From:	DEQ-OSWM
To:	Chalmers, Cory
Cc:	Angueira, Antony (DEQ); Robinson, Zack (DEQ); Willis, Marshall (DEQ); Grant, Matthew (DEQ); DEQ-OSWM
Subject:	[EXTERNAL] MVP 2025 S&S approved 6-30-2025
Date:	Tuesday, July 1, 2025 8:04:50 AM
Attachments:	image001.png
Importance:	High

Good morning Cory,

The 2025 MVP S&S for ESC and SWM, certified on 6/13/2025 and received by DEQ on 6/18/2025 was approved on 6/30/2025.

We are in the process of revising our Standards and Specifications approval letters. Please accept this email as the official approval notification of S&S coverage until a formal letter is generated and provided to MVP.

Thank you,
Tony

Tony Angueira
Stormwater Supervisor
Office of Stormwater Management
Virginia Department of Environmental Quality
1111 E. Main St., Suite 1400
Richmond, VA 23219
(804) 584-6265

STANDARDS AND SPECIFICATIONS

***

Erosion & Sediment Control
and
Stormwater Management

2025 Edition

Submitted by:

Mountain Valley Pipeline, LLC
2200 Energy Drive, Canonsburg, PA 15317

Table of Contents

Virginia Department of Environmental Quality

Standards and Specifications # _____ (Note: to be entered by the Department)

Standards and Specifications Agreement

For

MOUNTAIN VALLEY PIPELINE, LLC.

1. Standards and Specifications Entity

Entity Name:	Mountain Valley Pipeline, LLC.
Entity Address:	220 Energy Drive, Canonsburg, PA 15317
City, State, and Zip Code:	
Contact Name:	Jeffrey Klinefelter
Contact Phone:	724-873-1378
Contact Email:	Jeffrey.Klinefelter@EQT.com
Alt. Contact Name:	Cory Chalmers
Alt. Contact Phone:	304-627-8173
Alt. Contact Email:	Cory.Chalmers@EQT.com

2. Standards and Specifications Entity Type

☐ State
☐ Federal
☒ Linear Utility
☐ Public Service Authority
Wetland/Stream

3. Standards and Specifications Agreement Information

Agreement Date: _____

Date of previously approved agreement: July 31, 2023

Have there been any updates to your previously approved agreement? ☒ Yes ☐ No

4. Certification

"I certify under penalty of law that this agreement and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Printed Name:	JEFFREY KLINEFELTER
Title:	VP, MVP CONSTRUCTION & ENGINEERING
Signature:	
Date:	06/18/2025

Standards and Specifications Agreement

5. Administration

Per § 62.1-44.15:31 of the Code of Virginia, the Virginia Department of Transportation shall; any other state agency or federal entity may; and electric, natural gas, and telephone utility companies; interstate and intrastate natural gas pipeline companies; railroad companies; and authorities created pursuant to § 15.2-5102 of the Code of Virginia may submit standards and specifications, for approval by the Virginia Department of Environmental Quality (Department), who serves as the Virginia Erosion and Stormwater Management Program (VESMP) authority for all land-disturbing activities subject to approved standards and specifications. The Standards and Specifications Program is designed to provide a single set of standards and specifications, the Virginia Stormwater Management Handbook, Version 1.0, that describes how entities with approved standards and specifications conduct land-disturbing activities in a manner that will be consistent with the requirements of the Virginia Erosion and Stormwater Management Act (VESMA), Virginia Erosion and Stormwater Management Regulation, and the General Virginia Pollutant Discharge Elimination System (VPDES) Permit for Discharges of Stormwater from Construction Activities (Construction General Permit).

MOUNTAIN VALLEY PIPELINE, LLC., hereinafter the "S&S Entity," is responsible for administering, implementing, and complying with the standards and specifications for Erosion and Sediment Control (ESC) and Stormwater Management (SWM) set out in this agreement by following the design criteria in the Virginia Stormwater Management Handbook, Version 1.0, for all regulated land disturbance activities in the Commonwealth. This may include pipeline and related facility construction activities as well as all activities associated with the project from the initial planning stages to the final restoration and maintenance of the right-of-way (ROW) and/or limits of disturbance (LOD) **.**

6. Regulated Land-Disturbing Activities

A. Land-disturbing activities that meet one of the criteria below are regulated as follows:

1. Land-disturbing activity that disturbs 10,000 square feet or more, is less than one acre, not in an area of a locality designated as a Chesapeake Bay Preservation Area, and not part of a common plan of development or sale, is subject to criteria defined in Article 2 (9VAC25-875-540 et seq.) of Part V of the Virginia Erosion and Stormwater Management Regulation (Regulation).
2. Land-disturbing activity that disturbs 2,500 square feet or more, is less than one acre, and in an area of a locality designated as a Chesapeake Bay Preservation Area is subject to criteria defined in Article 2 (9VAC25-875-540 et seq.) and Article 3 (9VAC25-875-570 et seq.) of Part V of the Regulation unless Article 4 (9VAC25-875-670 et seq) of Part V is applicable, as determined in accordance with 9VAC25-875-480 and 9VAC25-875-490.
3. Land-disturbing activity that disturbs less than one acre, but is part of a larger common plan of development or sale that disturbs one acre or more, is subject to criteria defined in Article 2 (9VAC25-875-540 et seq.) and Article 3 (9VAC25-875-570 et seq.) of Part V of the Regulation unless Article 4 (9VAC25-875-670 et seq) of Part V is applicable, as determined in accordance with 9VAC25-875-480 and 9VAC25-875-490.
4. Land-disturbing activity that disturbs one acre or more is subject to criteria defined in Article 2 (9VAC25-875-540 et seq.) and Article 3 (9VAC25-875-570 et seq.) of Part V of the Regulation unless Article 4 (9VAC25-875-670 et seq.) of Part V is applicable, as determined in accordance with 9VAC25- 875-480 and 9VAC25-875-490.

B. Land-disturbing activities exempt per 9VAC25-875-90 are not required to comply with the requirements of the VESMA unless otherwise required by federal law.

7. Certified Personnel

A. The S&S Entity's administrator shall be responsible for the management and coordination of this standards and specifications agreement and shall be certified as a Dual Combined Administrator as outlined in 9VAC25- 875-400.

B. Plan Reviewers shall review all ESC and SWM plans for compliance with this standards and specifications agreement and all applicable laws and regulations. Plan reviewers shall be certified as a Plan Reviewer for ESC and a Plan Reviewer for SWM or as a Dual Plan Reviewer, as outlined in 9VAC25-875-400.

C. Compliance inspectors shall be responsible for the inspection and compliance of ESC, SWM, and stormwater pollution prevention plan practices. They shall be certified as an Inspector for ESC and an Inspector for SWM or as a Dual Inspector, as outlined in 9VAC25-875-400.

8. Review and Approval of Plans

A. The S&S Entity has the authority to approve soil erosion control and stormwater management (ESM) plans, except for activities not required to comply with the requirements of the Virginia Erosion and Stormwater Management Act (VESMA), under § 62.1-44.15:34 of the Code of Virginia. The ESM plan is a document describing methods for controlling soil erosion and managing stormwater in accordance with the requirements adopted pursuant to the VESMA. The ESM plan may consist of aspects of the erosion and sediment control plan and the stormwater management plan as each is described in the Virginia Erosion and Stormwater Management Regulation. (9VAC25-875-20)

B. ESM plans must be approved in writing. If a third party is used to fulfill the certification of the plan reviewer, the third-party reviewer may recommend approval to the S&S Entity; however, the S&S Entity formally approves the plan in writing. The date of the approvable plan should be noted in the approval letter signed by the S&S Entity's certified plan reviewer.

C. Plans must be reviewed and approved by Department-certified personnel, as outlined in 9VAC25-875-400, to ensure compliance with these Standards and Specifications for ESC and SWM and reviewed by the S&S Entity for consistency with the Virginia Stormwater Management Handbook, Version 1.0, and applicable permit and regulatory requirements.

D. The Department may require changes to an approved ESM plan in the following cases:

1. Where inspection has revealed that the plan is inadequate to satisfy applicable regulations or ordinances; or
2. Where the S&S Entity finds that because of changed circumstances, or for other reasons, the plan cannot be effectively carried out and proposed amendments to the plan, consistent with the requirements of the VESMA, are agreed to by the department, as the VESMP authority, and the S&S Entity.

9. Erosion and Sediment Control Plan – Contents of Plans

A. The S&S Entity shall prepare an erosion and sediment control plan for its land-disturbing activities. The erosion and sediment control plan shall contain all major conservation decisions to ensure that the entire unit or units of land will be treated to achieve the conservation objectives in 9VAC25-875-560. The erosion and sediment control plan shall be prepared in accordance with 9 VAC25-875-550 and be consistent with design criteria in the Virginia Stormwater Management Handbook, Version 1.0.

B. The person responsible for carrying out the plan shall provide the name of an individual holding a certificate who will be in charge of and responsible for carrying out the land-disturbing activity to the Department.

10. Erosion and Sediment Control Variances and Exceptions

A. The Department may waive or modify any of the standards that are deemed to be inappropriate or too restrictive for site conditions, by granting a variance. A variance may be granted under these conditions:

1. Prior to construction, the S&S Entity may request a variance to become part of the approved erosion and sediment control plan. The S&S Entity shall explain the reasons for requesting variances in writing. Specific variances which are allowed by the department shall be documented in the plan.
2. During construction, the person responsible for implementing the approved plan may request a variance in writing from the Department. The Department shall respond in writing either approving or disapproving such a request. If the department does not approve a variance within 10 days of receipt of the request, the request shall be considered disapproved. Following disapproval, the applicant may resubmit a variance request with additional documentation.

11. Stormwater Pollution Prevention Plan Contents

A. A stormwater pollution prevention plan shall include, but not be limited to, an approved erosion and sediment control plan, an approved stormwater management plan, a pollution prevention plan for regulated land- disturbing activities, and a description of any additional control measures necessary to address a total maximum daily load (TMDL) pursuant to 9VAC25-875-500 E.

B. An erosion and sediment control plan consistent with the requirements of 9VAC25-875-550 must be designed and implemented during construction activities. Prior to land disturbance, this plan must be approved by a Plan Reviewer for ESC or a Dual Plan Reviewer.

C. A stormwater management plan consistent with the requirements of 9VAC25-875-510 and the design criteria in the Virginia Stormwater Management Handbook, Version 1.0, must be designed and

implemented during construction activities. Prior to land disturbance, this plan must be approved by a Plan Reviewer for SWM or a Dual Plan Reviewer.

D. A pollution prevention plan that complies with 9VAC25-875-520 and identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site and describes control measures that will be used to minimize pollutants in stormwater discharges from the construction site must be developed before land disturbance commences.

E. In addition to the requirements of subsections A through D of this section, if a specific wasteload allocation for a pollutant has been established in an approved TMDL and is assigned to stormwater discharges from a construction activity, additional control measures that are consistent with the Virginia Stormwater Management Handbook, Version 1.0, must be identified and implemented by the operator so that discharges are consistent with the assumptions and requirements of the wasteload allocation.

F. The stormwater pollution prevention plan must address the requirements specified in 40 CFR 450.21, to the extent otherwise required by state law or regulations and any applicable provisions of a state permit:

1. Control stormwater volume and velocity within the site to minimize soil erosion;
2. Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion;
3. Minimize the amount of soil exposed during construction activity;
4. Minimize the disturbance of steep slopes;
5. Minimize sediment discharges from the site. The design, installation, and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity, and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;
6. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible;
7. Minimize soil compaction and, unless infeasible, preserve topsoil;
8. Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth-disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Stabilization must be completed within a reasonable period of time or as otherwise determined by the department. In arid, semiarid, and drought-stricken areas where initiating vegetative stabilization measures immediately is infeasible, alternative stabilization measures must be employed as specified by the Department; and
9. Utilize outlet structures that withdraw water from the surface, unless infeasible, when discharging from basins and impoundments.

G. The stormwater pollution prevention plan shall be amended whenever there is a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants to state waters and that has not been previously addressed in the plan. The stormwater pollution prevention plan must be maintained at a central onsite location. If an onsite location is unavailable, notice of the stormwater pollution prevention plan's location must be posted near the main entrance at the construction site.

12. Stormwater Management Plan Contents

A. A stormwater management plan shall be developed and implemented as approved or modified by the Department-certified plan reviewer and shall be developed in accordance with the following:

1. A stormwater management plan for a land-disturbing activity shall apply the stormwater management technical criteria outlined in Article 3 (9VAC25-875-570 et seq.) of Part V of the Regulation to the entire land-disturbing activity.
2. A stormwater management plan shall consider all sources of surface runoff and all sources of subsurface and groundwater flows converted to surface runoff; and
3. Best management practices in the stormwater management plan are consistent with design criteria in the Virginia Stormwater Management Handbook, Version 1.0.

B. A complete stormwater management plan shall address all requirements of 9VAC25-875-510.

C. All final plan elements, specifications, or calculations of the stormwater management plans whose preparation requires a license under Chapter 4 (§ 54.1-400 et seq.) or 22 (§ 54.1- 2200 et seq.) of Title 54.1 of the Code of Virginia shall be appropriately signed and sealed by a professional who is licensed to engage in practice in the Commonwealth of Virginia. Nothing in this subsection shall authorize any person to engage in practice outside his area of professional competence.

13. Pollution Prevention Plan Contents

A. A plan for implementing pollution prevention measures during construction activities shall be developed, implemented, and updated as necessary. The pollution prevention plan shall detail the design, installation, implementation, and maintenance of effective pollution prevention measures as specified in 40 CFR 450.21(d) to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented, and maintained to:
1. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
2. Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
3. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

B. The pollution prevention plan shall include effective best management practices to prohibit the following discharges in accordance with 40 CFR 450.21(e):
1. Wastewater from washout of concrete, unless managed by an appropriate control;
2. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;
3. Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and
4. Soaps or solvents used in vehicle and equipment washing.

C. Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls in accordance with 40 CFR 450.21(c).

14. Technical Criteria for Regulated Land-Disturbing Activities

A. To protect the quality and quantity of state water from the potential harm of unmanaged stormwater runoff resulting from land-disturbing activities, the S&S Entity shall adhere to the technical criteria for regulated land-disturbing activities set forth in Part V of the Regulation expressly to include 9VAC25-875-580 [water quality design criteria requirements]; 9VAC25-875-590 [water quality compliance]; 9VAC25-875-600 [water quantity]; 9VAC25-875-610 [offsite compliance options]; 9VAC25-875-620 [design storms and hydrologic methods]; 9VAC25-875-630 [stormwater harvesting]; 9VAC25-875-640

[linear development project]; and, 9VAC25-875-650 [stormwater management impoundment structures or facilities], which shall apply to all land-disturbing activities, except as expressly set forth in 9VAC25-875-490.

B. The S&S Entity shall submit documentation that offsite options, approved by the Department or applicable state board, that are required to achieve the necessary phosphorous water quality reductions have been obtained prior to the commencement of the land-disturbing activity (i.e., prior to issuance of the permit). In the case of a phased project, the land disturber may acquire or achieve the offsite nutrient reductions prior to the commencement of each phase of the land-disturbing activity in an amount sufficient for each such phase.

15. Long-Term Maintenance of Permanent Stormwater Facilities

A. The S&S Entity shall submit a construction record drawing for permanent stormwater management facilities to the VESMP authority based on the locality where the land-disturbing activity will occur. The record drawing shall contain a statement signed by a professional registered in the Commonwealth of Virginia pursuant to Chapter 4 (§ 54.1-400 et seq.) of Title 54.1 of the Code of Virginia, stating that to the best of the professional's knowledge, the construction record drawing shows all adjustments and revisions to the stormwater management plan made during construction and serve as a permanent record of the actual location of all constructed elements.

B. The provision of long-term responsibility for and maintenance of stormwater management facilities and other techniques specified to manage the quality or quantity of runoff is required. Such requirements shall be set forth in a maintenance agreement which is recorded in the local land records prior to permit termination or earlier and shall at a minimum:

1. Be submitted to the VESMP authority for review and approval prior to the approval of the stormwater management plan;

2. Be stated to run with the land;

3. Provide for all necessary access to the property for purposes of maintenance and regulatory inspections;

4. Provide for inspections and maintenance and the submission of inspection and maintenance reports to the VESCP, or VESMP authority; and

5. Be enforceable by all appropriate governmental parties.

(Note: the Department has approved a model stormwater management facility maintenance agreement for use on projects where it is the permitting authority. The model agreement is in Section 10.2.1.1 of the Handbook.)

16. Project Tracking and Reporting

A. The S&S Entity is responsible for providing project tracking and electronic notifications to the Department of all regulated land-disturbing activities subject to this standards and specifications agreement to comply with the applicable ESC and SWM requirements pursuant to 9VAC25-875-830 D 6.

B. The S&S Entity must electronically notify the Department of any land- disturbing activities subject to approved standards and specifications that the S&S Entity intends to construct in Virginia prior to initiating land disturbance. The following information is required to be included in the electronic notification two weeks prior to initiating the regulated land-disturbing activity:

1. Project name and any associated Construction General Permit number;

2. Project location (including nearest intersection, latitude and longitude, or access point);
3. On-site project manager name and contact information;
4. Responsible Land Disturber (RLD) name and contact information;
5. Project description;
6. Acreage of disturbance for the project;
7. Anticipated project start and finish date; and
8. Any deviations/variances/exemptions/waivers associated with the project.

C. In addition to the prior land disturbance notification described above, the S&S Entity shall submit to the Department bi-annual linear project tracking of all active projects covered under this standards and specifications agreement from the last six months (including those previously reported). This bi-annual linear project tracking must include the acreage for all listed projects and shall be submitted by January 15th and July 15th of each year to the Department.

17. Monitoring, Inspections, and Enforcement

A. The S&S Entity or its designated inspector shall perform periodic inspections of the land-disturbing activity during construction for:
   1. Compliance with the approved erosion and sediment control plan;
   2. Compliance with the approved stormwater management plan;
   3. Development, updating, and implementation of a pollution prevention plan;
   4. Compliance with these Standards and Specifications.;
   5. Compliance with the permit, if applicable; and
   6. Development and implementation of additional control measures necessary to address a TMDL.

B. Periodic inspections are the responsibility of the S&S Entity and shall be conducted by an Inspector for ESC and Inspector for SWM or a Dual Inspector, as outlined in 9VAC25-875-400.

C. The Department will conduct periodic inspections on all projects during construction, including random inspections and inspections in response to complaints. Where inspections by Department personnel reveal deficiencies in carrying out an approved plan, the Department may take enforcement actions in accordance with the VESMA and related regulations.

APPENDIX A
Specific Procedures and Processes

SPECIFIC PROCEDURES & PROCESSES FOR PROJECTS IN VIRGINIA

Mountain Valley Pipeline, LLC
2200 Energy Drive, Canonsburg, PA 15317

JUNE 2025

TABLE OF CONTENTS

APPENDICES

ACRONYMS & DEFINITIONS

ATWS	Additional Temporary Workspace
BMP	Best Management Practices
Commonwealth	Commonwealth of Virginia
EI	Environmental Inspector
ESC	Erosion and Sedimentation Control
FERC	Federal Energy Regulatory Commission
HDD	Horizontal Directional Drilling
LDA	Land-Disturbing Activity
LEI	Lead Environmental Inspector
LOD	Limits of Disturbance
MOUNTAIN VALLEY	Mountain Valley Pipeline, LLC
PLAN	FERC Upland Erosion Control Revegetation and Maintenance Plan
PROCEDURES	FERC Wetland and Waterbody Construction and Mitigation Procedures
RLD	Responsible Land Disturber
ROW	Right-of-Way
SPCC	Spill Prevention, Containment and Countermeasure
SWM	Stormwater Management
SWMA	Stormwater Management Act
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
UAS	Unmanned Aircraft System
VADEQ	Virginia Department of Environmental Quality
VDOT	Virginia Department of Transportation
VESCP	Virginia Erosion and Sediment Control Program
VRRM	Virginia Runoff Reduction Method
VSMH	Virginia Stormwater Management Handbook
VSMP	Virginia Stormwater Management Program

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC (MOUNTAIN VALLEY) is a joint venture in which EQT Corporation, LLC., and NextEra US Gas Assets, LLC, are the primary partners. MOUNTAIN VALLEY constructs, operates, and maintains interstate natural gas transmission projects and related infrastructure in the Commonwealth of Virginia and surrounding states.

MOUNTAIN VALLEY has prepared these Standards and Specifications for submission to the Virginia Department of Environmental Quality (VADEQ). These Standards and Specifications document the erosion and sediment control (ESC) and stormwater management (SWM) practices MOUNTAIN VALLEY will implement for regulated land disturbance and related activities in the Commonwealth associated with its natural gas transmission infrastructure.

These Standards and Specifications meet the applicable requirements of the following:

- Virginia Erosion and Stormwater Management Regulation (9VAC25-875);
- Virginia Erosion and Stormwater Management Act (VEMSA) (Va. Code § 62.1-44.15:24 et seq.);
- Federal Energy Regulatory Commission (FERC) Upland Erosion Control, Revegetation and Maintenance Plan (PLAN); and
- FERC Wetland and Waterbody Construction and Mitigation Procedures (PROCEDURES).

MOUNTAIN VALLEY and its construction contractors will implement these Standards and Specifications for all regulated land disturbance activities in the Commonwealth. Project-specific information along with figures illustrating the ESC and SWM devices to be implemented in accordance with these Standards and Specifications will be included in the site-specific ESC and SWM plans submitted to DEQ for approval, when required. The Virginia Stormwater Management Handbook (VSMH) (Version 4.1 and any subsequent revisions) will also be referenced as an approved source of ESC devices available for implementation.

2.0 GENERAL REQUIREMENTS

These Standards and Specifications have been prepared by MOUNTAIN VALLEY for use by its employees and contractors to identify the means and methods for controlling erosion of surface soils, and to reduce the runoff of sediment to the greatest extent reasonably achievable during and after construction of energy infrastructure projects.

Unless specifically stated, the BMPs and specifications from the VSMH, along with accompanying technical documents and guidance, have been adopted and are accepted for use.

The Minimum Standards and Specifications (STD & SPECS) from the VSMH typically employed for the construction of natural gas facilities are referenced by number throughout these Standards and Specifications. FERC requirements are also referenced by section. MOUNTAIN VALLEY will refer to the

measures in Chapter 7 of the Virginia Stormwater Management Handbook if site-specific conditions warrant additional ESC measures.

MOUNTAIN VALLEY does not, and has no plans to, conduct land-disturbing activities in areas subject to the Chesapeake Bay Preservation Act, Va. Code § 62.1-44.15:67. These Standards and Specifications therefore have not been developed to comply with the requirements of that Act.

Implementation of these Standards and Specifications will be overseen by one or more Program Administrators employed by MOUNTAIN VALLEY who possess the requisite program administrator certification(s) from VADEQ as listed in 9 VAC 25-850-40A (9VAC25-875-400(A)).

2.1 PLAN DEVELOPMENT AND REVIEW

MOUNTAIN VALLEY will implement the following steps for the development and review of ESC, SWM, and SWPPP plans:

- A Program Administrator who has completed the “Program Administrator for Erosion and Sedimentation Control” and “Program Administrator for Stormwater Management” will oversee the development and implementation of the ESC, SWM, and SWPPP plans in accordance with these Standards and Specifications.
- Site-specific ESC plans will be prepared for any regulated land-disturbing activity that disturbs 10,000 square feet or greater. For the purposes of the ESC plan requirements, land-disturbing means any man-made change to the land surface that may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands in the Commonwealth, including, but not limited to, clearing, grading, excavating, transporting, and filling of land, except those activities exempted by Va. Code § 62.1-44.15:51.
- Site-specific SWM plans and a Stormwater Pollution Prevention Plan will be prepared for any regulated land-disturbing activity that disturbs 1 acre or greater. For the purposes of the SWM plan requirements, land disturbance" or "land-disturbing activity" means a manmade change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation, except that the term shall not include those exemptions specified in Va. Code §62.1-44.15:34.
- Plans will be developed under the supervision of a professional engineer licensed to practice engineering in the Commonwealth of Virginia. The plans will comply with all applicable requirements of the Virginia ESC and Stormwater Management Regulation (9VAC25-875) (effective July 1, 2024), Virginia ESC and SWM Certification Regulations (9VAC25-850-50), FERC PLAN and PROCEDURES, and these Standards and Specifications.
- The ESC, SWM, or SWPPP plans will be submitted to one or more Plan Reviewers who have completed the VADEQ certification process for “Plan Reviewer for Erosion and Sediment Control” and “Plan Reviewer for Stormwater Management.”

- MOUNTAIN VALLEY and the Plan Reviewer(s) will conduct a completeness review to verify each project plan is complete.
- Any deficiencies identified by the Plan Reviewer(s) will be addressed and followed by further review by the Plan Reviewer(s). This process will continue until the Plan Reviewer(s) is satisfied that the plans meet the standards described in this document and thereby approves the plans.
- The Program Administrator will document approval of the plan set by stamping them and issuing a written approval letter on MOUNTAIN VALLEY letterhead. Minor redline changes to plans made in the field will be reviewed and approved by the Program Administrator in the same manner.
- The Program Administrator will submit variance requests, if any, to VADEQ for review and approval in accordance with 9VAC25-875-170.

2.2 VADEQ SITE-SPECIFIC PLAN REVIEW AND OVERSIGHT

In addition to the plan development and review requirements set in Section 2.1, the following additional site-specific plan review and oversight measures will be implemented if required by Va. Code § 62.1- 44.15:81.D or other authority. It is understood that these additional measures may be implemented for large pipeline construction projects but are not intended to apply to smaller-scale projects, such as routine maintenance and repair of previously constructed infrastructure.

- The Program Administrator(s) will act as the point of contact for VADEQ throughout the project.
- After completing the plan review and approval process outlined in Section 2.1, the Program Administrator will submit its ESC and SWM plans and related/supporting documentation, including any variance requests, and SWPPPs for a project to VADEQ for review and approval in accordance with this section.
- As authorized by law, the State Water Control Board and VADEQ may charge fees sufficient to cover the costs associated with plan reviews. Costs associated with the VADEQ review process may include third party plan review.
- Following completion of the technical review of the plans by VADEQ and determination the submission meets the requirements outlined in these Standards and Specifications, VADEQ will issue an approval letter as well as record stamp the approved plan documents.
- As authorized by law, the State Water Control Board and VADEQ may enforce approved specifications and charge fees equal to the lower of (i) $1,000 or (ii) an amount sufficient to cover the costs associated with standard and specification review and approval, project inspections, and compliance. Costs associated with the VADEQ review process may include third-party plan review.
- VADEQ will perform pre-scheduled as well as random site inspections for the project. Random site inspection or inspections in response to a complaint may be conducted without prior notification to MOUNTAIN VALLEY, its contractors and/or inspection staff. Inspections are intended to ensure compliance with the SWMA, the ESC Law and regulations adopted thereunder. The VADEQ may take enforcement actions if areas of non-compliance are identified during the routine inspection or

in response to a complaint report.

MOUNTAIN VALLEY shall notify VADEQ before commencing any land-disturbing activity (as that term is defined in Va. Code § 62.1- 44.15:51 and/or 9VAC25-875-10 and summarized in Section 2.1)) or project subject to these Standards and Specifications. Such notification shall be provided to allow VADEQ to determine if it will exercise its discretion to provide site-specific oversight to an activity or project in accordance with this Section 2.2.

2.3 PRECONSTRUCTION NOTIFICATION

The following information is required to be included in the e-notification StandardsandSpecs@deq.virginia.gov two weeks prior to initiating a regulated land-disturbing activity (LDA) (refer to Section 2.1 for definitions of land-disturbing activity):

- Project **name** and any associated Construction General Permit number;
- Project location (including nearest intersection, latitude and longitude, access point);
- On-site project manager name and contact information;
- Responsible Land Disturber (RLD) name and contact information;
- Project description;
- Acreage of disturbance for project;
- Anticipated project start and finish date; and
- Any deviations/variances/exceptions/waivers associated with this project.

The project's Pre-Construction kickoff meeting date, time and location will be provided in the e-notification. During the project's Pre-Construction kickoff meeting, MOUNTAIN VALLEY staff will present the project's Safety Environmental Awareness Program (SEAP) training. FERC requires that all visitors, agency representatives, contractors and company staff attend the project specific SEAP training prior to entering the project work limits. SEAP training will be conducted throughout the project to facilitate staff additions and visitors as needed.

In addition to the prior land disturbance notification described above, the S&S Entity shall submit to the Department bi-annual linear project tracking of all active projects covered under these standards and specifications agreement from the last six months (including those previously reported). This bi-annual linear project tracking must include the acreage for all listed projects and shall be submitted by January 15th and July 15th of each year to the Department.

Copies of the project permit authorizations will be maintained at each construction spread job trailer/yard in a dedicated project permit mailbox. The location of the mailbox will be identified during the project's Pre-Construction kickoff meeting held for each construction spread.

2.4 PRECONSTRUCTION REQUIREMENTS

A VADEQ-Certified Responsible Land Disturber (RLD), holding a valid RLD Certification, shall be named for each project (or per construction spread for large linear projects) involving regulated LDA. MOUNTAIN VALLEY will require, at minimum, one Environmental Inspector per project/construction spread to obtain/maintain a valid RLD Certification throughout the project construction and restoration activities.

A copy of the approved plans will be maintained in a project mailbox established for each project or construction spread, as applicable. All redline changes will be maintained on this official copy of the plan drawings and presented upon request to VADEQ inspectors during routine inspections.

2.5 REVISIONS TO ESC, SWM, & SWPPP PLANS

For revisions to the approved ESC Plans:

- Minor field-approved revisions that do not increase the LOD or that will increase the effectiveness of ESC and SWM BMPs will be "redlined" on a set of plans that will remain on site for the duration of the project to allow MOUNTAIN VALLEY and VADEQ to ensure compliance with the approved plan and applicable regulatory requirements:
  - MOUNTAIN VALLEY will maintain a log documenting all red-line changes per construction spread. The log will be presented to the VADEQ Inspector upon request for signoff. Minor redline revisions include (but are not limited to) the following:
    - Adjustment of BMP orientation to ensure proper function and protection of the adjacent resources;
    - Implementation of additional measures to meet changing site conditions or to address areas of potential concern;
    - Adjusting the location of the pipeline centerline within the permitted LOD;
    - Adjusting/lengthening the Temporary Stone Construction Entrance to address weather conditions; and
    - Additional reduction of LOD where necessary.
    - On a regular basis (at least every two weeks), the Program Administrator will review and approve minor redline changes made in the field in accordance with Section 2.1 to ensure consistency with the Standards and Specifications.
- Major revisions include (but are not limited to) the following:
  - Reroutes;
  - Proposed access road additions; and
  - Proposed additional temporary workspace (ATWS) areas.

The revision log documenting redline changes as well as the redline markup of ESC/SWM drawings will be located in each construction spread permit mailbox. An errata sheet will be maintained on the Project website

documenting all major plan approvals, additions, changes, modifications, and revisions along with their corresponding DEQ approval dates.

If VADEQ has assumed plan approval authority in accordance with Section 2.2, major revisions that exit the permitted LOD will be submitted by the MOUNTAIN VALLEY Program Administrator (after the following the plan review and approval process outlined in Section 2.1) to VADEQ for review and approval prior to implementation of the change for projects for which VADEQ has conducted individual plan review.

2.6 INSPECTION STAFF REQUIREMENTS & RESPONSIBILITIES

Environmental Inspection Staff requirements include[1]:

- A project will have one Lead Environmental Inspector (LEI) and at least one Environmental Inspector (EI) per construction spread.
- The LEI and EI(s) will be required to be knowledgeable of environmental permit compliance requirements, be experienced in ESC and SWM BMP installation, operation and maintenance requirements, project permit conditions, and experienced with the FERC's PLAN and PROCEDURES.
- The LEI/EI will review the implementation of the Standards and Specifications and any applicable environmental permits, resolve apparent conflicts between permits and the Standards and Specifications, and coordinate with the Construction Supervisor about additional measures which may be needed to address erosion and sedimentation.
- The LEI will also keep a daily log of activity documenting project activities related to environmental permit compliance and corrective measures implemented, site visitors (i.e. non-project staff), waterbody and wetland crossing log and ESC installation and maintenance activities.
- MOUNTAIN VALLEY will require all LEI and EI staff working on projects in the Commonwealth to obtain the dual ESC and SWM Inspector Certification (to function in these roles.
    - In addition, MOUNTAIN VALLEY may retain a VADEQ-Certified ESC and SWM Inspector from a third-party contractor as needed to provide additional staff support. MOUNTAIN VALLEY may also enter into agreements or contracts with soil and water conservation districts, adjacent localities, or other public or private entities to carry out or assist with these responsibilities.
- For activities regulated by FERC, MOUNTAIN VALLEY will also have a FERC third-party inspector assigned to each construction spread. This inspector will have peer status with all other activity inspectors and shall have the authority to stop activities that violate the environmental conditions of the FERC certificate or other authorizations and order corrective action once approval has been granted by the MOUNTAIN VALLEY Project Manager.

[1] Inspection staff requirements will be determined by MOUNTAIN VALLEY based on the construction activities being undertaken and accessibility to the active areas while providing appropriate coverage to maintain environmental compliance.

Environmental Inspection Staff responsibilities include (but are not limited to):

- Managing the spread punchlist for ESC controls that are in need of routine maintenance/repair/replacement due to (but not limited to the following):
  - Construction activities;
  - Storm events;
  - Third party related impacts (including but not limited to: livestock/wildlife, landowner, agricultural activities, unauthorized traffic, vandalism, etc.);
  - Degradation due to age; or
  - Ineffectiveness.
- Prioritizing punchlist items, as necessary, that have a higher potential to result in impacts to sensitive resources or off ROW areas if measures are not corrected in advance of the next precipitation event;
- Verifying punchlist items are completed;
- Ensuring compliance with Mountain Valley's federal and state permit conditions including those contained in these Standards and Specifications;
- Verifying construction limits prior to initiating construction activities;
- Identifying ESC/SWM and soil stabilization needs in all project areas;
- Inspecting installation, operation, and function of all ESC/SWM devices to ensure compliance with the typical details and that controls are functioning properly to prevent loss of sediment in accordance with the requisite inspection frequency;
- Identifying ESC/SWM controls that are in need of maintenance, repair and replacement, and entering items into the punchlist;
- Tracking of installation, maintenance, repair, replacement and removal of all ESC/SWM controls;
- Conducting routine inspections, including daily (as appropriate), SWPPP, and post-storm event;
- Coordinating with agency and third-party monitors regarding project activities and identifying areas where corrective measures are needed;
- Providing monitoring and oversight of all stream and wetland crossings, including by conducting pre- and post-crossing inspections; and
- Investigating ESC/SWM complaint notification.

The LEI and EI shall be responsible for submitting requests to VADEQ field coordinator or their designee, where necessary, for extension of the applicable timeframe to repair or maintain a deficient ESC measure identified by an inspector. Requests shall be submitted in writing and include sufficient information to demonstrate to VADEQ's satisfaction that compliance with the default timeframe would result in greater environmental impacts under the present conditions or that other circumstances beyond MOUNTAIN VALLEY'S control warrant an extension.

Conditions that warrant an extension of the default timeframe include, but are not limited to:

- Saturated soil conditions prevent the deployment of equipment to the location of the ESC control without causing greater damage to other controls and/or causing excessive disturbance to right-of-way areas that are otherwise stabilized; Where the potential damage to stabilized areas of the right-of-way, particularly where permanent vegetative stabilization is in progress, outweighs the likely benefit of deploying equipment to the location of the ESC control;
- Following severe storm events, if complying with the default timeframe for a particular ESC measure or measures would divert necessary resources from other post-storm response actions with greater environmental benefit;
- Where landowner permissions and/or other external requirements must be satisfied to complete an activity; or
- Where adverse weather conditions prevent safe working conditions.

Extensions shall be requested for the period of time reasonably necessary for the conditions justifying the extension to abate. Further extensions may be requested upon a demonstration that the conditions necessitating the extension remain. In the event a request for extension is denied, an appeal may be made via email to VADEQ project management with supporting documentation. Within 24 hours following submittal, a conference call may be necessary to discuss MOUNTAIN VALLEY/Agency concerns regarding the request and to finalize plans for resolution.

2.7 INSPECTION FREQUENCIES AND REQUIREMENTS

MOUNTAIN VALLEY will adhere to the following minimum schedules and requirements for conducting inspections of all temporary erosion and sediment controls and stormwater management BMPs for all areas of a project in the Commonwealth. MOUNTAIN VALLEY is subject to varying inspection frequencies consistent with the respective requirements of the Construction General Permit, VESCP, and VSMP. If adverse weather causes the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. Any time inspections are delayed due to adverse weather conditions, evidence of the adverse weather conditions shall be included in the SWPPP with the dates of occurrence. The frequencies and requirements outlined below consolidate these requirements.

2.7.1 ESC Inspections (DEQ-Certified ESC Inspector)

Inspection frequencies in non-TMDL watersheds:

- During or immediately following initial installation of erosion and sediment controls;
- At the completion of the project prior to the release of any performance bond; and
- Either of the following:
  - At least once every five business days; or

- At least once every 10 business days and no later than 48 hours following a measurable storm event (or on the next business day if the storm event occurs when there are more than 48 hours between business days).

Inspection frequencies in TMDL watersheds:

- During or immediately following initial installation of erosion and sediment controls;
- At the completion of the project prior to the release of any performance bond; and
- Either of the following:
  - At least once every four business days; or
  - At least once every five business days and no later than 24 hours following a measurable storm event (or on the next business day if the storm event occurs when there are more than 24 hours between business days).

Inspection Requirements:

- Record the date and time of the inspection and, when applicable, the date and rainfall amount of the last measurable storm event;
- Record the information and a description of any discharges occurring at the time of the inspection or evidence of discharges occurring prior to the inspection;
- Record any land-disturbing activities that have occurred outside of the approved ESC plan;
- Inspect the following for installation in accordance with the approved ESC plan, identification of any maintenance needs, and evaluation of effectiveness in minimizing sediment discharge, including whether the control has been inappropriately or incorrectly used:
  - All perimeter erosion and sediment controls, such as silt fence;
  - Soil stockpiles, when applicable, and borrow areas for stabilization or sediment trapping measures;
  - Completed earthen structures, such as dams, dikes, ditches, and diversions for stabilization and effective impoundment or flow control;
  - Cut and fill slopes;
  - Sediment basins and traps, sediment barriers, and other measures installed to control sediment discharge from stormwater;
  - Temporary or permanent channels, flumes, or other slope drain structures installed to convey concentrated runoff down cut and fill slopes;
  - Storm inlets that have been made operational to ensure that sediment laden stormwater does not enter without first being filtered or similarly treated; and
  - Construction vehicle access routes that intersect or access paved or public roads for minimizing sediment tracking.
  - Inspect areas that have reached final grade or that will remain dormant for more than 14 days to ensure:

- Initiation of stabilization activities have occurred immediately, as defined in 9VAC25-880-1; and;
- Stabilization activities have been completed within seven days of reaching grade or stopping work.

- Inspect for evidence that the approved ESC plan has not been properly implemented. This includes:
  - Concentrated flows of stormwater in conveyances such as rills, rivulets, or channels that have not been filtered, settled, or similarly treated prior to discharge, or evidence thereof;
  - Sediment laden or turbid flows of stormwater that have not been filtered or settled to remove sediments prior to discharge;
  - Sediment deposition in areas that drain to unprotected stormwater inlets or catch basins that discharge to surface waters. Inlets and catch basins with failing sediment controls due to improper installation, lack of maintenance, or inadequate design are considered unprotected;
  - Sediment deposition on any property (including public and private streets) outside of the construction activity covered by this general permit;
  - Required stabilization has not been initiated or completed or is not effective on portions of the site;
  - Sediment basins without adequate wet or dry storage volume or sediment basins that allow the discharge of stormwater from below the surface of the wet storage portion of the basin;
  - Sediment traps without adequate wet or dry storage or sediment traps that allow the discharge of stormwater from below the surface of the wet storage portion of the trap; and
  - Land disturbance or sediment deposition outside of the approved area to be disturbed.
- Inspect pollutant generating activities identified in the pollution prevention plan for the proper implementation, maintenance, and effectiveness of the procedures and practices.
- Identify any pollutant generating activities not identified in the pollution prevention plan.
- Identify and document the presence of any evidence of the discharge of prohibited pollutants.
- Inspectors should be familiar with and implement any other inspections requirements assigned by the Program Administrator to comply with any permit, consent decree, agency agreement, or voluntary measure.

Inspection Reports:

- Inspectors shall complete an inspection report for each inspection using the form provided by MOUNTAIN VALLEY. Inspection reports shall be appended to the SWPPP no later than four business days after the inspection is complete.
- Inspection reports and any actions taken in response shall be retained as part of the SWPPP for at least three years from the date the relevant project is completed. The inspection report shall identify any incidents of noncompliance. Where an inspection report does not identify any incidents of noncompliance, the report shall contain a certification that the construction activity is in compliance with the SWPPP.

2.7.2 SWM Inspections (DEQ-Certified SWM Inspector)

During Project Construction:

- Inspectors shall inspect any SWM measures installed during the period of project construction utilizing the inspection frequency and applicable requirements outlined above for ESC inspections.
  - Inspectors may require monitoring and reports from the person(s) responsible for meeting the SWM plan requirements to ensure compliance and to determine whether the measures required provide effective stormwater management.
  - Inspectors shall conduct such investigations and perform such other actions as are necessary to carry out the provisions of these Standards and Specifications and the approved SWM plans.
- SWM inspectors are responsible for ensuring:
  - Compliance with the approved ESC plan;
  - Compliance with the approved SWM plan;
  - Development, updating, and implementation of a pollution prevention plan; and
  - Development and implementation of any additional control measures necessary to address a TMDL.

After Project Construction:

- The post-construction inspection frequency will commence for a construction spread when all restoration activities outlined in Sections 2.18.1 through 2.18.6 have been completed for disturbed areas of the spread.
- SWM measures installed in accordance with approved SWM plans shall be periodically inspected and maintained as necessary. The inspection frequency, inspection requirements, and maintenance activities shall be in accordance with these Standards and Specifications and any applicable Stormwater Management Facility Maintenance Agreements entered into between MOUNTAIN VALLEY and VADEQ or other appropriate governmental authority.

2.8 EMERGENCY RESPONSE

In an emergency, MOUNTAIN VALLEY will respond as needed to prevent or minimize harm to persons or property and will contact (via phone and email) the appropriate agencies as soon as practicable under the circumstances. MOUNTAIN VALLEY will immediately implement stabilization and containment measures upon identification of a hazard and develop corrective measures in coordination with the appropriate agencies (including VADEQ). Conducting LDAs in response to a public emergency where the related work requires immediate authorization to avoid imminent endangerment to human health or the environment is not considered a regulated LDA. In such situations, VADEQ shall be advised of the disturbance within seven (7) days of commencing the land-disturbing activity, and compliance with the administrative requirements of subsection A of § 62.1-44.15:34, which is required within 30 days of commencing the LDA. If the land-disturbing activity would have required an approved erosion and sediment control plan or the activity were

not an emergency, then the land area disturbed shall be shaped and stabilized in accordance with the requirements of the VADEQ.

2.9 SPILL PREVENTION, CONTAINMENT, & COUNTERMEASURE PLAN

MOUNTAIN VALLEY projects will be implemented in accordance with a SPCC Plan that meets the requirements of the Commonwealth and federal agencies. A copy of the SPCC Plan will be maintained and updated onsite for implementation during project activities.

2.10 GENERAL DESCRIPTION OF PIPELINE CONSTRUCTION ACTIVITIES

Pipeline and related facility construction activities include all activities associated with the project from the initial planning stages to the final restoration and maintenance of the right-of-way (ROW). Daily activities will be planned and managed in advance to provide sufficient resources and manpower for the work effort to be accomplished in a timely manner. The primary construction activities undertaken by MOUNTAIN VALLEY are the construction of natural gas pipelines and facilities along with their associated continued maintenance. Other construction activities to be undertaken in accordance with these Standards and Specifications include the construction of access roads, laydown yards, mainline valves, and compressor stations necessary for the construction, maintenance, or operation of MOUNTAIN VALLEY's pipeline facilities.

Cross-country pipeline construction typically proceeds in an assembly line fashion, with multiple stages of construction occurring simultaneously at different locations to minimize the time needed to complete the project. The stages of construction include: survey and planning, mowing and clearing, grubbing and grading, trenching, pipe assembly (including stringing, bending, welding, testing, coating, and lowering-in), backfilling, final grading, and restoration. The ESC measures to be installed for each of these stages are described below. If any denuded area will remain idle for more than 14 days, temporary stabilization (temporary seed or mulch, as directed by the Environmental Inspector) will be applied within seven (7) days (unless otherwise noted) to that area.

Specific areas (e.g. wetland/water body crossings, residential areas, road or railroad crossings, etc.) requiring specialized construction measures (e.g. boring or directional drilling) will be treated as separate construction entities. Environmentally sensitive areas such as stream and wetland areas, ponds, water supply areas (springs, wells, public water intakes), karst features, threatened and endangered species areas, culturally significant areas (cemeteries, historical or archaeological resources), or areas identified by landowners as being of concern may require additional ESC Procedures, as described in Section 3.0 Temporary Erosion Controls and outlined in the project's ESC plan drawings. Specialized construction techniques often combine several construction stages into one. This reduces the duration earth disturbing activities occur in a specific area and in many cases, reduces the LOD required for implementation in these

specific areas. Final testing (see Section 2.24 Hydrostatic Testing) of facilities will be completed after tie-ins are completed.

2.11 CONSTRUCTION WORK AREAS

Construction work areas include all facilities, access roads, staging areas, temporary pipe yards, contractor yards, and the construction ROW. To the extent possible, previously disturbed areas will be used for construction to minimize new impacts. Landowner agreement and appropriate permits will be obtained prior to the use of any area for project construction activities. These ESC and SWM specifications apply to all construction work areas utilized by MOUNTAIN VALLEY.

Temporary workspace is typically reduced at waterbody and wetland crossings to the extent feasible. ATWS may be required at specific locations to accommodate road and utility crossings, waterbody and wetland crossings and in steep slope areas, etc. Variations may occur based on the type of facility under construction, landowner conditions, permit conditions, or topographic conditions.

The construction ROW may be widened (subject to compliance with all applicable survey and mitigation requirements, landowner agreements and all other necessary approvals) in areas such as steep slopes and topsoil conservation areas to ensure safe construction and for storage of excess spoil.

After construction is completed, all work areas will be restored with a perennial vegetative cover, unless specifically directed otherwise by the landowner or permit conditions. Following permanent stabilization, temporary work areas will be returned to pre-construction land uses.

Consistent with the 2024 Construction General Permit, MOUNTAIN VALLEY will minimize the exposure of waste materials to precipitation by closing or covering waste containers during precipitation events and at the end of the business day or implementing other similarly effective practices. Minimization of exposure is not required in cases where the exposure to precipitation will not result in a discharge of pollutants.

2.12 CONSTRUCTION LINE LIST AND PERMITS

MOUNTAIN VALLEY will provide the contractor with a Construction Line List that describes special requirements (e.g., timber salvage, topsoil segregation, restoration measures, and fencing requirements) requested by landowners. The contractor will comply with these special requirements so long as they do not conflict with the requirements of these Standards and Specifications or any other federal or state permit requirements.

When constructing a FERC-regulated project, landowner contact information is considered privileged and confidential and is not available for public review, including under Freedom of Information Act requests. As a result, parcel identification numbers are provided on site-specific ESC and SWM plan drawings. Information regarding landowners will be maintained by each construction spread EI as well as in the project job trailer located at each construction spread yard. This information will be available to the VADEQ during

site inspections and as needed throughout construction and restoration activities.

Per Minimum Standard (MS)14 of 9VAC25-875-560, MOUNTAIN VALLEY will obtain all applicable federal, state and local permits pertaining to working in wetlands or crossing live watercourses. In the event permit requirements are more stringent than the requirements of these Standards and Specification, the more restrictive requirements will be implemented. These may include, for example, the following:

- United States Army Corps of Engineers Nationwide Permit 12
- Virginia Marine Resources Commission Submerged Lands Agreement
- VADEQ 401 Water Quality Certification

It will be the construction contractor's responsibility to obtain permits that may be required for specialized activities such as burning, blasting, and transportation activities associated with the project. This responsibility shall be a condition of each contractor's contract.

2.13 SURVEY AND PLANNING

To the extent practicable, construction work areas will be selected in advance and included in all surveys, landowner negotiations, and permitting. Any new work areas selected by the contractor must receive appropriate review, permitting and applicable agency approval prior to their use. In the event additional workspace (including access roads, expanded temporary ROW, ATWS, etc.) is needed, MOUNTAIN VALLEY will submit additional information to VADEQ for review and approval prior to initiating use of these areas (provided VADEQ is exercising site-specific oversight for the activity or project in accordance with Section 2.2). The limits of the approved work areas, boundaries of environmentally sensitive areas and the location of the facilities will be marked in the field and verified prior to the start of mechanized activities.

2.14 MOWING AND CLEARING

The initial mechanized stage of construction involves the clearing of brush, trees, and vegetation from the ROW. Where mowing and clearing operations result in denuding of soil, stabilization, erosion control or sediment trapping measures shall be installed as soon as practicable, but no later than seven days after soil exposure, to prevent erosion and deposition of sediment on roadways, properties and waterways located off of the LOD. Vegetation will be cut off at ground level, and un-merchantable timber (e.g., brush, stumps, slash, and tree tops) will be disposed of by chipping and blowing chips off LOD in upland areas (landowner approval required), windrowing, or by burning (if allowed). Burning will only be conducted if appropriate permit approvals are received, and activity is authorized by MOUNTAIN VALLEY. Merchantable timber will be cut and stacked along the outboard edge of the construction LOD in upland areas as directed by the landowner ROW agreements and approved by the MOUNTAIN VALLEY Construction Supervisor.

Tree tops and brush may be chipped and spread (blown) uniformly onto undisturbed forest land adjacent

to the disturbed ROW if allowed per landowner agreement. Alternately, if wood chips generated from land clearing activities are scattered along the edge of the ROW, the chips will be spread to a maximum of 1 ton/acre and an additional application of 1 pounds of nitrogen per 1,000 square feet of wood chips will be made to affected areas. MOUNTAIN VALLEY will never apply more than one (1) pound of nitrogen per 1,000 square feet within a 30-day period. Annual limits for total nitrogen application will vary based on the solubility of the nutrient, therefore MOUNTAIN VALLEY will reference the most current VADEQ technical bulletin for the application rates in certain seasons and habitats.

Clearing of vegetation in wetlands will be limited to trees and shrubs, which will be cut flush with the surface of the ground and removed from the wetland. Stump removal, topsoil segregation, and excavation will be limited to the area immediately over the trench line within the permanent easement per, as applicable, permit requirements from the U.S. Army Corps of Engineers, FERC PROCEDURES, and/or a project's FERC Certificate conditions. Trees located within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating may be selectively cut and removed from the permanent ROW. Limited stump removal and grading may be conducted within the permanent easement in wetlands to ensure a safe working environment.

Where requested by the affected landowners, trees of special concern (i.e. located within or immediately adjacent to construction LOD) will be protected by fencing and armoring in accordance with VSMH C-SSM-01 Tree Protection and Preservation, as necessary. Trees and shrubs that are not required to be cleared to facilitate construction activities will not be unnecessarily damaged during construction (VSMH Fig. C-SSM-01-1, -2. -7. -8. -9).

2.15 FENCE CROSSINGS

Where it is necessary to remove existing fences in the ROW, adequate temporary fences and gates will be installed around the construction area, if required by the landowner. Temporary fences or gates will be provided with suitable fasteners and will be kept closed, except when necessary to be opened for construction purposes. Existing fences will be replaced in kind or as agreed upon with the landowner upon completion of work.

2.16 GRUBBING AND GRADING

The grading operation involves grubbing of stumps, stockpiling topsoil where applicable, and leveling the construction ROW to create a safe operating area for equipment, employees and vehicles. Where required (see Section 2.17), topsoil and subsoil disturbed during grading operations will be stored separately and will not be mixed together or with foreign material (e.g., stumps, slash, or wood chips). Soil stockpiles resulting from grading operations shall be stabilized or provided with sediment trapping measures. The disposal methods described in Section 2.14 Mowing and Clearing for clearing debris also apply to stumps. Grading and grubbing will be conducted as a separate construction activity at waterbody and wetland

crossings which will be treated as separate construction areas until the contractor is prepared to complete all other construction activities at that site in the shortest practicable time. Because grubbing and grading involve ground disturbance, down-gradient temporary ESC devices shall be installed and functioning prior to conducting these activities.

ESC measures will be installed as a first step in any LDA and will be made functional before upslope land disturbance takes place. Specifications for temporary ESC measures are discussed below in Section 3.0 Temporary Erosion Control.

2.17 TOPSOIL CONSERVATION

Topsoil will be segregated in pastureland, upland forested areas, residential areas, meadowlands, wetlands without standing water or saturated soil, areas requested by the landowner, and where directed by the EI. The topsoil will be stored separately from trench subsoil and replaced on top of the subgrade during final grading. Topsoil will be stored along the edge of the temporary LOD, maintaining a minimum 10-foot setback from waterbody and wetland boundaries. In non-saturated/non-standing water wetland areas, the top 12 inches of wetland soil will be segregated from the trench line during trenching activities to be used during restoration.

In agricultural lands and upland forested areas, topsoil will be stripped from either the full LOD (using additional temporary ROW to store the topsoil in this case) or from the trench line and subsoil storage area. During construction, topsoil storage piles shall be stabilized or protected with sediment trapping measures. At least 12 inches of topsoil (where available) will be segregated in deep soils. Where soils are shallow, every effort will be made to segregate the entire topsoil layer. In residential areas, topsoil replacement (i.e., importation of topsoil) is an acceptable alternative to topsoil segregation. Topsoil may not be used to fill sandbags or to pad the pipe.

2.18 DRAIN TILES

The following procedures apply to locations where existing drain tiles are encountered:

- Mark drain tile locations identified prior to and during construction.
- Inspect all drainage tile systems exposed within the area of disturbance to check for damage.
- Repair drain tiles damaged during construction activities to their original condition.
  - Drain tile repair will be limited to the area damaged within the construction LOD. Do not use filter covered drain tiles without agreement of the local soil conservation authorities and the landowner. The construction contractor, overseen by the EI or construction inspector, will be responsible for testing and repairs.
- For new pipelines in areas where drain tiles exist or are planned, ensure that the depth of cover over the pipeline is sufficient to avoid interference with drain tile systems. For adjacent pipeline

loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

2.19 IRRIGATION

Water flow will be maintained in crop irrigation systems, unless shutoff is coordinated with affected parties.

2.20 ACCESS ROADS

MOUNTAIN VALLEY will utilize existing roads and newly constructed roads to facilitate construction. Typical road widths will be 25 feet but may require additional temporary widening to facilitate use by large equipment and pipe delivery trucks. Existing roads will be maintained with minor grading and gravel dressing (as needed) to maintain the road surface. Temporary ESC BMPs will be installed in accordance with the ESC plan. For existing roads that require waterbody crossing culverts to be replaced due to condition or temporary widening for use, MOUNTAIN VALLEY will either span the waterbody to avoid impact or permit the culvert replacement as an impact under an appropriate permit from the U.S. Army Corps of Engineers and/or Virginia Water Protection permit.

Following installation of a project, existing roads that required temporary widening will be returned to pre-existing contours and conditions where required. At these required locations, any drainage culverts damaged will be repaired as needed and returned to pre-existing conditions. Areas of temporary widening will have the temporary road surface reclaimed and the disturbed areas revegetated. The road surface will be returned to the pre-existing width and a top coat of gravel applied (where necessary). Once disturbed areas are permanently stabilized with vegetation or other measures (i.e. gravel, where applicable), temporary ESC BMPs will be removed and properly disposed of at an approved waste disposal site.

Newly constructed temporary access roads will be installed in accordance with the ESC plans. Following completion of the project, temporary access roads will be returned to pre-existing contours and stabilized with permanent vegetation unless otherwise approved by VADEQ. Temporary ESC BMPs will be maintained on temporary access roads throughout the project until the disturbed area is restored and permanently stabilized with vegetation. Once the area has been permanently stabilized, the temporary ESC BMPs will be removed and properly disposed. Existing dirt roads, logging roads, and two-track or vegetated agricultural roads will be returned to their pre- construction conditions. Roads with a pre-construction dirt surface will be temporarily stabilized with seed and mulch upon restoration. No new roads will be constructed unless prior approval has been received from the appropriate agencies (including VADEQ and FERC).

Newly constructed permanent access roads that are required for operation of a project will be installed in accordance with the project's ESC plan terms and conditions. Permanent roads will be installed for construction use and will remain in-place for operation of the facilities. Permanent stormwater controls (as needed) will be designed in accordance with the Project approved ESC/SWM Plans, these Standards and

Specifications, the VSMH, and/or approved by VADEQ.

2.21 TRENCHING

Trenching consists of excavating the trench for the pipeline and is typically accomplished with an excavator or a rotary wheel-ditching machine. In areas where soft rock or hard pans are present, a tractor-mounted ripper or excavator mounted hammer can be used to break and loosen consolidated material. Loosened material will then be removed with an excavator. Spoil piles from trenching activities that will remain undisturbed for seven days or longer shall be stabilized or provided with sediment trapping measures. The ditch will be excavated to a minimum practicable width for excavation stability; additional width will be excavated to meet safety standards when work will occur within the excavation such as at tie-ins, bore pits, valve settings, etc. In areas where mechanized means of rock removal is unsuccessful, blasting may be used as needed. Projects will prepare a general blasting plan for use during activities. As necessary, a site-specific blasting plan may also be prepared by the construction contractor for MOUNTAIN VALLEY's review and approval. Any site or project-specific blasting plans can be found in the project-specific appendices.

2.22 TRENCH BREAKERS

Temporary trench breakers will be installed in the open trench during trenching, just upslope of every interceptor diversion (at a minimum), to reduce the velocity of storm water flow along the trench and decrease erosive velocity. Trench breakers are not employed in trenchless construction such as conventional boring or horizontal directional drilling, or in non-linear excavations (such as work within a station yard). Temporary trench breakers are typically made of sandbags but may consist of native materials except topsoil. Topsoil shall not be used for trench breakers. Trench breakers will be inspected prior to final back filling of the trench. See the following table for recommended spacing.

MAXIMUM RECOMMENDED SPACING AND MATERIALS FOR PERMANENT TRENCH BREAKERS[1]

Trench Slope	Distance (feet)	Plug Material
0-5%	See Note [2]	Concrete Filled Sacks
5-15%	500	Sandbags or Concrete Filled Sacks
15-25%	300	Sandbags or Concrete Filled Sacks
25-35%	200	Sandbags or Concrete Filled Sacks
35-100%	100	Sandbags or Concrete Filled Sacks
>100%	50	Concrete Filled Sacks (Wetted)

NOTE 1: Spacing and/or plug material approved in Project-Specific ESC/SWM Plans shall be used if different from what is shown here.

NOTE 2: Trench Breakers are required at all waterbody crossings regardless of trench slope. Otherwise, not required at slopes <5%.

Following pipe installation, the temporary trench breakers are replaced with permanent trench breakers to inhibit piping and subsurface erosion in the trench. Materials appropriate for use as permanent trench breakers include sandbags, concrete filled sacks, or VADEQ approved alternative. On steep slope areas, the MOUNTAIN VALLEY Construction Supervisor may require that permanent trench breakers be made with wetted cement bags, mortared stone, or other impervious material approved by VADEQ. Permanent trench breakers must be installed at stream banks, at the edge of wetlands, and in road and railroad embankments to minimize the chance of subsidence. Permanent trench breaker installations at waterbody and wetland crossings must be constructed with impervious materials to prevent the trench line from serving as a conduit to convey groundwater away from the resource.

2.23 PIPE ASSEMBLY

Most pipe assembly activities do not require any additional ESC measures; however, all ESC measures will be maintained in good working order where pipe assembly is being conducted.

2.24 HYDROSTATIC TESTING

A pipeline must be pressure tested after backfilling and before placing it into operation in order to establish the Maximum Allowable Operating Pressure (MAOP). Pressure testing may also be conducted on a pipe segment prior to lowering-in as directed by the Construction Supervisor. Pressure testing, or hydrostatic testing as it is called when the test is conducted with water, is often conducted while clean-up activities are on-going. The test manifold locations may be restored out of sequence with the rest of the ROW. If portions of the restored ROW must be disturbed again in order to complete pressure testing, ESC measures will be

implemented as applied during the rest of construction and as described in these Standards and Specifications.

Hydrostatic test water will be released to upland areas through an energy dissipating dewatering device in accordance with VSMH C-SCM-10 (Dewatering Structures) and/or approved Project Typical Construction Details. The dewatering structures will be sized to accommodate the rate and volume of release. These activities will be monitored and regulated to prevent erosion and over pumping of the dewatering structures. Releases will be stopped when necessary to perform maintenance of the dewatering structures and ensure they remain in good working order. No hydrostatic test releases will occur directly to waterbodies, wetlands or other identified environmentally sensitive areas.

Because MOUNTAIN VALLEY does not intend to release any hydrostatic test water to waterbodies, coverage under a Virginia Pollutant Discharge Elimination System (VPDES) permit is not required. Nevertheless, as an additional BMP, all upland releases of hydrostatic test water will be conducted in accordance with the sampling, monitoring, and effluent limit conditions (pH of 6.0-9.0, no more than 15.0 mg/l petroleum hydrocarbons and 0.011 mg/l total residual chlorine) of the General VPDES Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests, VAG83, 9 VAC 25-120-80, applicable to discharges of hydrostatic test water.

2.25 TRENCH DEWATERING

The trench will be cleared of debris and dewatered prior to lowering in pipe or equipment. Water from dewatering operations will be filtered through an approved filter bag that will comply with manufacturer's recommendations for inspection and maintenance, passed through a VADEQ standard dewatering structure, and discharged in a manner that does not result in accelerated erosion or adversely affect off-site property. Trench dewatering will be conducted through a filter bag and placed within a dewatering structure (i.e. VSMH C-SCM-10) or other approved alternative). Pumped Water Filter Bags should be replaced as often as necessary to maintain function and prevent a failure of the filter bag. Pumps used in the dewatering activity will be placed in a secondary containment to prevent spills of fuel or oil to the ground surface in accordance with the SPCC Plan. Dewatering structures will be constructed in a well vegetated stabilized area away from waterbodies and wetlands and sized according to the intended use. Discharge will be monitored and controlled to prevent erosion and sedimentation from occurring to adjacent areas as well as to prevent over pumping of the dewatering structure. The discharge will be directed away from any waterbody, wetland or other environmentally sensitive areas. The discharge point will be monitored during the activity to ensure that the discharge is thoroughly filtered, and no erosion or sedimentation occurs at the discharge point.

If directed or authorized by MVP, anionic polymers may be used as a flocculent on a case-by-case basis to supplement the approved treatment methods. These products may be considered for use during trench

dewatering in upland areas, during road or stream bores where high volumes of pit water are anticipated, during the dry-ditch open-cut resource crossings, and other areas where necessary. Polymer use is not intended for replacement of traditional methods but should be used in conjunction with the traditional methods. USE OF CATIONIC POLYMERS ARE PROHIBITED. All polymer products will be submitted to VADEQ for review prior to use.

2.26 BACKFILLING

Backfilling follows pipe installation and generally consists of replacing the material excavated from the trench. In areas where topsoil has been segregated, the subsoil will be replaced first, and the topsoil will be replaced during final grading. Backfilled trench material will be compacted to stabilize the trench. Excess rock, including blast rock may be used to backfill the trench to the top of the existing bedrock profile.

As specified above, permanent trench breakers will be installed in accordance with the specifications identified under Section 2.22 Trench Breakers to prevent the backfill from sliding or washing on sloping ground.

2.27 FINAL GRADING

Final grading will be completed no later than 20 calendar days after backfilling (10 calendar days in residential areas), soil and weather conditions permitting. These durations may be extended in locations where it is necessary to maintain a travel lane for access to other portions of the Project.

The ROW will be cleared of construction debris, re-graded to pre-construction contours, and segregated topsoil will be replaced. ROW diversions will be installed in accordance with approved Project Typical Construction Details. All temporary ESC perimeter controls will remain in place until replaced by permanent ESC measures or when a ground cover that is uniform, mature enough to survive, and will inhibit erosion is achieved. In rotated and permanent cropland and pastures, residential areas, and other areas as stipulated by the Construction Supervisor, excess rock greater than four (4) inches in diameter will be removed from at least the top 12 inches of soil to the extent practicable. After final grade is achieved, the size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. The landowner may approve other rock size provisions in writing.

In areas where establishing pre-construction contours and conditions are not feasible (i.e. valve locations, meter sites, new access road locations, etc.), MOUNTAIN VALLEY will address these areas in the site-specific ESC and SWM plans. These areas will be addressed specifically in the plan sets with the specific sheets identified in the cover letter when submitted to DEQ for review. In the event additional areas are identified (i.e. temporary access roads, etc.), MOUNTAIN VALLEY will contact VADEQ to discuss changes.

2.28 TEMPORARY STABILIZATION

When acceptable final grade cannot be achieved (e.g., during winter or early spring construction), when permanent seeding cannot be applied due to adverse soil and weather conditions, or any time a denuded area will remain idle for more than 14 calendar days, temporary stabilization measures will be implemented. Temporary seeding (VSMH C-SSM-09) will be applied to the rough graded area in accordance with Table 3.31-B in the VSMH. Following seed application, mulch will be applied to help the seed stay in place, to hide the seed from animals, and to retain soil moisture. Mulch can consist of straw, erosion control fabric, hydraulically applied blanket, or some functional equivalent. ESC measures will be monitored and maintained until conditions improve and final cleanup can be completed in the next recommended planting window.

Erosion control fabric, such as jute matting or bonded fiber blankets, may be used as temporary stabilization. Fiber matrix or polyacrylamide-based erosion control products will be substituted for erosion control blanket in agricultural areas. Additionally, slopes in excess of 30% will be stabilized with steep slope soil stabilization blankets and matting techniques identified in the VSMH C-SSM-05 Soil Stabilization Blankets and Matting. In addition to VSMH C-SSM-05 Soil and Stabilization Blankets and Matting, MOUNTAIN VALLEY will utilize hydraulically applied soil stabilization blankets and matting (i.e. EarthGuard, Flexterra or equivalent) as an alternative to the rolled ESC blanket material identified under VSMH C-SSM-05.

Plastic covering may also be used as temporary protection for soils, slopes, and stockpiles where soil conditions do not allow traditional mulching/seeding or soil stabilization blanket to be installed. Plastic covering shall be limited to stockpiles or small areas requiring urgent protection and only remain in place until traditional measures (mulching/seeding or soil stabilization blanket) can be installed.

As per MS-1, permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization shall be applied to areas that are planned to be left dormant for more than one year.

2.29 PERMANENT SLOPE BREAKERS

Permanent slope breakers (also commonly called ROW diversions or waterbars) are intended to reduce runoff velocity and divert water off the construction ROW. Permanent slope breakers will be constructed in accordance with the approved Project Typical Construction Details or VSMH. Permanent slope breakers will be constructed and maintained in all areas, except cultivated areas and lawns, using the maximum spacing identified in the approved Project Typical Construction Details or VSMH.

Permanent slope breakers will be constructed with a 2-4 percent out-slope to divert surface flow to a well-vegetated stable area. In the absence of a well-vegetated stable area, appropriate energy-dissipating

devices will be constructed off the construction ROW .

2.30 SOIL COMPACTION MITIGATION

During preparation of the LOD and trench excavation, topsoil will be segregated and stockpiled separately from excavated subsoil as provided in Section 2.17 Topsoil Conservation. During backfill and final grading, topsoil and subsoil will be returned to their original profile. MOUNTAIN VALLEY will decompact areas disturbed during construction activities to facilitate revegetation of the ROW. This will include discing, ripping, scarifying, tilling, or equivalent practices to the subsoil to a depth of 4-6” prior to returning topsoil to the ROW. Topsoil will then be disced (or an equivalent decompaction practice) prior to seed and mulch application. Severely compacted areas may require additional de-compaction activities to be employed on an as needed basis using a plow or other deep tillage implement.

Following discing (or an equivalent decompaction practice), seed and mulch will be applied to the prepared seedbed. In lieu of anchoring mulch to the topsoil using tracked equipment, MOUNTAIN VALLEY will utilize an agricultural crimper to minimize potential for excessive compaction to occur. As an alternative option in agricultural areas, arrangements can be made with the landowner to plant and plow under a "green manure" crop, such as alfalfa, to decrease soil bulk density and improve soil structure. If subsequent construction and cleanup activities result in further compaction, additional tilling may be required.

Restored soils will be tested for compaction throughout the project as necessary in areas disturbed by construction activities. Compaction testing locations will be determined by the MOUNTAIN VALLEY LEI/EI during restoration activities. Tests will be conducted on the same soil type under similar moisture conditions in undisturbed areas immediately adjacent to the Project site to identify approximate pre-construction conditions. A cone penetrometer or other appropriate devices will be used to conduct tests as necessary. Excess rock will be removed from at least the top 12 inches of soil to the extent practicable in all rotated and permanent cropland, hayfields, pastures, residential areas, and other areas at the landowner's request. The size, density, and distribution of rock on the construction work area should be similar to adjacent areas not disturbed by construction. Diligent efforts will be made to remove stones greater than four (4) inches if the off-ROW areas do not contain stones greater than (4) inches. The landowner may approve other rock size provisions in writing.

2.31 FUGITIVE DUST CONTROL

Implementation of construction and restoration BMPs and operational controls will be used to mitigate fugitive dust emissions. MVP will also implement operational controls, including the use of a reduced speed limit on unpaved access roads as well as sweeping/vacuuming paved roadways when Project-related soils are tracked out onto paved surfaces.

Wet suppression, using water, is the predominate method of suppressing fugitive dust on unpaved roads

and gravel pads as it causes finer materials to adhere into larger particles. Increasing the moisture content of the finer materials may be accomplished either naturally or mechanically. Moisture content of unpaved road surfaces can be naturally increased through rainfall. Moisture content can also be increased mechanically through the application of water. The amount of water required to sufficiently control fugitive dust emissions is dependent on the characteristics of materials (e.g., surface moisture content), ambient conditions (e.g., rainfall, humidity, temperature), activities occurring in the area (e.g., vehicle traffic, vehicle weight, speeds), etc. The contractors will have one or more water trucks available per spread that will load water from approved permitted sources to spray areas for dust control. Disturbed and trafficable areas will be kept sufficiently damp during working hours in dry conditions to minimize wind-blown or traffic-generated dust emissions. Areas to be watered include, but are not limited to, the following:

- the construction corridor for the pipeline, including additional temporary workspace;
- access roads;
- aboveground facility sites;
- active grading areas;
- un-stabilized areas;
- soil stockpiles; and
- parking areas.

The frequency at which water trucks will spray construction areas will vary based on weather and site conditions. More frequent applications will be required in dry conditions and where dust generation is likely.

2.32 RESTORATION

Restoration includes permanent soil stabilization measures, both vegetative and non-vegetative (e.g., rip rap or gabions). A permanent vegetative cover will be established on all disturbed areas of the ROW not otherwise permanently stabilized. Restoration will promptly follow final grading to take advantage of soil scarification resulting from grading and will be completed within seven (7) calendar days of final grading, weather and soil conditions permitting.

2.32.1 Cleanup

Final cleanup of an area (including final grading and installation of permanent ESC structures) will be completed within 20 calendar days after backfilling the trench in that area (10 calendar days in residential areas). These durations may be extended in locations where it is necessary to maintain a travel lane for access to other portions of the Project. If this schedule cannot be met, all temporary ESC measures shall be removed within 30 calendar days after final site stabilization or after the temporary measures are no longer needed. In no case will final cleanup be delayed beyond the end of the next recommended seeding season.

Construction debris or materials will be removed from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration. If a landowner requests the materials remain on the property but outside the LOD or moved to another property, MVP will work with the landowner to ensure that the material is placed in an environmentally acceptable location without the need for land disturbing activities. These areas will be documented in the Project's SWPPP.

2.32.2 Soil Stabilization Blankets and Matting

Slopes in excess of 30% will be stabilized with steep slope soil stabilization blankets and matting techniques identified in the VSMH C-SSM-05 Soil Stabilization Blankets and Matting. The blanket shall be nontoxic to vegetation and to the germination of seed and shall not be injurious to the unprotected skin of humans. The netting will be entwined with the mulching material/fiber to maximize strength and provide for ease of handling. It is recommended that the mulching material/fibers should interlock or entwine to form a dense layer, which not only resists raindrop impact, but also allow vegetation to penetrate the blanket. Blanket mulches will be started at the top of the slope and unrolled downhill, and adjacent blankets will be overlapped by a minimum of 2 inches. Wire staples 11-gauge or better and a minimum of 6 inches in length will be used to secure the blanket mulch in place in accordance with VSMH C-SSM-05 Soil Stabilization Blankets and Matting.

In addition to VSMH C-SSM-05 Soil and Stabilization Blankets and Matting, MOUNTAIN VALLEY will utilize hydraulically applied soil stabilization blankets and matting (i.e. EarthGuard, Flexterra, or equivalent) as an alternative to the rolled ESC blanket material identified under VSMH C-SSM-05. Information regarding the hydraulically applied blankets as provided in the project ESC and SWM plans.

2.32.3 Mulch Before Seeding

Mulch before seeding if:

- Final cleanup, including final grading and installation of permanent erosion control measures, is not completed in an area within 7 calendar days (per MS-1) after the trench in that area is backfilled; or
- Construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions; if mulching before seeding, increase mulch application on all slopes within 100 feet of waterbodies and wetlands to a rate of 3 tons/acre.

2.32.4 Bare Root Sapling and Shrub Planting

MOUNTAIN VALLEY may utilize bare root sapling and shrub planting to supplement seeding at its discretion or where required by a federal or state agency. The purpose of plantings is to establish target native tree species comparable to the region, site characteristics (e.g., topography; soil characteristics; adjacent vegetation), and adjacent forest composition in order to encourage the timely reestablishment of habitat

removed during project construction. For small mammals and birds, adequate spacing of planted shrubs can form a large clump or thicket and provide excellent cover, refuge, or brood-rearing habitat often absent in open landscapes. Furthermore, planting a diverse array of native shrubs and saplings with varying blooming periods will provide reliable sources of pollen and nectar for pollinator species during spring, summer, and autumn.

All species planted will be native to the area, and the seed source or ecotype of the saplings and shrubs will be as local as possible with preference given to within-state, then mountainous regions of an adjacent state, followed by within the Appalachian Mountain range.

A variety of factors are considered when planting bare-root seedlings. Storage of seedlings is important to ensure viability and to limit loss of seedlings prior to planting. To the extent practicable, time between delivery of seedlings to the restoration site and planting is limited. To prevent desiccation and preserve moisture, seedlings are kept in original shipping container (e.g., sack; box) and stored in cool, moist, and shady locations that will not receive direct sunlight, and is sheltered from wind. Refrigerated storage is used when possible.

Immediately prior to planting, seedlings are inspected for damage that may result in seedling mortality. Seedlings are examined and discarded if the following are present: broken stems or main roots, mold or mildew, stems with missing bark, desiccated roots, or a root system less than five (5) inches long. Seedlings deemed suitable are planted using a spade, shovel, or planting bar between October 1 and April 30 following seeding application (i.e., woody plants, forbs, and graminoids).

Holes for seedlings will be dug deep enough to fit the entire bare root system without bending; typically, between 8 and 10 inches. If roots are longer than the depth of the typical planting hole, roots shall be pruned. All pruning will take place in a manner to avoid desiccation (e.g., in shade). Following pruning, roots are moistened. Roots shall be treated with root dip absorbent polymers and mycorrhizal root dip inoculates in accordance with manufacturer's recommendations. One seedling will be placed in each hole with the roots inserted to the bottom and then lifted upward slightly so that the root collar is at or slightly below the finished grade. Each seedling is fertilized with a 5-gram tablet of controlled release fertilizer. When filling the planting hole, the seedling is maintained upright. The spade, planting bar, or shovel is inserted behind the planting hole and tilted back to close the bottom of the planting hole. The tool is then tilted forward to close the top of the hole. Soil is gently packed to fill any remaining voids.

2.32.5 After Restoration

Permanent vegetation will not be considered established until a ground cover is achieved that is uniform and mature enough to survive and inhibit erosion. In general, a stand of vegetation cannot be determined to be fully established until it has been maintained for one full growing season after planting. Temporary

ESC BMPs will be inspected and maintained until a ground cover that is uniform, mature enough to survive, and will inhibit erosion is achieved and established. Soils disturbed during ESC maintenance activities will be permanently seeded and mulched to prevent further erosion. All temporary ESC measures shall be removed within 30 calendar days after the site has been permanently stabilized and the temporary ESC measures are no longer needed, unless written authorization is received from the program authority. Following removal of the ESC measures, all areas disturbed during removal of the ESC measures will be seeded and mulched. MOUNTAIN VALLEY anticipates that one full growing season after restoration planting is complete and vegetation has established, construction will be complete, and the ROW enters the maintenance cycle (see Section 5.0 - Maintenance of Permanent Right-of-Way).

2.32.6 Off-Road Vehicle Control

At the request of a land management agency, measures may be installed and maintained to control unauthorized vehicle access to the ROW. These measures may include:

- Signs;
- Fences with locking gates;
- Slash and timber barriers, pipe barriers, or a line of boulders across the ROW; and/or
- Conifers or other appropriate trees or shrubs across the ROW.

2.32.7 Inspection Acreage Reductions & Terminations

MOUNTAIN VALLEY will follow the procedures in this section for any project subject to Section 2.2.

The Spread LEI or Mountain Valley-designated representative will be responsible for identifying areas of the LOD that meet the established permanent revegetation requirements.

- The LOD includes the Project regulated footprint in Virginia as shown on the approved SWM plans.
- Installation of all permanent post-construction BMPs must be completed and within the tolerances allowed by the Construction Typical Detail, VSMH, or VADEQ discretion.
    - As-built surveys must also be completed.

Once a site is determined to meet the established permanent revegetation requirements, a site visit will be conducted by a Mountain Valley-designated representative (Chief EI or equivalent) to verify conditions are acceptable for ECD removal. If it has been one (1) full growing season after planting, vegetation has established that meets Minimum Standard #3, and all permanent post-construction BMPs have been installed, temporary ECDs can be removed. The Mountain Valley Environmental representative will provide electronic notification to VADEQ regarding ECD removal. Following notification of ECD removal, Mountain Valley will remove ECDs from the designated areas and stabilize any disturbance that occurs during removal. Following one additional SWPPP inspection to confirm the site is stable following removal of ECDs, SWPPP inspection frequencies will be reduced to once every 30 days while the regulated project

area remains open for that section of ROW. All areas included in the reduced SWPPP inspection frequency will be summarized in the Environmental Auditors quarterly reports required under the Consent Decree.

In addition:

- Agricultural areas will be returned to the landowner once Mountain Valley establishes final grade and the landowner initiates or resumes agricultural activities, including mowing/producing hay, cultivating crops, livestock grazing, or other related activities. Mountain Valley shall photo document the start of those activities and record them on the SWPPP inspection form and redline drawings. VADEQ will be notified and further inspection activities by Mountain Valley will cease. Mountain Valley will maintain a list of all parcels where inspections have ceased.
- If unrelated land disturbing activity is planned by the landowner, a commercial/private third-party, or other state/federal agency following final restoration, Mountain Valley will provide notice so VADEQ can verify if regulatory coverage is needed by the third-party prior to Mountain Valley stopping inspections. Mountain Valley shall photo document the site conditions at the time of termination request. VADEQ will be notified and further inspection activities by Mountain Valley will cease. Mountain Valley will maintain a list of all locations where inspections have ceased.

Following the reduction in the SWPPP inspection frequency, Mountain Valley will continue to monitor these areas for growth. When a portion of the LOD achieves final vegetative stabilization, those areas will be eligible for removing the inspection requirement. Mountain Valley will then submit the required documentation to remove the inspected LOD from SWPPP inspection requirements. That documentation includes:

- Project Engineer's Certification;
- As-Built Plans showing locations of permanent controls and final seed mixes;
- Updated/Final Stormwater Management Plans; and
- BMP Maintenance Agreement.

Upon submission of these documents, Mountain Valley will conduct one additional 30-day SWPPP inspection prior to eliminating the SWPPP coverage for the identified area. All areas that have been eliminated from SWPPP inspection coverage will be identified in the Environmental Auditors quarterly report and documented in the Spread SWPPP documentation.

Once all regulated portions of the project have satisfied permanent revegetation requirements, MVP Environmental will submit a Notice of Termination request form to VADEQ.

3.0 TEMPORARY EROSION CONTROLS

MOUNTAIN VALLEY will utilize ESC measures contained within the VSMH as well as those approved Project Typical Construction Details included in the site-specific ESC plans. The temporary ESC details and measures described in the VSMH should be reviewed with the concurrence of the LEI, EI and Construction Supervisor before being implemented to ensure they conform to the site-specific conditions. Any measures not included in the VSMH, these Standards and Specifications, or a VADEQ-approved ESC plan must receive written approval from the appropriate agencies prior to implementation. All temporary ESC devices will be functional before upslope land disturbance takes place. All ESC structures and systems will be maintained, inspected, and repaired as needed to ensure continued performance of their intended function until replaced by permanent ESC devices or restoration is complete. All temporary devices will be removed within 30 days after site restoration or after the temporary measures are no longer needed. The Virginia Stormwater Management Handbook, which became effective on July 1, 2024, can be found digitally HERE.

3.1 ESC MEASURE IN NEED OF ROUTINE MAINTENANCE

All ESC structures and systems will be maintained, inspected, and repaired as needed in accordance with good engineering practices and, where applicable, manufacturer specifications to ensure continued performance of their intended function until replaced by permanent ESC devices or restoration and stabilization is complete. If an ESC measure is identified by any LEI, EI, or Construction Supervisor as needing routine maintenance, or if any VADEQ or other federal or state inspector provides MOUNTAIN VALLEY with an inspection report identifying an ESC structure or system as needing routine maintenance, the issue will be logged on MVP's punchlist. Because inspection activities are completed by multiple entities daily, items on the punchlist as well as items identified during agency and MOUNTAIN VALLEY inspections will be reconciled with all agency Leads on a daily basis to eliminate duplicate listings. Items identified as routine maintenance (described below) would not be included on the VADEQ tracker unless an extension is needed, or the item has exceeded the available repair window. Items listed as ineffective (described below) will be included on the VADEQ tracker. Notifications received from VADEQ inspectors after normal business hours shall be logged on the following day. Timely maintenance shall be completed as soon as practicable, but within such time as to prevent the erosion and sediment control measure from becoming ineffective and no later than three (3) business days from the date of notification (unless an extension has been granted by VADEQ). ESC measures identified by MVP's inspection staff or an agency inspection report as needing "routine maintenance" will be logged on MVP's punchlist separately from ESC measures identified as "ineffective."

"Routine maintenance" means minor upkeep, repair, cleaning, or amendment of an ESC measure that appears to be functioning adequately, but which may become ineffective if maintenance is not performed in a reasonable time period. This provision is intended to apply to ESC measures with minor flaws, damage, degradation, or capacity reductions that are not expected to prevent the measure from functioning

effectively during a normal precipitation event should one occur following the inspection. Examples of ESC measures in need of routine maintenance (within 3 business days) of identification include, but are not limited to:

- Compost Filter Sock (CFS)
  - Sediment deposition/buildup that is equal to or greater than 50% of the height of the CFS installation; and/or
  - Minor damage and holes, such as those that result from livestock or wildlife grazing, third-party vehicle crossings, landowner activities, or staking damage and do not result in the filter media contents (mulch) being lost from the CFS netting in a manner that renders the control ineffective.
- Silt Fence/Priority 1/Super Silt Fence
  - Sediment deposition/buildup that is equal to or greater than 50% of the aboveground height of the SF/Priority1/SSF installation;
  - Minor holes (generally less than 2 inches in diameter), such as those that result from livestock or wildlife grazing, fallen trees/limbs or wind damage, that pose no reasonable potential for off-ROW sediment discharge to occur;
  - Fabric that has become loose from stakes due to high winds, downed trees or limbs, or livestock grazing, or similar causes that has no reasonable potential for off-ROW sediment discharge to occur; and/or
  - Fence that has been knocked down due to livestock or wildlife grazing, landowner activities (i.e. ATV, vehicles or farm equipment crossings), or similar causes that has no reasonable potential for off-ROW sediment discharge to occur.
- Waterbars[2]
  - Temporary Conditions
    - Minor erosion along the throat (flow path) of the waterbar that results in channel erosion;
    - End treatments that have sediment accumulation equal to or greater than 50% of the aboveground height of the bmp; and/or
    - Sumps that have sediment accumulation equal to or greater than 50% of the overall depth of the sump.
  - Permanent Conditions
    - Minor erosion along the throat (flow path) of the waterbar that results in channel erosion; and/or

[2] Waterbars shall extend to the edge of the ROW and tie-in to the perimeter BMP to ensure runoff exits the ROW through the waterbar end treatment and does not accumulate behind the perimeter control. As result, the earthen waterbar will be constructed and maintained so that there is no gap (open space) between the top of the waterbar and the perimeter control (silt fence, Priority 1, super silt fence or compost filter sock) installation. Waterbars constructed in this manner shall not be flagged as needing routine maintenance.

- End treatment/level spreaders that have a measurable amount of sediment deposition.
- Disturbed Areas Temporarily Stabilized [3]
  - Measurable rill erosion develops in the treated area.

ESC measures that would require routine maintenance under normal circumstances will not be designated as such if, in the judgment of the inspector (MOUNTAIN VALLEY, VADEQ or FERC), other relevant circumstances necessitate prompt (24 hour) action to avoid or minimize the potential for environmental harm. Those circumstances may include, for example, the presence of a stream, wetland, or karst feature within 100 feet downgradient of the ESC measure, an approaching storm or extreme weather event (e.g., named tropical storm), or extended period of dormancy.

3.2 INEFFECTIVE ESC MEASURE

An "ineffective" temporary ESC measure is an ESC BMP that does not appear to be functioning adequately and therefore requires immediate maintenance to restore the measure to proper function. This provision is intended to apply to ESC measures with major damage, degradation, or capacity reductions that could prevent the measure from functioning during a normal precipitation event should one occur following the inspection.

Examples of ESC measures in need of immediate maintenance (within 24 hours) include, but are not limited to:

- Rock Construction Entrance
  - Observation that the rock construction entrance is not preventing mud or sediment from being tracked onto a public roadway.
- Rill Erosion
  - Area showing rill erosion is impacting the functioning of down-gradient erosion and sediment control measures.
- Cleanwater Diversion
  - Stormwater run-on bypasses the cleanwater diversion berm, directly entering the right-of- way;
  - Cleanwater diversion berm becomes compromised (due to erosion or third-party damage); and/or
  - Runoff from the LOD is entering the plunge pool.
- Disturbed, unstabilized, or unprotected areas that directly contribute stormwater runoff to sensitive areas[3];
- Any routine maintenance of ESCs or BMPs that directly contribute stormwater runoff to sensitive

[3] Application of hydraulic or pelletized forms of fiber mulch (EarthGuard) on disturbed areas remains effective from six to twelve months following application depending on precipitation amounts (up to 20 inches), even if it is not visible.

areas[4];

- ESCs that are not functioning;
- ESCs not installed per the approved Standards & Specifications, ESC/SWM plans (as applicable), or manufacturer specifications;
- ESCs at or within imminent risk of exceeding the designed capacity;
- ESCs at or within imminent risk of releasing sediment off LOD; and/or
- ESCs downslope of an area that has become unstable due to, for example, a slip.

4.0 SPECIAL PROCEDURES

MOUNTAIN VALLEY will implement specialized construction procedures in areas deemed an environmentally sensitive area such as waterbody and wetland crossings, areas of steep slopes and other areas of concern as identified below.

4.1 WATERBODY AND WETLAND CROSSINGS

Wetlands and waterbodies are natural resources given additional protection under the law because they provide important ecological benefits which may be altered or harmed by construction activities. Wetlands are areas where the plants have adapted to saturated soil conditions for extended periods of time. Wetlands often do not have standing water or even saturated soil at all times during the year and may host plants from flowers and grasses to common shrubs and trees. Waterbody is a term used for any permanent standing or flowing water, or defined channel, such as streams, rivers, ponds and reservoirs. Streams (the area from top of bank to top of bank) may be one of the following: perennial, meaning they typically have some flowing water year round (except in cases of drought), intermittent, meaning they only have flowing water during high flow periods such as spring but they have defined banks and stream bed, and ephemeral, meaning they only exist for a short period following precipitation or snowmelt.

A qualified professional (i.e. wetland and stream biologist) will identify all wetland and water body crossings during the planning and survey phase of the Project.

For every waterbody and wetland, a buffer will be added to both sides of each crossing to ensure that any transitional area is also treated as an environmentally sensitive area. Buffers will extend 50 feet where possible, or as far as topographic conditions permit, along the right-of-way from where the trench centerline enters the wetland and waterbody.

To minimize impacts to waterbody and wetland crossings, they will be treated as separate construction entities, except during clearing activities, and efforts will be made to cross these areas during low flow.

[4] Sensitive areas will be defined as streams, wetlands, road crossings, and karst features

Once grubbing and grading starts at a waterbody or wetland crossing it will be actively conducted for consecutive days until the crossing is completed and the work area restored. In general, the same measures as already discussed for upland construction also apply to waterbody and wetland crossings. Exceptions and Procedures of special emphasis are discussed below. Permits may include conditions that further modify these requirements. Crossings will be constructed as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit. If the pipeline parallels a waterbody, at least 15 feet of undisturbed vegetation will be maintained between the waterbody and the right-of-way, if possible, except at the crossing location. Where waterbodies meander or have multiple channels, the pipeline will be routed to minimize the number of waterbody crossings.

The methods described in this section will be employed unless incompatible or more stringent requirements are imposed by the U.S. Army Corps of Engineers, Virginia Marine Resources Commission, or other appropriate federal or state authority.

4.1.1 Time Windows for Construction[5]

If the below indicated species is present within the waterbody, no in-stream construction activities will be conducted during the following time windows unless written approval is received from the appropriate federal or state agency:

- **Coldwater Fisheries** - March 1 – June 30
- **Warmwater Fisheries** - April 15 – July 15
- **Natural Trout Streams** -
  - Brown Trout (*Salmo trutta*) and Brook Trout (*Salvelinus fontinalis*) – October 1 – March 31
  - Rainbow Trout (*Oncorhynchus mykiss*) - March 15 - May 15
- **Stockable Trout Streams** - there is no time of year restrictions for stockable trout; however, MOUNTAIN VALLEY will consult with the Virginia Department of Wildlife Resources' Aquatic Regional Area Manager before constructing in stockable trout streams.
- **Roanoke log perch** (*Percina rex*) waters - March 15 - June 30.
- **Orangefin madtom** (*Noturus gilberti*) waters - March 15 – May 31
- **Atlantic pigtoe** (*Fusconaia masoni*), James spinymussel (*Parvaspina collina*), pistolgrip (*Tritogonia verrucosa*), and yellow lance (*Elliptio lanceolata*) – May 15 – July 31
- **Green floater** (*Lasmigona subviridis*) and **Yellow lampmussel** (*Lampsilis cariosa*)– April 15 – June 15 and August 15 - September 30

Additional time-of-year restrictions may be observed as appropriate or required by regulatory agencies to protect aquatic species not included in this list.

[5] *Time of Year Restrictions and Other Recommendations* available for reference at Virginia DWR website.

4.1.2 Planning and Survey

MOUNTAIN VALLEY intends to employ one of the Utility Stream Crossing (VSMH C-ENV-04) methods to complete open water crossings. The method selected during planning and surveying may need to be altered based on field conditions at the time of construction. Alterations must be approved by the Construction Supervisor and the LEI/EI prior to implementation. MOUNTAIN VALLEY will contact the plan-approving Authority if necessary.

The principal methods of crossing waterbodies in the Commonwealth will be open-cut dry-ditch. These methods include Flume Pipe Crossing, Cofferdam Crossing, and Dam and Pump (VSMH C-ENV-04). In the event a conventional bore or directional drill method is proposed or required, the crossing would be conducted in accordance with these details following approval of necessary federal and state permitting requirements.

For crossings of all state-designated fisheries as well as waterbodies with sensitive species concerns, all construction equipment will cross the waterbody on an equipment bridge. Equipment bridges are not required at minor waterbodies that do not have a state-designated fishery classification (for example, agricultural or intermittent drainage ditches).

For crossings of waterbodies greater than 10 feet in width, use of equipment operating in the waterbody will be limited to that needed to construct the crossing. All other construction equipment must cross on an equipment bridge.

Except where a federal or state agency requires a trenchless crossing method, wetland crossings will be constructed using standard trench-and-backfill methods. Heavy equipment working in wetlands will utilize equipment mats or other suitable methods to minimize soil disturbance and compaction.

Staging areas for waterbody and wetland crossings will be located outside the buffer areas and will be the minimum necessary to stage the waterbody or wetland crossing. No refueling, hazardous materials storage, equipment maintenance, or equipment parking will take place within 100 feet of the waterbody or wetland crossing. If pumps are being used within the waterbody or wetland crossing, small quantities of fuel in Gerry cans may be stored on site within a spill containment device, otherwise fuel may not be stored within waterbody and wetland crossings. Equipment and vehicles will not be washed in any waterways. The LEI/EI will specify additional stabilization measures as needed to prevent equipment from rutting within waterbody and wetland crossings.

Waterbody and wetland crossings will be clearly marked in the field prior to the start of tree clearing activities.

4.1.3 Additional Temporary Workspace (ATWS) and Access Roads

Clearing of vegetation between extra work areas and the edge of the wetland will be limited to the permitted construction ROW. The size of extra work areas will be limited to the minimum needed to construct the waterbody crossing. The only access roads, other than the construction right-of-way, that will be used in wetlands are those existing roads that can be used with minimal or no modification to the wetland.

4.1.4 Temporary Erosion and Sediment Control

Per MS-4, sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment shall be constructed as a first step in any land- disturbing activity and shall be made functional before upslope land disturbance takes place. Sediment barriers will be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete. Sediment barriers will be installed across the entire construction right-of-way at all waterbody crossings. Where waterbodies are adjacent to the construction right-of-way, sediment barriers will be installed along the edge of the construction right-of-way as necessary to contain spoil and sediment within the ROW. Trench plugs will be used at all waterbody crossings to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the waterbody. Trench plugs will be of sufficient size to withstand upslope water pressure.

4.1.5 Clearing

Clearing operations will be permitted within the buffer at all waterbody and wetland crossings but no grubbing or grading will be conducted until the contractor is prepared to install the pipe and backfill. Temporary equipment crossings will be installed to facilitate equipment crossings of waterbody and wetland areas during clearing activities. Care will be taken during clearing operations not to deposit mud in open water, and to minimize rutting of the right-of-way. All woody debris will be removed from within the waterbody or wetland crossing for disposal. Vegetation will be cut off at ground level, leaving existing root systems in place, and removed from the wetland for disposal. Timber riprap may be employed to stabilize the equipment work area provided all timber is obtained from within the approved construction work area. All timber riprap must be installed to facilitate removal upon completion of construction. Any disturbed soil will be mulched before the clearing crew leaves the waterbody or wetland crossing at the end of each day. MOUNTAIN VALLEY will reduce the construction LOD at waterbody and wetland crossings to 75 feet to minimize impacts. Clearing activities within wetland areas will be restricted to the 75-foot temporary construction LOD.

4.1.6 Grubbing and Grading

Before grading begins and as grubbing progresses, sediment barriers (staked bales or silt fence, compost filter socks, etc.) will be installed across the construction area at the edge of the water or the edge of the wetland, and along the sides of the construction work area as needed to prevent the flow of spoil into the waterbody or wetland. Clearing of vegetation in wetlands would be limited to trees and shrubs, which would be cut flush with the surface of the ground and removed from the wetland. Stump removal, topsoil segregation, and excavation would be limited to the area immediately over the trench line within the 50-foot permanent ROW easement per, as applicable, permit requirements from the U.S. Army Corps of Engineers or VADEQ, FERC PROCEDURES, and/or a project's FERC Certificate conditions. Trees located within 15

feet of the pipeline with roots that could compromise the integrity of the pipeline coating may be selectively cut and removed from the permanent ROW. A limited amount of stump removal and grading may be conducted within the permanent ROW easement in wetlands to ensure a safe working environment. In wetlands, very little grading is expected, as topography is generally flat and low-lying.

Per MS-13, when a live waterbody must be crossed by construction vehicles more than twice in a 6-month period, a temporary stream crossing of non-erodible material must be provided.

Temporary ROW diversions (interceptor diversions) will be installed at the ends of the waterbody or wetland crossing.

4.1.7 Equipment Bridges

Only clearing equipment may cross waterbodies before installation of equipment bridges. The number of such crossings of each waterbody will be limited to one per piece of equipment. Soil will not be used to construct or stabilize equipment bridges. Equipment bridges will be constructed using one of the following methods:

- Equipment pads and culvert(s)
- Clean rock fill and culvert(s) that conforms to the requirements in the VSMH
- Flexi-float or portable bridge(s)
- Temporary Vehicular Stream Crossing (VSMH C-ENV-03)
- Timber mat bridges

Each equipment bridge will be designed and maintained to withstand and pass the highest flow that would reasonably be expected to occur while the bridge is in place and prevent soil from entering the waterbody. Equipment bridges will be removed following completion of restoration of the ROW with permanent seeding, unless it is authorized to remain as a permanent bridge. If there will be more than 30 days between final cleanup and the beginning of permanent seeding and reasonable alternative access to the right-of-way is available, equipment bridges will be removed as soon as possible after final cleanup.

4.1.8 Trenching

Trenching activities will begin promptly after grading is completed. If trenching of adjacent upland areas has been completed but will not be backfilled before the waterbody or wetland crossing is trenched, a trench plug will be left in place at the end of the waterbody or wetland crossing to prevent stormwater runoff from entering the waterbody or wetland by way of the trench. During excavation, the top one foot of wetland soil or streambed substrate will be segregated and stockpiled separate from the trench spoil. This segregated material will be utilized during restoration of the waterbody or wetland to enhance restoration with the native seedbank and substrate materials.

Any water that must be removed from the work area will be conducted through a dewatering structure.

Dewatering structures will be located in an upland area, outside of riparian buffer areas, whenever possible. The dewatering activity will be carefully monitored to prevent erosion and sedimentation in the waterbody or wetland, and in such a manner that no heavily silt-laden water flows into any waterbody.
A minimum of the top one (1) foot of topsoil will be conserved from over the trench in wetlands without standing water or saturated soil.

If standing water or saturated soils are present, low-ground-weight construction equipment, will be used or normal equipment will be operated on timber riprap, prefabricated equipment mats, or geotextile fabric overlain with gravel. Geotextile fabric used for this purpose must be strong enough to allow removal of all gravel and fabric from the wetland.

4.1.9 Spoil Pile Placement and Control

All spoil from waterbody crossings will be placed in the construction right- of-way at least 10 feet from the water's edge or in additional extra work area as described above. Sediment barriers will be used to prevent the flow of spoil into any waterbody.

4.1.10 Pipe Installation

For smaller crossings, the pipe string will be assembled outside the waterbody or wetland crossing and carried into position. For larger crossings, pipe assembly will be conducted outside of the waterbody or wetland crossing except for those crossings that utilize the porta-dam crossing method. For all large porta-dam crossing methods, assembly will be conducted in the dry area behind the porta-dam. All welding and coating debris will be fully removed from the waterbody or wetland crossing prior to retuning flow to the waterbody. As determined necessary by MOUNTAIN VALLEY, saddle bags filled with clean pea gravel or sand for pipe weights within waterbody or wetland crossings will be used to ensure negative buoyancy.

4.1.11 Backfilling

Backfilling will begin promptly after pipe installation is completed. Permanent trench breakers will be installed in the banks of stream channels and at the ends of wetlands. The top 12 inches of backfill will be made with clean native stream substrate.

4.1.12 Final Grading

Final grading will begin promptly after backfilling is completed. If final grade is reached on any portion of the wetland site, vegetation will be established to prevent erosion. Temporary seeding will be applied within 7 days if any portion of the site will remain dormant for more than 14 days to prevent erosion. Disturbed areas will be restored to pre-construction contours, and in wetlands, topsoil will be replaced preserving the native seed bank which will enable restoration with native plant species. Sediment barriers at the edge of the wetland or edge of the water will be repaired or replaced as necessary. Permanent ROW diversions

(interceptor diversions) will be installed at the edge of the buffer area or base of the slope nearest the waterbody and wetland. All materials used to stabilize the equipment work area will be removed (e.g. timber riprap or timber mats). Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site.

If soil and weather conditions prevent final grade to be established in a wetland (e.g. if the permit specified a winter construction window), a temporary approximate grade will be established. ESC measures will be restored or replaced as needed, and temporary stabilization will be applied.

4.1.13 Restoration

Restoration will begin immediately after final grade is established. Stream banks will be restored by vegetative stabilization (VSMH C-ENV-01) where site conditions warrant or by riprap (VSMH C-ENV-02) where banks slope are 3h:1v or steeper. Vegetative stabilization generally includes planting a perennial conservation seed mix from Table 3.32-B located in the VSMH (Table C-ENV-01-3). If grubbing has not been extensive, then native shrub and tree species are expected to sprout and regenerate naturally. Stream banks will be seeded prior to mulch application. A sediment barrier will be maintained at the edge of the water until revegetation of the streambank is successful.

Wetlands will be temporarily seeded in accordance with approved Project Typical Construction Detail and mulched with clean straw (where required), then allowed to revegetate with native seedbank present in the segregated topsoil. A sediment barrier will be maintained around the restored area until revegetation is successful.

In wetlands where saturated conditions or standing water is present, topsoil segregation will be conducted to the extent practicable. Following installation of the pipeline, the trench will be backfilled using native wetland soils and restored to preexisting conditions. No soil or rock will be imported for use during backfilling of the trench. Annual ryegrass will be applied to wetland areas and mulched with straw (where required) to temporarily stabilize the area while the native wetland seedbank reestablishes the area with native vegetation. No seeding should be conducted in areas of standing water. The riparian buffers will be restored using the procedures discussed above for upland areas.

For all affected forested wetlands, restoration activities will be conducted in accordance with approved permit conditions and mitigation requirements. If saplings are required to be planted within the temporary ROW areas, this will be conducted in accordance with Section 2.32.4 – Bare Root Sapling and Shrub Planting (VSMH Fig. C-SSM-08-4) unless otherwise specified by applicable permit conditions.

4.2 SPECIALIZED CROSSING PROCEDURES

MOUNTAIN VALLEY has considered specialized procedures for use during project planning, permitting

and implementation at waterbody and wetland crossings. A discussion of these construction procedures that may be implemented during construction is included in the following sections.

4.2.1 Horizontal Directional Drill Method

The horizontal directional drill (HDD) is a method that allows for trenchless construction across an area by pre-drilling a smaller diameter pilot hole below the depth of a conventional pipeline lay and then pulling the pipeline through the pre-drilled borehole. Two bore pits are established prior to initiating the HDD; one at the entry and one at the exit location. A series of wires are deployed at the ground surface to map the bore path during installation. The method utilizes a slurry referred to as drilling mud, which is composed of 95 percent water and bentonite, a naturally occurring clay mineral. Bentonite-based drilling mud is a non-toxic, non-hazardous material that is also used to construct potable water wells. The drilling mud is pumped under pressure through the inside of the drill pipe and flows back (returns) to the drill entry point along the outside of the drill pipe. The purpose of the drilling mud is to lubricate the drill bit and convey the drill cuttings back to the drill entry point where the mud is reconditioned and re-used in a closed, circulating process. It also forms a cake on the rock surface of the borehole, which helps to keep the drill hole open and maintain circulation of the drilling mud system. A pilot hole is drilled to establish a smaller diameter bore from entry to exit point. The bore diameter is then increased to the necessary diameter using a series of reamers to establish the bore to the necessary diameter. Once completed, the pipe segment will be assembled and pulled through the bore.

If proposed, an HDD contingency plan will be developed, and geotechnical investigations would be conducted. During construction, MOUNTAIN VALLEY will minimize or avoid impacts by implementation of the construction practices outlined in the *HDD Contingency Plan*. MOUNTAIN VALLEY will consult with VADEQ and other regulatory agencies for approval on this crossing method prior to implementation.

4.2.2 Conventional Bore Method

Some waterbodies are directly associated with or adjacent to roads or railroads. Where these roads or railroads are to be crossed using a horizontal 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 conventional bore or guided 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.

4.2.3 Guided Conventional Bore

This methodology is very similar to the conventional bore method, except a small diameter “guided pilot” is installed first. The drill string is then attached to the front of the conventional auger during the final hole opening phase. After the pilot hole is successfully across the span, the drill string remains in place and the conventional auger bore machine completes the bore to the required diameter attaching to the drill stem to keep the conventional auger bore in line. The stems are removed on the exit side as the auger advances from the launch side. No fluids are utilized during the conventional auger bore phase.

4.2.4 Microtunnel Method

Microtunneling is an enhanced drilling technique that allows for trenchless excavation beneath features including roads, highways, railroads, rivers, waterbodies, environmentally sensitive areas, landfills, and shore approaches. As in a conventional bore, Microtunneling typically requires two pits to be excavated, one on each side of the feature to be bored. These pits are typically closer to the feature being crossed than they would be for an HDD. Unlike a conventional auger bore, microtunneling utilizes a microtunneling boring machine (MTBM), which uses remote-operated hydraulic cylinders to steer the machine along the proposed bore path. Microtunneling only requires one drilling pass as the product pipe is in inserted behind the MTBM as it completes the bore—significantly reducing the risk of collapse. Additionally, microtunneling’s use of a much smaller volume of drilling fluid at a drastically reduced pressure greatly minimizes the risk of an inadvertent return.

4.2.5 Direct Pipe

Direct Pipe drilling is a proprietary trenchless installation method that combines the advantages of traditional HDD and microtunneling technology, while reducing the potential for inadvertent returns associated with HDD. Direct Pipe drilling uses an MTBM drilling head and benefits from the same advantages as microtunneling including low IR potential, steerability, installation of pipe with a single drilling pass, and mitigated risk of bore hole collapse. Direct pipe can be used for trenchless construction below features including roads, railways, rivers, waterbodies, environmentally sensitive areas, landfalls, and shore approaches.

4.2.6 Bore Pits

Use of bore pits (required for the horizontal directional drill method, conventional bore method, guided conventional bore method, microtunnel method, and direct pipe) requires excavation of launching and receiving pits located in workspace on each side of the feature being crossed. The excavation of bore pits is not materially different from other upland construction activities. Bore pits will be excavated within the approved limits-of-disturbance. The bore pit excavations are sloped or shored to comply with all local, state, and federal safety regulations. Like trench excavation, bore pits produce spoil piles from the excavated material to create the pit, which are monitored and managed until the bore is complete, and the bore pits are

backfilled. Those spoil piles shall be stabilized and/or provided with sediment trapping measures in accordance with the requirements applicable to soil stockpiles (e.g., Section 2.17).

Dewatering may be required and, if so, will be conducted in accordance with the requirements for trench dewatering (Section 2.25).

4.2.7 Flume Pipe Method

If the stream crossing is less than ten feet wide the flume pipe method may be used. The flume pipe method is typically used in combination with an equipment crossing and starts with the installation of the dam, pump, and flume, continuing with the trench excavation, the pipeline installation, backfilling of the trench and ending with the stabilization of the stream bank. This process will be completed as fast as practicable from flume installation to stabilization of the stream bank. The flume pipe crossing must be made operational prior to the start of construction in the stream. No material will be removed from the stream until the flume is in place. The flume is sandbagged at each end to direct the stream flow through the flume, and the outlet is protected with riprap to minimize scour. The pipeline trench can then be excavated (while dry), the pipe installed, and backfilling completed with the flume pipe in place. Spoil piles will be kept a minimum of 10 feet from the water's edge and will be contained by sediment barriers. Trenching and backfilling must be completed, and the disturbed stream banks must be stabilized with riprap or vegetation before the flumes for the pipeline and equipment crossings are removed (VSMH C-ENV-2 and VSM Fig. C-ENV-04-3, respectively).

4.2.8 Cofferdam (Porta-dam) Method

This method may be used for crossing channels 10 feet or wider and will be designed so as not to prevent the flow of the stream. A cofferdam will be constructed within the construction ROW (using cofferdam products, etc.), enclosing approximately 60% the streambed in a semi-circle (VSMH Fig. C-ENV-04-4)). The cofferdam should seal tightly to the streambed to minimize water from entering the construction area. Pumps will be needed to keep water out of excavations. All earth disturbance will occur in the dry area behind the cofferdam. The pipe will be installed, and the disturbed area backfilled and stabilized. Sediment barriers at the waterline should be in good working order before the cofferdam is removed. Stabilization will occur with either riprap or vegetation. The cofferdam is then set up from the opposite bank and extends far enough to include the tie-in point in mid-stream. The remainder of the pipe is installed and the tie-in weld is made. Clean up follows the same procedures described above.

4.2.9 Pump-Around (Dam and Pump) Method

The pump-around method is a "dry ditch" construction technique utilizing pumps and hoses to convey waterbody flow around the excavation area. The following restrictions apply when using the pump-around method:

- Sandbag bulkheads or porta-dams shall be constructed above and below the area of excavation.
- Stand-by pump(s) and hose(s) must be on-site during the crossing.
- Pumps shall have secondary containment in accordance with the SPCC Plan.
- Downstream flow must be maintained throughout trenching, pipe laying and backfilling operations.
- Screening (intake hose) must meet the minimum specification per agency requirements.
- Dewater structure with energy dissipater shall be utilized to prevent scour and increased sedimentation.
- Filter bags can be used to maintain clean water.

4.3 AREAS OF SPECIAL CONCERN

MOUNTAIN VALLEY has identified areas of special concern that exist within a project area. A discussion of these areas follows.

4.3.1 Steep Slope Areas

Slope gradients will be identified on the ESC plans in steep slope areas. Potential for erosion may be present in areas of steep slopes and increases as slope length and gradient increases. Additional erosion and sediment control measures may be necessary in these areas based upon field conditions at the time of construction. Refer to the table below for the slope ranges and erosion hazard rating.

Erosion Hazard Ratings

Slope Gradient	Length of Slope	Erosion Hazard Rating
0-7%	< 300 feet	Low
7-15%	< 150 feet	Moderate
0-7%	> 300 feet	High
7-15%	> 150 feet	
≥15%	> 75 feet	

Additionally, steep slopes are defined differently for each of the six counties within the Commonwealth in which MOUNTAIN VALLEY presently operates, detailed in the table below.

County-Specific Steep Slopes Definitions

County	Steep Slope Definition	Source	Notes
Craig	Not defined	N/A	**No local definitions found**
Giles	> 20%	Giles Co. 2012 Comp. Plan	Revision adopted 2012; Natural Resources-Slope
Montgomery	> 25%	Montgomery Co. 2025 Comp. Plan	Adopted 2004, revised 2011; Planning and Land Use Policies, PLU 1.2; also mentioned in Co. Code Sec 10-39(h)4
Roanoke	> 33%	Roanoke Co. Code	Sec. 8.1.3 – Definitions; Chapter 12 Stormwater Design Manual
Franklin	> 25%	Franklin Co. 2025 Comp. Plan	Adopted 2007; also mentioned in Co. Code Sec 25- 189(f)(4) in regards to required open space for residential cluster development
Pittsylvania	> 25%	Pittsylvania Co. 2010 Comp. Plan	Chapter 2 -Natural and Cultural Environment

Construction activities within areas considered as steep slope conditions will be conducted in accordance with the BMPs presented in a project's Landslide Mitigation Plan (if applicable to a project) and MOUNTAIN VALLEY's steep slope approved Project Typical Details.

4.3.2 Soils Properties

Soils mapping information for soils crossed by the Project will be provided on the Existing Conditions plan drawing set included as part of the ESC/SWM plans. The soil erodibility factor (K) denotes the sensitivity of different soils to the forces of erosion. Areas that have a high erodibility rating will be noted as a critical area on the Project's Existing Conditions plans. Additional erosion and sediment control measures may be necessary in these areas based upon field conditions at the time of construction. Refer to the table below for the erodibility factors:

Erodibility Factor

Erodibility Factor (K)	Erodibility Rating
≤ 0.23	Low
0.23 - 0.36	Moderate
≥ 0.36	High

The soil reactivity (pH) is a major factor in the establishment of vegetation and permanent stabilization of the disturbed areas. The surface soil pH and associated lime application rate are specified in Section 2.18.2 (Permanent Seeding) and will be noted on the ESC plans. Additional information regarding acid forming materials (soils/rock) are detailed below in Section 4.4.4 Acidic Soil Areas.

Sensitive soils such as agricultural soils (prime farmlands or farmland soils of statewide importance), wetland soils and topsoil in all areas will be segregated during implementation. During preparation of the LOD and trench excavation, topsoil will be segregated and stockpiled separately from excavated subsoil. Topsoil will be temporarily stabilized with mulch and seeded (as needed). Following installation of the pipeline and backfilling of the trench with subsoil, MOUNTAIN VALLEY will disc the subsoil in accordance with Section 2.30 (Soil Compaction Mitigation) to enhance revegetation of the ROW. During backfill and final grading, topsoil and subsoil will be returned to their original profile. Permanent slope breakers, if required, will be installed in accordance with approved Project Typical Construction Detail or the VSMH. Once the topsoil has been returned to its original profile, additional soil compaction mitigation will be conducted over the full LOD followed by permanent seed and mulch installation.

4.3.3 Landslide Prone Areas

Landslides occur primarily in weathered bedrock or colluvial soil and within old landslide debris located on steep slopes. Where appropriate based on-site conditions, MOUNTAIN VALLEY will develop a Landslide Mitigation Plan (LMP) to address areas of concern identified prior to construction and present mitigation strategies that may be implemented at other areas during construction. The LMP areas are identified by reviewing available historic aerial photographs, soils data, and topographic maps. Construction operations will be staffed with geotechnical personnel who will identify additional areas in which the LMP mitigation measures will be implemented (and additional mitigation measures, as necessary).

4.4.4 Acidic Soils Areas

Areas of acidic soils are known to occur within portions of Virginia. In order to identify and mitigate potential impacts should these soils be encountered; an Acid Forming Materials Identification and Testing Work (AFM) Plan will be referenced for implementation during activities.

4.4.5 Karst Areas

Karst areas are known to occur in portions of Virginia. If karst areas will be crossed by a pipeline construction project, MOUNTAIN VALLEY will prepare a Karst Hazards Assessment that describes construction methods to mitigate or eliminate potential impacts (*see Appendix A*) for karst features that cannot be avoided through minor variations within the construction easement. If conditions require, Karst Specialist inspection teams will be deployed during construction to monitor karst features and provide recommendations for avoidance or mitigation. Locations of all karst features identified during project investigations will be included on the ESC and SWM plan drawings submitted to VADEQ for each construction spread.

4.4.6 Waterbody and Wetland Areas

During planning, routing, and design phases of a pipeline construction project, MOUNTAIN VALLEY will conduct desktop analyses and field delineations to identify waterbody and wetland areas within the study corridor. Identified waterbody resources include streams (unnamed as well as named tributaries), springs/seeps, water supply wells, ponds, and other surface impoundments as well as wetlands. Desktop review as well as field verification will be utilized to identify private ponds located within 1,500 feet downslope of a project LOD. All waterbody and wetland resources identified within the Project LOD and areas immediately adjacent to the LOD (including temporary workspaces, ATWS, contractor yards, access roads, etc.) will be depicted on a project's ESC and SWM plan drawings. All waterbody and wetland areas disturbed by construction activities will be permitted under the US Army Corps of Engineers / VADEQ Joint Permit Application process.

Project ESC plans are designed with appropriate BMPs to protect all crossed and adjacent resources including waterbody and wetland areas from potential sedimentation as result of construction activities.

4.4.7 Other Environmentally Sensitive Areas

During routing, field investigations, and design, other environmentally sensitive areas can be identified. Other environmentally sensitive areas include but are not limited to the following: threatened and endangered species areas, culturally significant areas (cemeteries, historical or archaeological resources), or areas identified by landowners as being of concern. Since environmentally sensitive areas are treated as confidential for the protection of those resources, these resources will not be specifically identified on ESC or SWM plans. MOUNTAIN VALLEY will comply with all mitigation requirements imposed by the relevant federal or state agencies with authority for these resources – such as any requirements developed through the Endangered Species Act and National Historic Preservation Act consultation processes – and will utilize appropriate BMPs deployed during construction as an additional level of protection for these areas.

4.4.8 Water Supply Sources

MOUNTAIN VALLEY will develop a Water Resources Identification and Testing Plan which outlines procedures for identification and testing of both private and public water supply for any pipeline construction projects. MOUNTAIN VALLEY will identify public water supply sources within three miles downstream of the proposed project disturbances as well as private water supply resources (springs/wells) within 150 feet of the LOD in non-karst areas and within 500 feet of the LOD in karst areas (as applicable). MOUNTAIN VALLEY will conduct desktop reviews supplemented by field verification (where access has been granted) as well as in discussions with property owners to identify locations of private water supplies. Landowners and public water suppliers with water supply resources located within the parameters listed above will be contacted regarding access to request permission for MOUNTAIN VALLEY will complete baseline testing prior to construction activities.

4.4.9 Subsurface Drainage Areas

Project activities in Virginia are likely to encounter subsurface drainage features during construction activities. These include drain tiles and irrigation lines. Locations of these resources are identified during routing, landowner discussions during ROW acquisition, and when exposed during construction implementation. Locations will be identified during pre-construction stakeout (when known). All drain tiles including septic (sewer) drain field lines, drain tiles and irrigation lines damaged or disturbed during construction will be repaired and returned to their original condition and function. Any disruption to service and alternative mitigation measures will be coordinated with the affected landowner.

During construction, MOUNTAIN VALLEY will install permanent trench breaker drains to facilitate removal of accumulated groundwater from the pipeline trench. Permanent trench breaker drains will be installed and maintained in accordance with the approved Project Typical Construction Details or VSMH. In addition, MOUNTAIN VALLEY will install cutoff drains to convey subsurface flow/groundwater through the permanent ROW in areas of side-hill construction per the approved Project Typical Construction Details or VSMH. Appropriate outlet protection will be installed as needed. All trench breaker drains and cut- off drain installations will be noted on the ESC/SWM drawings following installation.

4.4.10 Drainage Features

Non-jurisdictional drainage features such as roadside ditches, swales, diversion ditches and diversion terraces may be crossed during construction activities. During construction, MOUNTAIN VALLEY will maintain service through these drainage features to the extent practicable. This will include installation of temporary culverts or pump around contingency if water is present at time of crossing installation. Following installation of the Project, all non-jurisdictional drainage features will be returned to pre-construction contours and conditions.

4.4.11 Utility Line Crossings

Portions of a pipeline route may cross existing public and private utility corridors. Many of the locations will be identified during field routing activities and during property owner negotiations. Locations of these utilities are not depicted on the Project ECS plans to minimize potential for misidentification of the utility location.

In order to accurately depict utility locations prior to commencement of Project earth disturbing activities, MOUNTAIN VALLEY's contractors will notify Miss Utility of Virginia at https://va811.com/ or 1-800-552-7001 to have existing utility line locations delineated. For distribution and service lines that are not covered by the VA811 notice, MOUNTAIN VALLEY will coordinate with the property owner to identify approximate line locations. In addition, MOUNTAIN VALLEY contractors will utilize appropriate line locating equipment to identify locations of buried service lines (gas/water/electric) that are not covered by the VA811 system. Appropriate signage will be installed to identify locations of existing utilities prior to commencing construction.

Aboveground utility lines including electric (distribution and transmission), telephone, tv cable, or other will be appropriately delineated. Aboveground utility locations are typically identified using a combination of signage, dedicated spotter and physical barriers placed in proximity to the utility line. Examples include use of ground signage and hazard or car lot ribbon tied to non-conductive goal posts placed on either side of the LOD. Locations of overhead utility crossings that require identification are determined during pre-construction stakeout of the LOD and appropriate marking installed at that time.

5.0 MAINTENANCE OF PERMANENT RIGHT-OF-WAY

5.1 POST-CONSTRUCTION MONITORING AND MAINTENANCE

Follow-up inspections of all disturbed areas will be conducted to determine the success of revegetation. In some cases, revegetation cannot be determined to be fully established until it has been maintained for one full year after planting. However, permanent vegetation shall not be considered established until a ground cover is achieved that is uniform, mature enough to survive and will inhibit erosion. If vegetative cover and density is not acceptable or there are excessive noxious weeds after two full growing seasons, a professional agronomist will determine the need for additional restoration measures (such as fertilizing or reseeding).

When necessary, the measures recommended by the agronomist will be implemented. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Drainage and irrigation systems will be monitored and problems resulting from pipeline construction in active agricultural areas will be corrected. Trench breaker drains and cut-off drains installed within the pipeline trench will be monitored and maintained functional during operation of the Project. Outlet locations will be field identified via appropriate measures (i.e. signage, flagging, etc.).

Normally, the entire permanent ROW will be maintained. Maintaining this width is necessary for the following reasons:

- Access for routine pipeline patrols and corrosion surveys.
- Access in the event that emergency repairs of the pipeline are needed.
- Visibility during aerial patrols. The full width of the ROW will be kept clear where overhanging foliage decreases visibility.

Vegetation maintenance adjacent to waterbodies will be limited to allow a riparian strip at least 25-feet wide, as measured from the waterbody's ordinary high-water mark, to permanently revegetate with native plant species across the entire ROW. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline and up to 10 feet wide will be mowed annually and may be maintained in an herbaceous state. In addition, trees that are located within 15 feet of the pipeline and are greater than 15 feet in height may be cut and removed from the ROW.

The success of wetland revegetation will be monitored in accordance with the FERC PLAN and PROCEDURES and any other requirements from the U.S. Army Corps of Engineers.

Shrubs or other vegetation used to screen long sections of the ROW from public view will be properly maintained. Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, will continue throughout the life of the Project. Signs, gates, and vehicle trails will be maintained as necessary.

5.1.1 Long Term Responsibility and Maintenance

Upon completion of any project, MOUNTAIN VALLEY will provide the VADEQ with a document with the following information:

- The responsible parties that will provide for the long-term maintenance of the project; and
- Maintenance Agreements, with VADEQ's review and approval, for any applicable structural BMPs.

5.1.2 Unmanned Aircraft Systems Inspections

Protocols for unmanned aircraft systems (UAS) inspections include:

- UAS flights to capture high-definition images of ROW stabilization may be employed to conduct inspection activities in areas with temporary ECDs that have limited to no safe access (such as hazardous weather conditions, impassable stream levels, etc.) or areas where the temporary ECDs have already been removed. All imagery used must be recently captured (i.e. within the last 7 calendar days). The VADEQ inspector will be notified of scheduled UAS flights at least 48 hours prior to flight. All imagery taken during the flights shall be provided to the Inspector upon their request. All flights will be flown under FAA Part 107 rules and regulations and any other applicable federal, state, or local rule or regulation to the extent not preempted by FAA rules.

- Weather conditions must be clear, visibility not limited, areas not shadowed (time of day), etc.
- Close-up view of resource crossings must be conducted to allow for adequate evaluation of ECDs.
  - If any areas of concern are identified during the field flight, those areas must be inspected via ground inspection within 24 hours of identification.
- If high winds or other weather conditions prevent UAS flight, the inspection shall be conducted as soon as weather conditions allow. If a UAS flight is delayed and the required inspection frequency will be exceeded before weather conditions improve, a ground inspection shall be conducted.
- Following completion of the UAS flight and desktop review of the data, a Visual Site Inspection Form shall be completed that summarizes the findings and populated with photos obtained during the flight.
- No UAS flights can occur on or over U.S. Forest Service property without special coordination and approval by the U.S. Forest Service.

5.2 MAINTENANCE TECHNIQUES

5.2.1 Mowing

To facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually in an herbaceous state (brush hogged no more than annually). Full ROW clearing is to occur no more frequently than once every 3 years. In no case shall routine vegetation maintenance clearing occur between April 15 and August 1 of any year.

In wetland areas, no routine vegetation mowing or clearing will be conducted over the full width of the permanent ROW in wetlands. In order to facilitate periodic inspections, a corridor centered over the pipeline and up to 10 feet wide may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. In addition, trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating may be selectively cut and removed from the permanent ROW. Native herbaceous and woody shrub species will be allowed to reestablish in wetland ROW as noted above.

Herbicides or pesticides will not be used in or within 100 feet of a wetland, except as authorized by the appropriate federal or state agency.

5.2.2 Wetland Right-of-Ways

Maintenance of permanent ROW in wetlands will be performed in compliance with all applicable wetland permit conditions as well as Section 2.32 - Restoration of these Standards and Specifications, and FERC's PLAN and PROCEDURES. There will be no herbicides or pesticides applied in or within 100 feet of a wetland boundary, except as allowed by the appropriate federal or state agency.

5.2.3 Erosion Control

Erosion issues identified on the pipeline ROW during facility operations will be reported to the local MOUNTAIN VALLEY Operations Supervisor and addressed accordingly. These reports may originate from landowners, agencies, or MOUNTAIN VALLEY personnel performing routine patrols. Corrective measures will be performed as needed.

5.2.4 Routine Pipeline Patrol

Routine pipeline ROW inspections will be performed to ensure that MOUNTAIN VALLEY can maintain continuous, reliable service to its customers. During these inspections, all permanent ESC devices installed during construction will be inspected to ensure that they are functioning properly. In addition, attention should be given to:

- Fallen timber or other perils to the pipeline;
- Signs of ground settlement/movement that might endanger the pipeline or adjacent lands;
- Signs of encroachment on the pipeline or pipeline ROW;
- Missing or damaged line markers or fence enclosures;
- Emergency contact information is posted on all enclosures and line markers verification;
- Areas of erosion and washouts across the ROW;
- Permanent ROW diversions (Slope Breakers);
- Waterbody crossings; and
- Any other conditions that could imperil the pipeline or conflict with MOUNTAIN VALLEY's rights under existing ROW agreements.

The local MOUNTAIN VALLEY Operations Supervisor will be notified of any conditions that need attention. Corrective measures taken will be documented and performed on a priority or as needed basis.

5.3 REPORTING

The Program Administrator shall maintain records that identify by milepost:

- Method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
- Acreage treated:
- Dates of backfilling and seeding;
- Names of landowners requesting special seeding treatment and a description of the follow-up actions; and
- Weekly e-reporting to the applicable VADEQ regional office.

6.0 MINIMUM STANDARDS

Technical requirements include both Erosion and Sediment Control Minimum Standards (VSMH Section 5.3.1) and Stormwater Management Standards (VSMH Section 5.3.2). This section is intended to introduce the requirements but does not provide guidance on how to meet these requirements for individual projects. This guidance is provided in Chapter 6, which uses an integrated approach and provides advice on selecting BMPs. While many of the Erosion and Sediment Control Minimum Standards and Stormwater Minimum Standards are separate, it is important to understand that the stormwater standard described in this section does interact with the Stormwater Management Standards in important ways. This is discussed in detail within VSMH Section 5.3.2.1.

The Minimum Standards (MS) are listed in section 560 of the Virginia Erosion and Stormwater Management Regulation (9VAC25-875-560) and state when and where ESC practices must be used for the effective control of soil erosion and sediment deposition. Every VESMP and VESCP authority must require compliance with the MS. They should be incorporated in all ESC plans and implemented in all LDAs. The plan preparer, plan reviewer, developer (operator), and inspector should mutually understand the MS. As such, they allow for consistent enforcement and compliance throughout the state.

MINIMUM STANDARD 1 – Permanent or temporary soil stabilization will be applied to denuded (bare soil) areas within 7 days after final grade is reached on any portion of the site. Temporary soil stabilization will be applied within 7 days to denuded areas that may not be at final grade but will remain dormant for longer than 14 days. Permanent stabilization will be applied to areas that are to be left dormant for more than 1 year. If final grade is reached on any portion of the site, vegetation must be established to prevent erosion. Because ground cover can reduce erosion potential by more than 90%, temporary seeding must be applied if any portion of the site will remain dormant for more than 14 days.

MINIMUM STANDARD 2 – During construction of the project, soil stockpiles and borrow areas will be stabilized or protected with sediment trapping measures. The applicant is responsible for the temporary protection and permanent stabilization of all soil stockpiles onsite as well as borrow areas and soil intentionally transported from the project site. Locations of stockpiles and borrow pits should be identified on site plans, and stockpiles should have perimeter erosion and sediment control measures installed as well as located with enough setback distance from streams, waterways, and entrances/line of sight. Soil stockpile slopes should not exceed 2:1 (horizontal: vertical).

MINIMUM STANDARD 3 – A permanent vegetative cover will be established on denuded areas that are not otherwise permanently stabilized. Permanent vegetation will not be considered established until a ground cover is achieved that is uniform, mature enough to survive, and will inhibit erosion. See C-SSM-10 for requirements to consider turf established.

MINIMUM STANDARD 4 – Sediment basins and traps, perimeter dikes, sediment barriers, and other measures intended to trap sediment will be constructed as a first step in any LDA and will be made functional before upslope land disturbance takes place.

This MS is meant to ensure that sediment does not leave the perimeter of the LDA once site clearing, grading, and construction commences. A certain amount of initial land disturbance may be required to provide access for equipment to install the perimeter controls, but site clearing and grading should be kept to a minimum until the perimeter controls are in place.

MINIMUM STANDARD 5 – Stabilization measures will be applied to earthen structures, such as dams, dikes, channels, and diversions, immediately after installation. In this case, immediate stabilization is required so that the earthen erosion and sediment control structures that were installed do not become a source of sediment. Earthen structures are generally intended to impound, convey, or divert water; therefore, immediate stabilization is needed to prevent damage or failure of the structure.

MINIMUM STANDARD 6 – Sediment traps and sediment basins will be designed and constructed based on the total drainage area to be served by the trap or basin. Sediment traps should be not used for more than 18 months unless they are designed as a permanent impoundment. The minimum storage capacity of a sediment trap will be 134 cubic yards per acre of drainage area (134 cubic yards per acre is equivalent to 1 inch of runoff), and the trap will only control drainage areas less than 3 acres. Provide a combination of man-made stormwater conveyance system improvement, stormwater detention, or other measures that is satisfactory to the VESMP or VESCP authority. Surface runoff from disturbed areas that is composed of flow from drainage areas greater than or equal to 3 acres will be controlled by a sediment basin. The minimum storage capacity of a sediment basin will be 134 cubic yards per acre of drainage area. Temporary sediment basins should be designed and constructed based on the total drainage area to be served by the sediment basin. The maximum total drainage area to be served by a temporary sediment basin should be 100 acres. The outfall system will, at a minimum, maintain the structural integrity of the basin during a 25-year storm of 24-hour duration. Runoff coefficients used in runoff calculations will correspond to a bare earth condition or those conditions expected to exist while the sediment basin is used. The minimum storage capacity of a temporary sediment trap should be 134 cubic yards per acre of total drainage area, half of which should be in the form of a permanent pool or wet storage to provide a stable settling medium. The remaining half should be in the form of a drawdown or dry storage to provide extended settling time during less frequent, larger storm events. Concentrated stormwater flow from a temporary sediment basin should be released into an adequate stormwater conveyance system. Demonstrate that the total drainage area at the point of discharge within the stormwater conveyance system is at least 100 times greater than the drainage area served by the temporary sediment basin in question. Sediment trapping devices should be:

- Placed at, or as near as possible to, the lowest drainage points within the disturbed area and/or where there is a connection to an offsite system;
- Installed as a first-step measure (MS-4);
- Stabilized immediately (MS-5); and
- Designed to include outlet protection for basins (MS-11).

MINIMUM STANDARD 7 – Cut and fill slopes will be designed and constructed in a manner that will minimize erosion. Slopes that are found to be eroding excessively within 1 year of permanent stabilization will be provided with additional slope stabilizing measures until the problem is corrected. Cut and fill slopes

are susceptible to erosion due to increased runoff flow velocity, so they must be constructed in the best way possible to decrease erosion by reducing slope length and grade. Plans must clearly show slope length and grades that will remain stable. It is important that slopes are properly seeded and mulched to establish permanent vegetation so erosion by concentrated flow does not occur. Roughening the surface of the slope can also help decrease runoff by lowering the velocity of flow and increasing water retention, which leads to better seed germination. This practice should generally be implemented unless the slope will require a high degree of maintenance mowing after vegetative establishment.

MINIMUM STANDARD 8 – Concentrated runoff will not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume, or slope drain structure.

Concentrated runoff flowing down a cut or fill slope will cause erosion; therefore, concentrated flow must be controlled at the outlet and down the slope through a temporary or permanent channel, flume, or slope drain. The ends of these slope drains need outlet protection to prevent erosion from concentrated flows. Check dams in stormwater conveyances on cut/fill slopes should be used at the top and bottom of the slope and as needed along the length of the channel.

MINIMUM STANDARD 9 – When water seeps from a slope face, adequate drainage or other protection will be provided. Cut and fill operations may expose shallow aquifers, perched aquifers, or groundwater tables from which water may seep through the side of a slope. The water seeps can cause slopes to erode, or slough, from the soil's weight. Interception drains should be used to collect and safely convey groundwater away from unstable slopes. Riprap revetments or retaining wall may be used on steeper slopes. These areas should be clearly shown on the plans and the SWPPP.

MINIMUM STANDARD 10 – All storm sewer inlets that are made operable during construction will be protected so that sediment-laden water cannot enter the conveyance system without first being filtered or otherwise treated to remove sediment. Storm sewers are designed to efficiently transport stormwater. When sediments enter the storm sewers, the following could occur:

- When the velocity of flow is high, much of the sediment will be quickly transported to the nearest receiving channel; or
- When the velocity of the flow is low, the sediment will deposit in the pipes, resulting in clogging and potential flooding of a site during storm events.

Either of these scenarios can cause detrimental impacts to receiving channels and areas tributary to the channels. Proper inlet protection should be placed and maintained during all LDAs. Inlet protection may be the outfall for the site, and additional sediment trapping measures may be needed. Inlet protection can be provided in several different configurations. These should be clearly shown on the plans and described in the SWPPP.

MINIMUM STANDARD 11 – Before newly constructed stormwater conveyance channels or pipes are made operational, adequate outlet protection and any required temporary or permanent channel lining will be installed in both the conveyance channel and receiving channel. Outlet protection and channel lining is a component of MS-5 as well. These should be clearly shown on the plans and described in the SWPPP. Outlet protection provides energy dissipation of the concentrated discharge from a pipe or channel to

prevent erosion and provide a stable transition. Temporary or permanent channel lining helps to ensure that the channel itself will not erode once water is flowing through it.

MINIMUM STANDARD 12 – When work in a live watercourse is performed, precautions will be taken to minimize encroachment, control sediment transport, and stabilize the work area to the greatest extent possible during construction. Non-erodible material will be used for the construction of causeways and cofferdams. Earthen fill may be used for these structures if they are armored by non-erodible cover materials. Check dams, silt fence, and other perimeter controls should not be placed across a live watercourse. Ensure that proper permits (see MS-14) are included in the SWPPP.

MINIMUM STANDARD 13 – When a live watercourse must be crossed by construction vehicles more than twice in any 6-month period, a temporary vehicular stream crossing constructed of non-erodible material will be provided. When two different construction vehicles cross a stream, one right after the other, the stream has now been crossed twice and can no longer be crossed within the next 6 months without violating this minimum standard. This minimum standard allows one construction vehicle to cross a stream, then return within any 6-month period without further treatment; otherwise, a temporary stream crossing must be constructed. Temporary vehicle crossings need to be properly permitted per MS-14. Temporary culverts need to be properly sized per MS-19. Purpose: Provide a means for construction traffic to cross flowing streams without damaging the channel or banks and keep sediment generated by construction traffic out of the stream. When a live water course must be crossed by construction vehicles more than twice in any six-month period, a temporary vehicular stream crossing constructed of non-erodible material shall be provided.

MINIMUM STANDARD 14 – All applicable federal, state, and local requirements pertaining to working in or crossing live watercourses will be met. Activities in live watercourses usually fall under the jurisdiction of other agencies and/or regulations including:

- U.S. Army Corps of Engineers (404 Permit);
- VDEQ's 401 permitting regulations;
- Virginia Marine Resources Commission (VMRC); and
- Virginia Department of Wildlife Resources (DWR) or local wetland board time of year restrictions.

All applicable permits need to be obtained and available onsite before construction in live watercourses may start. Water bodies may be identified through wetland delineation followed by a jurisdictional determination by the U.S. Army Corps of Engineers. Wetlands, streams, and other water bodies and the impact on these water bodies are usually indicated on plans and sometimes include permit numbers.

MINIMUM STANDARD 15 – The bed and banks of a watercourse will be stabilized immediately after work in the watercourse is completed. Stabilization at the end of each day or immediately after work is completed will ensure that sediment is not impacting other parts of the watercourse. Protective measures will be needed when work cannot be completed in a day. When working in water, the safety of the workers and equipment is important. The weather also factors in heavily when deciding to continue working in a watercourse due to potentially high flows of water. Stabilization matting or rock revetment should be used from the water line to the bank full elevation, and additional measures may be necessary up to the 10-year

water surface elevation. Any work within a Resources Protection Area requires local approval.

MINIMUM STANDARD 16 – Underground utility lines will be installed in accordance with the following standards in addition to other applicable criteria:

- No more than 500 linear feet of trench may be opened at one time.
- Excavated material will be placed on the uphill sides of trenches.
- Effluent from dewatering operations will be filtered or passed through an approved sediment trapping device (or both) before being discharged in a manner that does not adversely affect flowing streams or offsite property.
- Material used for backfilling trenches will be properly compacted in order to minimize erosion and promote stabilization.
- Re-stabilization will be accomplished in accordance with Part V of the Regulation, 9VAC25-875-470 et seq.
- Applicable safety requirements will be met.

The basic principle of controlling erosion and sedimentation on utility projects is to have the trench backfilled and stabilized as soon as possible. Greater open trench lengths are allowed if the Professional Engineer seals the drawings and provides a written narrative description and graphical depiction of the installation process that explains why a larger open trench length is necessary based upon installation process, pipe material, pipe diameter, and soil and slope characteristics. The purpose is to demonstrate the maximum practicable open trench length per installation spread (i.e., length of a linear utility being installed by one crew). Large projects may have multiple “spreads” under construction at one time.

MINIMUM STANDARD 17 – Where construction vehicle access routes intersect paved or public roads, provisions will be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a paved or public road surface, the road surface will be cleaned thoroughly at the end of each day. Sediment will be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing will be allowed only after sediment is removed in this manner. This provision will apply to individual development lots as well as to larger LDAs. During wet weather, construction traffic can transport a significant amount of sediment (i.e., mud) onto paved public roads, creating not only a sedimentation problem but also a safety hazard and public nuisance. Many jurisdictions have local ordinances requiring public roads to be kept clean, regardless of the applicability of the erosion and sediment control regulations. The operator is responsible for keeping public roads adjacent to their project clean. Mud should be swept or shoveled off the road and deposited on areas where it will not cause another sedimentation problem. Construction road stabilization accessing staging areas and stockpiles will help minimize sediment transport.

MINIMUM STANDARD 18 – All temporary erosion and sediment control measures will be removed within 30 days after final site stabilization or after the temporary measures are no longer needed, unless otherwise authorized by the VESMP or VESCP authority. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures will be permanently stabilized to prevent further erosion and

sedimentation. Temporary erosion and sediment control measures can become a problem if left in place beyond their useful life.

- Sediment fences can trap wildlife and small animals.
- Sediment basins can become drowning hazards or sources of sediment in cases of failure, and they become unsightly.

Temporary control measures should be removed as soon as their function has been completed, and the area should be stabilized.

MINIMUM STANDARD 19 – Properties and waterways downstream from development sites will be protected from sediment deposition, erosion, and damage due to increases in volume, velocity, and peak flowrate of stormwater runoff for the stated frequency storm of 24-hour duration. MS-19 (9VAC25-875-560) requires designers to evaluate the adequacy of the downstream man-made and/or natural channels to safely convey the developed condition runoff and to verify the adequacy of all channels and pipes in the following manner:

1. If not using energy balance methodology (see Section 5.3.2.3 Channel Protection if you are unfamiliar with this method), demonstrate that the total drainage area to the point of analysis within the channel is 100 times greater than the contributing drainage area of the project (in which case, the channel or pipe system is assumed to be adequate based on the correspondingly small impact of the project's runoff to the larger stream or channel system).
2. Natural channels will be analyzed using a 2-year storm to verify that stormwater will not overtop channel banks or cause erosion of channel bed or banks.
3. All man-made channels will be analyzed using a 10-year storm to verify that stormwater will not overtop its banks and by the use of a 2-year storm to demonstrate that stormwater will not cause erosion of channel bed or banks; and
4. Pipes and storm sewer systems will be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system.
5. If the existing or man-made channels or pipes are not adequate, the applicant will:
   5.1 Improve the channel to a condition that meets the artificial channel criteria previously described. Improve the pipe or pipe system so that the 10-year storm is contained within the system.
   5.2 Develop a site design that:
      a. Will not cause the pre-development peak runoff rate from a 2-year storm to increase when runoff outfalls into a natural channel; or
      b. Will not cause the pre-development peak runoff rate from a 10-year storm to increase when runoff outfalls into a man-made channel; or
      c. Provide a combination of channel improvement, stormwater detention, or other measures satisfactory to the VESMP authority to prevent downstream erosion.

APPENDIX A – KARST MITIGATION PLAN

The following provides project-specific information for the Mountain Valley H-605 Pipeline.

Karst Mitigation Plans will be developed for other projects if required by FERC with FERC maintaining approval and enforcement authority.

KARST MITIGATION PLAN

(Revised for Implementation Plan - Trenchless Crossing)

Prepared for:

Mountain Valley PIPELINE

Mountain Valley Pipeline

2200 Energy Drive, 2nd Floor

Canonsburg, PA 15317

October 31, 2017 (Original IP-20)

Revised June 7, 2022 (IP Trenchless Crossing)

Prepared by:

Draper Aden Associates

Engineering • Surveying • Environmental Services

DAA Project Number: B14188B-01 / B14188B-21 / 017558

Draper Aden Associates (DAA) prepared this document (which may include drawings, specifications, reports, studies and attachments) in accordance with the agreement between DAA and MVP Gathering, LLC.

The standard of care for all professional engineering, environmental and surveying and related services performed or furnished by DAA under this Agreement are the care and skill ordinarily used by members of these professions practicing under similar circumstances at the same time and in the same locality. DAA makes no warranties, express or implied, under this Agreement in connection with DAA's services.

Conclusions presented are based upon a review of available information, the results of our field studies, and/or professional judgment. To the best of our knowledge, information provided by others is true and accurate, unless otherwise noted.

DAA's liability, hereunder, shall be limited to amounts due DAA for services actually rendered, or reimbursable expenses actually incurred.

Any reuse or modification of any of the aforementioned documents (whether hard copies or electronic transmittals) prepared by DAA without written verification or adaptation by DAA will be at the sole risk of the individual or entity utilizing said documents and such use is without the authorization of DAA. DAA shall have no legal liability resulting from any and all claims, damages, losses, and expenses, including attorney's fees arising out of the unauthorized reuse or modification of these documents. Client shall indemnify DAA from any claims arising out of unauthorized use or modification of the documents whether hard copy or electronic.

TABLE OF CONTENTS

1.0 INTRODUCTION

This **Karst Mitigation Plan** addresses the assessment and mitigation of potential hazards associated with land disturbance in karst terrain to support Mountain Valley Pipeline (MVP) construction, and post-construction monitoring. Hazards include the potential to impact sensitive karst features during construction, as well as potential hazards presented to pipeline construction and operation associated with karst terrain.

Karst feature assessment and mitigation efforts that are covered in this Plan will take place within the limits of land disturbance (LOD) along the MVP alignment (including trenchless crossings) underlain by karst terrain (**Figure 1**). The LOD is identified in this Plan as an area within the MVP construction easement where ground cover is removed or altered through MVP construction activities (clearing and grubbing, trenching, blasting, boring or drilling), and trenchless crossings.

The post-construction monitoring portion of this Plan is designed to surveil the alignment for potential land subsidence that may be associated with an activated subsurface karst feature once reclamation actives are completed and the pipeline is brought into operation. Potential mitigation measures are also discussed in this Plan.

Karst terrain occurs from southern Summers County, West Virginia into Roanoke County, Virginia along an approximately 33-mile corridor (although karst terrain is not contiguous) within which the MVP alignment is proposed for construction (**Figure 1**). Note that karst terrain is not continuous throughout the karst zone illustrated in **Figure 1**. The Appalachian Plateau and Valley and Ridge geologic provinces are characterized by Mississippian to Ordovician age sedimentary bedrock, with folding and ancient thrust faulting resulting in a complicated distribution of rock types through this region. Siliciclastic sedimentary bedrock that does not form karst terrain is interbedded, or otherwise in contact with karst-forming carbonate bedrock.

The **Karst Hazards Assessment** (provided under separate cover) for the MVP alignment in karst terrain included a desk top review using public and proprietary data sources extending a minimum of 0.25-mile from either side of the currently proposed MVP alignment. A more detailed assessment was made through field confirmation of karst features within a minimum of 150 feet

from the proposed MVP alignment on parcels where landowner permission was granted to access the property.

Avoidance of a karst feature constitutes the first and foremost recommendation for mitigating impact. If an identified karst feature cannot be reasonably avoided, or if a previously unidentified karst feature is encountered or forms during construction, this **Karst Mitigation Plan** provides recommendations for impact mitigation and feature stabilization.

MVP will deploy a **Karst Specialist (KS)** prior to, and during construction to confirm, monitor, and mitigate if necessary, existing karst features, and to assess and mitigate previously unidentified karst features that are encountered or observed to form during MVP land disturbance and construction.

1.1 Regulatory Framework

Land disturbance for natural gas pipeline construction and installation constitutes a construction practice that is regulated under federal and state laws for stormwater management and erosion and sediment control (ESC). Construction within karst terrain carries additional regulations to protect caves. The following summarizes the regulatory programs currently in-place in Virginia and West Virginia that will apply to pipeline construction in karst terrain.

In Virginia, ESC is governed by the Erosion & Sediment Control Law (§62.1-44.15:51 et seq) and the Erosion & Sediment Control Regulations (9VAC25-840) and falls under the purview of the Virginia Department of Environmental Quality (DEQ). Note that effective July 2, 2013, DEQ assumed stormwater permitting responsibilities from the Virginia Department of Conservation and Recreation. These laws and regulations serve to let the State regulate construction ESC in compliance with the Clean Water Act NPDES Permit program. Specifically, construction stormwater discharges are covered by the General VPDES permit for discharges of stormwater from construction activities, which requires that the Erosion Control/Stormwater regulations are followed for applicable sites. In normal cases, Erosion & Sediment Control regulations are triggered if land disturbance exceeds 10,000 square feet, and stormwater regulations are triggered if land disturbance exceeds one acre.

West Virginia also administers stormwater general permits through the West Virginia Department of Environmental Protection (WVDEP). Activities that disturb more than one (1) acre but less than three (3) acres are required to comply with the terms of the General Permit by completing a "Notice of Intent" form, while projects disturbing greater than three (3) acres must submit a site registration application form. For projects disturbing between three (3) and 99 acres, the form must be submitted to DEP at least 60 days prior to starting the project. Sites disturbing 100 acres or more, discharge to Tier 3 waters, have an initial grading construction phase of one (1) year or greater, or a common plan of development greater than 10 acres must submit the form at least 100 days prior to starting the project.

Virginia codified a law for protecting caves (the Virginia Cave Protection Act, Code of Virginia Section 10.1-1000 to 1008); there is no corresponding law that specifically protects karst.

The Virginia Department of Conservation and Recreation, a division of the Department of Environmental Quality, includes a Karst Protection Coordinator branch. Coordination with the Karst Protection Coordinator is described in more detail in this plan.

West Virginia also has a state law designed to protect caves (West Virginia Cave Protection Act, West Virginia Code - Chapter 20, Article 7A-1 through 7A-6) but does not address karst protection measures in general.

There are no specific laws or regulations governing blasting to remove shallow bedrock for pipeline trench construction. Nonetheless, a blasting plan will be prepared by the qualified blasting contractor and the Plan enforced to mitigate impacts to structures, sensitive features, and water resources in karst resulting from blasting.

1.2 Overview of Potential Karst Hazards

The term "karst" refers to a type of landform or terrain that is characterized by the presence of sinkholes, caverns, irregular "pinnacled" bedrock surface, and springs. The development of karst terrain is a result of the presence of soluble bedrock such as limestone, dolomite, marble or gypsum. Any landscape that is underlain by soluble bedrock has the potential to develop a karst terrain landform.

The most prevalent type of karst feature observed at the ground surface along the proposed MVP alignment in karst terrain (**Figure 1**) are sinkholes. Sinkholes fall into two broad categories, termed "vault-collapse" sinkholes, or "cover-collapse" sinkholes. Vault-collapse type sinkholes (i.e., where a cavern "vault" or roof has failed catastrophically) are relatively rare in karst terrain along the proposed MVP alignment. However, cover-collapse type sinkholes are more commonly observed.

Cover-collapse sinkholes typically develop by the raveling of overburden into solution channels within the bedrock mass, in which water is the transport medium for the movement of the fines. The natural raveling process is generally slow such that sinkhole development generally occurs over a long time span. However, various changes at a site can sometimes lead to the sudden and unanticipated development of sinkholes.

The most common changes that may initiate sinkhole development are:

1. Increase or redirection of overland or subsurface water flow paths, which accelerates the raveling of fines;
2. Removal of vegetation cover and topsoil (i.e., stripping and grubbing), which can reduce the cohesive strength of overburden that overlies a conduit; and
3. Sudden changes in the elevation of the water table (such as drought, over-pumping of wells, or quarry dewatering), which removes the neutral buoyancy of the water supporting a conduit plug, and may result in rapid collapse.

As noted earlier, caves, pinnacled bedrock and karst springs are also observed within karst terrain underlying the proposed MVP alignment and are addressed later in this plan.

1.3 Karst Hazards Assessment

MVP deployed KS team to evaluate the karst terrain of southern West Virginia and southwestern Virginia through which the proposed MVP alignment will traverse. The KS team holds qualifications of, or work under the direction of, a professional geologist having direct work experience with karst hydrology and geomorphic processes. The KS team has over 70 years of combined direct field experience evaluating karst features in the vicinity of the proposed MVP alignment.

The KS team provided a detailed inventory in the **Karst Hazards Assessment** (provided under separate cover) of karst features within a minimum 0.25-mile of the centerline of the currently proposed MVP alignment and other Project components (e.g., access roads, temporary workspaces, etc.,). The KS team evaluated publicly available and proprietary karst feature data to inventory karst features. Direct field observations (where property access was granted) was used to confirm the desktop review and evaluate the terrain for additional, previously undocumented karst features.

Recommendations were provided to MVP on the locations of sensitive karst features, or areas that are particularly susceptible to karst formation but had limited mapping and field reconnaissance. For these specific karst areas, the KS team recommended that geophysical remote sensing techniques (e.g., electrical resistivity, ground penetrating radar, etc.,) be used, and if necessary invasive borings be completed, to further elucidate a karst feature or a discrete area suspected to have subsurface karst formations. In response to the karst feature assessment, MVP made alignment adjustments to avoid sensitive karst areas. Alignment adjustments therefore reduce the corresponding recommendations for remote sensing and invasive boring evaluations.

Karst features located in the final alignment are minor in nature and extent (e.g., cover-collapse sinkholes). These features will be confirmed and monitored by the KS team prior to and during construction (discussed below) and if necessary stabilized. Formation of a significant karst feature during construction would be monitored and evaluated by the KS. Additional site evaluation (including geophysical remote sensing and invasive borings) may be recommended by the KS to evaluate potential that the feature serves as a conduit to groundwater and if necessary to support mitigation measures (discussed later in this report).

2.0 KARST TERRAIN INSPECTION PRIOR TO AND DURING CONSTRUCTION

MVP deployed a KS team prior to tree clearing and complete a **Level 1** inspection of karst features in the LOD (see **Appendix A** for Karst Feature Inspection Form). The final MVP alignment accommodated for karst feature avoidance recommendations. Therefore, a karst feature located within the LOD is likely to be minor in its extent and nature and a candidate for mitigation and stabilization prior to disturbance.

The KS will consult with MVP Construction to determine the recommended course of action prior to land disturbance in the vicinity of the feature. It is anticipated that the most common karst feature requiring mitigation for MVP construction will be cover-collapse sinkholes (discussed below). Karst feature stabilization will, if necessary, be completed in conjunction with recommendations from the appropriate state agency (Virginia Department of Conservation and Recreation, Karst Protection; West Virginia Department of Environmental Protection).

MVP will deploy an on-site KS team during construction activities (clearing and grubbing, trenching, blasting, trenchless crossing) within karst terrain. The role of the KS is to observe construction activities to assist in limiting potential negative impacts, and to inspect, assess and if necessary mitigate karst features that are encountered or form during construction in conjunction with recommendations from the appropriate state agency (Virginia Department of Conservation and Recreation, Karst Protection; West Virginia Department of Environmental Protection).

Two or more KS will be available to conduct multiple inspections in karst terrain where MVP Construction crews may be working at different locations simultaneously.

2.1 Level 1 Inspection of a Karst Feature

A **Level 1 Inspection** of a karst feature will entail observation and documentation of the following ground and feature characteristics:

1. soil subsidence;
2. rock collapse;
3. sediment filling;
4. swallet (sinking stream) or notable increased surface water infiltration;
5. spring / seep / flooding;
6. cave or void space;

7. clogging; and/or other changes in morphology or function that might indicate potential impact to the epikarst stratum caused by the work.

The inspection will be recorded on a Karst Feature Inspection Form (**Appendix A**), including digital photographs, GPS coordinates and reference to the nearest MVP milepost.

If any of the representative changes listed above are observed at a karst feature, the KS will complete a **Level 2 Inspection** (discussed below).

2.2 Level 2 Inspection of a Karst Feature

The **Level 2 Inspection** will be conducted as follows, and recorded on a Karst Feature Inspection Form provided in **Appendix A**.

The KS will examine the suspected karst feature to identify potential connectivity to the subterranean environment and risk for impacting groundwater quality. The choice of characterization methods will be proposed to MVP by the KS, and will include any combination of (but not be limited to):

1. visual assessment and physical inspection;
2. geophysical survey;
3. track drill probes;
4. infiltration or dye trace testing; or
5. other techniques utilized to facilitate subsurface characterization of karst features.

If the karst feature does not appear to have connectivity to the subterranean environment and risk for impacting groundwater quality, the KS will provide MVP Construction with a recommendation on stabilization measures for the feature (see Section 3.1 of this Plan), and construction activities will continue after the feature is stabilized.

If it is determined that the feature has connectivity to the subterranean environment and potential to impact groundwater, the KS will consult with MVP Construction regarding appropriate mitigation. Mitigation activities would be conducted in conjunction with recommendations from the appropriate state agency (Virginia Department of Conservation and Recreation, Karst Protection; West Virginia Department of Environmental Protection).

In addition:

- The KS will contact Mr. Wil Orndorff, DCR Karst Protection (540-230-5960; Wil.Orndorff@dcr.virginia.gov) within 24 hours of observing a new karst feature within the LOD, to alert DCR of the karst feature and proposed mitigation activities. DCR may request to review the feature prior to further disturbance.

- The KS will contact Mr. Nick Schaer, Program Development Geologist, WVDEP (304-926-0499 ext. 1510; Nick.a.schaer@wv.gov) within 24 hours of observing a new karst feature within the LOD, to alert DEP of the karst feature and proposed mitigation activities. DEP may request to review the feature prior to further disturbance.

Mountain Valley's KS will be available to meet with DCR staff or WVDEP staff no later than 24 hours following a staff request.

A weekly **Level 1 Inspection** of the stabilized or mitigated feature will be completed and documented by the KS on a Karst Feature Inspection Form (**Appendix A**) while construction activities (clearing and grubbing, trenching, blasting, trenchless crossing) are on-going within 150 feet of the feature.

Mitigation or stabilization activities will be documented upon completion in a report prepared by the KS, to be delivered to MVP.

2.3 Agency Coordination

Mountain Valley will coordinate with the Virginia DCR to identify areas with high potential for stream loss. Should the potential for or an actual stream loss occur, the karst specialists will coordinate with the MVP Environmental Inspectors, construction personnel and the Virginia DCR to develop a site-specific plan to avoid the loss or mitigate the issue.

3.0 MANAGEMENT OF NEWLY IDENTIFIED KARST FEATURES

If a suspected karst feature is intercepted during work activities, or forms within the LOD during construction activities (clearing and grubbing, trenching, blasting, boring or drilling), the KS will conduct a combined **Level 1** and **Level 2 Inspection** of the feature.

Suspected karst features include:

1. Sinkhole;
2. Spring;
3. Bedrock enclosed conduit(s) or void;
4. Solution pocket that extends beyond visual examination range (and therefore may be open);
5. Soil void;
6. Highly fractured karst bedrock;

The KS will follow the procedural outlines listed above for **Level 1** and **Level 2 Inspections**.

3.1 Sinkhole Stabilization

Sinkholes are common surficial geomorphic expressions of karst terrain. If a sinkhole is located within the proposed LOD and cannot be reasonably avoided, the sinkhole will be stabilized prior to construction in accordance with recommendations provided by the KS, and in conjunction with recommendations from the appropriate state agency (Virginia Department of Conservation and Recreation, Karst Protection; West Virginia Department of Environmental Protection).

A weekly **Level 1 Inspection** (described below) of the stabilized feature will be completed and documented by the KS (see **Appendix A** for Karst Feature Inspection Form) while construction activities (clearing and grubbing, trenching, blasting, boring or drilling) are on-going within 150 feet of the feature.

Mitigation activities will be documented upon completion in a report prepared by the KS, to be delivered to MVP.

See the following sections of this report for activities to be followed under this Mitigation Plan for karst features other than sinkholes that are located within the MVP LOD.

4.0 MEASURES TO AVOID IMPACTS TO THE KARST AQUIFER AND ENVIRONMENT

The following procedures will be used during pipeline construction activities (clearing and grubbing, trenching, blasting, boring or drilling) to limit potential impact to karst features and related water resources.

1. Protect known and/or future mapped recharge areas of cave streams and other karst features (see **Karst Hazards Assessment** provided under separate cover to identify the relevant construction area where these features are located) by following relevant conservation standards, specifically those pertaining to stream and wetland crossings, erosion and sediment control, and spill prevention, containment, and control.
2. MVP construction activities (clearing and grubbing, trenching, blasting, boring or drilling) will be conducted in a manner that minimizes alteration of existing grade and hydrology of karst features:
    a. In linear excavations adjacent to karst features, spoils will be stockpiled and managed up-slope of the excavation, and runoff controlled according to the MVP project-specific stormwater management and ESC Plan (under separate cover).
    b. Surface water control measures, including, but not limited to diversion (direct water flow into trench or off right-of-way areas past the area of concern), detention or collection and transportation, will be utilized to prevent construction-influenced surface water from free flowing into karst features.
    c. Karst features will not be utilized for the disposal of water.
3. Blasting will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of known or inferred subsurface karst structures. If rock is required to be hammered or blasted, the following parameters will be adhered to:
        a. The excavation will be carefully inspected for voids or other openings, or signs of enhanced secondary porosity.
        b. If the rock removal intercepts an open or clay-filled void, cave, or other signs of enhanced secondary porosity, see previous section of this plan for **Level 1** and **Level 2 Inspections**.
        c. Blasting will be conducted by a qualified blasting contractor, in accordance with the contractors written and approved blasting plan.

d. If a track drill is used to prepare the hole(s) for the explosive charge(s) and the boring encounters an open or clay-filled void, cave, or other signs of enhanced secondary porosity, see previous section of this plan for **Level 1** and **Level 2 Inspections**.

4. Comply with requirements of project Spill Prevention, Control, and Countermeasures Plan (SPCC) prepared by Contractor (under separate cover). During construction, if the KS observes unexpected conditions that may affect a karst feature, the KS will re-examine and enhance if necessary the procedures and BMPs designed to protect karst features. The following general guidelines will be incorporated into the SPCC for construction practices in karst terrain:

   a. To reduce the risk of groundwater contamination, equipment will not be parked or left idling for extended periods of time (more than 12 hours), refueled or serviced within 100 feet of any karst feature.
   b. Equipment refueling will not be performed within flagged or marked buffer areas of streambeds, sinkholes, fissures, or areas draining into these or other karst features, except by hand-carried cans (5 gallon maximum capacity) when necessary.
   c. Equipment servicing and maintenance areas will be sited outside of flagged or marked buffer areas of streambeds, sinkholes, fissures, or areas draining into these or other karst features.
   d. Prevent runoff resulting from construction equipment washing operations to directly enter any karst feature by locating these operations outside of the buffer area.
   e. Mountain Valley will also restrict equipment storage and fueling from occurring upgradient (with respect to surface water flow) from the 100-foot karst feature exclusion buffer to further limit potential for impacts.
   f. Hazardous materials, chemicals, fuels, lubricating oils, and petroleum products will not be stored within 100 feet of any karst feature.
   g. All equipment will be checked by a construction inspector daily for leaks prior to beginning work in karst areas. If any leaks are observed, or damaged or defective equipment is discovered, drip pans and other containment will be deployed immediately and the equipment removed or repaired as soon as practical.
   h. If a reportable spill (reportable volume will be defined in the project-specific SPCC Plan) occurs within a karst feature or water body, refer to the project-specific SPCC Plan.

5. The intent of ESC and related Best Management Practices (BMPs) is to confine project-related disturbance to the LOD, protect sensitive karst features, and minimize erosion and enhance revegetation in those areas. In addition to ESC BMPs for standard pipeline construction, which includes specifications by regulatory agencies, additional BMPs will be implemented as specified by the KS.
    a. The KS and EI will be on site during all phases of construction, and they have the responsibility to determine if mitigation measures provide sufficient protection of the identified features given site conditions. The KS and EI have the authority to adjust and improve BMP protection around these resources to address changes in conditions.
    b. To provide additional protection throughout the project, Mountain Valley will also inspect the environmental controls throughout the project area once every seven days or after a 0.25-inch rain event.
6. Discharge of hydrostatic testing water in karst areas will be avoided if practicable. If circumstances require hydrostatic testing water to be discharged in karst areas, the KS will recommend a discharge location in consideration of the following guidelines:
    a. Do not discharge hydrostatic testing water directly into flagged or marked buffer areas of karst features or channels or surface features that flow towards karst feature(s).
    b. Where possible, discharge hydrostatic test water down-gradient of karst features unless on-the-ground circumstances (e.g., manmade structures, terrain, and other sensitive resources) prevent such discharge.
        i. If those circumstances occur, discharge water into uplands greater than 500 feet from flagged or marked buffer areas of karst features unless on-the ground circumstances (e.g. manmade structures, terrain, other sensitive resources) prevent such discharge.
        ii. If i.) above is not practicable, discharge water as far from flagged or marked karst features as practical and utilize additional sediment and water flow control devices to minimize effects.
    c. Control the rate and volume of discharge to prevent land erosion, sediment mobilization and ponding of water.

5.0 POST-CONSTRUCTION MONITORING

After pipeline construction and land reclamation are completed, Mountain Valley will implement a monitoring program within karst terrain to surveil for potential land subsidence that may be associated with activation of a subsurface karst feature. The monitoring program will provide early-warning detection of subtle ground movement and trigger Mountain Valley's post-construction landform evaluation and mitigation procedures in karst terrain, as described below. Recommendations for mitigation are discussed in Section 5.3, below. More specific mitigation measures will depend upon the results of the monitoring program, and the Mountain Valley KS team's field observations on actual conditions.

Mountain Valley will construct the pipeline with safeguards to prevent impacts to, and from, karst terrain, as discussed above. Mountain Valley does not consider it sound practice to establish a construction area that requires repeated interim measures to maintain stability.

5.1 Light Detection and Ranging (LiDAR) Surveys

Mountain Valley will utilize aerial Light Detection and Ranging (LiDAR) surveys on a prescribed periodic basis (discussed below) to monitor the ROW for changes in ground topography that could be indicators of potential land subsidence due to activation of a subsurface karst feature.

LiDAR works by emitting multiple laser pulses over the same area, such that some pulses are reflected off intermediate surfaces (i.e. variable height vegetation, buildings, power lines, etc.) and some of the pulses find the underlying ground surface. The resulting data are processed to classify data that represent the ground surface (i.e., generate a bare Earth model), providing a detailed topographic and geomorphic landform model to detect subtle changes in ground morphologies.

A progression of LiDAR data collected over time over the ROW in karst terrain will be compared to previous surveys in order to identify whether subtle landform chances are occurring that could correspond with possible land subsidence. The sequential LiDAR models of the area of concern will be configured as a "heat map" to more clearly identify changes in geomorpholgy. If ground subsidence is perceived via LiDAR monitoring (analysis is discussed below), direct inspection by the Mountain Valley KS team will take place to assess the potential for sinkhole or other karst

feature formation. The intent is to mitigate subtle landform movements before a larger failure could occur.

5.2 Monitoring Schedule

Mountain Valley will conduct semiannual aerial LiDAR monitoring of the ROW in karst terrain during an initial two-year period after construction is complete, rendering four (4) sequential LiDAR surveys during the first two years after construction. This spans a critical period of time post-construction to confirm that land reclamation is established, and that karst terrain underlain by the ROW is stable. Continued monitoring described below will confirm these conclusions over the long-term.

If karst terrain in the ROW is demonstrated to be stable by sequential LiDAR monitoring data for the initial two years of semiannual monitoring (described above), the frequency of LiDAR survey will be reduced to annually for another two consecutive years. This will provide six (6) LiDAR monitoring events over the span of four years in order to detect potential land subsidence.

If the ROW in karst terrain is demonstrated to be stable by sequential LiDAR monitoring data for the combined four years of monitoring (i.e., the initial two years of semiannual monitoring, followed by two years of annual monitoring), the frequency of LiDAR surveys will be further reduced to a five-year periodicity throughout the life of the pipeline.

As each new sequential LiDAR survey is completed (see monitoring schedule above), the data will be processed and compared to all historical LiDAR data for the ROW available at the time to produce a "heat map" of potential ground movement over time.

If karst terrain reclamation is required in the ROW, Mountain Valley will remediate the area per the KS team's recommendations and include the repaired area specifically in its routine monitoring schedule to document that land stability was achieved.

5.3 Slope Stability Mitigation Measures

If land subsidence is detected by the LiDAR monitoring program, Mountain Valley will engage the Mountain Valley KS team to complete field inspection and verification and confirm actual

conditions and governing reasons for the topographic changes. Recommendations for remedial measures will be provided to Mountain Valley based on the KS team inspection observations.

Once Mountain Valley has received recommendations from the KS team, Mountain Valley will contact Mr. Wil Orndorff, DCR Karst Protection (540-230-5960; Wil.Orndorff@dcr.virginia.gov) to alert DCR of potential karst feature activation and proposed mitigation activities. DCR may request to review the feature prior to further disturbance. If the karst feature is observed in West Virginia, Mountain Valley will also contact Mr. Nick Schaer, Program Development Geologist, WVDEP (304-926-0499 ext. 1510; Nick.a.schaer@wv.gov).

Once Mountain Valley has received recommendations from the KS team, and notified the agency(ies), Mountain Valley will implement planned remedial activities. Specific remedial measures will depend upon the nature and extent of potential land subsidence. Examples of potential redial measures could include:

- If subsidence is confirmed in surficial backfill in the ROW (which may or may not be associated with subsurface karst), enhanced backfill compaction (or replacement with engineered materials), enhanced water management, and aggressive revegetation will be implemented.

- If subsidence in native earth material outside of the ROW is confirmed, the KS team inspectors will provide recommendations to Mountain Valley for remediation measures such as sinkhole stabilization measures discussed earlier in this Plan.

- If subsidence may have resulted in pipe stress, a stress relief excavation may be required to allow the pipeline to rebound to the non-stress condition prior to subsidence. Stress relief excavations typically start in the middle of the area where land movement is observed and extend in either direction until no rebound is observed, and generally continue for a minimum of an additional 50 feet. Surveys may be required during the excavation work to track pipeline rebound, and to confirm before and after pipeline location and elevation. Stress relief excavations would only be contemplated for relatively large-scale movement scenarios.

- Mountain Valley may also consider installing strain gauges on the pipeline during stress-relief excavation. The strain gauges would monitor potential accumulated pipeline strain in the future if land subsidence continues. Strain gauge monitoring would be conducted manually on a yearly basis, unless LiDAR monitoring under the post-remediation timeframe continues to identify large-scale slope movement, in which case the strain gauges will be monitored on a six-month basis. Strain gauges would only be contemplated for relatively large-scale movement scenarios.

FIGURE 1 – KARST ZONE

Mountain Valley Pipeline Project

Mountain Valley PIPELINE

FIGURE NUMBER 1
Karst Zones

October 2017

Draper Aden Associates
Engineering • Surveying • Environmental Services

Approximately 24.0 miles of karst terrain is traversed by the proposed route.
~10.6 Miles of Limestone
~13.4 Miles of Dolomite

It is encountered in non-contiguous areas across the Counties of Summers, Monroe, Giles, Craig, and Montgomery.

Summers
Monroe
Greenbrier
Greenbrier
Greenbrier
Alleghany
Craig
Botetourt
Roanoke
Salem
Montgomery
Pulaski
Giles
Mercer
Mercer
Mercer
MP-180
MP-190
MP-200
MP-210
MP-220
MP-230
MP-240

Legend

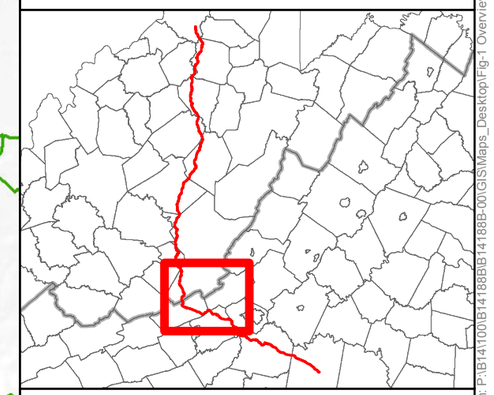
MVP Proposed Route with Mile Posts

Karst Areas

Rock Type

Limestone

Dolomite



Karst Regions adapted from 1968 Geological Map of West Virginia. 1:250,000. West Virginia Geological and Economic Survey.
Digital Representation of the 1993 Geologic Map of Virginia; 1:500,000
U.S. Geological Survey, 2003; (Virginia Division of Mineral Resources Publication 174)
Geologic Map of Giles County, Virginia, 1986. Ed. E.K.Rader and T.M.Gathright II

N

1:225,000

NAD 1983 UTM 17N

0 2 4 6 8 Miles

Service Layer Credits:

Background hillshade: Shuttle Radar Topography Mission 90m DEM; NASA

Document Path: P:\B14\100\B14188B\B14188B-00\GIS\Maps_Desktop\Fig-1 Overview Karst Zones v5r1.mxd

APPENDIX A - KARST FEATURE INSPECTION FORM

Date:_____ Karst Specialist:_____ MVP Milepost:_____

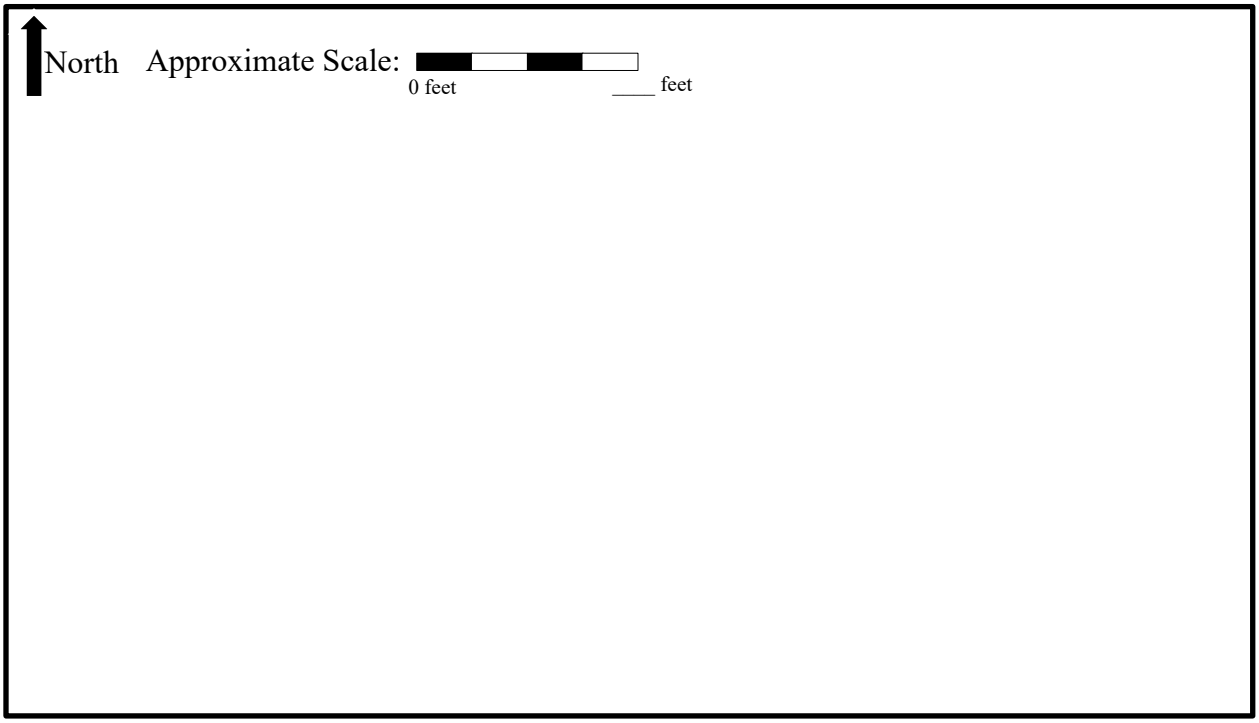
GPS Coordinates (X, Y; coordinate system):_____

Digital image documentation:

Photo #	View toward (circle):	Description:
	North South East West	
	North South East West	
	North South East West	
	North South East West	

Continue on next page if necessary.

Sketch:



Level 1 Inspection: Check characteristics observed:

____ soil subsidence ____ rock collapse ____sediment filling

____ swallet / notable increased surface water infiltration ____spring / seep or flooding

____ clogging; and/or other changes in morphology or function that might indicate potential impact to the epikarst stratum caused by the work.
Description:_____
_____
_____

Recommend Level 2 Inspection? (circle one) **Yes / No**

Level 2 Inspection: Check inspection method(s):

_____ visual assessment _____ geophysical survey _____ track drill probes

_____ infiltration or dye trace testing

_____ other: _____

Mitigation recommended? (circle one) **Yes / No**

Summarize recommended mitigation method(s):

_____
_____
_____
_____

KS contact Wil Orndorff, DCR (540-230-5960)? **Yes / No** Date_____ Time_____

DCR Inspection requested? (circle one) **Yes / No**

KS contact Nick Schaer, WVDEP (304-926-0499)? **Yes / No** Date_____ Time_____

WVDEP Inspection requested? (circle one) **Yes / No**

Notes:

_____
_____