0.3
<i>Cercis canadensis</i>	Eastern Redbud	0.3
<i>Cornus florida</i>	Flowering Dogwood	0.3
<i>Diospyros virginiana</i>	Persimmon	0.3
<i>Ilex opaca</i>	American Holly	0.3
<i>Nyssa sylvatica</i>	Black Gum	0.3
<i>Sassafras albidum</i>	Sassafras	0.3
<i>Hamamelis virginiana</i>	Witch Hazel	0.3
<i>Lindera benzoin</i>	Spicebush	0.3
<i>Vaccinium angustifolium</i>	Lowbush Blueberry	0.3
<i>Viburnum acerifolium</i>	Mapleleaf Viburnum	0.3
<i>Vitis aestivalis</i>	Grape	0.3

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

NOTE:

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

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL

FOREST REGENERATION WOODY SEED MIX AND APPLICATION RATES

DRAWING NO.	REV.
MVP-SG-ES11.1	P1

Name	Ph preference	Wetland Indicator Status
Annual Ryegrass (<i>Lolium Multiflorum</i> (L. perenne var. italicum))	5.0–7.9	NI/moderate
German/Foxtail Millet (<i>Setaria italica</i>)	5.3–6.9	FACU
Cereal Rye (<i>Secale cereale</i>)	5.2–8.0	NI/damp
Browntop Millet (<i>Panicum ramosum</i>)	5.5–6.9	FACU

NOTES:

- 1): MINIMUM SEED RATE WILL BE 50 LBS/ACRE
- 2): UTILIZE APPROPRIATE SEED FOR TIME OF YEAR

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
TEMPORARY EROSION CONTROL SEED MIX	
DRAWING NO.	REV.
MVP-SG-ES11.10	P1

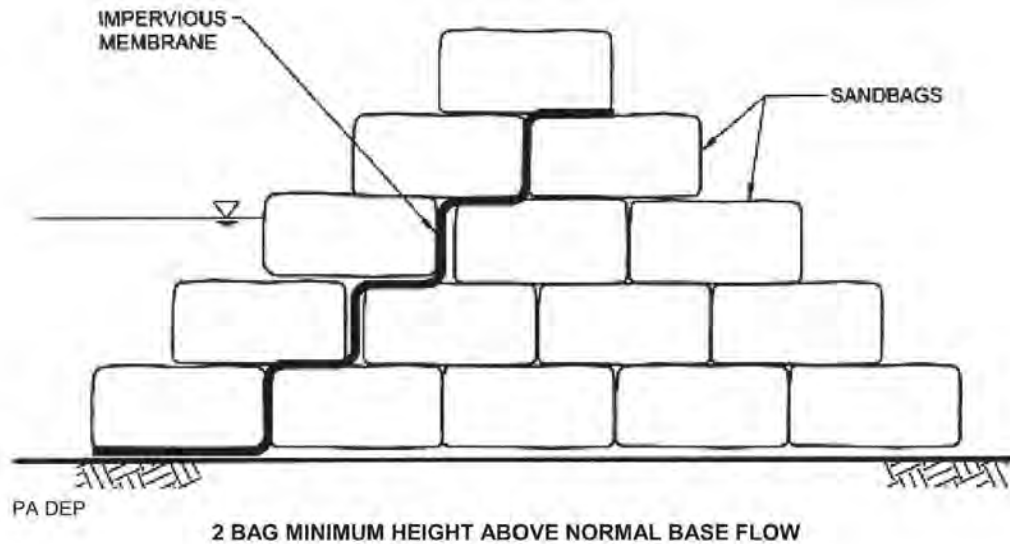
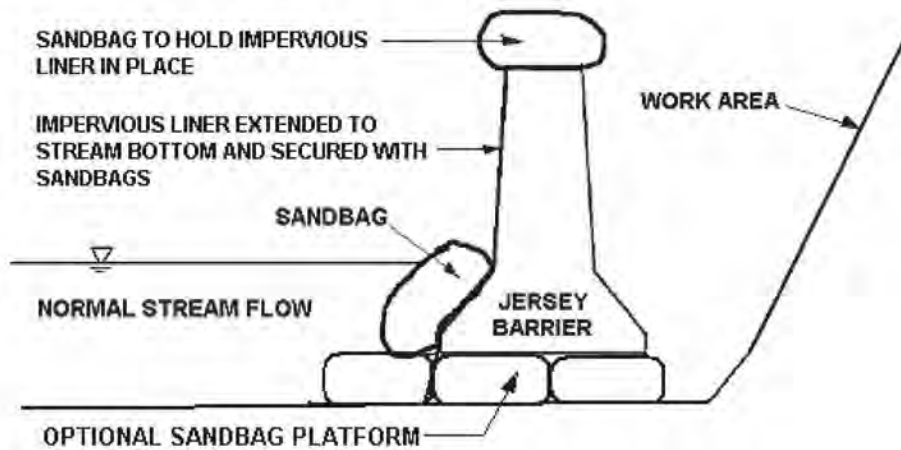


FIGURE 3.13
Jersey Barrier Cofferdam – End View



NOTES: AT NO TIME, SHOULD MORE THE 60% OF THE STREAM CHANNEL WIDTH BE DIVERTED DURING PIPELINE INSTALLATION.

GRUBBING SHALL NOT TAKE PLACE WITHIN 50 FEET OF TOP-OF-BANK UNTIL ALL MATERIALS REQUIRED TO COMPLETE CROSSING ARE ON SITE AND PIPE IS READY FOR INSTALLATION. TRENCH BREAKERS SHALL BE INSTALLED WITHIN THE TRENCH ON BOTH SIDES OF THE STREAM CHANNEL (MVP TYPICAL DETAIL MVP-20). WATER ACCUMULATING WITHIN THE WORK AREA SHALL BE PUMPED TO A PUMPED WATER FILTER BAG OR SEDIMENT TRAP PRIOR TO DISCHARGING INTO ANY RECEIVING SURFACE WATER. HAZARDOUS OR POLLUTANT MATERIAL STORAGE AREAS SHALL BE LOCATED AT LEAST 100 FEET BACK FROM THE TOP OF STREAMBANK. ALL EXCESS EXCAVATED MATERIAL SHALL BE IMMEDIATELY REMOVED FROM THE STREAM CROSSING AREA.

ALL DISTURBED AREAS WITHIN 50 FEET OF TOP-OF-BANK SHALL BE BLANKETED OR MATTED WITHIN 24 HOURS OF INITIAL DISTURBANCE FOR MINOR STREAMS OR 48 HOURS OF INITIAL DISTURBANCE FOR MAJOR STREAMS UNLESS OTHERWISE AUTHORIZED.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



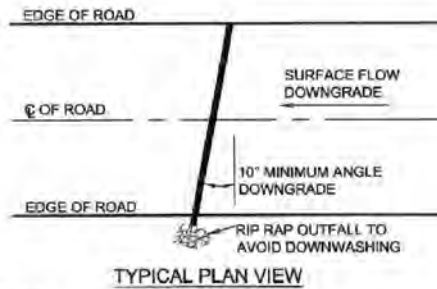
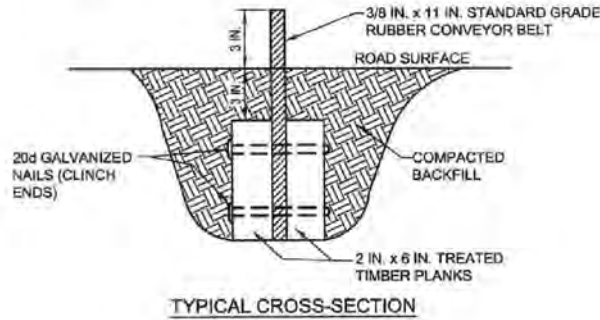
ENVIRONMENTAL DETAIL

COFFERDAM STREAM
CROSSING METHOD

DRAWING NO.
MVP-SG-ES13.2

REV.
P1

**STANDARD CONSTRUCTION DETAIL
Water Deflector**



USDA Forest Service

Deflector shall be inspected weekly and after each runoff event.

Accumulated sediment shall be removed from deflector within 24 hours of inspection.

Belt shall be replaced when worn and no longer effective.

Deflectors may be used to direct runoff from an access road to a well-vegetated area or sediment removal facility.

A deflector is typically constructed from rubber belting ranging from 5/16" to 1/2" thick held between two 2" x 6" wooden planks.

This method of directing runoff from an access road works best on low traffic roads. deflectors can be used on roads with grades exceeding 10%.

Road Grade (%)	Distance Between Dips (FT)
2	300
3	235
4	200
5	180
6	165
7	155
8	150
9	145
10	140

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

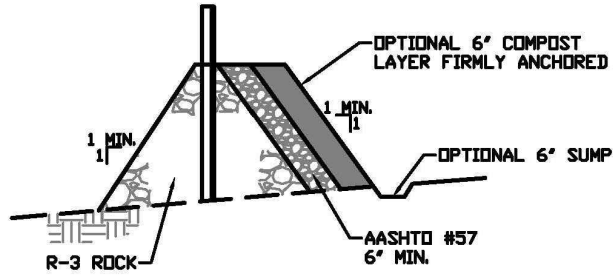


ENVIRONMENTAL DETAIL

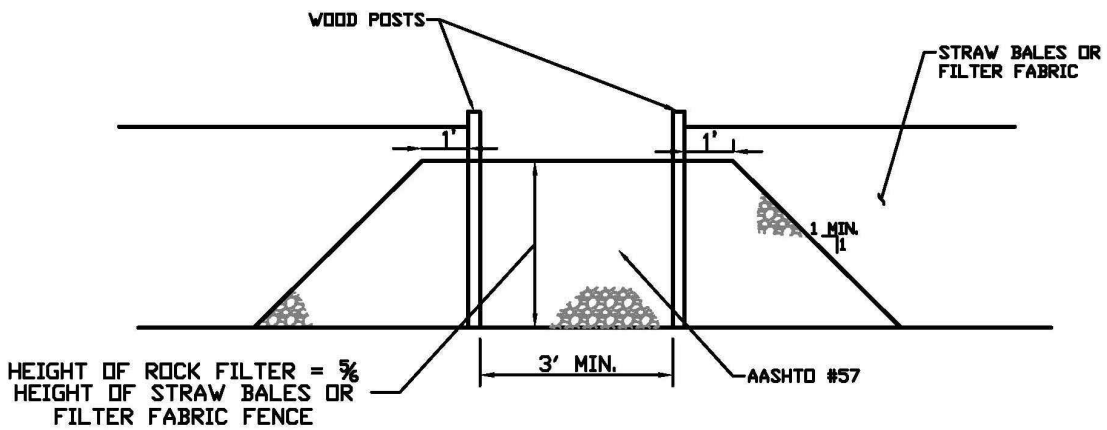
WATER DEFLECTOR

DRAWING NO.
MVP-SG-ES14

REV.
P1



OUTLET CROSS SECTION



UP-SLOPE FACE

A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HQ AND EV WATERSHEDS.

SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



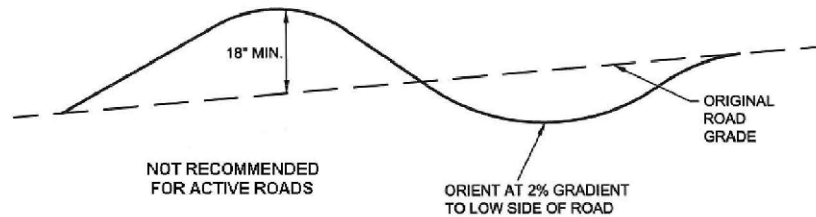
ENVIRONMENTAL DETAIL

ROCK FILTER OUTLET

DRAWING NO.
MVP-SG-ES17

REV.
P1

**STANDARD CONSTRUCTION DETAIL #3-5
Waterbar**



Adapted from USDA Forest Service

Waterbars shall discharge to a stable area.

Waterbars shall be inspected weekly (daily on active roads) and after each runoff event. Damaged or eroded waterbars shall be restored to original dimensions within 24 hours of inspection.

Maintenance of waterbars shall be provided until roadway, skidtrail, or right-of-way has achieved permanent stabilization.

Waterbars on retired roadways, skidtrails, and right-of-ways shall be left in place after permanent stabilization has been achieved.

TABLE 3.1 – Maximum Waterbar Spacing

PERCENT SLOPE	SPACING (FT)
<5	250
5 - 15	150
15 - 30	100
> 30	50

Adapted from USDA Forest Service

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



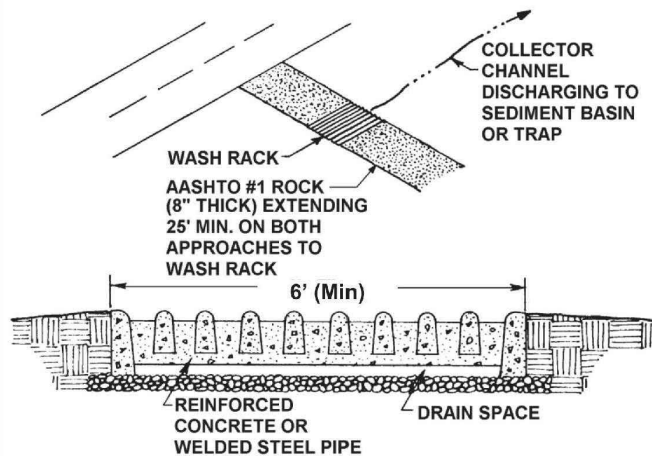
ENVIRONMENTAL DETAIL

WATERBAR

DRAWING NO.
MVP-SG-ES19

REV.
P1

Rock Construction Entrance with Wash Rack



Modified from Smith Cattleguard Company

IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 70 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK.

Wash rack shall be 20 feet (min.) wide or total width of access.

Wash rack shall be designed and constructed to accommodate anticipated construction vehicular traffic.

A water supply shall be made available to wash the wheels of all vehicles exiting the site.

MAINTENANCE: Rock construction entrance thickness shall be constantly maintained to the specified dimensions by adding rock. A stockpile of rock material shall be maintained on site for this purpose. Drain space under wash rack shall be kept open at all times. Damage to the wash rack shall be repaired prior to further use of the rack. All sediment deposited on roadways shall be removed and returned to the construction site immediately. Washing the roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable.

A metal wash rack or livestock grate is an acceptable alternative to the reinforced concrete one shown in the standard detail. Approaches to the wash rack should be lined with aashto #1 at a minimum of 25' on both sides. The wash rack should discharge to a sediment removal facility, such as a vegetated filter strip or into a channel leading to a sediment removal device (e.g. a sediment trap or sediment basin). Rock construction entrances with wash racks should be maintained to the specified dimensions by adding rock when necessary at the end of each workday. A stockpile of rock material should be maintained on site for this purpose. Sediment deposited on paved roadways should be removed and returned to the construction site.

NOTE: Washing the roadway or sweeping the deposits into roadway ditches, sewers, culverts, or other drainage courses is not acceptable. Damaged wash racks should be repaired as necessary to maintain their effectiveness. In lieu of washrack installation, MVP will extend the RCE by 70' increments until mud tracking condition is alleviated.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



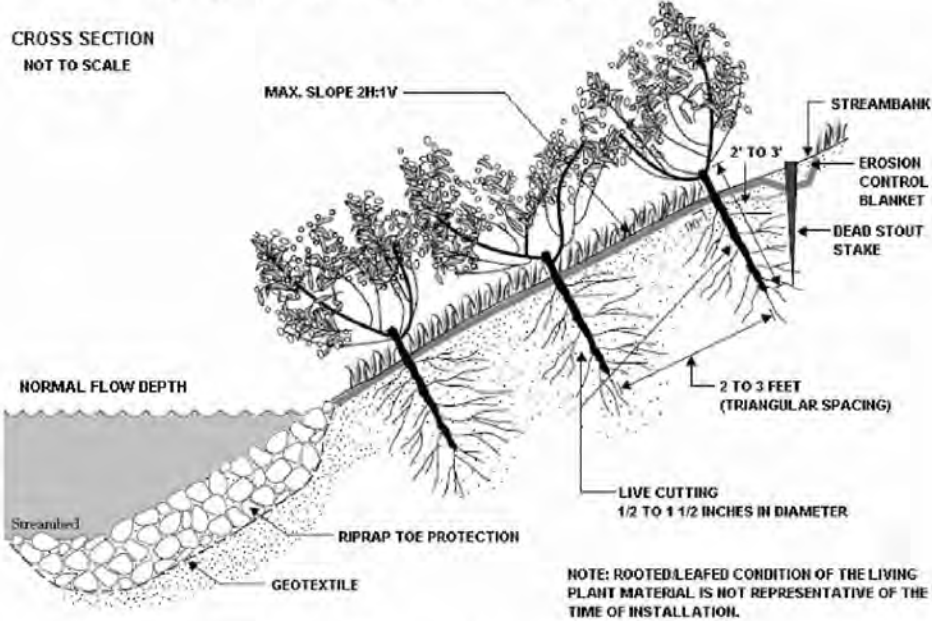
ENVIRONMENTAL DETAIL

ROCK CONSTRUCTION ENTRANCE WITH WASH RACK

DRAWING NO.
MVP-SG-ES20

REV.
P1

Riprap Streambank Protection with Optional Live Stakes



Adapted from USDA NRCS, *Engineering Field Handbook*, Chapter 16

Filter stone may be substituted for the geotextile where site and soil conditions warrant.

NOTE: Extend riprap into streambed only as far as required to provide proper toe support.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

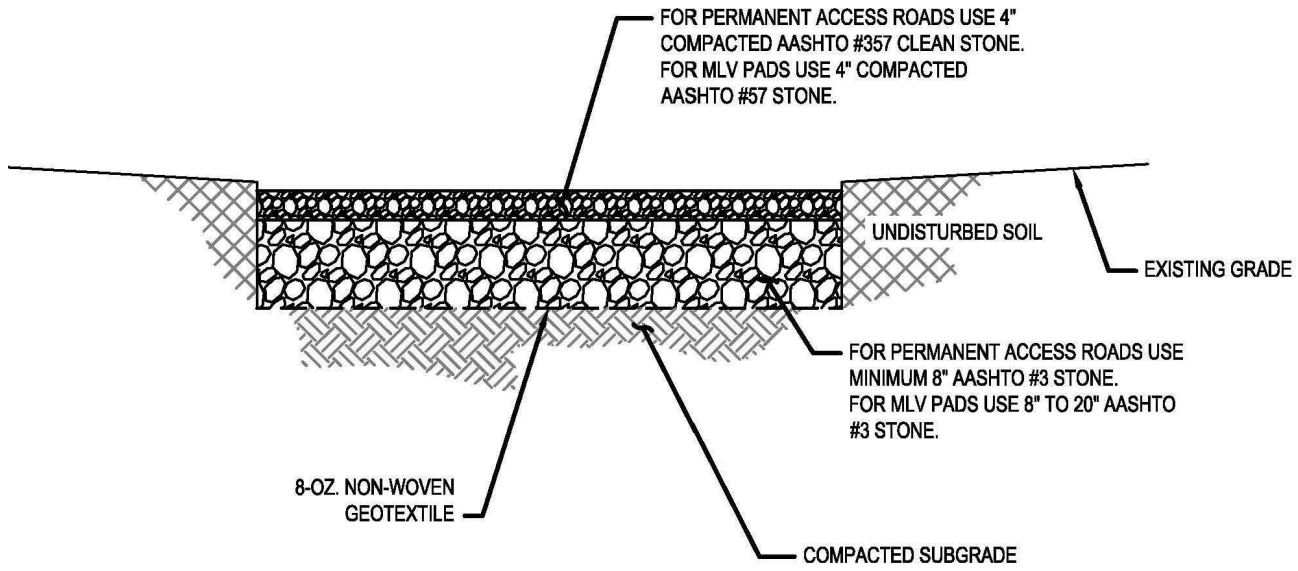


ENVIRONMENTAL DETAIL

RIPRAP STREAMBANK PROTECTION
WITH OPTIONAL LIVE STAKES

DRAWING NO.
MVP-SG-ES25

REV.
P1



NOTES:

1. THICKNESS OF AASHTO #3 STONE/AGGREGATE LAYER FOR MLV PADS TO BE BETWEEN 8" AND 20" DEPENDING ON THE STORAGE VOLUME NEEDED TO MEET STORMWATER QUANTITY REQUIREMENTS.
2. THICKNESS OF AASHTO #3 STONE/AGGREGATE LAYER FOR ACCESS ROADS TO BE A MINIMUM OF 8" OR MORE AS DIRECTED.
3. COMPACT SUBGRADE PRIOR TO BACKFILL PLACEMENT. FOR BACKFILL, A MIN. 95% COMPACTION (ASTM D 698) IS REQUIRED.
4. UNSUITABLE MATERIAL SHALL BE REMOVED PRIOR TO SUBGRADE COMPACTION AND BACKFILL PLACEMENT. ADDITIONAL SUBGRADE COMPACTION NOT REQUIRED FOR MLV PADS.

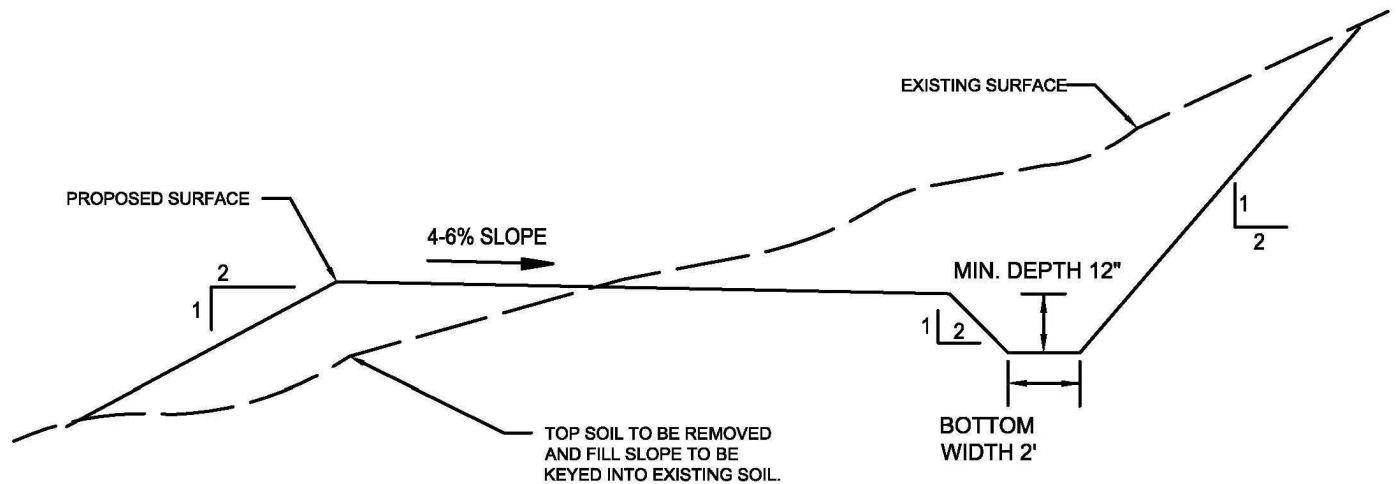
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CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL

GAP GRADED GRAVEL DETAIL
FOR MAINLINE VALVE PADS &
PERMANENT ACCESS ROADS

DRAWING NO.	REV.
MVP-SG-ES33	P1



NOTE:

1. INSLOPE WITH DITCH SECTION FOR USE ON STEEP SLOPE AND AREAS WITH POOR SOILS.
2. EROSION CONTROL MATTING TO BE INSTALLED ON CUT AND FILL SLOPES STEEPER THAN 3H:1V. SLOPES LESS THAN 3H:1V WILL BE MULCHED PER MVP-ES45 TO MVP-ES45.5.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

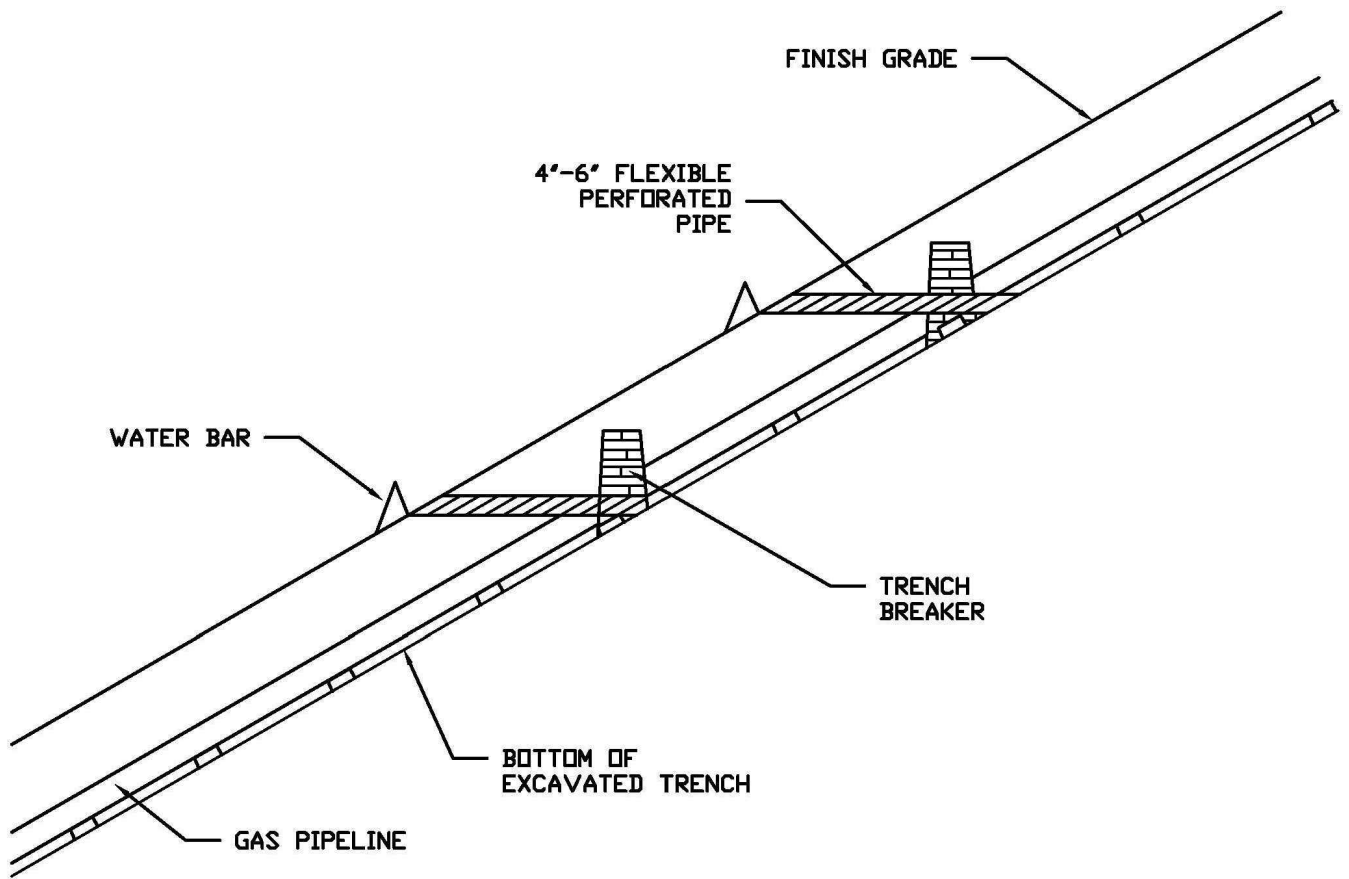


ENVIRONMENTAL DETAIL

PROPOSED ACCESS ROAD
TYPICAL SECTION

DRAWING NO.
MVP-SG-ES34

REV.
P1



NOTE:

4'-6' FLEXIBLE PERFORATED PIPE TO BE INSTALLED AT TRENCH BREAKERS ON STEEP SLOPES TO DRAIN SUBSURFACE WATER INTO WATER BARS.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

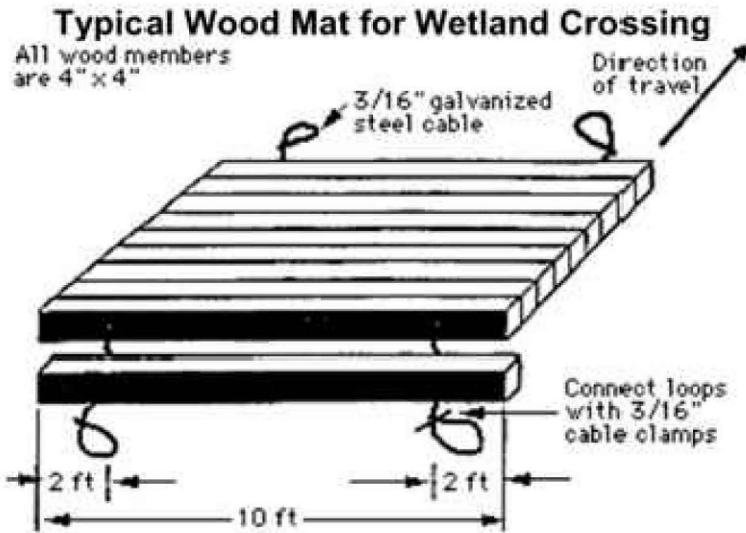


ENVIRONMENTAL DETAIL

TRENCH DETAIL

DRAWING NO.
MVP-SG-ES35

REV.
P1



University of Minnesota FS 07009

A geotextile underlayment shall be used under the wood mat.

Source: PaDEP, E&S Pollution Control Manual, March 2012.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

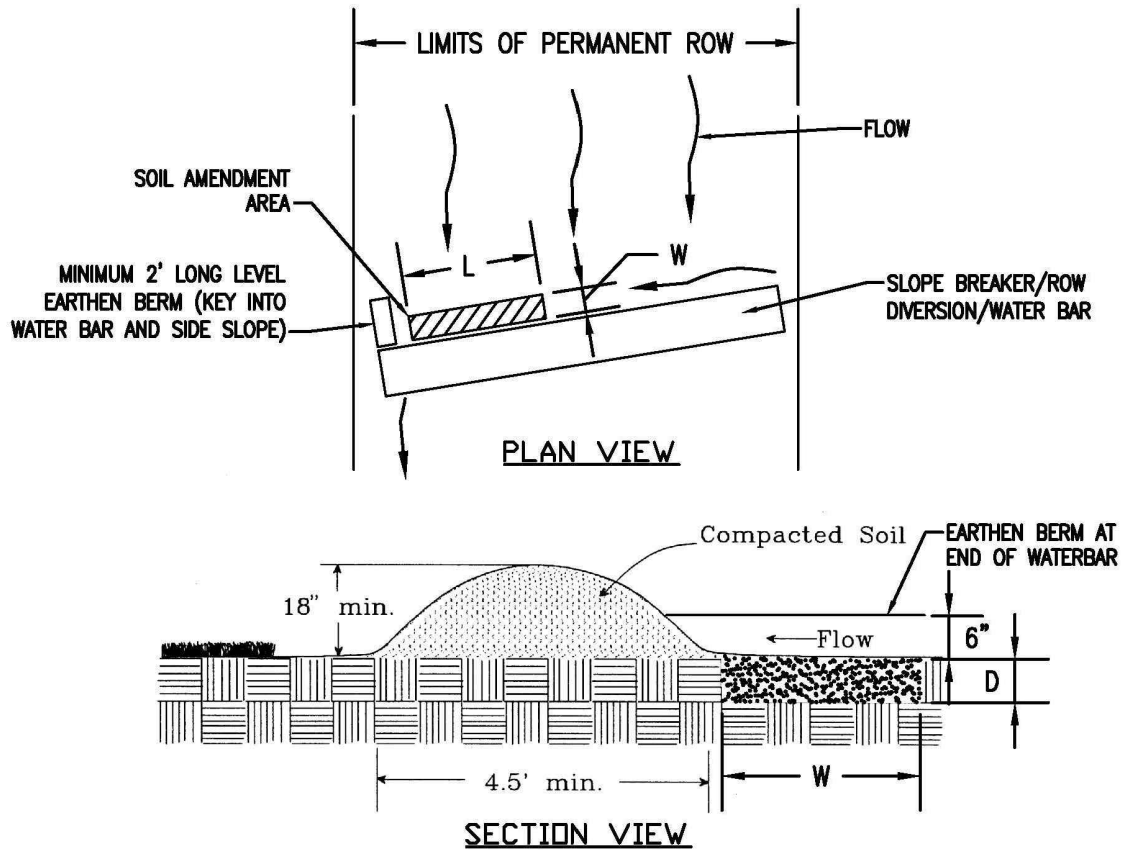


ENVIRONMENTAL DETAIL

TIMBER MAT/WETLAND CROSSING

DRAWING NO.
MVP-SG-ES37

REV.
P1



NOTES

1. WIDTH "W" OF SOIL AMENDMENT PER PERMANENT DIVERSION DIKE/WATERBAR WITH SOIL AMENDMENT SCHEDULE.
2. THE INCORPORATION DEPTH "D" IS ASSUMED TO BE 1 FT PER TABLE 4.3 IN VA DEQ STORMWATER DESIGN SPEC #4. AN INCORPORATION DEPTH OF 2 FT IS USED IN CASES WHERE ADDITIONAL STORAGE CAPACITY IS NEEDED IN ORDER TO MEET WATER QUANTITY REQUIREMENTS.
3. DEVELOPED FROM VA. DSWC PLATE 3.09-1.
4. SEE SHEET 0.7, TEMPORARY RIGHT OF WAY DIVERSION/WATERBAR ADDITIONAL DETAILS FOR PLAN VIEW.

Diversion Dikes/Waterbars with Compost Schedule				
Drainage Area	Diversion Dike Identification #	Soil Amendment Depth (D) (ft)	Soil Amendment Width (W) (ft)	Minimum Length of Soil Amendment (L) (ft)
DA-GI-002	WB-GI8-001	1	2	9
DA-GI-018B	WB-GI8-002	2	3	50
DA-GI-020A	WB-GI8-003	1	2	40
DA-GI-022A	WB-GI8-004	2	2	26
DA-GI-026D	WB-GI8-005	1	2	40
DA-GI-027C	WB-GI8-006	1	3	44
DA-GI-028B	WB-GI8-007	1	2	33
DA-GI-034A	WB-GI8-008	1	2	41

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

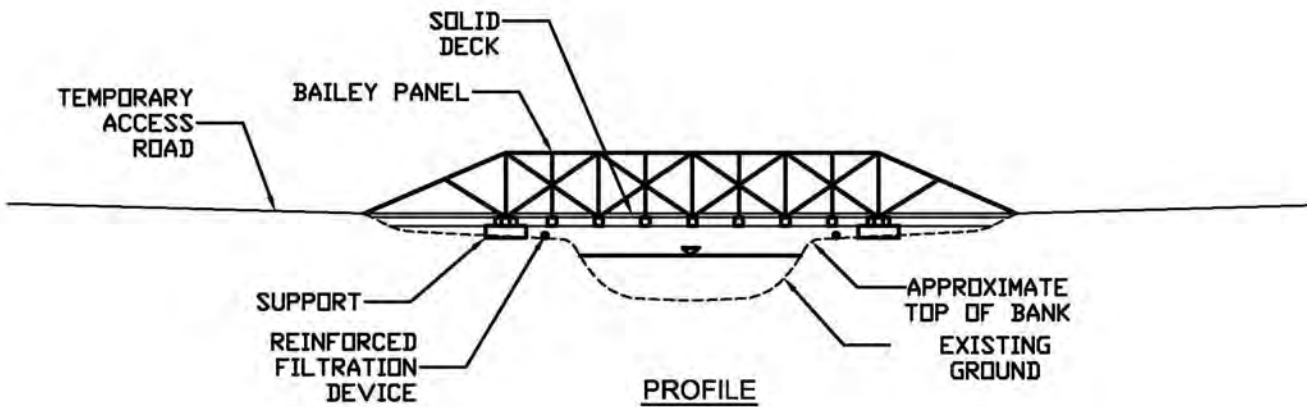
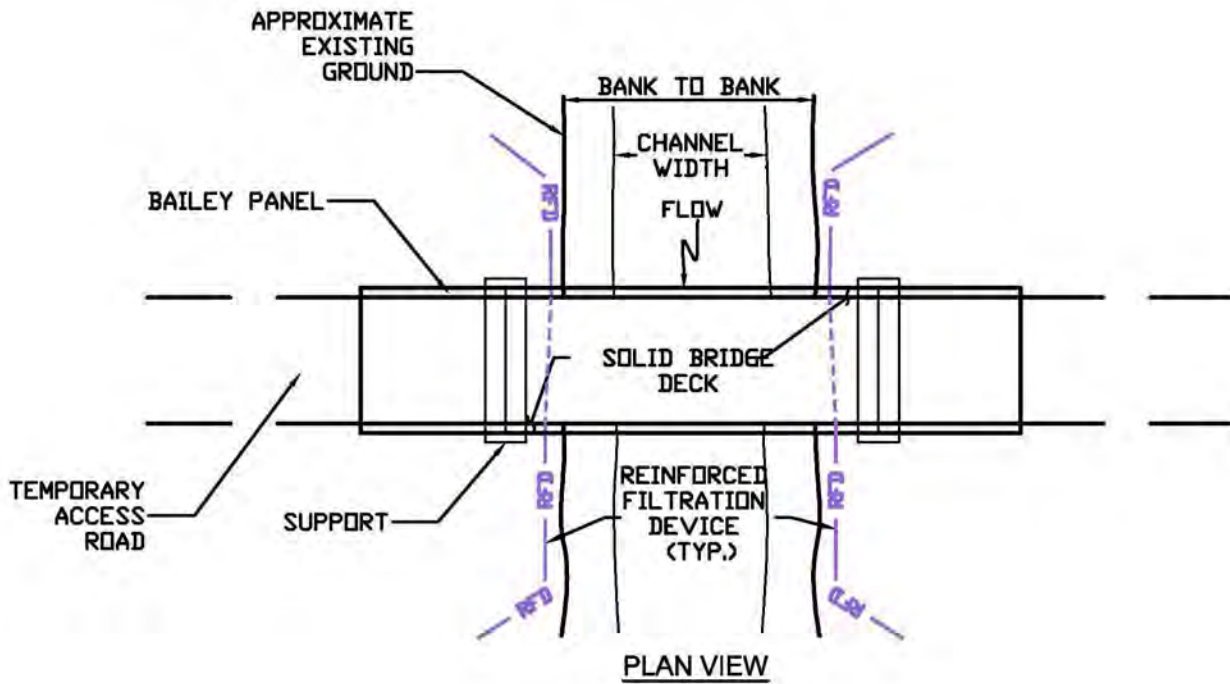


ENVIRONMENTAL DETAIL

DIVERSION DIKE/WATERBARS WITH COMPOST

DRAWING NO.
MVP-SG-ES38

REV.
P1



DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1

JOB NO.

PROJECT ID:

H-650-TYP



ENVIRONMENTAL DETAIL

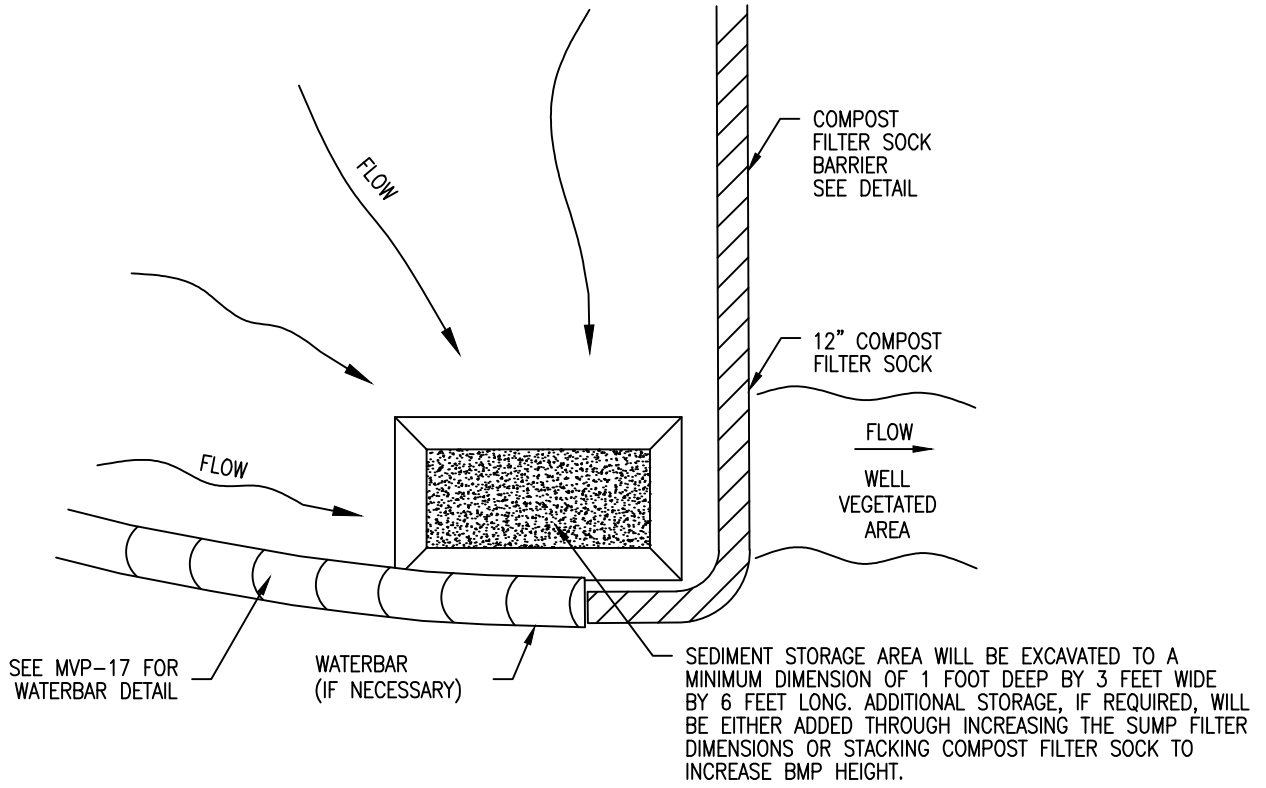
MODULAR TEMPORARY
BAILEY BRIDGE

DRAWING NO.

MVP-SG-ES41

REV.

P1



NOTES:

1. SUMP FILTER MAY BE USED IN CONJUNCTION WITH TEMPORARY WATERBAR (AS DIRECTED BY OWNER REPRESENTATIVE).
2. SUMP FILTER SHALL BE LOCATED ENTIRELY WITHIN THE LIMITS OF DISTURBANCE.
3. BMP SHOULD BE CHECKED EVERY 4 BUSINESS DAYS FOR SEDIMENT ACCUMULATION, PROPER OPERATION, AND COMPOST FILTER SOCK INTEGRITY.
4. ADDITIONAL COMPOST FILTER SOCKS MAY BE NECESSARY BEYOND WHAT IS SHOWN ON DETAIL TO MEET INTENDED BMP REQUIREMENTS.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



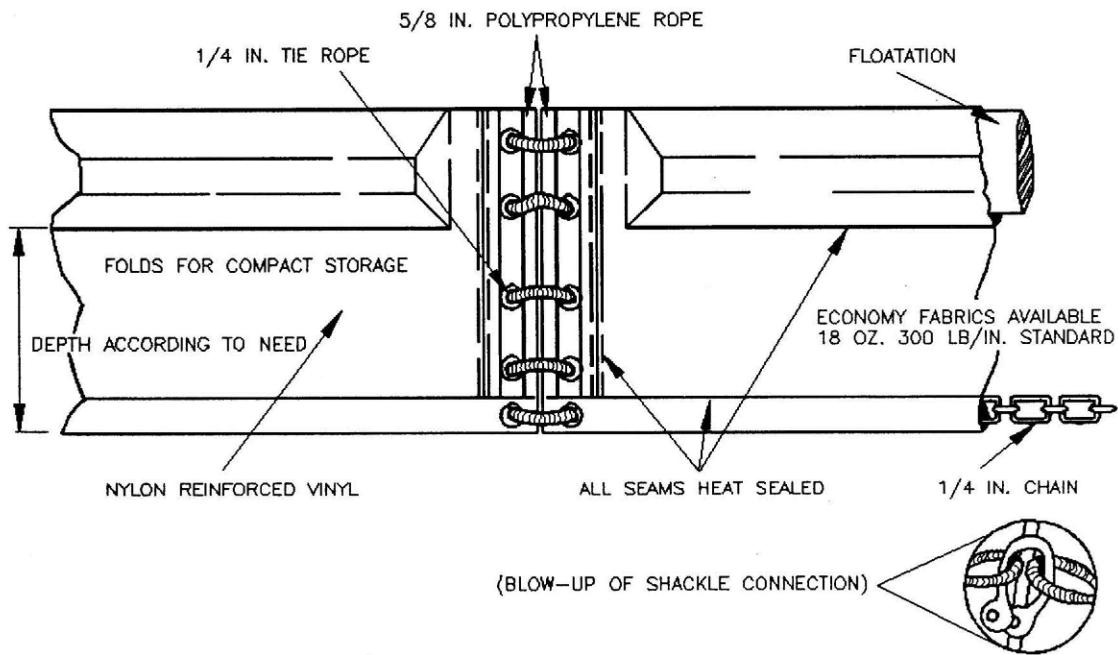
ENVIRONMENTAL DETAIL

TYPICAL SUMP FILTER

DRAWING NO.
MVP-SG-ES42

REV.
P1

TYPE I

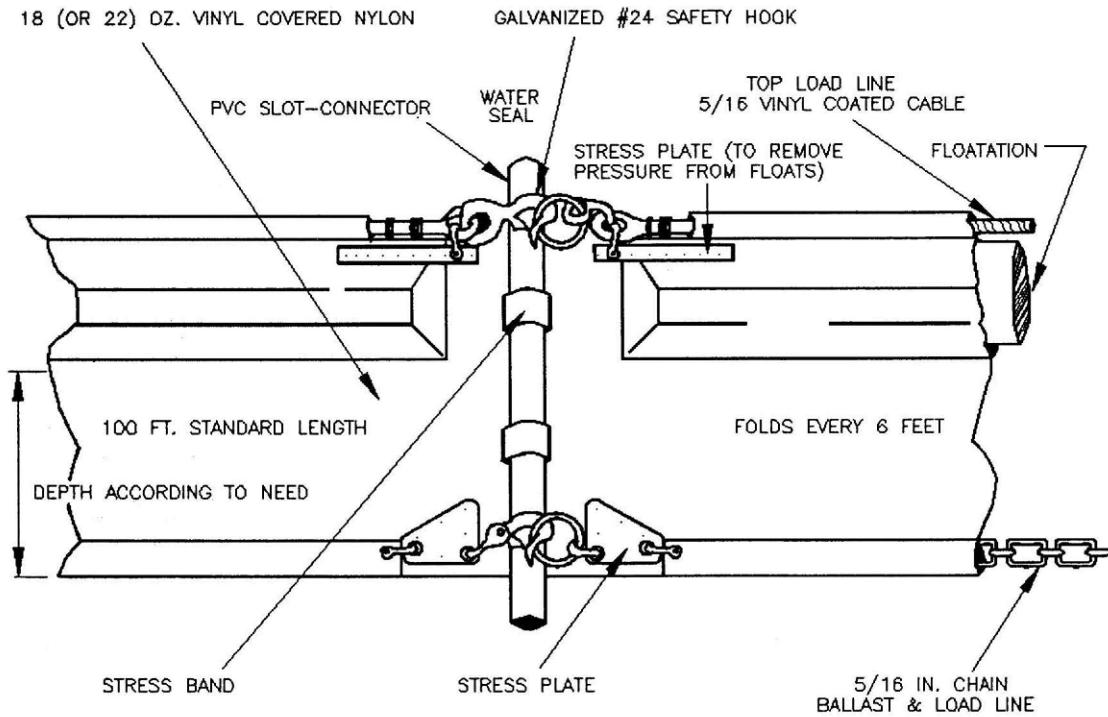


DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
TURBIDITY CURTAIN DETAIL	
DRAWING NO.	REV.
MVP-SG-ES43.1	P1

TYPE II



DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



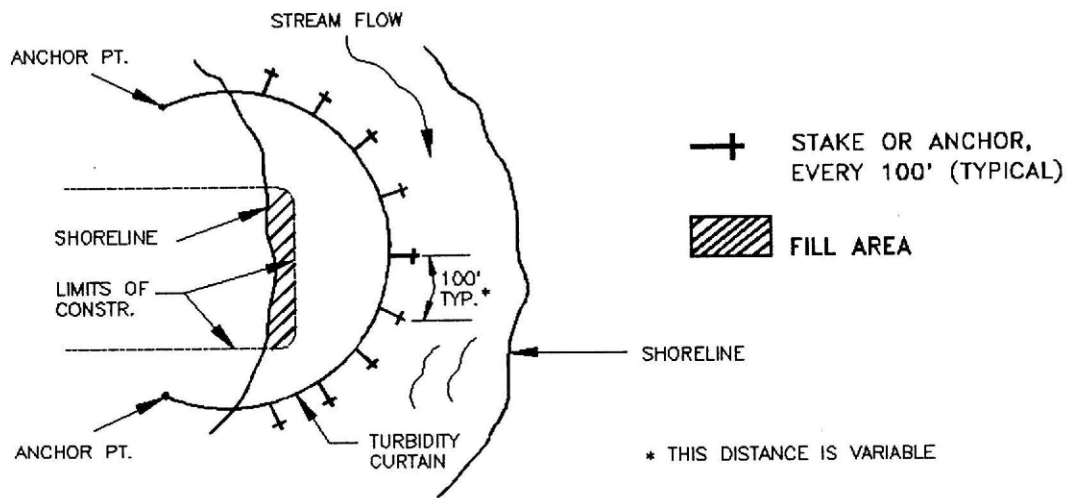
ENVIRONMENTAL DETAIL

TURBIDITY CURTAIN DETAIL

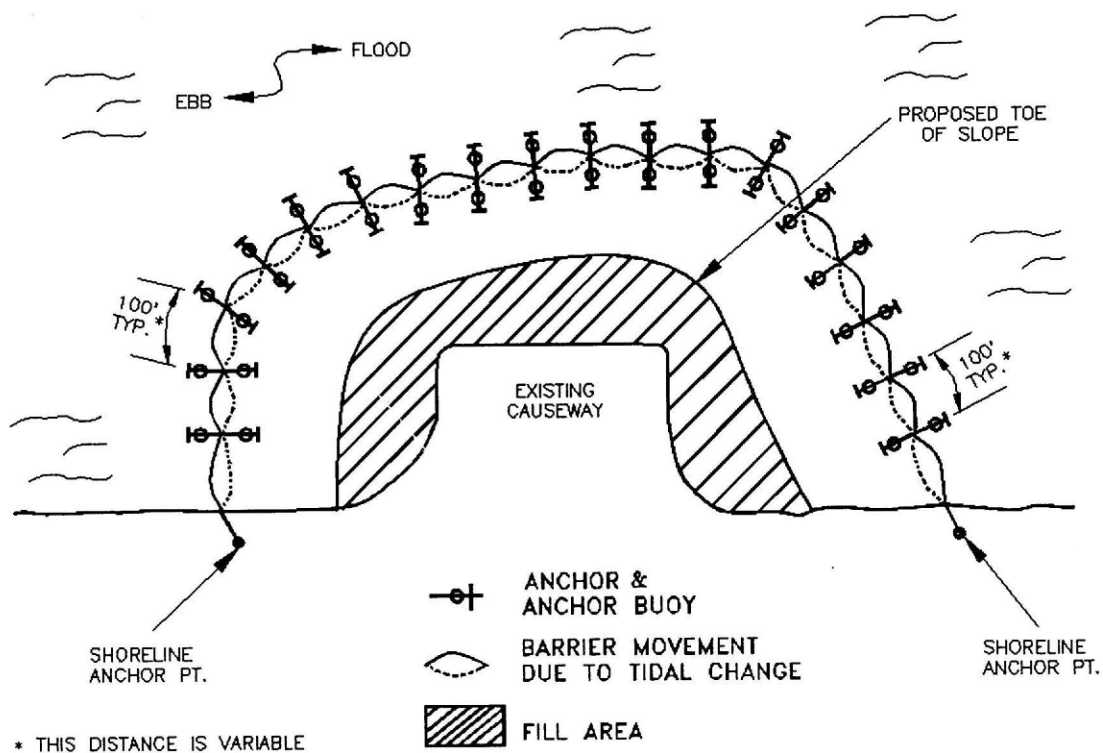
DRAWING NO.
MVP-SG-ES43.2

REV.
P1

TYPICAL LAYOUTS: STREAMS, PONDS & LAKES (PROTECTED & NON-TIDAL)



TIDAL WATERS AND/OR HEAVY WIND & WAVE ACTION



DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1

JOB NO.

PROJECT ID:

H-650-TYP



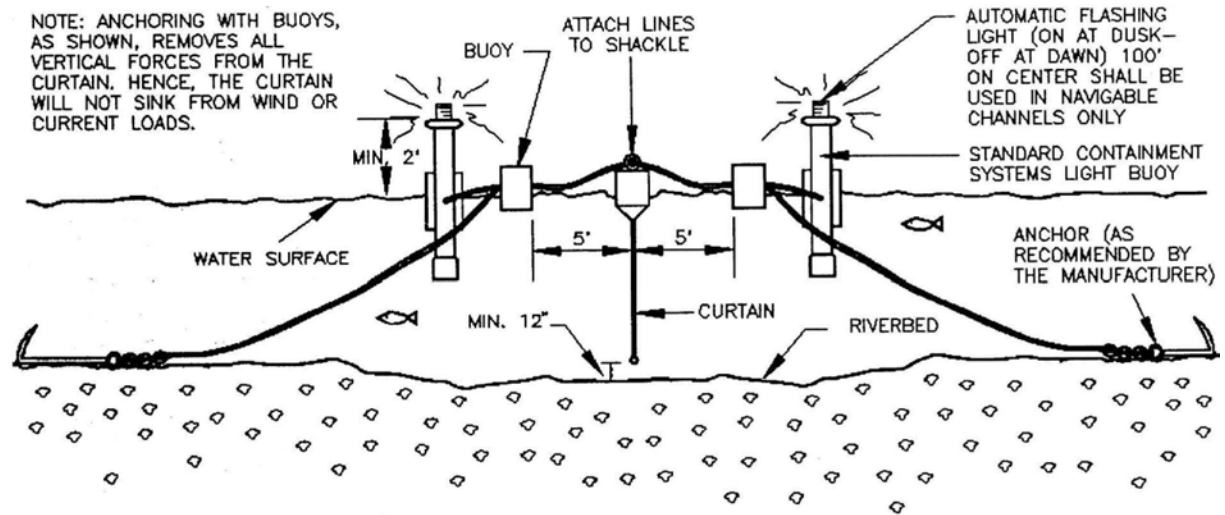
ENVIRONMENTAL DETAIL

TURBIDITY CURTAIN DETAIL

DRAWING NO.
MVP-SG-ES43.3

REV.
P1

ORIENTATION WHEN INSTALLED (TIDAL SITUATION - TYPE III)



DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



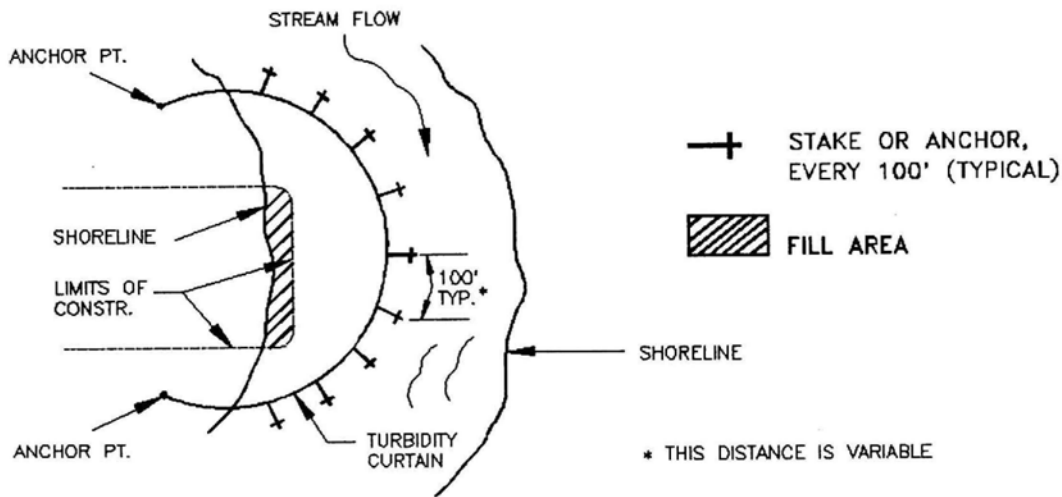
ENVIRONMENTAL DETAIL

TURBIDITY CURTAIN DETAIL

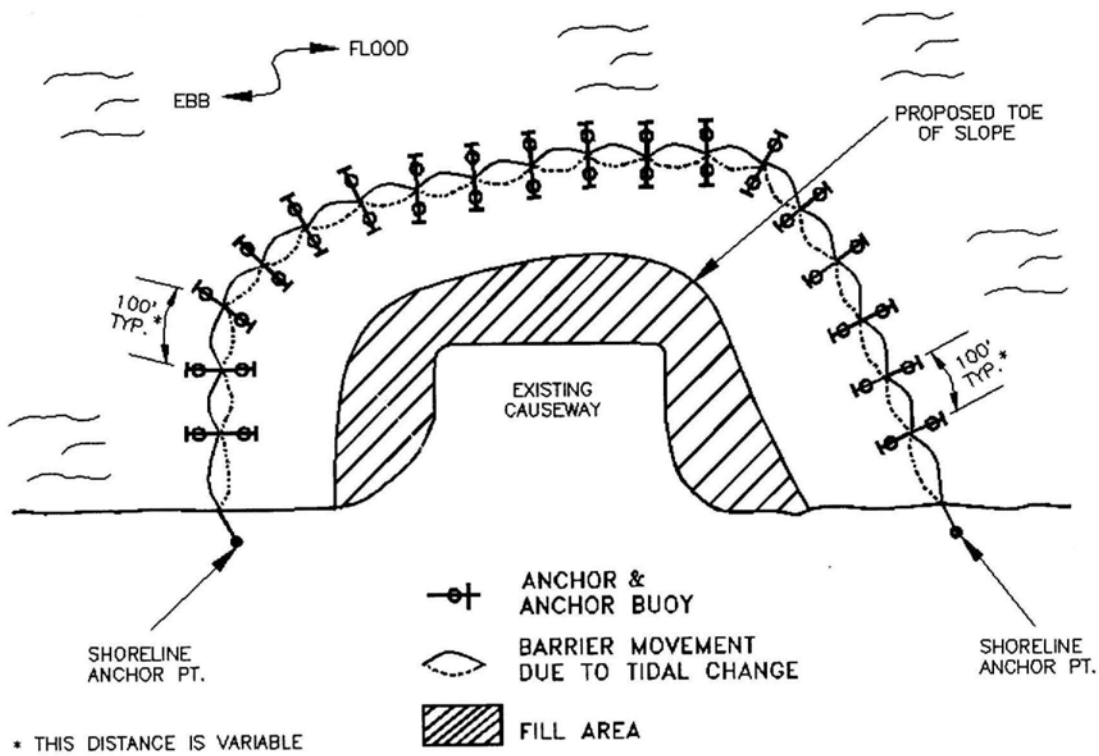
DRAWING NO.
MVP-SG-ES43.4

REV.
P1

TYPICAL LAYOUTS: STREAMS, PONDS & LAKES (PROTECTED & NON-TIDAL)



TIDAL WATERS AND/OR HEAVY WIND & WAVE ACTION



DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
TURBIDITY CURTAIN DETAIL	
DRAWING NO.	REV.
MVP-SG-ES43	P1

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

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

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

Organic Mulches

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

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

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

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

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

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

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

Chemical Mulches and Soil Binders

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

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
MULCHING	
DRAWING NO.	REV.
MVP-SG-ES45.1	P1

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

Blankets and Matting

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

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

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

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

Specifications

Organic Mulches

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

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

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

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

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

DRAWN	TRC	DATE	8/7/2018		ENVIRONMENTAL DETAIL	
CHECKED	XXX	DATE	X/X/2018		MULCHING	
APP'D	XXX	DATE	X/X/2018			
SCALE	N.T.S.	SHEET	1 OF 1			
JOB NO.						
PROJECT ID:				DRAWING NO.		REV.
H-650-TYP				MVP-SG-ES45.2		P1

TABLE 3.35-A			
ORGANIC MULCH MATERIALS AND APPLICATION RATES			
MULCHES:	RATES:		NOTES:
	Per Acre	Per 1000 sq. ft.	
Straw	1 ½ - 2 tons (Minimum 2 tons for winter cover)	70 – 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	Minimum 1500 lbs.	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods.* Apply as slurry.
Corn Stalks	4 – 6 tons	185 – 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	4 – 6 tons	185 – 275 lbs.	Free of coarse matter. Air-dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	50 – 70 cu. yds.	1-2 cu. yds.	Free of coarse matter. Air-dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
* When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 2000 lbs./ac. Or 45 lbs./1000 sq. ft.			

Source: Va. DSWC

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
MULCHING	
DRAWING NO.	REV.
MVP-SG-ES45.3	P1

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

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

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

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

The following types of binders may be used:

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

Apply asphalt at 0.10 gallon per square yard (10 gal./1000 sq. ft. or 430 gal./acre). Do not use heavier applications as it may cause the straw to "perch" over rills. All asphalt designations are from the Asphalt Institute Specifications.

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

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

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
MULCHING	
DRAWING NO.	REV.
MVP-SG-ES45.4	P1

Chemical Mulches

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

- a. Where no other mulching material is available.
- b. In conjunction with temporary seeding during the times when mulch is not required for that practice.
- c. From March 15 to May 1 and August 15 to September 30, provided that they are used on areas with slopes no steeper than 4:1, which have been roughened in accordance with SURFACE ROUGHENING, Std. & Spec. 3.29. If rill erosion occurs, another mulch material shall be applied immediately.

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

Maintenance

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

DRAWN	TRC	DATE	8/7/2018		ENVIRONMENTAL DETAIL	
CHECKED	XXX	DATE	X/X/2018		MULCHING	
APP'D	XXX	DATE	X/X/2018			
SCALE	N.T.S.	SHEET	1 OF 1			
JOB NO.						
PROJECT ID:				DRAWING NO.		
H-650-TYP				MVP-SG-ES45.5		
				REV.		
				P1		

MULCHING

Definition

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

Purposes

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

Conditions Where Practice Applies

1. Areas which have been permanently seeded (see Appendix B – Typical Construction Details MVP-ES11.1 through ES12.3) should be mulched immediately following seeding.
2. Areas which cannot be seeded because of the season should be mulched to provide some protection to the soil surface. An organic mulch should be used, and the area then seeded as soon weather or seasonal conditions permit. It is not recommended that fiber mulch be used alone for this practice; at normal application rates it just simply does not provide the protection that is achieved using other types of mulch.
3. Mulch may be used together with plantings of trees, shrubs, or certain ground covers which do not provide adequate soil stabilization by themselves.
4. Mulch shall be used in conjunction with temporary seeding operations as specified in TEMPORARY SEEDING, Std. & Spec. 3.31

Planning Considerations

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

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

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

DRAWN TRC	DATE 8/7/2018		ENVIRONMENTAL DETAIL	
CHECKED XXX	DATE X/X/2018		MULCHING	
APP'D XXX	DATE X/X/2018			
SCALE N.T.S.	SHEET 1 OF 1			
JOB NO.			DRAWING NO.	REV.
PROJECT ID: H-650-TYP		MVP-SG-ES45	P1	

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

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

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

Specifications

Materials

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

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

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

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

Soluble salts shall not exceed 500 ppm.

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

DRAWN	TRC	DATE	8/7/2018		ENVIRONMENTAL DETAIL	
CHECKED	XXX	DATE	X/X/2018		TOPSOILING & SOIL HANDLING	
APP'D	XXX	DATE	X/X/2018			
SCALE	N.T.S.	SHEET	1 OF 1			
JOB NO.					DRAWING NO. MVP-SG-ES46.1	
PROJECT ID: H-650-TYP				REV. P1		

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	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID: H-650-TYP			



ENVIRONMENTAL DETAIL

TOPSOILING & SOIL HANDLING

DRAWING NO.

MVP-SG-ES46.2

REV.

P1

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	403
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:

1. 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.
2. 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:
 - a. 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.
 - b. 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	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL

TOPSOILING & SOIL HANDLING

DRAWING NO.
MVP-SG-ES46.3

REV.
P1

TOPSOILING AND SOIL HANDLING FROM SOUTHGATE

Definition

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

Purposes

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

Conditions Where Practice Applies

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

Planning Considerations

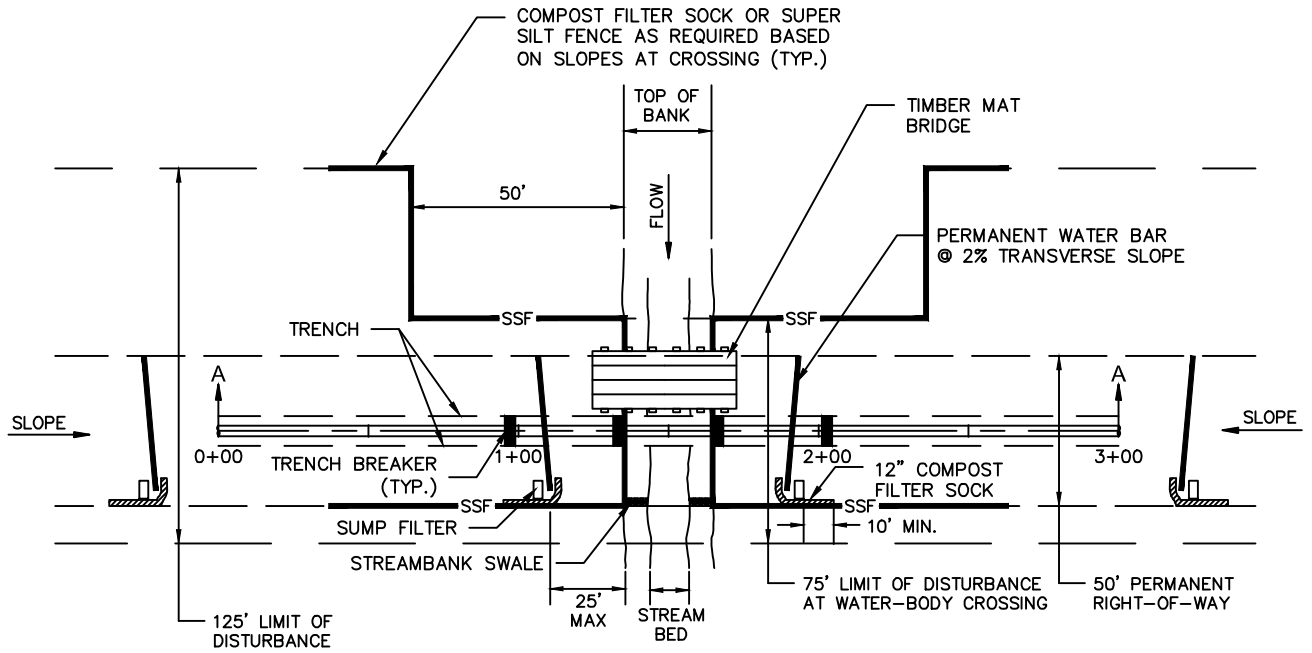
Topsoil is the surface layer of the soil profile, generally characterized as being darker than the subsoil due to the presence of organic matter. It is the major zone of root development, carrying much of the nutrients available to plants, and supplying a large share of the water used by plants.

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

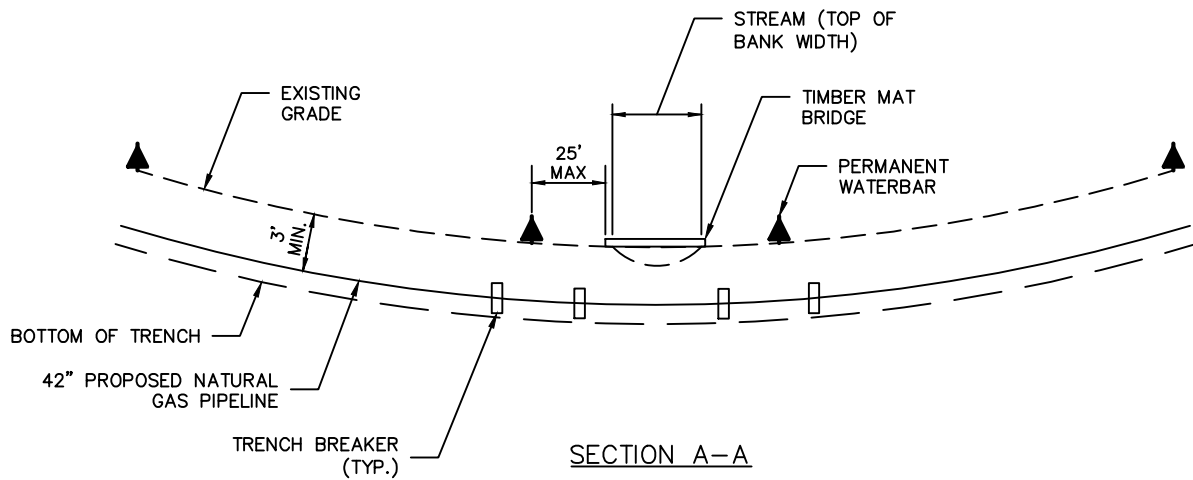
Advantages of topsoil include its high organic matter content and friable consistence, water-holding capacity, and nutrient content.

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

DRAWN	TRC	DATE	8/7/2018	ENVIRONMENTAL DETAIL	
CHECKED	XXX	DATE	X/X/2018		
APP'D	XXX	DATE	X/X/2018	TOPSOILING & SOIL HANDLING	
SCALE	N.T.S.	SHEET	1 OF 1		
JOB NO.				DRAWING NO. MVP-SG-ES46	
PROJECT ID: H-650-TYP					



PLAN



SECTION A-A

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			

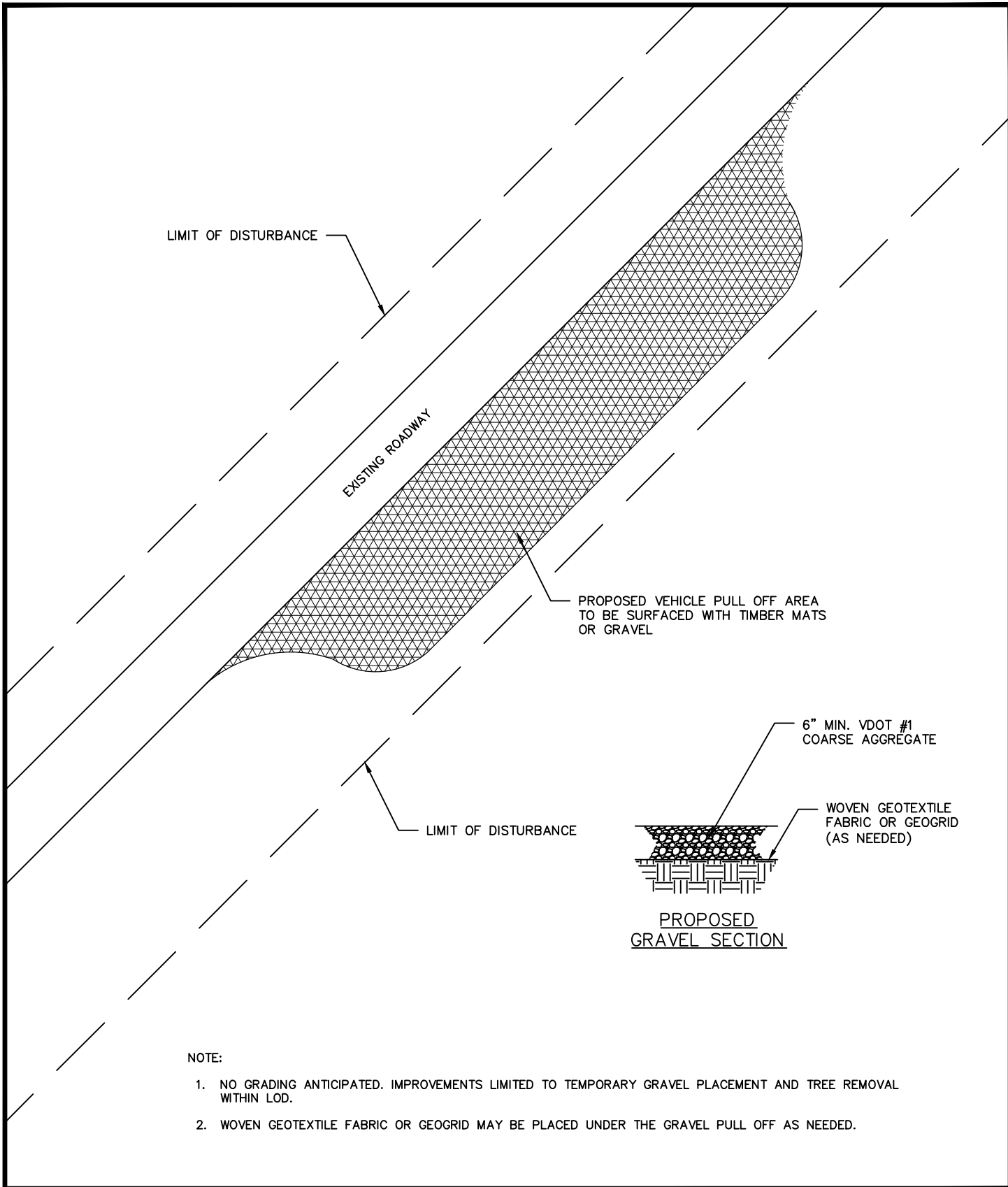


ENVIRONMENTAL DETAIL

TIMBER MAT BRIDGE
STREAM CROSSING

DRAWING NO.
MVP-SG-ES49

REV.
P1



NOTE:

1. NO GRADING ANTICIPATED. IMPROVEMENTS LIMITED TO TEMPORARY GRAVEL PLACEMENT AND TREE REMOVAL WITHIN LOD.
2. WOVEN GEOTEXTILE FABRIC OR GEOGRID MAY BE PLACED UNDER THE GRAVEL PULL OFF AS NEEDED.

DRAWN	TRC	DATE	8/7/2018
CHECKED	XXX	DATE	X/X/2018
APP'D	XXX	DATE	X/X/2018
SCALE	N.T.S.	SHEET	1 OF 1
JOB NO.			
PROJECT ID:			
H-650-TYP			



ENVIRONMENTAL DETAIL	
TEMPORARY VEHICLE PULL OFF DETAIL	
DRAWING NO.	REV.
MVP-SG-ES54	P1

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-C2

Plot Plans

**(Critical Energy/Electric Infrastructure Information, CUI//CEII
Provided Under Separate Cover)**

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Pittsylvania, VA	0.0	1000	VA-PI-001.000	0.72	Forest / Woodland	Materials
Pittsylvania, VA	0.1	1001	VA-PI-002.000	0.23	Forest / Woodland	Materials
Pittsylvania, VA	0.2	1003	VA-PI-002.000	0.23	Forest / Woodland	Materials
Pittsylvania, VA	0.3	1004	VA-PI-002.000	0.30	Forest / Woodland	Pipe
Pittsylvania, VA	0.3	1005	VA-PI-002.000	0.23	Forest / Woodland	Pipe
Pittsylvania, VA	0.3	1006	VA-PI-002.000	0.11	Agriculture	Mats
Pittsylvania, VA	0.3	1007	VA-PI-002.000	0.23	Agriculture	Materials
Pittsylvania, VA	0.5	1008	VA-PI-002.000	0.29	Forest / Woodland	Equipment
Pittsylvania, VA	0.6	1009	VA-PI-003.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	0.7	1010	VA-PI-003.000	1.02	Forest / Woodland	Mats
Pittsylvania, VA	0.8	1011	VA-PI-003.000	0.23	Open Land	Pumps
Pittsylvania, VA	0.9	1012	VA-PI-003.000	0.11	Open Land	Materials
Pittsylvania, VA	0.9	1013	VA-PI-005.000	0.50	Open Land	Boring Equip
Pittsylvania, VA	1.0	1014	VA-PI-005.000	0.74	Open Land	Boring Equip
Pittsylvania, VA	1.1	1015	VA-PI-006.000	0.22	Open Land	Boring Equip
Pittsylvania, VA	1.3	1016	VA-PI-008.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	1.4	1017	VA-PI-008.000	0.23	Open Land	Mats
Pittsylvania, VA	1.4	1018	VA-PI-009.000	0.30	Open Land	Mats
Pittsylvania, VA	1.5	1019	VA-PI-009.000	0.11	Open Land	Materials
Pittsylvania, VA	1.6	1020	VA-PI-009.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	1.7	1021	VA-PI-009.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	1.8	1022	VA-PI-010.000	0.46	Open Land	Mats
Pittsylvania, VA	1.9	1023	VA-PI-010.000	0.23	Open Land	Pumps
Pittsylvania, VA	1.9	1024	VA-PI-010.000	0.24	Open Land	Pumps
Pittsylvania, VA	2.3	1025	VA-PI-012.000	0.46	Open Land	Pipe
Pittsylvania, VA	3.0	1026	VA-PI-014.000	0.15	Open Land	Boring Equip
Pittsylvania, VA	3.0	1027	VA-PI-015.000	0.21	Agriculture	Boring Equip
Pittsylvania, VA	3.1	1028	VA-PI-014.000	0.06	Agriculture	Boring Equip
Pittsylvania, VA	3.2	1029	VA-PI-016.000	0.14	Agriculture	Boring Equip
Pittsylvania, VA	3.2	1030	VA-PI-018.000	0.06	Agriculture	Boring Equip
Pittsylvania, VA	3.4	1031	VA-PI-022.000	0.23	Open Land	Pumps
Pittsylvania, VA	3.5	1032	VA-PI-023.000	0.28	Open Land	Mats
Pittsylvania, VA	3.6	1033	VA-PI-023.000	0.12	Agriculture	Materials
Pittsylvania, VA	3.6	1034	VA-PI-023.000	0.08	Agriculture	Materials
Pittsylvania, VA	3.8	1035	VA-PI-023.000	0.23	Agriculture	Pumps
Pittsylvania, VA	3.8	1036	VA-PI-022.000	0.21	Agriculture	Pumps
Pittsylvania, VA	3.9	1037	VA-PI-022.000	0.17	Agriculture	Mats

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Pittsylvania, VA	4.2	1038	VA-PI-025.000	0.23	Agriculture	Pumps
Pittsylvania, VA	4.3	1039	VA-PI-025.000	0.23	Agriculture	Mats
Pittsylvania, VA	4.4	1040	VA-PI-026.000	0.23	Agriculture	Pumps
Pittsylvania, VA	4.4	1041	VA-PI-026.000	0.13	Agriculture	Boring Equip
Pittsylvania, VA	4.5	1042	VA-PI-030.000	0.08	Open Land	Boring Equip
Pittsylvania, VA	4.5	1043	VA-PI-031.000	0.19	Forest / Woodland	Boring Equip
Pittsylvania, VA	4.5	1044	VA-PI-030.001	0.21	Forest / Woodland	Boring Equip
Pittsylvania, VA	4.6	1045	VA-PI-032.000	0.35	Forest / Woodland	Boring Equip
Pittsylvania, VA	4.6	1046	VA-PI-032.000	0.44	Forest / Woodland	Boring Equip
Pittsylvania, VA	4.8	1047	VA-PI-033.000	1.04	Open Land	Mats
Pittsylvania, VA	5.0	1048	VA-PI-042.000	0.45	Forest / Woodland	Mats
Pittsylvania, VA	5.0	1049	VA-PI-032.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	5.2	1050	VA-PI-034.000	0.23	Forest / Woodland	Materials
Pittsylvania, VA	5.3	1051	VA-PI-034.000	0.60	Forest / Woodland	Equipment
Pittsylvania, VA	5.4	1052	VA-PI-034.000	0.27	Forest / Woodland	Boring Equip
Pittsylvania, VA	5.5	1053	VA-PI-035.000	0.51	Forest / Woodland	Boring Equip
Pittsylvania, VA	5.8	1054	VA-PI-036.000	0.69	Open Land	Pipe
Pittsylvania, VA	6.0	1055	VA-PI-036.000	1.06	Open Land	Pipe
Pittsylvania, VA	6.1	1056	VA-PI-036.000	0.39	Open Land, Forest / Woodland	Materials
Pittsylvania, VA	6.2	1057	VA-PI-036.000	0.32	Forest / Woodland	Pumps
Pittsylvania, VA	6.3	1058	VA-PI-036.000	0.27	Forest / Woodland	Materials
Pittsylvania, VA	6.4	1059	VA-PI-036.000	0.23	Forest / Woodland, Open	Pumps
Pittsylvania, VA	6.4	1060	VA-PI-036.000	0.28	Forest / Woodland	Materials
Pittsylvania, VA	6.4	1061	VA-PI-037.000	0.90	Open Land	Mats
Pittsylvania, VA	6.7	1062	VA-PI-037.000	0.23	Forest / Woodland	Materials
Pittsylvania, VA	6.9	1063	VA-PI-038.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	7.0	1064	VA-PI-038.000	0.25	Forest / Woodland	Mats
Pittsylvania, VA	7.1	1065	VA-PI-039.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	7.2	1066	VA-PI-039.000	0.32	Forest / Woodland	Pumps
Pittsylvania, VA	7.3	1067	VA-PI-040.000	1.20	Agriculture	Pipe
Pittsylvania, VA	7.4	1068	VA-PI-041.000	0.10	Forest / Woodland	Boring Equip
Pittsylvania, VA	7.6	1069	VA-PI-042.000	0.23	Forest / Woodland	Boring Equip
Pittsylvania, VA	7.6	1070	VA-PI-043.000	0.48	Open Land	Boring Equip
Pittsylvania, VA	7.8	1071	VA-PI-044.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	7.8	1072	VA-PI-044.000	0.23	Forest / Woodland	Mat
Pittsylvania, VA	7.9	1073	VA-PI-044.000	0.46	Open Land	Pipe
Pittsylvania, VA	8.1	1074	VA-PI-045.000	0.23	Open Land	Mats

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Pittsylvania, VA	8.2	1075	VA-PI-045.000	0.23	Open Land	Pumps
Pittsylvania, VA	8.3	1076	VA-PI-045.000	0.32	Open Land	Boring Equip
Pittsylvania, VA	8.3	1077	VA-PI-046.000	0.31	Open Land	Boring Equip
Pittsylvania, VA	8.4	1078	VA-PI-047.000	0.34	Open Land	Equipment
Pittsylvania, VA	8.6	1079	VA-PI-048.000	0.23	Open Land	Mats
Pittsylvania, VA	8.7	1080	VA-PI-048.000	0.61	Open Land	Pipe
Pittsylvania, VA	8.8	1081	VA-PI-048.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	9.1	1082	VA-PI-051.000	0.86	Open Land	Mats
Pittsylvania, VA	9.2	1083	VA-PI-051.000	0.23	Forest / Woodland	Equipment
Pittsylvania, VA	9.3	1084	VA-PI-052.000	0.32	Forest / Woodland	Pipe
Pittsylvania, VA	9.5	1085	VA-PI-052.000	0.36	Agriculture	Boring Equip
Pittsylvania, VA	9.6	1086	VA-PI-053.000	0.17	Open Land	Boring Equip
Pittsylvania, VA	9.6	1087	VA-PI-053.000	0.06	Open Land	Materials
Pittsylvania, VA	9.8	1088	VA-PI-053.000	0.24	Agriculture	Materials
Pittsylvania, VA	10.0	1089	VA-PI-053.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	10.1	1090	VA-PI-053.000	0.37	Forest / Woodland	Mats
Pittsylvania, VA	10.2	1091	VA-PI-055.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	10.2	1092	VA-PI-055.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	10.5	1093	VA-PI-061.000	0.80	Open Land	Boring Equip
Pittsylvania, VA	10.9	1094	VA-PI-075.000	0.24	Open Land	Boring Equip
Pittsylvania, VA	10.9	1095	VA-PI-075.000	0.74	Open Land	Materials
Pittsylvania, VA	11.3	1096	VA-PI-075.000	1.08	Open Land	Equipment
Pittsylvania, VA	11.4	1097	VA-PI-076.000	0.23	Forest / Woodland	Equipment
Pittsylvania, VA	11.5	1098	VA-PI-076.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	11.7	1099	VA-PI-076.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	11.8	1100	VA-PI-077.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	12.0	1101	VA-PI-077.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	12.0	1102	VA-PI-077.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	12.1	1103	VA-PI-077.000	0.57	Open Land	Pipe
Pittsylvania, VA	12.3	1104	VA-PI-079.000	0.34	Forest / Woodland	Materials
Pittsylvania, VA	12.4	1105	VA-PI-079.000	0.41	Agriculture	Boring Equip
Pittsylvania, VA	12.5	1106	VA-PI-082.000	0.52	Agriculture	Boring Equip
Pittsylvania, VA	12.7	1107	VA-PI-082.000	1.19	Agriculture	Equipment
Pittsylvania, VA	12.8	1108	VA-PI-082.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	12.9	1109	VA-PI-084.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	13.1	1110	VA-PI-084.000	0.52	Open Land	Equipment
Pittsylvania, VA	13.4	1111	VA-PI-085.000	0.26	Open Land	Equipment

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Pittsylvania, VA	13.5	1112	VA-PI-087.000	0.44	Open Land	Boring Equip
Pittsylvania, VA	13.5	1113	VA-PI-089.000	0.28	Forest / Woodland	Boring Equip
Pittsylvania, VA	13.6	1114	VA-PI-090.000	0.20	Forest / Woodland	Pumps
Pittsylvania, VA	13.8	1115	VA-PI-091.000	0.73	Forest / Woodland	Equipment
Pittsylvania, VA	14.2	1116	VA-PI-092.000	0.66	Open Land	Mats
Pittsylvania, VA	14.3	1117	VA-PI-094.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	14.4	1118	VA-PI-094.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	14.9	1119	VA-PI-096.000	0.19	Open Land	Boring Equip
Pittsylvania, VA	15.0	1120	VA-PI-099.000	0.54	Agriculture	Materials
Pittsylvania, VA	15.5	1121	VA-PI-099.000	0.26	Agriculture	Materials
Pittsylvania, VA	15.7	1122	VA-PI-101.000	0.23	Open Land	Materials
Pittsylvania, VA	15.8	1123	VA-PI-102.000	0.22	Forest / Woodland	Pumps
Pittsylvania, VA	15.9	1124	VA-PI-102.000	1.02	Open Land	Pipe
Pittsylvania, VA	16.1	1125	VA-PI-103.000	0.04	Forest / Woodland	Boring Equip
Pittsylvania, VA	16.1	1126	VA-PI-106.000	0.25	Forest / Woodland	Boring Equip
Pittsylvania, VA	16.2	1127	VA-PI-106.000	0.50	Agriculture	Materials
Pittsylvania, VA	16.3	1128	VA-PI-106.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	16.3	1129	VA-PI-106.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	16.5	1130	VA-PI-111.000	0.10	Agriculture	Boring Equip
Pittsylvania, VA	16.6	1131	VA-PI-115.000	0.14	Forest / Woodland	Boring Equip
Pittsylvania, VA	16.8	1132	VA-PI-115.000	0.34	Agriculture	Mats
Pittsylvania, VA	17.0	1133	VA-PI-115.000	0.17	Agriculture	Materials
Pittsylvania, VA	17.0	1134	VA-PI-115.000	0.25	Agriculture	Equipment
Pittsylvania, VA	17.4	1135	VA-PI-118.000	0.69	Open Land	Pipe
Pittsylvania, VA	17.4	1136	VA-PI-118.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	17.5	1137	VA-PI-118.000	0.12	Open Land	Materials
Pittsylvania, VA	17.8	1138	VA-PI-119.000	0.52	Forest / Woodland	Mats
Pittsylvania, VA	17.9	1139	VA-PI-121.000	0.46	Forest / Woodland	Pumps
Pittsylvania, VA	18.1	1140	VA-PI-121.000	0.36	Forest / Woodland	Materials
Pittsylvania, VA	18.2	1141	VA-PI-121.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	18.3	1142	VA-PI-121.000	0.89	Open Land	Boring Equip
Pittsylvania, VA	18.4	1143	VA-PI-124.000	0.34	Agriculture	Boring Equip
Pittsylvania, VA	18.8	1144	VA-PI-128.000	0.46	Residential	Materials
Pittsylvania, VA	19.1	1145	VA-PI-128.000	0.29	Open Land	Boring Equip
Pittsylvania, VA	19.1	1146	VA-PI-130.000.ABU	0.47	Agriculture	Boring Equip
Pittsylvania, VA	19.4	1147	VA-PI-135.000	0.21	Agriculture	Boring Equip
Pittsylvania, VA	19.8	1148	VA-PI-144.000	0.23	Forest / Woodland	Mats

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Pittsylvania, VA	19.9	1149	VA-PI-149.000	0.23	Forest / Woodland	Materials
Pittsylvania, VA	19.9	1150	VA-PI-150.100	2.19	Open Land	HDD
Pittsylvania, VA	20.0	1151	VA-PI-151.000	0.24	Forest / Woodland	Materials
Pittsylvania, VA	20.0	1152	VA-PI-152.000	0.24	Open Land	Materials
Pittsylvania, VA	20.2	1153	VA-PI-152.000	0.13	Open Land	Materials
Pittsylvania, VA	20.3	1154	VA-PI-156.000	0.18	Residential	Equipment
Pittsylvania, VA	20.3	1155	VA-PI-156.000	0.18	Residential	Equipment
Pittsylvania, VA	20.4	1156	VA-PI-158.000	0.06	Open Land	Materials
Pittsylvania, VA	20.4	1157	VA-PI-158.000	0.07	Open Land	Materials
Pittsylvania, VA	20.5	1158	VA-PI-160.000	0.23	Agriculture	Equipment
Pittsylvania, VA	20.5	1159	VA-PI-160.000	0.16	Agriculture	Pumps
Pittsylvania, VA	20.6	1160	VA-PI-160.000	0.69	Open Land	Pipe
Pittsylvania, VA	20.7	1161	VA-PI-160.000	0.23	Agriculture	Materials
Pittsylvania, VA	20.8	1162	VA-PI-160.000	0.23	Open Land	Pumps
Pittsylvania, VA	21.1	1163	VA-PI-162.000	0.23	Agriculture	Materials
Pittsylvania, VA	21.2	1164	VA-PI-162.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	21.3	1165	VA-PI-164.000	0.34	Forest / Woodland	Mats
Pittsylvania, VA	21.4	1166	VA-PI-163.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	21.8	1167	VA-PI-165.000	0.11	Forest / Woodland	Materials
Pittsylvania, VA	21.8	1168	VA-PI-165.000	0.88	Open Land	Mats
Pittsylvania, VA	22.2	1169	VA-PI-169.000	0.07	Residential	Boring Equip
Pittsylvania, VA	22.2	1170	VA-PI-171.000	0.50	Forest / Woodland	Boring Equip
Pittsylvania, VA	22.5	1171	VA-PI-173.000	0.11	Forest / Woodland	Materials
Pittsylvania, VA	22.5	1172	VA-PI-173.000	0.25	Forest / Woodland	Materials
Pittsylvania, VA	22.6	1173	VA-PI-173.000	0.11	Forest / Woodland	Equipment
Pittsylvania, VA	22.6	1174	VA-PI-173.000	0.20	Forest / Woodland	Equipment
Pittsylvania, VA	22.7	1175	VA-PI-173.000	0.34	Open Land	Pipe
Pittsylvania, VA	22.9	1176	VA-PI-173.000	0.34	Forest / Woodland	Equipment
Pittsylvania, VA	23.1	1177	VA-PI-174.000	0.23	Forest / Woodland	Materials
Pittsylvania, VA	23.1	1178	VA-PI-174.000	0.21	Forest / Woodland	Mats
Pittsylvania, VA	23.2	1179	VA-PI-174.000	0.33	Forest / Woodland	Pumps
Pittsylvania, VA	23.3	1180	VA-PI-174.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	23.4	1181	VA-PI-174.000	0.28	Forest / Woodland	Equipment
Pittsylvania, VA	23.6	1182	VA-PI-175.000	0.46	Forest / Woodland	Materials
Pittsylvania, VA	23.6	1183	VA-PI-175.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	23.7	1184	VA-PI-175.000	0.23	Forest / Woodland	Materials
Pittsylvania, VA	23.8	1185	VA-PI-175.000	0.52	Forest / Woodland	Boring Equip

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Pittsylvania, VA	23.9	1186	VA-PI-178.000	0.45	Forest / Woodland	Boring Equip
Pittsylvania, VA	24.0	1187	VA-PI-178.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	24.0	1188	VA-PI-178.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	24.1	1189	VA-PI-178.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	24.2	1190	VA-PI-178.000	0.67	Forest / Woodland	Pipe
Pittsylvania, VA	24.5	1191	VA-PI-178.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	24.5	1192	VA-PI-178.000	0.26	Forest / Woodland	Equipment
Pittsylvania, VA	24.8	1193	VA-PI-178.000	0.94	Forest / Woodland	Equipment
Pittsylvania, VA	24.9	1194	VA-PI-178.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	25.0	1195	VA-PI-179.000	1.03	Open Land, Forest / Woodland	Pipe
Pittsylvania, VA	25.1	1196	VA-PI-179.000	0.48	Forest / Woodland	Boring Equip
Pittsylvania, VA	25.1	1197	VA-PI-180.000	0.45	Forest / Woodland	Boring Equip
Pittsylvania, VA	25.2	1198	VA-PI-180.000	0.15	Open Land	Equipment
Pittsylvania, VA	25.3	1199	VA-PI-180.000	0.23	Forest / Woodland	Pumps
Pittsylvania, VA	25.3	1200	VA-PI-180.000	0.23	Forest / Woodland	Equipment
Pittsylvania, VA	25.8	1201	VA-PI-180.000	0.23	Open Land	Pumps
Pittsylvania, VA	25.9	1202	VA-PI-180.000	0.23	Forest / Woodland	Equipment
Pittsylvania, VA	26.0	1203	VA-PI-180.000	0.23	Forest / Woodland	Mats
Pittsylvania, VA	26.0	1204	VA-PI-180.000	0.23	Forest / Woodland	Equipment
Pittsylvania, VA	26.1	1205	VA-PI-180.000	0.46	Forest / Woodland	Materials
Rockingham, NC	26.4	1206	NC-RO-001.000	0.53	Forest / Woodland	Boring Equip
Rockingham, NC	26.4	1207	NC-RO-002.000	0.37	Forest / Woodland	Materials
Rockingham, NC	26.6	1208	NC-RO-002.000	0.23	Forest / Woodland	Boring Equip
Rockingham, NC	26.7	1209	NC-RO-004.000	0.29	Open Land	Boring Equip
Rockingham, NC	26.8	1210	NC-RO-004.000	0.23	Open Land	Mats
Rockingham, NC	26.9	1211	NC-RO-004.000	1.25	Open Land	Pipe
Rockingham, NC	27.1	1212	NC-RO-004.000	0.13	Forest / Woodland	Boring Equip
Rockingham, NC	27.1	1213	NC-RO-005.000	0.10	Open Land	Boring Equip
Rockingham, NC	27.2	1214	NC-RO-005.000	0.11	Open Land	Materials
Rockingham, NC	27.2	1215	NC-RO-005.000	0.28	Open Land	Mats
Rockingham, NC	27.6	1218	NC-RO-005.000	0.17	Forest / Woodland	Mats
Rockingham, NC	27.7	1222	NC-RO-006.000	0.23	Forest / Woodland	Equipment
Rockingham, NC	27.9	1224	NC-RO-006.000	1.03	Agriculture	Pipe
Rockingham, NC	28.1	1225	NC-RO-006.000	0.17	Silviculture	Mats
Rockingham, NC	28.1	1226	NC-RO-006.000	0.21	Agriculture	Pumps
Rockingham, NC	28.2	1227	NC-RO-006.000	0.17	Open Land	Boring Equip
Rockingham, NC	28.3	1228	NC-RO-006.000	0.23	Open Land	Boring Equip

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Rockingham, NC	28.4	1229	NC-RO-006.000	0.40	Open Land	Mats
Rockingham, NC	28.4	1230	NC-RO-006.000	1.20	Open Land	Equipment
Rockingham, NC	28.6	1231	NC-RO-006.000	0.23	Open Land	Materials
Rockingham, NC	28.7	1232	NC-RO-006.000	0.92	Forest / Woodland	Mats / Materials
Rockingham, NC	28.7	1233	NC-RO-006.000	0.46	Forest / Woodland	Materials
Rockingham, NC	28.8	1234	NC-RO-007.000	0.23	Forest / Woodland	Materials
Rockingham, NC	28.9	1235	NC-RO-007.000	0.23	Open Land	Mats
Rockingham, NC	29.0	1236	NC-RO-007.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	29.2	1237	NC-RO-007.000	0.23	Forest / Woodland	Mats
Rockingham, NC	29.3	1239	NC-RO-007.000	0.47	Open Land, Forest / Woodland	Mats / Materials
Rockingham, NC	29.2	1238	NC-RO-007.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	29.3	1240	NC-RO-007.000	0.46	Forest / Woodland, Open Land	Equipment
Rockingham, NC	29.7	1241	NC-RO-007.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	29.7	1242	NC-RO-007.000	0.46	Open, Forest / Woodland	Mats
Rockingham, NC	29.7	1243	NC-RO-007.000	0.23	Agriculture	Materials
Rockingham, NC	29.8	1244	NC-RO-007.000	0.23	Agriculture	Materials
Rockingham, NC	30.0	1245	NC-RO-011.000	0.23	Open Land	Mats / Materials
Rockingham, NC	30.1	1246	NC-RO-011.000	0.92	Open Land	Boring Equip
Rockingham, NC	30.1	1247	NC-RO-011.000	0.69	Agriculture	Boring Equip
Rockingham, NC	30.3	1248	NC-RO-013.000	1.38	Agriculture	Boring Equip
Rockingham, NC	30.5	1249	NC-RO-014.000	0.19	Agriculture	Boring Equip
Rockingham, NC	30.5	1250	NC-RO-016.000	0.23	Open Land	Mats
Rockingham, NC	30.5	1251	NC-RO-016.000	0.31	Open Land	Mats
Rockingham, NC	30.6	1252	NC-RO-019.000	0.12	Open Land	Boring Equip
Rockingham, NC	30.8	1253	NC-RO-022.000	0.23	Open Land	Mats / Materials
Rockingham, NC	30.9	1254	NC-RO-022.000	0.23	Open Land	Materials
Rockingham, NC	31.0	1255	NC-RO-022.000	0.23	Forest / Woodland	Materials
Rockingham, NC	31.1	1256	NC-RO-022.000	0.23	Forest / Woodland	Materials
Rockingham, NC	31.2	1257	NC-RO-025.000	0.23	Forest / Woodland	Materials
Rockingham, NC	31.3	1258	NC-RO-025.000	0.74	Open Land	Equipment
Rockingham, NC	31.3	1259	NC-RO-025.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	31.4	1260	NC-RO-027.000	0.23	Forest / Woodland	Mats
Rockingham, NC	31.7	1261	NC-RO-033.000	0.63	Open Land	Boring Equip
Rockingham, NC	31.9	1262	NC-RO-034.000	0.23	Forest / Woodland	Equipment
Rockingham, NC	32.1	1263	NC-RO-035.000	0.23	Open Land	Mats
Rockingham, NC	32.2	1264	NC-RO-037.000	0.18	Forest / Woodland	Materials

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Rockingham, NC	32.2	1265	NC-RO-037.000	0.26	Forest / Woodland	Equipment
Rockingham, NC	32.4	1266	NC-RO-038.000	0.23	Open Land	Mats / Materials
Rockingham, NC	32.5	1267	NC-RO-038.000	0.26	Open Land	Materials
Rockingham, NC	32.6	1268	NC-RO-038.000	0.34	Open Land	Equipment
Rockingham, NC	32.7	1269	NC-RO-038.000	0.23	Open Land	Mats
Rockingham, NC	32.8	1270	NC-RO-039.000	0.93	Forest / Woodland	Equipment / Pipe
Rockingham, NC	32.9	1271	NC-RO-040.000	0.27	Forest / Woodland	Mats
Rockingham, NC	32.9	1272	NC-RO-039.000	0.37	Forest / Woodland	Materials
Rockingham, NC	33.0	1273	NC-RO-040.000	0.23	Forest / Woodland	Materials
Rockingham, NC	33.0	1274	NC-RO-040.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	33.2	1275	NC-RO-041.000	0.23	Open Land	Mats
Rockingham, NC	33.2	1276	NC-RO-041.000	0.31	Open Land	Boring Equip
Rockingham, NC	33.3	1277	NC-RO-041.000	0.25	Open Land	Boring Equip
Rockingham, NC	33.3	1278	NC-RO-042.000	0.25	Forest / Woodland	Boring Equip
Rockingham, NC	33.4	1279	NC-RO-042.000	0.23	Forest / Woodland	Mats
Rockingham, NC	33.4	1280	NC-RO-042.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	33.6	1281	NC-RO-044.000	0.23	Forest / Woodland	Materials
Rockingham, NC	33.7	1282	NC-RO-044.000	0.46	Forest / Woodland	Pipe
Rockingham, NC	33.8	1283	NC-RO-042.000	0.23	Forest / Woodland	Mats
Rockingham, NC	33.9	1284	NC-RO-042.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	34.0	1285	NC-RO-045.000	0.23	Forest / Woodland	Materials
Rockingham, NC	34.0	1286	NC-RO-045.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	34.2	1287	NC-RO-045.000	0.46	Open Land	Equipment
Rockingham, NC	34.3	1288	NC-RO-047.000	0.23	Forest / Woodland	Materials
Rockingham, NC	34.3	1289	NC-RO-047.000	0.37	Open Land	Equipment
Rockingham, NC	34.6	1290	NC-RO-051.000	0.23	Forest / Woodland	Materials
Rockingham, NC	34.6	1291	NC-RO-051.000	0.23	Forest / Woodland	Materials
Rockingham, NC	34.7	1292	NC-RO-053.000	0.23	Open Land	Materials
Rockingham, NC	34.8	1293	NC-RO-054.000	0.23	Forest / Woodland	Pipe
Rockingham, NC	34.8	1294	NC-RO-054.000	0.23	Forest / Woodland	Pipe
Rockingham, NC	34.8	1295	NC-RO-054.000	0.23	Open Land	Materials
Rockingham, NC	34.9	1296	NC-RO-054.000	0.23	Forest / Woodland	Mats
Rockingham, NC	35.1	1297	NC-RO-054.000	0.23	Forest / Woodland	Materials
Rockingham, NC	35.2	1298	NC-RO-057.000	0.23	Forest / Woodland	Materials
Rockingham, NC	35.4	1299	NC-RO-057.000	0.46	Open Land	Equipment
Rockingham, NC	35.5	1300	NC-RO-057.000	0.39	Open Land	Pipe
Rockingham, NC	35.7	1301	NC-RO-058.000	0.40	Agriculture	Equipment

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Rockingham, NC	36.0	1302	NC-RO-058.000	0.40	Forest / Woodland	Equipment
Rockingham, NC	36.0	1303	NC-RO-058.000	0.40	Forest / Woodland	Pipe
Rockingham, NC	36.1	1304	NC-RO-061.000	0.23	Forest / Woodland	Mats
Rockingham, NC	36.2	1305	NC-RO-061.000	0.46	Open Land	Materials
Rockingham, NC	36.3	1306	NC-RO-061.000	0.25	Agriculture	Materials
Rockingham, NC	36.3	1307	NC-RO-061.000	0.24	Agriculture	Boring Equip
Rockingham, NC	36.4	1308	NC-RO-063.000	0.25	Agriculture	Materials
Rockingham, NC	36.4	1309	NC-RO-062.000	0.24	Forest / Woodland	Boring Equip
Rockingham, NC	36.4	1310	NC-RO-063.000	0.40	Forest / Woodland	Equipment
Rockingham, NC	36.7	1311	NC-RO-063.000	0.24	Open Land	Boring Equip
Rockingham, NC	36.7	1312	NC-RO-063.000	0.24	Open Land	Boring Equip
Rockingham, NC	36.7	1313	NC-RO-067.000.ABU	0.13	Residential	Boring Equip
Rockingham, NC	36.8	1314	NC-RO-066.000	0.06	Forest / Woodland	Equipment
Rockingham, NC	36.8	1315	NC-RO-068.000	0.38	Forest / Woodland	Pipe
Rockingham, NC	36.9	1316	NC-RO-068.000	0.23	Agriculture	Materials
Rockingham, NC	37.2	1317	NC-RO-069.000	0.46	Open Land	Equipment
Rockingham, NC	37.2	1318	NC-RO-072.000	0.23	Forest / Woodland	Materials
Rockingham, NC	37.3	1319	NC-RO-072.000	0.23	Forest / Woodland	Mats
Rockingham, NC	37.3	1320	NC-RO-072.000	0.23	Forest / Woodland	Materials
Rockingham, NC	37.4	1321	NC-RO-073.000	0.23	Forest / Woodland	Mats
Rockingham, NC	37.5	1322	NC-RO-074.000	0.13	Forest / Woodland	Materials
Rockingham, NC	37.5	1323	NC-RO-075.000	0.04	Open Land	Materials
Rockingham, NC	37.7	1324	NC-RO-077.000	0.89	Open Land	Pipe
Rockingham, NC	37.8	1325	NC-RO-079.000	0.23	Forest / Woodland	Mats
Rockingham, NC	37.9	1326	NC-RO-080.000	0.44	Forest / Woodland	Equipment
Rockingham, NC	38.0	1327	NC-RO-084.000	0.38	Forest / Woodland	Equipment
Rockingham, NC	38.1	1328	NC-RO-085.000	0.46	Open Land	Materials
Rockingham, NC	38.2	1329	NC-RO-086.000	0.29	Open Land	Equipment
Rockingham, NC	38.3	1330	NC-RO-087.000	0.23	Forest / Woodland	Mats
Rockingham, NC	38.4	1331	NC-RO-088.000	0.26	Forest / Woodland	Equipment
Rockingham, NC	38.4	1332	NC-RO-089.000	0.23	Forest / Woodland	Mats
Rockingham, NC	38.6	1333	NC-RO-089.000	0.23	Forest / Woodland	Materials
Rockingham, NC	38.6	1334	NC-RO-089.000	0.38	Forest / Woodland	Mats / Materials
Rockingham, NC	38.9	1335	NC-RO-090.000	0.33	Forest / Woodland	Boring Equip
Rockingham, NC	38.9	1336	NC-RO-090.000	0.45	Forest / Woodland	Equipment
Rockingham, NC	38.9	1337	NC-RO-091.000	0.25	Forest / Woodland	Boring Equip
Rockingham, NC	39.0	1338	NC-RO-091.000	0.56	Forest / Woodland	Materials

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Rockingham, NC	39.0	1339	NC-RO-091.000	0.23	Forest / Woodland	Materials
Rockingham, NC	39.1	1340	NC-RO-091.000	0.23	Forest / Woodland	Materials
Rockingham, NC	39.2	1341	NC-RO-092.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	39.2	1342	NC-RO-092.000	0.18	Forest / Woodland	Mats
Rockingham, NC	39.4	1343	NC-RO-094.000	0.45	Agriculture	Mats / Materials
Rockingham, NC	39.7	1344	NC-RO-095.000	0.62	Open Land	Materials
Rockingham, NC	39.7	1345	NC-RO-095.000	0.23	Forest / Woodland	Boring Equip
Rockingham, NC	39.8	1346	NC-RO-100.000	0.18	Forest / Woodland	Boring Equip
Rockingham, NC	39.8	1347	NC-RO-100.000	0.72	Open Land	Equipment
Rockingham, NC	39.9	1348	NC-RO-100.000	0.39	Forested	Equipment
Rockingham, NC	40.0	1349	NC-RO-099.000.AR	0.70	Open Land	Materials
Rockingham, NC	40.2	1350	NC-RO-101.000	0.23	Forest / Woodland	Mats
Rockingham, NC	40.3	1351	NC-RO-101.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	40.3	1352	NC-RO-101.000	0.23	Forest / Woodland	Materials
Rockingham, NC	40.4	1353	NC-RO-103.000	0.11	Residential	Boring Equip
Rockingham, NC	40.4	1354	NC-RO-105.000	0.45	Forest / Woodland	Boring Equip
Rockingham, NC	40.6	1355	NC-RO-106.000	0.50	Agriculture	Pipe
Rockingham, NC	40.6	1356	NC-RO-108.000	0.23	Forest / Woodland	Materials
Rockingham, NC	40.7	1357	NC-RO-108.000	0.23	Forest / Woodland	Mats
Rockingham, NC	40.7	1358	NC-RO-108.000	0.23	Forest / Woodland	Materials
Rockingham, NC	40.8	1359	NC-RO-109.000	0.50	Forest / Woodland	Equipment
Rockingham, NC	40.8	1360	NC-RO-109.000	0.23	Forest / Woodland	Mats
Rockingham, NC	40.9	1361	NC-RO-109.000	0.20	Forest / Woodland	Pumps
Rockingham, NC	40.9	1362	NC-RO-109.000	0.40	Forest / Woodland	Equipment
Rockingham, NC	41.0	1363	NC-RO-109.000	0.34	Open Land	Materials
Rockingham, NC	41.2	1364	NC-RO-110.000	0.46	Forest / Woodland	Equipment
Rockingham, NC	41.3	1365	NC-RO-111.000	0.23	Open Land	Materials
Rockingham, NC	41.3	1366	NC-RO-111.000	0.18	Forest / Woodland	Materials
Rockingham, NC	41.5	1367	NC-RO-111.000	0.85	Forest / Woodland	Pipe
Rockingham, NC	41.7	1368	NC-RO-111.000	0.28	Forest / Woodland	Boring Equip
Rockingham, NC	41.7	1369	NC-RO-112.000	0.20	Open Land	Boring Equip
Rockingham, NC	41.8	1370	NC-RO-112.000	0.18	Open Land	Boring Equip
Rockingham, NC	41.8	1371	NC-RO-112.000	0.79	Open Land	Boring Equip
Rockingham, NC	41.9	1372	NC-RO-112.000	0.23	Open Land	Boring Equip
Rockingham, NC	41.9	1373	NC-RO-113.000	0.23	Forest / Woodland	Materials
Rockingham, NC	42.0	1374	NC-RO-113.000	0.39	Forest / Woodland	Equipment
Rockingham, NC	42.1	1375	NC-RO-112.000	0.20	Open Land	Materials

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Rockingham, NC	42.2	1376	NC-RO-112.000	0.59	Open Land	Boring Equip
Rockingham, NC	42.2	1377	NC-RO-112.200	0.17	Forest / Woodland	Boring Equip
Rockingham, NC	42.3	1378	NC-RO-112.200	0.15	Forest / Woodland	Equipment
Rockingham, NC	42.5	1379	NC-RO-117.000	0.26	Open Land	Materials
Rockingham, NC	42.5	1380	NC-RO-117.000	0.52	Forest / Woodland	Materials
Rockingham, NC	42.6	1381	NC-RO-117.000	0.37	Open Land	Equipment
Rockingham, NC	42.8	1382	NC-RO-117.000	0.88	Forest / Woodland	Pipe
Rockingham, NC	43.1	1383	NC-RO-117.000	0.23	Open Land	Materials
Rockingham, NC	43.1	1384	NC-RO-117.000	0.66	Forest / Woodland	Boring Equip
Rockingham, NC	43.2	1385	NC-RO-122.000	0.59	Forest / Woodland	Boring Equip
Rockingham, NC	43.3	1386	NC-RO-122.000	0.46	Forest / Woodland	Pipe
Rockingham, NC	43.3	1387	NC-RO-122.000	0.14	Open Land	Materials
Rockingham, NC	43.4	1388	NC-RO-122.000	0.23	Forest / Woodland	Equipment
Rockingham, NC	43.4	1389	NC-RO-122.000	0.23	Forest / Woodland	Materials
Rockingham, NC	43.5	1390	NC-RO-122.000	0.27	Forest / Woodland	Equipment
Rockingham, NC	43.5	1391	NC-RO-122.000	0.23	Forest / Woodland	Boring Equip
Rockingham, NC	43.5	1392	NC-RO-122.100	0.50	Open Land	Boring Equip
Rockingham, NC	43.5	1393	NC-RO-122.100	0.26	Forest / Woodland	Materials
Rockingham, NC	43.7	1394	NC-RO-126.000	0.23	Forest / Woodland	Materials
Rockingham, NC	43.8	1395	NC-RO-133.200	0.23	Forest / Woodland	Materials
Rockingham, NC	43.9	1396	NC-RO-133.200	0.23	Forest / Woodland	Materials
Rockingham, NC	44.0	1397	NC-RO-133.200	0.40	Open Land	Equipment
Rockingham, NC	44.0	1398	NC-RO-133.000	0.11	Open Land	Materials
Rockingham, NC	44.0	1399	NC-RO-133.000	0.17	Open Land	Materials
Rockingham, NC	44.1	1400	NC-RO-133.000	0.17	Open Land	Materials
Rockingham, NC	44.1	1401	NC-RO-133.000	0.23	Open Land	Equipment
Rockingham, NC	44.2	1402	NC-RO-133.000	0.23	Forest / Woodland	Equipment
Rockingham, NC	44.2	1403	NC-RO-133.000	0.25	Open Land	Pumps / Mats
Rockingham, NC	44.3	1404	NC-RO-133.000	0.46	Open Land	Pipe
Rockingham, NC	44.5	1405	NC-RO-136.000	0.08	Agriculture	Materials
Rockingham, NC	44.5	1406	NC-RO-136.000	0.51	Agriculture	Materials
Rockingham, NC	44.5	1407	NC-RO-136.000	0.11	Agriculture	Materials
Rockingham, NC	44.9	1408	NC-RO-138.000	0.42	Agriculture	Materials
Rockingham, NC	44.9	1409	NC-RO-138.000	0.09	Agriculture	Bore Equipment
Rockingham, NC	45.0	1410	NC-RO-138.000	0.59	Agriculture	Bore Equipment
Rockingham, NC	45.0	1411	NC-RO-139.000	0.44	Agriculture	Bore Equipment
Rockingham, NC	45.0	1412	NC-RO-139.000	0.15	Agriculture	Bore Equipment

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Rockingham, NC	45.0	1413	NC-RO-139.000	0.11	Agriculture	Materials
Rockingham, NC	45.3	1414	NC-RO-139.000	0.51	Agriculture	Materials
Rockingham, NC	45.7	1415	NC-RO-140.000	0.23	Forest / Woodland	Materials
Rockingham, NC	45.8	1416	NC-RO-142.000	0.46	Open Land	Materials
Rockingham, NC	45.8	1417	NC-RO-142.000	0.70	Open Land	Materials
Rockingham, NC	45.9	1418	NC-RO-142.000	0.23	Forest / Woodland	Mats
Rockingham, NC	45.9	1419	NC-RO-142.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	46.2	1420	NC-RO-143.000	0.46	Agriculture	Materials
Rockingham, NC	46.4	1421	NC-RO-143.000	0.39	Open Land	Materials
Rockingham, NC	46.5	1422	NC-RO-146.100	0.23	Forest / Woodland	Mats
Rockingham, NC	46.5	1423	NC-RO-146.100	0.38	Forest / Woodland	Materials
Rockingham, NC	46.5	1424	NC-RO-146.100	0.23	Forest / Woodland	Pumps
Rockingham, NC	46.7	1425	NC-RO-146.100	0.23	Open Land	Materials
Rockingham, NC	46.8	1426	NC-RO-148.500	0.76	Open Land	Materials
Rockingham, NC	47.0	1427	NC-RO-148.500	0.23	Forest / Woodland	Pumps
Rockingham, NC	47.0	1428	NC-RO-148.500	0.23	Forest / Woodland	Mats
Rockingham, NC	47.1	1429	NC-RO-149.000	0.46	Open Land	Pumps
Rockingham, NC	47.1	1430	NC-RO-149.000	0.46	Open Land	Mats
Rockingham, NC	47.2	1431	NC-RO-149.000	0.76	Open Land	Materials
Rockingham, NC	47.4	1432	NC-RO-149.100	0.42	Forest / Woodland	Materials
Rockingham, NC	47.4	1433	NC-RO-153.000	0.06	Forest / Woodland	Pumps
Rockingham, NC	47.5	1434	NC-RO-153.000	0.06	Forest / Woodland	Mats
Rockingham, NC	47.6	1435	NC-RO-154.000	0.23	Forest / Woodland	Mats
Rockingham, NC	47.7	1436	NC-RO-154.000	0.56	Forest / Woodland	Materials
Rockingham, NC	47.7	1437	NC-RO-154.000	0.58	Forest / Woodland	Materials
Rockingham, NC	47.8	1438	NC-RO-154.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	47.9	1439	NC-RO-155.000	0.06	Forest / Woodland	Materials
Rockingham, NC	47.9	1440	NC-RO-155.000	0.57	Forest / Woodland	Materials
Rockingham, NC	48.0	1441	NC-RO-155.000	0.06	Forest / Woodland	Materials
Rockingham, NC	48.0	1442	NC-RO-155.000	0.40	Forest / Woodland	Materials
Rockingham, NC	48.3	1443	NC-RO-156.000	1.52	Agriculture	Materials
Rockingham, NC	48.5	1444	NC-RO-157.000	0.46	Agriculture	Bore Equipment
Rockingham, NC	48.5	1445	NC-RO-156.000	0.26	Forest / Woodland	Bore Equipment
Rockingham, NC	48.5	1446	NC-RO-160.000	0.26	Agriculture	Bore Equipment
Rockingham, NC	48.6	1447	NC-RO-160.000	0.23	Agriculture	Materials
Rockingham, NC	48.7	1448	NC-RO-162.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	48.7	1449	NC-RO-162.000	0.35	Forest / Woodland	Mats

Appendix 1-D						
Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project						
County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Rockingham, NC	48.8	1450	NC-RO-162.000	0.23	Forest / Woodland	Materials
Rockingham, NC	49.2	1451	NC-RO-162.000	0.26	Forest / Woodland	Bore Equipment
Rockingham, NC	49.2	1452	NC-RO-165.000	0.47	Open Land	Bore Equipment
Rockingham, NC	49.3	1453	NC-RO-165.000	0.23	Open Land	Mats
Rockingham, NC	49.3	1454	NC-RO-165.000	0.31	Forest / Woodland	Mats
Rockingham, NC	49.4	1455	NC-RO-165.000	0.23	Open Land	Pumps
Rockingham, NC	49.6	1456	NC-RO-168.000	0.36	Open Land	Bore Equipment
Rockingham, NC	49.6	1457	NC-RO-169.000	0.23	Forest / Woodland	Bore Equipment
Rockingham, NC	49.7	1458	NC-RO-169.000	0.39	Forest / Woodland	Materials
Rockingham, NC	49.8	1459	NC-RO-170.000	0.39	Forest / Woodland	Materials
Rockingham, NC	49.8	1460	NC-RO-171.000	0.32	Open Land, Forest / Woodland	Materials
Rockingham, NC	49.9	1461	NC-RO-171.000	0.23	Forest / Woodland	Pumps
Rockingham, NC	50.0	1462	NC-RO-173.000	0.23	Forest / Woodland	Mats
Rockingham, NC	50.4	1463	NC-RO-175.000	0.46	Open Land	Materials
Rockingham, NC	51.3	1464	NC-RO-181.000	0.38	Agriculture	Materials
Rockingham, NC	51.4	1465	NC-RO-181.000	0.23	Agriculture	Materials
Rockingham, NC	51.5	1466	NC-RO-181.000	0.51	Agriculture	Materials
Rockingham, NC	51.6	1467	NC-RO-181.000	0.22	Agriculture	Materials
Rockingham, NC	51.7	1468	NC-RO-182.000	0.16	Agriculture	Bore Equipment
Rockingham, NC	51.7	1469	NC-RO-183.000	0.30	Agriculture	Materials
Rockingham, NC	51.7	1470	NC-RO-183.000	0.31	Agriculture	Bore Equipment
Rockingham, NC	52.0	1471	NC-RO-183.000	0.41	Agriculture	Bore Equipment
Rockingham, NC	52.1	1472	NC-RO-184.000	0.42	Open Land	Mats
Rockingham, NC	52.1	1473	NC-RO-185.000	0.23	Forest / Woodland	Pumps
Guilford, NC	52.2	1474	NC-GU-001.000	0.23	Open Land	Materials
Guilford, NC	52.4	1475	NC-GU-001.000	0.23	Open Land	Materials
Guilford, NC	52.4	1476	NC-GU-001.000	0.38	Forest / Woodland	Materials
Rockingham, NC	52.6	1477	NC-RO-186.000	0.23	Open Land, Forest / Woodland	Materials
Rockingham, NC	52.7	1478	NC-RO-186.000	0.20	Open Land	Materials
Alamance, NC	52.7	1479	NC-AL-000.005	0.20	Open Land	Materials
Alamance, NC	52.7	1480	NC-AL-000.005	0.14	Forest / Woodland	Pumps
Alamance, NC	52.8	1481	NC-AL-000.005	0.14	Forest / Woodland	Mats
Alamance, NC	52.8	1482	NC-AL-000.015	0.28	Residential	Materials
Alamance, NC	53.0	1483	NC-AL-000.020	0.39	Forest / Woodland	Materials
Alamance, NC	53.1	1484	NC-AL-000.045	0.52	Forest / Woodland	Bore Equipment
Alamance, NC	53.1	1485	NC-AL-000.050	0.61	Agriculture	Bore Equipment
Alamance, NC	53.4	1486	NC-AL-000.055	0.34	Agriculture	Bore Equipment

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Alamance, NC	53.4	1487	NC-AL-000.065	0.35	Silviculture	Bore Equipment
Alamance, NC	53.4	1488	NC-AL-000.065	0.23	Silviculture	Bore Equipment
Alamance, NC	53.5	1489	NC-AL-000.065	0.23	Forest / Woodland	Materials
Alamance, NC	53.5	1490	NC-AL-000.065	0.35	Residential	Materials
Alamance, NC	53.6	1491	NC-AL-000.065	0.23	Silviculture	Materials
Alamance, NC	53.7	1492	NC-AL-000.065	0.23	Silviculture	Materials
Alamance, NC	53.8	1493	NC-AL-003.000	0.23	Agriculture	Materials
Alamance, NC	54.0	1494	NC-AL-005.000	0.23	Open Land	Materials
Alamance, NC	54.1	1495	NC-AL-005.000	0.23	Agriculture	Materials
Alamance, NC	54.1	1496	NC-AL-005.000	0.47	Agriculture	Bore Equipment
Alamance, NC	54.2	1497	NC-AL-006.000	0.47	Agriculture	Bore Equipment
Alamance, NC	54.3	1498	NC-AL-006.000	0.47	Agriculture	Materials
Alamance, NC	54.5	1499	NC-AL-006.000	0.23	Forest / Woodland	Mats, Pumps
Alamance, NC	54.6	1500	NC-AL-007.000	0.23	Forest / Woodland	Pumps
Alamance, NC	54.7	1501	NC-AL-007.000	0.23	Forest / Woodland	Mats
Alamance, NC	54.7	1502	NC-AL-007.000	0.46	Agriculture	Materials
Alamance, NC	55.0	1503	NC-AL-008.000	0.30	Open Land	Pumps
Alamance, NC	55.0	1504	NC-AL-009.000	0.23	Forest / Woodland	Mats
Alamance, NC	55.1	1505	NC-AL-009.000	0.38	Agriculture	Bore Equipment
Alamance, NC	55.1	1506	NC-AL-009.000	0.38	Agriculture	Bore Equipment
Alamance, NC	55.1	1507	NC-AL-010.000	0.30	Agriculture	Bore Equipment
Alamance, NC	55.2	1508	NC-AL-010.000	0.46	Agriculture	Mats, Pumps
Alamance, NC	55.3	1509	NC-AL-010.000	0.66	Forest / Woodland	Materials
Alamance, NC	55.4	1510	NC-AL-016.000	0.46	Forest / Woodland	Materials
Alamance, NC	55.5	1511	NC-AL-018.000	0.46	Agriculture	Materials
Alamance, NC	55.6	1512	NC-AL-018.000	0.13	Forest / Woodland	Materials
Alamance, NC	55.6	1513	NC-AL-018.000	0.23	Open Land	Materials
Alamance, NC	55.7	1514	NC-AL-022.000	0.37	Forest / Woodland	Bore Equipment
Alamance, NC	55.8	1515	NC-AL-022.000	0.93	Agriculture	Bore Equipment
Alamance, NC	56.0	1516	NC-AL-025.000	0.46	Agriculture	Materials
Alamance, NC	56.2	1517	NC-AL-025.000	0.23	Agriculture	Materials
Alamance, NC	56.3	1518	NC-AL-025.000	0.65	Agriculture	Materials
Alamance, NC	56.4	1519	NC-AL-027.000	0.13	Forest / Woodland	Mats
Alamance, NC	56.4	1520	NC-AL-027.000	0.44	Open Land	Bore Equipment
Alamance, NC	56.4	1521	NC-AL-028.000	0.08	Forest / Woodland	Pumps
Alamance, NC	56.6	1522	NC-AL-028.000	0.17	Forest / Woodland	Pumps
Alamance, NC	56.7	1523	NC-AL-028.000	0.23	Agriculture	Mats

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Alamance, NC	56.8	1524	NC-AL-028.000	0.39	Agriculture	Materials
Alamance, NC	57.0	1525	NC-AL-033.000	0.23	Open Land	Pumps
Alamance, NC	57.0	1526	NC-AL-036.000	0.46	Agriculture	Materials
Alamance, NC	57.0	1527	NC-AL-037.000	0.11	Forest / Woodland	Pumps
Alamance, NC	57.1	1528	NC-AL-037.000	0.23	Open Land	Materials
Alamance, NC	57.2	1529	NC-AL-039.000	0.57	Forest / Woodland	Pumps And Mats
Alamance, NC	57.3	1530	NC-AL-039.000	0.05	Residential	Materials
Alamance, NC	57.4	1531	NC-AL-039.000	0.25	Open Land	Materials
Alamance, NC	57.5	1532	NC-AL-041.000	0.48	Open Land	Bore Equipment
Alamance, NC	57.5	1533	NC-AL-042.000	0.15	Open Land	Bore Equipment
Alamance, NC	57.8	1535	NC-AL-043.000	0.43	Forest / Woodland	Materials
Alamance, NC	57.8	1536	NC-AL-043.000	0.27	Residential	Bore Equipment
Alamance, NC	57.9	1537	NC-AL-044.000	0.42	Open Land	Bore Equipment
Alamance, NC	57.9	1538	NC-AL-046.000	0.47	Open Land	Bore Equipment
Alamance, NC	57.9	1539	NC-AL-046.000	0.22	Open Land	Materials
Alamance, NC	58.1	1540	NC-AL-046.000	0.46	Open Land	Materials
Alamance, NC	58.4	1541	NC-AL-050.000	0.29	Open Land	Materials
Alamance, NC	58.6	1542	NC-AL-051.000	0.23	Forest / Woodland	Pumps
Alamance, NC	58.7	1543	NC-AL-051.000	0.23	Forest / Woodland	Mats
Alamance, NC	58.7	1544	NC-AL-052.000	0.23	Forest / Woodland	Pumps
Alamance, NC	58.7	1545	NC-AL-052.000	0.23	Forest / Woodland	Mats
Alamance, NC	58.8	1546	NC-AL-052.000	0.24	Forest / Woodland	Materials
Alamance, NC	58.8	1547	NC-AL-052.000	0.15	Forest / Woodland	Materials
Alamance, NC	59.1	1548	NC-AL-054.000	0.45	Forest / Woodland	Bore Equipment
Alamance, NC	59.1	1549	NC-AL-053.000	0.30	Forest / Woodland	Bore Equipment
Alamance, NC	59.2	1550	NC-AL-058.000	0.30	Residential	Bore Equipment
Alamance, NC	59.3	1551	NC-AL-057.000	0.41	Forest / Woodland	Materials
Alamance, NC	59.6	1552	NC-AL-064.000	0.39	Open Land	Materials
Alamance, NC	59.6	1553	NC-AL-064.000	0.22	Open Land	Mats
Alamance, NC	59.7	1554	NC-AL-064.000	0.23	Open Land	Pumps
Alamance, NC	60.0	1555	NC-AL-066.000	0.64	Open Land	Bore Equipment
Alamance, NC	60.0	1556	NC-AL-067.000	0.49	Open Land	Bore Equipment
Alamance, NC	60.2	1557	NC-AL-068.000	0.40	Open Land	Bore Equipment
Alamance, NC	60.5	1558	NC-AL-070.000	0.46	Open Land	Materials
Alamance, NC	60.7	1559	NC-AL-075.000	0.23	Forest / Woodland	Mats
Alamance, NC	60.7	1560	NC-AL-075.000	0.23	Forest / Woodland	Pumps
Alamance, NC	60.8	1561	NC-AL-074.000	0.23	Open Land	Pumps

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Alamance, NC	61.4	1562	NC-AL-077.000	0.24	Forest / Woodland	Bore Equipment
Alamance, NC	61.4	1563	NC-AL-081.000	0.37	Forest / Woodland	Bore Equipment
Alamance, NC	61.4	1564	NC-AL-081.000	0.45	Forest / Woodland	Bore Equipment
Alamance, NC	61.5	1565	NC-AL-081.000	0.40	Open Land	Materials
Alamance, NC	61.6	1566	NC-AL-081.000	0.40	Agriculture	Materials
Alamance, NC	61.7	1567	NC-AL-081.000	0.23	Open Land	Materials
Alamance, NC	61.9	1568	NC-AL-081.000	0.53	Open Land	Materials
Alamance, NC	62.2	1569	NC-AL-084.000	0.39	Agriculture	Materials
Alamance, NC	62.4	1571	NC-AL-085.000	0.32	Open Land	Mats
Alamance, NC	62.5	1572	NC-AL-086.000	0.27	Open Land	Pumps
Alamance, NC	62.7	1573	NC-AL-086.000	0.23	Open Land	Mats
Alamance, NC	62.7	1574	NC-AL-086.000	0.20	Open Land	Pumps
Alamance, NC	62.8	1575	NC-AL-089.000	0.57	Open Land	Bore Equipment
Alamance, NC	62.8	1576	NC-AL-093.000	0.24	Open Land	Bore Equipment
Alamance, NC	63.0	1577	NC-AL-093.000	0.23	Forest / Woodland	Pumps
Alamance, NC	63.1	1578	NC-AL-094.000	0.34	Forest / Woodland	Bore Equipment
Alamance, NC	63.1	1579	NC-AL-098.000	0.10	Forest / Woodland	Materials
Alamance, NC	63.1	1580	NC-AL-096.000	0.41	Forest / Woodland	Mats
Alamance, NC	63.2	1581	NC-AL-097.000	0.46	Forest / Woodland	Pumps
Alamance, NC	63.5	1582	NC-AL-101.000.AR	0.46	Open Land	Truck Turn Around
Alamance, NC	63.5	1583	NC-AL-102.000.ABU	0.69	Open Land	Bore Equipment
Alamance, NC	63.7	1584	NC-AL-103.000	0.80	Forest / Woodland	Materials
Alamance, NC	63.7	1585	NC-AL-104.000	0.46	Forest / Woodland	Bore Equipment
Alamance, NC	63.8	1586	NC-AL-103.000	0.23	Silviculture, Forest / Woodland	Mats
Alamance, NC	63.9	1587	NC-AL-103.000	0.23	Silviculture	Pumps
Alamance, NC	64.0	1588	NC-AL-103.000	0.35	Silviculture	Materials
Alamance, NC	64.1	1589	NC-AL-106.000	0.38	Open Land	Materials
Alamance, NC	64.5	1590	NC-AL-104.000	0.06	Open Land	Materials
Alamance, NC	64.5	1591	NC-AL-107.000	0.06	Open Land	Materials
Alamance, NC	64.6	1592	NC-AL-107.000	0.25	Open Land	Materials
Alamance, NC	64.7	1593	NC-AL-108.000	0.41	Open Land	Materials
Alamance, NC	64.8	1594	NC-AL-108.000	0.32	Open Land	Bore Equipment
Alamance, NC	64.8	1595	NC-AL-105.000	0.36	Open Land	Bore Equipment
Alamance, NC	64.9	1596	NC-AL-110.000	0.32	Forest / Woodland	Materials
Alamance, NC	65.0	1598	NC-AL-113.000	0.38	Open Land	Materials
Alamance, NC	65.1	1599	NC-AL-117.000	0.27	Open Land	Mats
Alamance, NC	65.1	1600	NC-AL-116.000	0.23	Forest / Woodland	Pumps

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Alamance, NC	65.3	1601	NC-AL-119.000	0.46	Commercial, Open Land	Materials
Alamance, NC	65.4	1602	NC-AL-119.000	0.33	Open Land	Materials
Alamance, NC	65.5	1603	NC-AL-119.000	0.27	Open Land	Materials
Alamance, NC	65.7	1604	NC-AL-120.000	0.25	Forest / Woodland	Mats
Alamance, NC	65.7	1605	NC-AL-120.000	0.22	Forest / Woodland	Pumps
Alamance, NC	65.8	1606	NC-AL-122.000	0.11	Open Land	Mats
Alamance, NC	65.8	1607	NC-AL-121.000.ABU	0.29	Forest / Woodland	Pumps
Alamance, NC	65.9	1608	NC-AL-126.000	0.25	Forest / Woodland	Mats
Alamance, NC	65.9	1609	NC-AL-126.000	0.12	Forest / Woodland	Pumps
Alamance, NC	66.0	1610	NC-AL-126.000	0.46	Forest / Woodland	Parking
Alamance, NC	66.1	1611	NC-AL-126.000	0.23	Open Land	Materials
Alamance, NC	66.4	1612	NC-AL-130.000	0.12	Agriculture	Materials
Alamance, NC	66.4	1613	NC-AL-130.000	0.23	Forest / Woodland	Mats
Alamance, NC	66.5	1614	NC-AL-131.000	0.23	Open Land	Pumps
Alamance, NC	66.6	1615	NC-AL-128.000	0.39	Forest / Woodland	Materials
Alamance, NC	66.6	1616	NC-AL-132.000	0.23	Forest / Woodland	Mats
Alamance, NC	66.7	1617	NC-AL-132.000	0.23	Forest / Woodland	Pumps
Alamance, NC	66.8	1618	NC-AL-133.000	0.48	Open Land	Materials
Alamance, NC	67.1	1619	NC-AL-135.000	0.23	Open Land	Mats
Alamance, NC	67.1	1620	NC-AL-137.000	0.23	Forest / Woodland	Pumps
Alamance, NC	67.5	1621	NC-AL-139.000	0.69	Open Land	Materials
Alamance, NC	67.5	1622	NC-AL-139.000	0.68	Open Land	Materials
Alamance, NC	67.6	1623	NC-AL-140.000	0.23	Forest / Woodland	Mats
Alamance, NC	67.6	1624	NC-AL-142.000	0.23	Forest / Woodland	Pumps
Alamance, NC	67.7	1625	NC-AL-142.000	0.18	Open Land	Mats
Alamance, NC	67.7	1626	NC-AL-142.000	0.11	Forest / Woodland	Materials
Alamance, NC	67.7	1627	NC-AL-142.000	0.31	Forest / Woodland	Materials
Alamance, NC	67.8	1628	NC-AL-143.000	0.23	Forest / Woodland	Pumps
Alamance, NC	67.8	1629	NC-AL-143.000	0.20	Forest / Woodland	Mats
Alamance, NC	67.8	1630	NC-AL-143.000	0.23	Forest / Woodland	Pumps
Alamance, NC	67.8	1631	NC-AL-143.000	0.23	Forest / Woodland	Mats
Alamance, NC	67.9	1632	NC-AL-143.000	0.23	Silviculture	Mats
Alamance, NC	67.9	1633	NC-AL-143.000	0.23	Forest / Woodland	Pumps
Alamance, NC	67.9	1634	NC-AL-143.000	0.23	Forest / Woodland	Mats
Alamance, NC	68.1	1635	NC-AL-145.000	0.25	Forest / Woodland	Materials
Alamance, NC	68.1	1636	NC-AL-144.000	0.23	Open Land, Forest / Woodland	Pumps
Alamance, NC	68.1	1637	NC-AL-144.000	0.11	Open Land	Materials

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Alamance, NC	68.1	1638	NC-AL-144.000	0.23	Open Land	Bore Equipment
Alamance, NC	68.2	1639	NC-AL-148.000	0.28	Forest / Woodland	Bore Equipment
Alamance, NC	68.2	1640	NC-AL-148.000	0.23	Forest / Woodland	Pumps
Alamance, NC	68.3	1641	NC-AL-148.000	0.23	Forest / Woodland	Mats
Alamance, NC	68.3	1642	NC-AL-148.000	0.23	Open Land	Pumps
Alamance, NC	68.3	1643	NC-AL-148.000	0.23	Open Land	Mats
Alamance, NC	68.4	1644	NC-AL-148.000	0.23	Forest / Woodland	Pumps
Alamance, NC	68.4	1645	NC-AL-148.000	0.23	Forest / Woodland	Mats
Alamance, NC	68.4	1646	NC-AL-149.000	0.51	Open Land	Materials
Alamance, NC	68.5	1647	NC-AL-149.000	0.20	Open Land	Bore Equipment
Alamance, NC	68.5	1648	NC-AL-149.000	0.50	Forest / Woodland	Bore Equipment
Alamance, NC	68.6	1649	NC-AL-150.000	0.10	Forest / Woodland	Materials
Alamance, NC	68.7	1650	NC-AL-151.000	0.29	Open Land	Materials
Alamance, NC	68.8	1651	NC-AL-154.000	0.26	Forest / Woodland	Materials
Alamance, NC	68.9	1652	NC-AL-162.000	0.16	Forest / Woodland	Mats
Alamance, NC	69.0	1653	NC-AL-166.000	0.23	Forest / Woodland	Pumps
Alamance, NC	69.0	1654	NC-AL-167.000	0.21	Forest / Woodland	Materials
Alamance, NC	69.2	1655	NC-AL-174.000	0.10	Industrial, Open Land	Materials
Alamance, NC	69.3	1656	NC-AL-174.130	0.95	Forest / Woodland	Materials
Alamance, NC	69.4	1657	NC-AL-182.100.ABU	0.25	Open Land	Materials
Alamance, NC	69.5	1658	NC-AL-184.000	0.23	Commercial / Industrial	Materials
Alamance, NC	69.5	1659	NC-AL-184.000	0.23	Forest / Woodland	Mats
Alamance, NC	69.5	1660	NC-AL-184.000	0.27	Forest / Woodland	Materials
Alamance, NC	69.8	1661	NC-AL-186.000	0.23	Forest / Woodland	Mats
Alamance, NC	69.9	1662	NC-AL-186.000	0.23	Forest / Woodland	Pumps
Alamance, NC	70.0	1663	NC-AL-186.000	0.23	Forest / Woodland	Mats
Alamance, NC	70.0	1664	NC-AL-188.000	0.23	Forest / Woodland	Pumps
Alamance, NC	70.2	1665	NC-AL-188.000	0.23	Forest / Woodland	Materials
Alamance, NC	70.3	1666	NC-AL-188.000	0.23	Forest / Woodland	Mats
Alamance, NC	70.3	1667	NC-AL-189.000	0.23	Forest / Woodland	Pumps
Alamance, NC	70.4	1668	NC-AL-190.000	0.21	Open Land	Materials
Alamance, NC	70.5	1669	NC-AL-191.000	0.23	Forest / Woodland	Materials
Alamance, NC	70.5	1670	NC-AL-191.000	0.65	Forest / Woodland	Materials
Alamance, NC	70.5	1671	NC-AL-191.000	0.05	Open Land	Parking
Alamance, NC	70.6	1672	NC-AL-191.000	0.21	Forest / Woodland	Pumps, Mats
Alamance, NC	70.6	1673	NC-AL-191.000	0.23	Forest / Woodland	Pumps, Mats
Alamance, NC	70.6	1674	NC-AL-191.100.AR	0.11	Open Land	Parking

Appendix 1-D

Additional Temporary Workspace Areas Associated with Construction of MVP Southgate Project

County State	Milepost	Name ID Number	Ownership	Area (Acres)	Current Land Use	Purpose
Alamance, NC	70.6	1675	NC-AL-191.000	0.23	Forest / Woodland	Mats
Alamance, NC	70.9	1676	NC-AL-191.000	0.52	Forest / Woodland	Bore Equipment
Alamance, NC	70.9	1677	NC-AL-191.000	0.51	Forest / Woodland	Bore Equipment
Alamance, NC	71.0	1678	NC-AL-192.000	0.72	Open Land	Bore Equipment
Alamance, NC	71.3	1679	NC-AL-192.000	0.61	Open Land	Materials
Alamance, NC	71.4	1680	NC-AL-193.000	0.46	Forest / Woodland	Materials
Alamance, NC	71.5	1681	NC-AL-194.000	0.49	Open Land	Pumps
Alamance, NC	71.6	1682	NC-AL-194.000	0.46	Open Land	Pipe
Alamance, NC	71.6	1683	NC-AL-194.000	0.24	Open Land	Materials
Alamance, NC	71.7	1684	NC-AL-195.000	0.23	Open Land	Mats
Alamance, NC	71.7	1685	NC-AL-196.000	0.23	Forest / Woodland	Pumps
Alamance, NC	71.8	1686	NC-AL-197.000	0.46	Open Land	Materials
Alamance, NC	71.9	1687	NC-AL-198.000	0.23	Forest / Woodland	Pumps, Mats
Alamance, NC	72.0	1688	NC-AL-199.000	0.63	Open Land	Materials
Alamance, NC	72.3	1689	NC-AL-201.000	0.23	Residential	Materials
Alamance, NC	72.5	1690	NC-AL-207.000	0.19	Forest / Woodland	Materials
Alamance, NC	72.5	1691	NC-AL-207.000	0.12	Open Land, Forest / Woodland	Materials
Alamance, NC	72.6	1692	NC-AL-210.000	1.17	Open Land	Boring Equipment

Note: ATWS shown on the alignment sheets that lie outside of the study corridor are currently under evaluation. Information on these areas will be provided in the final Resource Reports included with the Certificate application expected to be filed in November 2018.

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-E1 Existing Utility Corridors Adjacent to the MVP Southgate Project

Appendix 1-E2 Deviations from Existing Utility Corridors along the MVP Southgate Project

Appendix 1-E1						
Existing Utility Corridors Adjacent to the MVP Southgate Project						
Begin MP	End MP	Name	Type	Distance (Miles)	Off-Set between Pipe and Edge of ROW	Construction ROW Overlap
0.4	3.6	Williams Transco	Pipeline Transmission	3.2	25	15
4.6	5.2	Williams Transco	Pipeline Transmission	0.6	25	15
5.3	7.5	Williams Transco	Pipeline Transmission	2.2	25	15
7.7	9.4	Williams Transco	Pipeline Transmission	1.7	25	15
9.6	9.8	Williams Transco	Pipeline Transmission	0.2	25	15
10.2	11.2	Williams Transco	Pipeline Transmission	1.0	25	15
11.6	13.1	Williams Transco	Pipeline Transmission	1.5	25	15
14.2	14.8	Williams Transco	Pipeline Transmission	0.6	25	15
15.8	15.8	Williams Transco	Pipeline Transmission	0	25	15
16	16.6	Williams Transco	Pipeline Transmission	0.6	25	15
17.6	19.5	Williams Transco	Pipeline Transmission	1.9	25	15
19.5	19.9	Williams Transco	Pipeline Transmission	0.4	25	35
20.5	23.7	Williams Transco	Pipeline Transmission	3.2	25	15
23.8	24.5	Williams Transco	Pipeline Transmission	0.7	25	15
25.1	26.7	Williams Transco	Pipeline Transmission	1.6	25	15
26.9	28.2	Williams Transco	Pipeline Transmission	1.3	25	15
28.4	29.4	Williams Transco	Pipeline Transmission	1.0	25	15
30.7	31	Williams Transco	Pipeline Transmission	0.3	25	15
31.8	32.1	Williams Transco	Pipeline Transmission	0.3	25	15
32.2	32.4	Williams Transco	Pipeline Transmission	0.2	25	15
32.7	32.9	Williams Transco	Pipeline Transmission	0.2	25	15
33.3	34.3	Duke power	Electric Transmission	1.0	25	15
34.3	35.4	Duke power	Electric Transmission	1.1	25	35
38.4	38.5	Duke power	Electric Transmission	0.1	25	35
39	39.1	Duke power	Electric Transmission	0.1	25	35
41	42	Duke power	Electric Transmission	1.0	25	35
42.6	43.1	Duke power	Electric Transmission	0.5	25	35
44.7	44.9	Duke power	Electric Transmission	0.2	25	15
45.6	45.8	Duke power	Electric Transmission	0.2	25	35
49.1	49.7	Duke power	Electric Transmission	0.6	25	15
49.8	52.5	Duke power	Electric Transmission	2.7	25	35
53.1	53.5	Duke power	Electric Transmission	0.4	25	15
53.9	54.9	Duke power	Electric Transmission	1.0	25	35
55.6	57.5	Duke power	Electric Transmission	1.9	25	15
57.7	57.8	Duke power	Electric Transmission	0.1	25	15
59.6	60	Duke power	Electric Distribution	0.4	25	15

Appendix 1-E2			
Deviations from Existing Utility Corridors Along the MVP Southgate Project			
Begin MP	End MP	Distance (Miles)	Reasons for deviation
0	0.4	0.4	Terrain and location of pipeline starting point
3.6	4.6	1.0	Pond, residence
5.2	5.3	0.1	Large waterbody
7.5	7.7	0.2	Existing pipeline facility
9.4	9.6	0.2	Existing pipeline facility
9.8	10.2	0.4	Terrain
11.2	11.6	0.4	Terrain, stream
13.1	14.2	1.1	Multiple residences, terrain
14.8	15.8	1.0	Residence, pond
15.8	16	0.2	Terrain
16.6	17.6	1.0	Road crossing, residences
19.9	20.5	0.6	Road crossing, residences
23.7	23.8	0.1	Terrain
24.5	25.1	0.6	Terrain
26.7	26.9	0.2	Existing pipeline facility
28.2	28.4	0.2	Pond, wetland
29.4	30.7	1.3	Terrain, large wetland, existing pipeline facility
31	31.8	0.8	residences, terrain
32.1	32.2	0.1	Terrain
32.4	32.7	0.3	Terrain, hunt stand
32.9	33.3	0.4	Wetland, terrain
35.4	38.4	3.0	Pond, terrain, home sites
38.5	39	0.5	Terrain, road crossing
39.1	41	1.9	Terrain, stream, pond, electrical substation, residences
42	42.6	0.6	Buildings, terrain
43.1	44.7	1.6	Electrical substation, terrain, residence, ponds
44.9	45.6	0.7	Residences, terrain, ponds
45.8	49.1	3.3	Terrain, ponds, residences, lake, solar farm, electrical substation
52.5	53.1	0.6	Residences, terrain
53.5	53.9	0.4	Pond
54.9	55.6	0.7	Multiple Residences
57.5	57.7	0.2	Pond
57.8	59.6	1.8	Pond, terrain, residences
60	72.6	12.6	Terrain, ponds, river crossing, multiple residences

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
Virginia												
TAR	TA-PI-000	0.0	Existing	Temporary	Mountain Valley Pipeline, LLC	25	2699	Gr	OL, FW, CI	G, S	1.5	0.0
TAR	TA-PI-001	0.4	Existing	Temporary	Transcontinental Gas Pipeline Company, LLC Private. Mountain Valley Pipeline, LLC	25	1027	D	AG, FW, OL	S, W	0.6	0.0
PAR	PA-PI-001A	0.4	Existing	Permanent	Transcontinental Gas Pipeline Company, LLC Private Mountain Valley Pipeline, LLC	25	2528	D	AG, OL, FW, CI	S, W	1.5	1.5
TAR	TA-PI-002	0.4	Existing	Temporary	Mountain Valley Pipeline, LLC	25	491	D	AG, FW, OL	S, W	0.3	0.0
TAR	TA-PI-003	1.5	Existing	Temporary	Private	25	2349	G	CI, OL, RE	S, W	1.3	0.0
TAR	TA-PI-004	1.8	Existing	Temporary	Private	25	1196	D	CI, FW, OL	S, W	0.7	0.0
TAR	TA-PI-005	2.4	Existing	Temporary	Private	25	2017	D	OL, RE	S, C, W	1.2	0.0
TAR	TA-PI-006	3.9	Existing	Temporary	Private	25	1775	D	AG, FW, CI, OL	S, C, W	1.0	0.0
TAR	TA-PI-007	4.8	Existing	Temporary	Private	25	981	D	OL, RE	S, W	0.6	0.0
TAR	TA-PI-008	4.8	Existing	Temporary	Private	25	321	G	CI, RE	S, W	0.2	0.0
TAR	TA-PI-009	5.0	Existing	Temporary	Private	25	3976	G	FW, ID, OL	S, W	2.3	0.0
TAR	TA-PI-010	5.2	Existing	Temporary	Private	25	5600	D	AG, FW, CI, OL	S, W	3.2	0.0
TAR	TA-PI-011	5.3	Existing	Temporary	Private	25	3160	D	FW, OL	S, W	1.8	0.0
TAR	TA-PI-013	5.5	Existing	Temporary	Private	25	6657	D	FW, CI, OL, RE	S, W	3.8	0.0
TAR	TA-PI-014	5.7	Existing	Temporary	Pittsylvania County, VA Private	25	2944	G	FW, ID, OL	S, W	1.7	0.0
TAR	TA-PI-015	5.8	Existing	Temporary	Pittsylvania County, VA	25	1079	G	FW, OL	S, W	0.6	0.0
TAR	TA-PI-016	6.1	Existing	Temporary	Pittsylvania County, VA	25	329	G	FW, CI, OL	S, W	0.2	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-PI-017	6.4	Existing	Temporary	Pittsylvania County, VA	25	818	G	CI, OL	S, W	0.5	0.0
TAR	TA-PI-018	7	Existing	Temporary	Private	25	1530	D	FW, OL	S, W	0.9	0.0
TAR	TA-PI-020	7.8	Existing	Temporary	Private	25	2601	D	FW, CI, OL	S, W	1.5	0.0
TAR	TA-PI-021	8.4	Existing	Temporary	Private	25	780	D	FW, CI, OL	S, W	0.3	0.0
TAR	TA-PI-022	8.7	Existing	Temporary	Private	25	2170	D	FW, OL, RE	S, W	1.2	0.0
TAR	TA-PI-023	9.1	Existing	Temporary	Private	25	2092	G	AG, FW, OL, RE	S, W	1.2	0.0
TAR	TA-PI-024	9.5	Existing	Temporary	Private	25	1406	G	AG, FW, CI, OL	S, W	0.9	0.0
TAR	TA-PI-025	9.8	Existing	Temporary	Private	25	2503	D	AG, FW, CI, OL	S, W	1.4	0.0
TAR	TA-PI-026	10.2	Existing	Temporary	Private	25	315	G	FW, OL	S, W	0.1	0.0
TAR	TA-PI-027	11.3	Existing	Temporary	Independent Timber, Inc.	25	2132	G	FW, OL	S, W	1.2	0.0
TAR	TA-PI-028	12.3	Existing	Temporary	Private	25	2297	D	AG, FW, CI, OL	S, W	1.3	0.0
PAR	PA-PI-029	12.5	Existing	Permanent	Private	25	209	D	AG, CI	S, W	0.1	0.1
TAR	TA-PI-030	12.7	Existing	Temporary	Private	25	1067	D	AG, FW	S, W	0.5	0.0
TAR	TA-PI-031	12.8	Existing	Temporary	Private	25	683	D	AG, FW	S, W	0.2	0.0
TAR	TA-PI-032	13.2	Existing	Temporary	Private	25	1068	G	OL	S, W	0.6	0.0
TAR	TA-PI-033	13.3	Existing	Temporary	Private	25	711	G	FW, OL	S, W	0.4	0.0
TAR	TA-PI-034	13.8	Existing	Temporary	Private	25	2669	D	FW, IC, OL	S, W	1.5	0.0
TAR	TA-PI-035	14.3	Existing	Temporary	Private	25	4838	D	AG, FW, IC, OL, RE	S, W	2.7	0.0
TAR	TA-PI-036	15.0	Existing	Temporary	Private	25	218	G	AG, CI	S, W	0.1	0.0
TAR	TA-PI-037	15.5	Existing	Temporary	Private	25	2988	G	AG, CI, OL	S, W	1.7	0.0
TAR	TA-PI-038	16	Existing	Temporary	Private	25	886	G	OL, RE	S, W	0.5	0.0
TAR	TA-PI-039	16.2	Existing	Temporary	Private	25	651	G	AG, FW, OL	S, W	0.3	0.0
TAR	TA-PI-040	16.2	Existing	Temporary	Private	25	59	D	AG, FW, OL	S, W	0.2	0.0
TAR	TA-PI-041	16.8	Existing	Temporary	Private	25	634	G	FW, CI, OL, RE	S, W	0.4	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-PI-042	16.8	Existing	Temporary	Private	25	2560	D	AG, FW, CI, OL	S, W	1.4	0.0
TAR	TA-PI-043	17.3	Existing	Temporary	Private	25	2235	D	AG, FW, CI, OL, RE	S, W	1.2	0.0
TAR	TA-PI-044	17.3	Existing	Temporary	Private	25	2070	D	AG, FW, OL	S, W	1.1	0.0
TAR	TA-PI-045	17.6	Existing	Temporary	Private	25	2002	G	FW, OL, RE	S, W	1.1	0.0
TAR	TA-PI-046	18.1	Existing	Temporary	Private	25	1816	D	AG, FW, CI, OL	S, W	0.9	0.0
TAR	TA-PI-048	18.8	Existing	Temporary	Private	25	1283	D	AG, FW, CI, OL, RE	S, W	0.7	0.0
TAR	TA-PI-049	19.6	Existing	Temporary	Private	25	244	G	CI, OL	S, W	0.1	0.0
TAR	TA-PI-050	20	Existing	Temporary	Private	25	316	A	CI, OL		0.2	0.0
TAR	TA-PI-051	20.4	Existing	Temporary	Private	25	82	G	ID, OL, RE	S, W	0.0	0.0
TAR	TA-PI-052	20.6	Existing	Temporary	Private	25	3046	D	AG, FW, CI, OL	S, W, C	1.7	0.0
PAR	PA-PI-053	21.2	Existing	Permanent	Private	25	698	G	OL, RE	S, W	0.4	0.4
TAR	TA-PI-054	21.4	Existing	Temporary	Private	25	2440	G	FW, CI, OL	S, W	1.4	0.0
TAR	TA-PI-055	21.8	Existing	Temporary	Private	25	2927	G	AG, FW, CI, OL, RE	S, W	1.7	0.0
TAR	TA-PI-056	22.5	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	231	G	FW, OL	S, W	0.1	0.0
TAR	TA-PI-057	22.6	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	169	G	FW, OL	S, W	0.0	0
TAR	TA-PI-058	22.6	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority Private	25	3872	G	FW, CI, OL	S, W	2.2	0.0
TAR	TA-PI-059	22.7	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	883	G	FW, OL	S, W	0.5	0.0
TAR	TA-PI-060	22.9	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	816	G	FW, OL	S, W	0.4	0.0
TAR	TA-PI-061	23.2	Existing	Permanent	Danville-Pittsylvania Regional Industrial Facility Authority	25	4076	D	FW, CI, OL	S, W, C	2.4	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-PI-062	23.6	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	3357	D	FW, CI, OL	S, W, C	1.9	0.0
TAR	TA-PI-063	24.2	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	2920	D	FW, CI, OL	S, W, C	1.6	0.0
TAR	TA-PI-064	24.8	Existing	Temporary	Danville-Pittsylvania Regional Industrial Facility Authority	25	2884	D	FW, CI, OL	S, W	1.5	0.0
TAR	TA-PI-066	25	Existing	Temporary	Private	25	2492	D	FW, CI, OL	S, W	1.3	0.0
TAR	TA-PI-067	25.2	Existing	Temporary	Private	25	2034	D	FW, OL	S, W	1.2	0.0
TAR	TA-PI-068	26.1	Existing	Temporary	Private	25	1326	D	FW, OL	S, W	0.2	0.0
Virginia Subtotal:											67.5	2.0
North Carolina												
TAR	TA-PI-068	26.2	Existing	Temporary	Private	25	1326	D	FW, OL	S, W	0.5	0.0
TAR	TA-RO-069	26.3	New	Temporary	Private	25	31	Gr	FW, OL	G, S, W	0.0	0.0
TAR	TA-RO-070	26.4	Existing	Temporary	Private	25	609	D	FW, OL	S, W	0.3	0.0
TAR	TA-RO-071	26.9	Existing	Temporary	Private	25	3490	G	FW, CI, OL, RE	S, W	1.9	0.0
TAR	TA-RO-072	27.1	Existing	Temporary	Private	25	1033	G	FW, CI, OL	S, W	0.6	0.0
TAR	TA-RO-073	27.3	Existing	Temporary	Private	25	1308	G	FW, CI, OL	S, W	0.7	0.0
TAR	TA-RO-074	27.9	Existing	Temporary	Private	25	2366	G	AG, OL	S, W	1.3	0.0
TAR	TA-RO-075	28.2	Existing	Temporary	Private	25	1155	G	OL	S, W	0.3	0.0
PAR	PA-RO-000	28.4	Existing	Permanent	Private	25	1,295	G	FW, OL	S, W	0.7	0.7
TAR	TA-RO-076	28.7	Existing	Temporary	Private	25	1273	G	FW, OL	S, W	1.4	0.0
TAR	TA-RO-077	28.7	Existing	Temporary	Private	25	1695	G	AG	S, W	1.0	0
TAR	TA-RO-078	29.3	Existing	Temporary	Private	25	2209	D	FW, CI, OL RE	S, W	1.3	0.0
TAR	TA-RO-079	29.7	Existing	Temporary	Private	25	2270	D	AG, FW, CI, OL	S, W	1.2	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-RO-080	30.1	Existing	Temporary	Private	25	3612	G	AG, CI, OL RE	S, W	2.1	0.0
TAR	TA-RO-081	30.3	New	Temporary	Private	25	1759	Gr	AG, CI, OL	S, W	1.0	0.0
PAR	PA-RO-082	30.5	Existing	Permanent	Public Service Company Of North Carolina, Inc	25	443	G	IC, OL	S, W	0.3	0.3
TAR	TA-RO-083	31.3	Existing	Temporary	Private	25	2565	G	FW, CI, OL, RE	S, W	1.5	0.0
TAR	TA-RO-084	31.7	New	Temporary	Private	25	122	Gr	ID, OL	S, W	0.1	0.0
TAR	TA-RO-085	32.5	Existing	Temporary	Private	25	3706	G	FW, CI, OL	S, W	2.1	0.0
TAR	TA-RO-086	32.6	Existing	Temporary	Private	25	379	D	OL	S, W	0.2	0.0
TAR	TA-RO-087	32.9	Existing	Temporary	Private	25	2614	D	FW, CI, OL, RE	S, W	1.5	0.0
TAR	TA-RO-088	33.7	Existing	Temporary	Private	25	1889	D	FW, CI, OL, RE	S, W	1.0	0.0
TAR	TA-RO-089	34.2	Existing	Temporary	Private	25	1847	G	FW, CI, OL, RE	S, W	1.1	0.0
TAR	TA-RO-090	34.7	Existing	Temporary	Private	25	948	D	FW, CI, OL	S, W	0.5	0.0
TAR	TA-RO-091	34.8	Existing	Temporary	Private	25	855	D	FW, OL	S, W	0.5	0.0
TAR	TA-RO-092	35.5	Existing	Temporary	Private	25	828	G	FW, CI, OL, RE	S, W	0.5	0.0
TAR	TA-RO-093	35.7	Existing	Temporary	Private	25	828	D	AG, FW, CI, OL	S, W	0.4	0.0
TAR	TA-RO-094	36	Existing	Temporary	Private	25	912	D	FW, ID, OL	S, W	0.5	0.0
TAR	TA-RO-095	36.2	Existing	Temporary	Private	25	603	G	AG, FW, OL	S, W	0.3	0.0
TAR	TA-RO-099	36.9	Existing	Temporary	Private	25	1016	D	AG, FW, CI, RE	S, W	0.4	0.0
TAR	TA-RO-100	37.2	Existing	Temporary	Private	25	1940	D	FW, OL	S, W	1.1	0.0
PAR	PA-RO-101	37.5	New	Permanent	Private	25	225	Gr	OL	S, W	0.1	0.1
TAR	TA-RO-102	37.7	Existing	Temporary	Private	25	1643	D	CI, OL, RE	S, W	0.9	0.0
TAR	TA-RO-103	38.1	Existing	Temporary	Private	25	1390	D	FW, CI, OL	S, W	0.8	0.0
TAR	TA-RO-104	38.6	Existing	Temporary	Private	25	325	D	FW, CI, OL	S, W	0.2	0.0
TAR	TA-RO-106	39	Existing	Temporary	City Of Reidsville	25	503	G	FW, OL	S, W	0.3	0.0
TAR	TA-RO-107	39.4	Existing	Temporary	Private	25	2045	D	AG, FW, CI, OL, RE	S, W	1.1	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-RO-108	39.7	New	Temporary	Private	25	321	Gr	FW, OL	S, W	0.1	0.0
PAR	PA-RO-109	39.8	Existing	Permanent	Private Duke Power Company	25	1136	G	IC, OL	S, W	0.7	0.7
TAR	TA-RO-110	39.8	Existing	Temporary	Private Duke Power Company	25	6448	C	CI, OL		3.6	0.0
TAR	TA-RO-111	41	Existing	Temporary	Private	25	4630	G	AG, FW, CI, OL, RE	S, W	2.6	0.0
TAR	TA-RO-112	41.5	Existing	Temporary	Private	25	1755	D	FW, OL	S, W	0.9	0.0
TAR	TA-RO-113	41.8	Existing	Temporary	Private	25	1922	D	FW, CI, OL	S, W	1.0	0.0
PAR	PA-RO-114	42.2	Existing	Permanent	Private	25	348	D	IC, OL	S, W	0.3	0.3
TAR	TA-RO-115	42.5	Existing	Temporary	Private	25	701	G	FW, CI, OL, RE	S, W	0.3	0.0
TAR	TA-RO-116	42.5	Existing	Temporary	Private United States Cellular Corporation	25	1650	D	FW, OL	S, W	0.9	0.0
TAR	TA-RO-117	43.5	New	Temporary	Private	25	48	Gr	CI, OL	S, W	0.0	0.0
TAR	TA-RO-118	43.5	New	Temporary	Private	25	186	Gr	OL	S, W	0.1	0.0
TAR	TA-RO-119	44	Existing	Temporary	Private	25	906	D	FW, OL	S, W	0.5	0.0
TAR	TA-RO-120	44	Existing	Temporary	Private	25	1898	D	FW, OL, RE	S, W	1.0	0.0
TAR	TA-RO-121	44.1	Existing	Temporary	Private	25	342	D	OL	S, W	0.2	0.0
TAR	TA-RO-122	44.2	Existing	Temporary	Private	25	1875	D	FW, CI, OL, RE	S, W	1.0	0.0
TAR	TA-RO-123	44.5	New	Temporary	Private	25	524	Gr	AG, FW	S, W	0.2	0.0
TAR	TA-RO-124	44.9	Existing	Temporary	Private	25	343	D	FW, CI, OL	S, W	0.2	0.0
TAR	TA-RO-125	45	New	Temporary	Private	25	270	Gr	AG	S, W	0.1	0.0
TAR	TA-RO-126	45.4	Existing	Temporary	Private	25	2304	D	AG, FW, CI	S, W	1.3	0.0
TAR	TA-RO-127	46.2	Existing	Temporary	Private	25	2244	G	AG, FW, OL, RE	S, W	1.2	0.0
TAR	TA-RO-128	46.7	Existing	Temporary	Private	25	1450	D	AG, FW, CI, OL	S, W	0.8	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-RO-129	46.8	Existing	Temporary	Private	25	1567	D	AG, FW, CI, OL	S, W	0.9	0.0
TAR	TA-RO-130	47.3	Existing	Temporary	Private	25	1568	D	FW, OL, RE	S, W	0.8	0.0
TAR	TA-RO-131	48.3	Existing	Temporary	Private	25	1928	D	AG, CI, OL	S, W	1.1	0.0
TAR	TA-RO-133	48.6	Existing	Temporary	Duke Power Company Private	25	1210	D	AG, FW, OL	S, W	0.7	0.0
TAR	TA-RO-134	48.9	Existing	Temporary	Private	25	56	G	CI	S, W	0.0	0.0
TAR	TA-RO-135	49.3	Existing	Temporary	Private	25	537	D	OL	S, W	0.3	0.0
TAR	TA-RO-136	49.5	New	Temporary	Private	25	109	Gr	CI,OL	S, W	0.1	0.0
TAR	TA-RO-137	49.7	New	Temporary	Private	25	461	Gr	FW, CI	S, W	0.3	0.0
TAR	TA-RO-138	49.9	Existing	Temporary	Private	25	985	D	FW, OL, RE	S, W	0.5	0.0
TAR	TA-RO-139	50.4	Existing	Temporary	Private	25	2954	D	AG, FW, CI, OL	S, W	1.6	0.0
TAR	TA-RO-140	51.4	Existing	Temporary	Private	25	1330	D	AG, FW, CI	S, W	0.5	0.0
TAR	TA-RO-141	51.6	Existing	Temporary	Private	25	530	D	AG	S, W	0.3	0.0
TAR	TA-RO-142	51.8	Existing	Temporary	Private	25	683	D	AG, CI	S, W	0.4	0.0
TAR	TA-RO-143	52	Existing	Temporary	Private	25	1032	D	AG, FW, CI, OL	S, W	0.6	0.0
TAR	TA-RO-144	52.2	Existing	Temporary	Private	25	1379	D	AG, FW, CI, OL	S, W	0.7	0.0
TAR	TA-RO-145	52.4	Existing	Temporary	Private	25	746	D	FW, OL	S, W	0.4	0.0
TAR	TA-RO-146	52.6	Existing	Temporary	Private	25	327	Gr	FW, CI, OL, RE	S, W	0.1	0.0
TAR	TA-AL-147	53	Existing	Temporary	Private	25	240	D	FW, CI, OL, RE	S, W	0.1	0.0
TAR	TA-AL-148	53.4	New	Temporary	Private	25	40	Gr	AG	S, W	0.0	0.0
TAR	TA-AL-150	53.5	Existing	Temporary	Private	25	66	G	FW, RE, SI	S, W	0.0	0.0
TAR	TA-AL-152	53.6	Existing	Temporary	Private	25	619	G	CI, RE, SI	S, W	0.4	0.0
TAR	TA-AL-153	53.8	Existing	Temporary	Private	25	1544	D	AG, CI, OL	S, W	0.8	0.0
TAR	TA-AL-154	54.3	Existing	Temporary	Private	25	2450	D	AG, FW	S, W	1.3	0.0
TAR	TA-AL-155	54.7	Existing	Temporary	Private	25	3455	D	AG, FW, OL	S, W	1.9	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-AL-156	55.5	Existing	Temporary	Private	25	701	D	AG, FW, OL	S, W	0.4	0.0
TAR	TA-AL-157	55.6	Existing	Temporary	Private	25	476	D	FW, OL	S, W	0.3	0.0
TAR	TA-AL-159	56.3	Existing	Temporary	Private	25	269	G	FW, CI, OL	S, W	0.1	0.0
TAR	TA-AL-160	56.9	New	Temporary	Private	25	2049	Gr	AG, FW, CI, OL	S, W	1.1	0.0
TAR	TA-AL-161	57.8	New	Temporary	Private	25	243	Gr	FW, OL, RE	S, W	0.2	0.0
TAR	TA-AL-162	58.1	Existing	Temporary	Private	25	1096	D	AG, FW, CI, OL	S, W	0.6	0.0
TAR	TA-AL-163	58.4	Existing	Temporary	Private	25	1034	G	IC, OL	S, W	0.6	0.0
PAR	PA-AL-164	58.8	Existing	Permanent	Private	25	1202	D	FW, CI, OL	S, W	0.7	0.7
TAR	TA-AL-165	60	New	Temporary	Private	25	263	Gr	FW, CI, OL	S, W	0.1	0.0
PAR	PA-AL-166	60.3	Existing	Permanent	Private	25	120	Gr	CI, OL	S, W	0.1	0.1
TAR	TA-AL-167	61	Existing	Temporary	Private	25	2328	D	AG, FW	S, W	0.9	0.0
TAR	TA-AL-168	61.6	Existing	Temporary	Private	25	577	G	AG, FW, CI, OL	S, W	0.3	0.0
TAR	TA-AL-169	62.3	Existing	Temporary	Private	25	2777	D	FW, OL, RE	S, W	1.5	0.0
TAR	TA-AL-171	63.4	Existing	Temporary	Private	25	630	D	AG, OL	S, W	0.3	0.0
TAR	TA-AL-172	63.7	New	Temporary	Private	25	3257	Gr	FW, CI, OL, SI	S, W	1.9	0.0
TAR	TA-AL-173	64	New	Temporary	Private	25	958	Gr	SI	S, W	0.5	0.0
PAR	PA-AL-174	64.5	Existing	Permanent	Private	25	475	Gr	FW, OL	S, W	0.3	0.3
TAR	TA-AL-175	64.9	Existing	Temporary	Private	25	88	G	FW, CI, RE	S, W	0.1	0.0
TAR	TA-AL-177	65.3	Existing	Temporary	Private	25	2605	G	CI, OL, RE	S, W	1.4	0.0
TAR	TA-AL-179	66.1	Existing	Temporary	Private	25	1323	G	FW, CI, OL	S, W	0.6	0.0
TAR	TA-AL-180	66.8	New	Temporary	Private	25	1459	Gr	AG, FW, CI, OL	S, W	0.8	0.0
TAR	TA-AL-181	67.5	Existing	Temporary	Private	25	1949	D	FW, CI, OL, RE	S, W	1.0	0.0
TAR	TA-AL-184	68.1	Existing	Temporary	Private	25	84	A	CI, OL	W	0.0	0.0
TAR	TA-AL-185	68.4	Existing	Temporary	Private	25	1704	Gr	FW, CI, OL	S, W	0.9	0.0

Appendix 1-F

Proposed New, Improved, and Private Access Roads for the MVP Southgate Project

State/ Facility/ Road ID a/	Road Name	MP b/	New or Existing	Proposed for Temporary or Permanent Use	Ownership/ Management	Road Dimensions		Existing Surface c/	Existing Land Use d/	Proposed Improvement e/	Construction Area (acres) f/	Operation Area (acres) g/
						Width (feet)	Length (feet)					
TAR	TA-AL-186	68.7	Existing	Temporary	Private	25	2947	G	FW, CI, OL, RE	S, W	1.7	0.0
TAR	TA-AL-187	69	Existing	Temporary	Private	25	1296	A	FW, CI, RE		0.7	0.0
TAR	TA-AL-188	70.5	Existing	Temporary	Private	25	1813	C	FW, CI, OL		1.0	0.0
TAR	TA-AL-189	70.9	Existing	Temporary	Private	25	2191	Gr	FW, OL	S, W	1.2	0.0
TAR	TA-AL-190	71.1	Existing	Temporary	Alamance Community College	25	247	G	FW, CI, OL	S	0.1	0.0
TAR	TA-AL-191	71.1	Existing	Temporary	Alamance Community College	25	58	G	ID, OL	S	0.0	0.0
TAR	TA-AL-192	71.8	Existing	Temporary	Private	25	1447	D	FW, OL	S, W	0.7	0.0
TAR	TA-AL-193	72	Existing	Temporary	Private	25	1357	Gr	FW, CI, OL	S, W	0.7	0.7
PAR	PA-AL-194	72.6	Existing	Permanent	Transcontinental Gas Pipeline Company, LLC Public Service Company Of North Carolina, Inc. Private	25	538	G	CI, OL	S	0.3	0.3
North Carolina Subtotal:											81.0	3.5
PROJECT TOTAL:											148.5	5.5

Note: The totals shown in this table may not equal the sum of addends due to rounding.

a/ TAR=Temporary, PAR=Permanent Access Road.

b/ Milepost (MP) at final intersection of access road with construction workspace. Approximate MP rounded to the nearest tenth.

c/ Dominant surface condition provided. A=Asphalt, C=Concrete, G=Gravel, D=Dirt, Gr=Greenfield.

d/ OL = Open Land (non-agricultural), AG = Agricultural, FW = Forested / Woodland, CI = Commercial / Industrial, RE = Residential; SI = Silviculture.

e/ P=Paving, G=Grading, S=Stone, C=Culverts, W=Widening, R=Realignment. No improvements to occur within wetlands crossed by the access road.

f/ Does not include area overlapping with pipeline, aboveground facility, or contractor/pipe storage yard construction workspaces.

g/ Does not include area overlapping with pipeline permanent ROW or aboveground facility permanent facility boundary (fence line/footprint). Only PARs will have an operational area impact.

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-G

Project-Specific Erosion and Sediment Control Plan

[Not Included with this Draft]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-H

Fire Prevention and Suppression Plan

[Not Included with this Draft]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-I

Foreign Utility Lines Crossed by H-650 Pipeline

MVP Southgate Project

Appendix 1-I			
Foreign Utility Lines Crossed by H-650 Pipeline MVP Southgate Project			
State, County	Milepost	Type (Gas/Electric/Other)	Owner
Virginia			
Pittsylvania	0.81	Electric	To Be Determined
Pittsylvania	3.14	Electric	To Be Determined
Pittsylvania	3.19	Electric	To Be Determined
Pittsylvania	4.53	Electric	To Be Determined
Pittsylvania	5.27	Electric	VA EL
Pittsylvania	6.29	Electric	DOMINION
Pittsylvania	6.31	Electric	Virginia Electric and Power Company
Pittsylvania	7.37	Electric	To Be Determined
Pittsylvania	7.37	Electric	To Be Determined
Pittsylvania	7.37	Fiber Optic	C & P Telephone
Pittsylvania	7.61	Electric	Unknown
Pittsylvania	9.5	Gas	COLUMBIA GAS
Pittsylvania	9.53	Electric	To Be Determined
Pittsylvania	10.57	Electric	To Be Determined
Pittsylvania	10.88	Electric	To Be Determined
Pittsylvania	10.90	Electric	To Be Determined
Pittsylvania	12.46	Unknown	To Be Determined
Pittsylvania	13.28	Electric	Duke
Pittsylvania	14.83	Electric	Appalachian Power Co.
Pittsylvania	16.80	Electric	Appalachian Power Co.
Pittsylvania	16.80	Electric	American Electric
Pittsylvania	18.37	Electric	City of Danville
Pittsylvania	18.43	Electric	To Be Determined
Pittsylvania	18.44	Electric	American Electric
Pittsylvania	18.44	Electric	To Be Determined
Pittsylvania	19.17	Electric	Duke
Pittsylvania	19.32	Electric	Duke
Pittsylvania	19.32	Electric	To Be Determined
Pittsylvania	19.36	Electric	To Be Determined
Pittsylvania	19.45	Gas	Williams
Pittsylvania	19.47	Gas	Williams
Pittsylvania	19.70	Electric	To Be Determined
Pittsylvania	19.71	Electric	To Be Determined
Pittsylvania	20.27	Electric	Duke
Pittsylvania	20.28	Electric	Duke
Pittsylvania	20.35	Electric	Duke
Pittsylvania	24.84	Electric	To Be Determined
Pittsylvania	25.07	Electric	To Be Determined
Pittsylvania	30.47	Gas	Williams
North Carolina			
Rockingham	30.58	Electric	Duke
Rockingham	30.77	Electric	To Be Determined
Rockingham	31.70	Electric	To Be Determined
Rockingham	32.10	Electric	To Be Determined

Appendix 1-I			
Foreign Utility Lines Crossed by H-650 Pipeline MVP Southgate Project			
State, County	Milepost	Type (Gas/Electric/Other)	Owner
Rockingham	34.28	Electric	Duke
Rockingham	34.29	Electric	Duke
Rockingham	34.31	Electric	Duke
Rockingham	34.32	Electric	Duke
Rockingham	35.56	Electric	Duke
Rockingham	35.79	Electric	To Be Determined
Rockingham	35.79	Electric	Duke
Rockingham	36.33	Electric	Duke
Rockingham	40.43	Electric	Duke
Rockingham	40.45	Electric	Duke
Rockingham	41.96	Electric	Duke
Rockingham	41.97	Electric	Duke
Rockingham	41.98	Electric	Duke
Rockingham	41.99	Electric	Duke
Rockingham	43.36	Electric	Duke
Rockingham	43.38	Electric	Duke
Rockingham	44.98	Electric	Duke
Rockingham	44.98	Electric	To Be Determined
Rockingham	51.02	Gas	Plantation
Alamance	55.59	Electric	Duke
Alamance	55.61	Electric	Duke
Alamance	55.78	Electric	To Be Determined
Alamance	55.81	Electric	To Be Determined
Alamance	56.10	Fiber Optic	AT&T
Alamance	56.43	Electric	Duke
Alamance	58.05	Fiber Optic	AT&T
Alamance	60.00	Electric	To Be Determined
Alamance	68.33	Electric	Duke
Alamance	69.13	Fiber Optic	AT&T
Alamance	69.14	Electric	To Be Determined
Alamance	69.15	Electric	To Be Determined
Alamance	69.38	Electric	To Be Determined
Alamance	69.38	Electric	To Be Determined
Alamance	70.18	Fiber Optic	AT&T
Alamance	70.18	Fiber Optic	AT&T

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-J

Winter Construction Plan

[Not Included with this Draft]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-K

Agency Correspondence

[Correspondence to Date]

(Provided Under Separate Cover)

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-L

Public, Stakeholder, and Agency Participation Plan

[Not Included with this Draft]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-M

Stakeholder List (Public) [*Not Included with this Draft*]

Landowner Line List (Privileged and Confidential Information, CUI//PRIV) [*Not Included with this Draft*]

Federal, State, Local Stakeholder List (Public) [*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 1

Appendix 1-N

**Response Matrix for FERC Comments on First Draft
Resource Reports 1 & 10**

<p align="center">FERC Comments on First Draft Resource Report 1 [Dated: July 18, 2018]</p>	<p align="center">Location in Resource Report or Response to Comment</p>
<p>1. Provide a discussion on any other known expansion projects connected to this Project. Include mapping, tabular information, and primary receipt and delivery points for each proposed project or project under construction.</p>	<p>The Project is not aware of any expansion projects connected to the MVP Southgate Project.</p>
<p>2. Based on comments received, discuss whether any natural gas transported for the Project would be designated for export.</p>	<p>Section 1.1.2 Page 1-2</p>
<p>3. Based on comments received, expand on the described need for the Project.</p>	<p>Section 1.1.2 Page 1-2</p>
<p>4. Identify the quantity of gas that will be received and/or delivered from the East Tennessee Natural Gas line to the Project.</p>	<p>Section 1.2.1 Page 1-4</p>
<p>5. Identify the dimensions of the communication towers planned at each compressor station.</p>	<p>Section 1.2.2.4 Page 1-10</p>
<p>6. In appendix 1-E, identify locations where the planned route deviates from its collocation with an existing utility corridor and explain why the deviation is required.</p>	<p>Appendix 1-E2</p>
<p>7. Include locations where the construction right-of-way would not be reduced to 75 feet in wetlands or streams and provide justifications for not reducing the workspace.</p>	<p>Section 1.3.1 Page 1-11</p>
<p>8. Identify and justify any Project-specific modifications to the FERC's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan); and Wetland and Waterbody Construction and Mitigation Procedures (Procedures).</p>	<p>Section 1.4.1.1 Page 1-17</p>
<p>9. Include a plan for burning of debris and address the potential use of accelerants, any special measures for minimizing impacts on air quality, and the minimum distance that burning would occur from nearby residences.</p>	<p>Appendix 1-H [Not Included with this Draft]</p>
<p>10. Describe the feasibility of using municipal water in lieu of obtaining water for horizontal directional drill (HDD) operations from the waterbody being crossed.</p>	<p>Section 1.4.1.1 Page 1-17</p>
<p>11. Include information on the impacts of any facilities that would be constructed as part of the electrical utility service that would be provided to each of the compressor stations (section 1.2.2.5 of RR1).</p>	<p>Section 1.2.2.5 Page 1-10</p>
<p>12. Identify any non-jurisdictional facilities associated with the Project (section 1.9, page 1-46 of RR1). If there are any non-jurisdictional facilities that would be built as a result of the new gas volumes associated with the Project, include the following detailed information for each facility:</p> <ul style="list-style-type: none"> a. company/owner; b. type of facility; c. dimensions (pipe diameter, length, horsepower, etc. as appropriate for pipeline and land area for other facilities); d. maps showing locations; e. federal permits required and their status; f. status of local and state permits required; and g. any environmental reviews required for local, state, or federal permitting authorities. 	<p>Section 1.9 Page 1-41</p>
<p>13. Discuss the feasibility of using a 75-foot-wide construction right-of-way in lieu of the planned 100-foot-wide construction right-of-way.</p>	<p>Section 1.3.1 Page 1-11</p>
<p>14. Discuss the feasibility of using adjacent utility rights-of-way as part of the planned construction workspace (overlap).</p>	<p>Section 1.3.1 Page 1-11</p>
<p>15. Include a table that identifies past, present, and reasonably foreseeable future projects within the resource-specific geographic scopes identified in the table below. This table should also include the following information:</p> <ul style="list-style-type: none"> a. project name, sponsor/proponent, and location (city/county); b. approximate distance and direction of the project from the MVP Southgate Project facilities; c. project type and a description of the project; d. footprint/layout and anticipated impacts (acres of land/resource [wetlands, vegetation, habitat, etc.] affected); 	<p>Section 1.10 Table 1.10-1 Page 1-47</p>

<p align="center">FERC Comments on First Draft Resource Report 1 [Dated: July 18, 2018]</p>	<p align="center">Location in Resource Report or Response to Comment</p>
<p>e. a description of the permits or authorizations required for the project and a description of any environmental review required to support those permits or authorizations; and</p> <p>f. the current status and schedule of the project (e.g., proposed for October 2019, under construction, completed).</p> <p>Also, include qualitative and quantitative descriptions of cumulative and/or overlapping impacts these projects and the MVP Southgate Project would have on each environmental resource. Lastly, include a map showing the identified projects in relation to the MVP Southgate Project.</p> <p>Based on the size and scope of the MVP Southgate Project, we recommend using our standard resource-specific geographic scopes to assess cumulative impacts, which are listed in the table below. Understanding that knowledge of the specific characteristics of a project area may dictate an alternative geographic scope for the cumulative impacts analysis, you may suggest another geographic scope. However, include a detailed justification of why use of this scope is appropriate.</p>	

<p align="center">FERC Comments on First Draft Resource Report 10 [DATED: JULY 18, 2018]</p>	<p align="center">Location in Resource Report or Response to Comment</p>
<p>1. Include a discussion of any other natural gas suppliers in the area (i.e. Piedmont Natural Gas) as potential system alternatives. Also include system alternatives for the PSNC distribution system, such as delivery to the Dan River Interconnect and utilizing PSNC distribution lines to supply the Haw River Interconnect.</p>	<p>Section 10.4 Page 10-3</p>
<p>2. Include estimates of truck and rail cars needed per day, required upgrades to existing road/rail infrastructure, and/or additional liquefaction and regasification facilities necessary to deliver required volumes of natural gas as liquefied natural gas.</p>	<p>Section 10.4.1 Page 10-3</p>
<p>3. Include alternatives considered for the Lambert and Russell Compressor Station sites. For each compressor station alternative location, evaluate site topography and existing vegetation (i.e., trees) as potential sound and visual buffers relative to the nearest NSAs and residents. Include all applicable information for the sites as described in the comparison table included in section 10.4 of the FERC's "Guidance Manual for Environmental Report Preparation."</p>	<p>Section 10.7 Page 10-30</p>
<p>4. Provide a desktop analysis of the following potential alternative routes:</p>	
<p>a. a segment reroute that would reduce the number of residences affected between mileposts (MPs) 40.25 and 41 in Rockingham County. This alternative should be located to the west of the planned pipeline route to increase the distance between the route and the residences; and</p>	<p>Section 10.6.1 Page 10.24</p>
<p>b. a segment reroute that would reduce impact to the Robert Pollok-Hill View Farms operation at MP 15 in Pittsylvania County.</p>	<p>Section 10.6.2 Page 10-29</p>