MVP Southgate Project

Docket No. PF18-4-000

Draft

Resource Report 1 – General Project Description

June 14, 2018

Resource Report 1—General Project Description	
Filing Requirement	**Location in Environmental Report**
1. Provide a detailed description and location map of the project facilities (§ 380.12(c)(1)). • Include all pipeline and aboveground facilities. • Include support areas for construction or operation. • Identify facilities to be abandoned. • Summarize the total acreage of land affected by construction and operation of the project.	Section 1.2 Figure 1.2-1 Section 1.3 Resource Report 8 *[Not included with this draft]*
2. Describe any non-jurisdictional facilities that would be built in association with the project. (§ 380.12(c)(2)). • Include auxiliary facilities (See § 2.55(a)). • Describe the relationship to the jurisdictional facilities. • Include ownership, land requirements, gas consumption, megawatt size, construction status, and an update of the latest status of federal, state, and local permits/approvals. • Include the length and diameter of any interconnecting pipeline. • Apply the four-factor test to each facility (see § 380.12(c)(2)(ii)).	Section 1.9
3. Provide the following maps and photos: A. Current, original United States Geological Survey (USGS) 7.5-minute series topographic maps with mileposts showing the project facilities (§ 380.12(c)(3)). o Maps of equivalent details are acceptable if legible (check with staff). o Show locations of all linear project elements, and label them. o Show locations of all significant aboveground facilities, and label them. B. Aerial images or photographs or alignment sheets based on these sources with mileposts showing the project facilities. (§ 380.12(c)(3)). o No more than 1-year old o Scale no smaller than 1:6,000 o Covering minimum 0.5 mile-wide corridor, including mileposts C. Send two (2) additional copies of topographic maps and aerial images/photographs directly to the environmental staff of the Office of Energy Projects (OEP). D. Provide detailed typical construction right-of-way cross-section diagrams showing information such as widths and relative locations of existing rights-of-way, new permanent rights-of-way, and temporary construction rights-of-way. See Resource Report 8 – Land Use, Recreation, and Aesthetics.	Appendix 1-B (USGS map excerpts) Appendix 1-A (alignment sheets) *[Not included with this draft]*
4. Provide plot/site plans for: A. Compressor stations showing the location of the nearest noise-sensitive areas (NSA) within 1 mile. (§ 380.12(c)(3,4)). o Scale no smaller than 1:3,600 o Show reference to topographic maps and aerial alignments provided above B. All other aboveground facilities that are not completely within the right-of-way	Appendix 1-C2 (CEII) *[Not included with this draft]*

Resource Report 1—General Project Description	
Filing Requirement	**Location in Environmental Report**
5. Identify facilities to be abandoned.	Not Applicable
6. Describe construction and restoration methods. (§ 380.12(c)(6)).	Section 1.4
7. If Resource Report 5 - Socioeconomics is not provided, provide the start and end dates of construction, the number of pipeline spreads that would be used, and the workforce per spread.	Resource Report 5 *[Not included with this draft]*
8. Describe reasonably foreseeable plans for future expansion of facilities, including additional land requirements and the compatibility of those plans with the current proposal.	Section 1.6
9. Identify the permits required for construction across surface waters. (§ 380.12(c)(9)). • Include the status of all permits. • For construction in the federal offshore area be sure to include consultation with the MMS. File with the MMS for rights-of-way grants at the same time or before you file with the FERC. • Describe all authorizations required to complete the proposed action and the status of applications for such authorizations	Section 1.7 Table 1.7-1
10. Provide the names and addresses of all affected landowners as required and certify that all affected landowners will be notified; • Affected landowners are defined in § 157.6(d)(2) • Provide an electronic copy directly to the environmental staff.	Appendix 1-L *[Not included with this draft]*

RESOURCE REPORT 1
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LIST OF ACRONYMS AND ABBREVIATIONS

API	American Petroleum Institute
ATWS	Additional temporary construction workspace
BMPs	best management practices
Certificate	Certificate of Public Convenience and Necessity
EI	Environmental Inspector
E&SCP	Erosion and Sediment Control Plan
East Tennessee	East Tennessee Natural Gas, LLC
FERC or Commission	Federal Energy Regulatory Commission
hp	horsepower
MLV	mainline block valves
Mountain Valley	Mountain Valley Pipeline, LLC
MP	milepost
NEPA	National Environmental Policy Act
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	FERC Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC Wetland and Waterbody Construction and Mitigation Procedures
Project	MVP Southgate Project
psig	pounds per square inch gauge
PSNC Energy	PSNC Energy, a wholly owned subsidiary of SCANA Corporation
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation

RESOURCE REPORT 1
GENERAL PROJECT DESCRIPTION

1.1 INTRODUCTION

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

The proposed H-650 pipeline will interconnect with and receive gas from the existing Mountain Valley Pipeline near Chatham, Virginia, and the East Tennessee Natural Gas, LLC ("East Tennessee") mainline near Eden, North Carolina, and will deliver gas to connections with customers' existing facilities in Eden and Graham, North Carolina. The Project is a stand-alone project from the Mountain Valley Pipeline and has an expected in-service date of late 2020. In addition to the H-650 pipeline, Mountain Valley proposes to construct and operate a new, approximately 47,700 horsepower ("hp") compressor station near the beginning of the pipeline at milepost ("MP") 0.0, a new, approximately 11,500 hp compressor station near MP 26; and meter stations and other ancillary facilities required for the safe and reliable operation of the pipeline.

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

1.1.1 Environmental Resource Report Organization

The FERC's NEPA review process requires Mountain Valley to submit an Environmental Report consisting of up to 12 individual resource reports for natural gas pipeline projects. Each resource report addresses particular aspects of the environment in the Project area and evaluates the potential effects of the

construction and operation of the Project on those aspects. This Pre-Filing Draft Resource Report 1 (General Project Description) consists of a complete summary of the proposed Project facilities, land requirements, and construction and restoration methods for the pipeline and aboveground facilities, the proposed construction schedule and workforce and operation and maintenance of Project facilities. This resource report also provides information on permits and approvals, including major consultations, potential impacts on affected landowners, non-jurisdictional facilities, and cumulative impacts.

1.1.2 Purpose and Need

Mountain Valley conducted an Open Season between April 11, 2018 and May 11, 2018. PSNC Energy, a wholly owned subsidiary of SCANA Corporation ("PSNC Energy"), an anchor shipper, has committed to 300,000 million cubic feet per day of firm transportation service to be made available by the Project. Mountain Valley and PSNC Energy entered into binding agreements for the Project in December 2017, more than two months after the Commission issued its certificate to the 303-mile Mountain Valley Pipeline Project. While the Mountain Valley Pipeline Project is targeted to commence service in late 2018, Mountain Valley expects this Project to commence service in late 2020. Negotiations continue with additional shippers that expressed interest in the open season and are expected to conclude soon. The Project will have a separate incrementally priced transportation rate and shippers can elect to only ship on the Project.

The purpose of the Project is to: (1) meet the growing needs of natural gas users in the southeastern U.S.; (2) add a new natural gas transmission pipeline to provide competition and enhance the reliability and resiliency of the existing pipeline infrastructure in North Carolina and southern Virginia; and (3) provide North Carolina and southern Virginia with direct pipeline access to the Marcellus and Utica gas regions in West Virginia, Ohio and southwestern Pennsylvania. The Project will enhance the diversity of gas supply and create additional pipeline capacity in the region. PSNC Energy will use the gas it transports to serve its fast growing residential, commercial and industrial markets in North Carolina. North Carolina's population is expected to increase by nearly 2 million people between 2020 and 2035.[1] In addition to helping to meet increased demand for natural gas, the Project will provide for a new pipeline entrant into the North Carolina market. The Piedmont region of North Carolina is currently served by two interstate natural gas pipelines, Transcontinental Gas Pipe Line Company, LLC and East Tennessee, respectively. In 2013, the North Carolina Utilities Commission recognized the need for competitive interstate pipeline capacity alternatives in Docket No. G-100, Sub 91, *Investigation Regarding Competitive Alternatives for Additional Natural Gas Service Agreements*. The Project will satisfy this need for a new competitive interstate pipeline consistent with the expressed goal of the North Carolina Utilities Commission. In

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

addition to being interconnected with the existing Mountain Valley Pipeline system in Virginia, the Project will provide a direct interconnection to East Tennessee, thereby allowing primary firm forward-hauls of natural gas increasing reliability, and allowing for additional gas supplies to be sourced from various producing regions and storage facilities. Finally, the Project will provide direct access to the prolific Marcellus and Utica regions in West Virginia, Ohio and southwestern Pennsylvania. Thus, the Project will enhance and diversify gas supplies for North Carolina, Virginia, and the southeastern U.S. generally.

1.2 LOCATION AND DESCRIPTION OF FACILITIES

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

1.2.1 Pipeline Facilities

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

From the Lambert Compressor Station, the H-650 pipeline will traverse southwest approximately 26.2 miles into Rockingham County, North Carolina. The pipeline will then continue southwest into Rockingham County approximately 2.0 miles to a proposed interconnect with East Tennessee (LN 3600 Interconnect) located at approximate MP 28.0 near Eden, North Carolina. From this point, the H-650 pipeline will continue southwest approximately 2.4 miles to a proposed delivery interconnect (T-15 Dan River Interconnect) located at approximate MP 30.

From the T-15 Dan River Interconnect, the H-650 pipeline will continue southwest for approximately 2.1 miles. East of the City of Eden, North Carolina, the H-650 pipeline will turn to the southeast near MP 32.6, and continue southeast approximately 20 miles, into Alamance County at (MP 52.5), east of the town of Wentworth and the City of Reidsville. From the Alamance County line, the H-650 pipeline will continue southeasterly to MP 65.5, where it will turn south and continue for about 6.5 miles to its proposed delivery terminus (T-21 Haw River Interconnect) located at MP 72 approximately 2.5 miles southeast of the City of Graham, North Carolina.

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

Figure 1.2-1 provides an overview of the proposed Project facilities. Table 1.2-1 identifies the counties crossed by the proposed pipeline route by milepost. Appendix 1-A contains alignment sheets for the Project and Appendix 1-B contains United States Geological Society (USGS) 7.5-minute topographic quadrangle map excerpts. Appendix 1-C1 will contain all applicable Typical Drawings. *[Note: Mountain Valley will provide alignment sheets and typical drawings in the draft Resource Reports to be filed with the FERC.]*

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

Table 1.2-1
MVP Southgate Project Pipeline Facilities

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

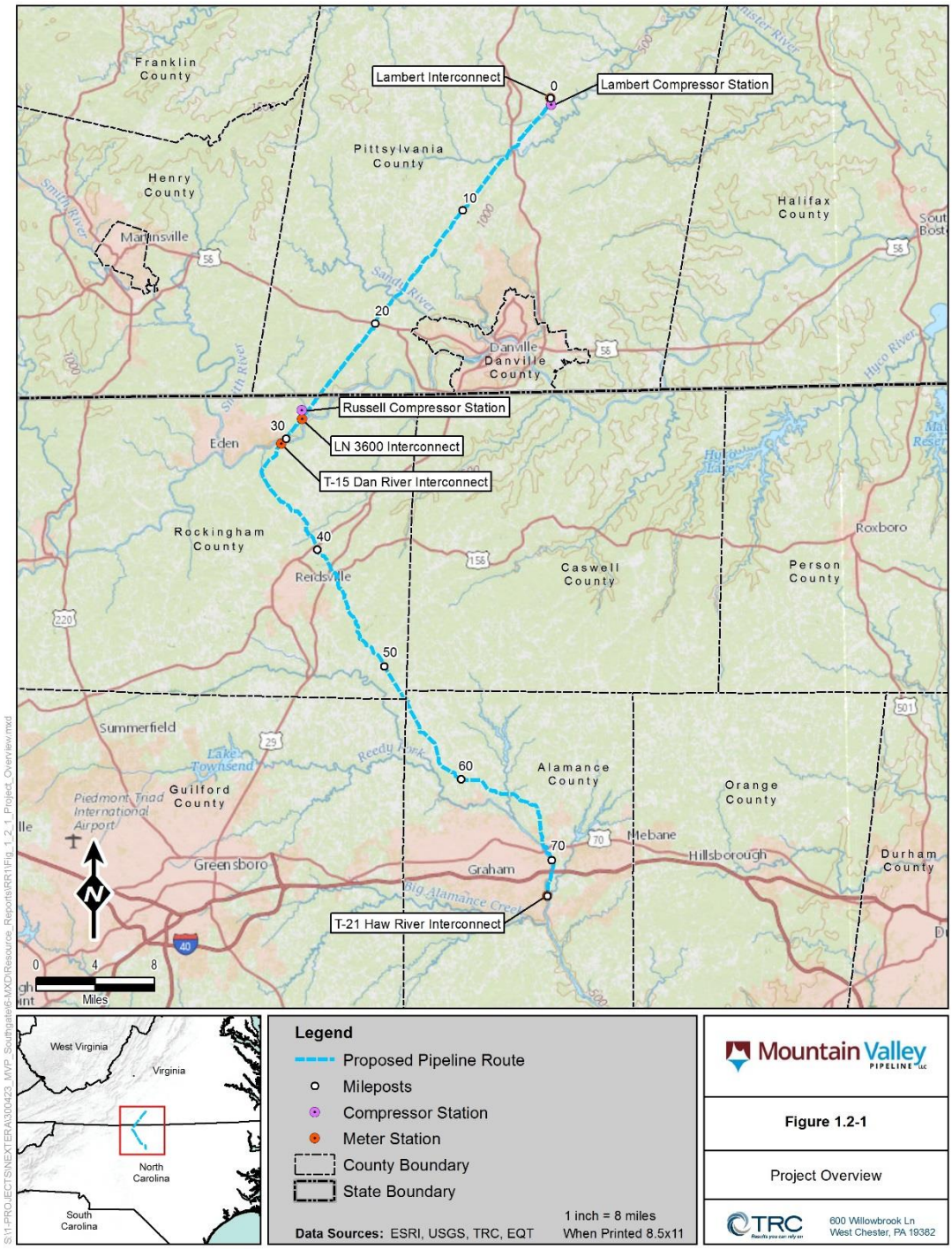


Figure 1.2-1. Project Overview

1.2.2 Aboveground Facilities

Table 1.2-2 provides a summary of the proposed aboveground facilities that include two compressor stations, four meter (interconnect) stations, pig launcher and receiver, and mainline block valves ("MLV").

Table 1.2-2
MVP Southgate Project Aboveground Facilities

Compressor Stations					
Facility	**Approximate Milepost**	**County, State**	**Isometric HP**	**Suction PSIG**	**Discharge PSIG**
Lambert Compressor Station	0.0	Pittsylvania, VA	47,700	780	1,450
Russell Compressor Station	26	Rockingham, NC	11,150	900	1,450

Pig Launchers/Receivers		
Launcher/Receiver	**Approximate Milepost**	**Associated Facility**
Pig Launcher	0	Lambert Compressor Station
Pig Receiver	TBD	TBD
Pig Launcher	TBD	TBD
Pig Receiver	72	T-21 Haw River Interconnect

Valves and Meter Stations		
Block Valves	**Class Distribution (percent)**	**Class Miles**
Class 1	69.5	50.82
Class 2	27.8	20.30
Class 3	2.7	1.96
Class 4	0	0
Railroad Crossings/Class 1	N/A	0.02
Railroad Crossings/Class 2	N/A	0.01
Total	--	
Meter Stations		**Approximate Milepost**
Lambert Interconnect		0
LN 3600 Interconnect		28
T-15 Dan River Interconnect		30
T-21 Haw River Interconnect		72

1.2.2.1 Compressor Stations

The Project will require two new compressor stations to move gas from the beginning of the pipeline at the existing Mountain Valley Pipeline system in Pittsylvania County, Virginia, to the associated delivery points along the pipeline. Mountain Valley's typical plot plans for each compressor station are included in Appendix 1-C2 (CEII). *[Note: Mountain Valley will provide compressor station plot plans in the draft Resource Reports to be filed with the FERC.]*

The Project will require approximately 58,850 hp as dictated by the flow rate, pressure conditions expected on the H-650 pipeline, and ambient temperatures. Mountain Valley anticipates the supply pressure at the Lambert Interconnect (MP 0.0) to be approximately 780 psig while the delivery pressure at the T-21 Haw River Interconnect (MP 72.75) is expected to be approximately 750 psig. The gas flow will drop in pressure due to frictional losses and elevation changes as it travels within the H-650 pipeline. To overcome these losses, as well as to meet the pressure requirements at the East Tennessee and PSNC Energy delivery interconnects, the pressure will be boosted by the two proposed compressor stations. Natural gas fired turbine engines will power the compressors on the Project. The natural gas to power the compressors will be provided by the Project's shippers.

Lambert Compressor Station

Mountain Valley will construct the Lambert Compressor Station at MP 0.0 in Pittsylvania County, Virginia on a parcel of land owned by Mountain Valley. The Lambert Compressor Station will pull gas from the existing Mountain Valley Pipeline system for delivery to the proposed Russell Compressor Station (approximate MP 26) and downstream interconnects via the H-650 pipeline. Mountain Valley anticipates that the Lambert Compressor Station will contain three gas-driven turbines which combined will provide approximately 47,700 hp of compression. The station is expected to include a compressor building, electrical control building, office, and air compressor building. A chain linked fence security will surround the perimeter of the station site upon completion of construction. Equipment at the compressor station includes but is not limited to gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, heaters, and auxiliary micro-turbines. Mountain Valley has designed the Lambert Compressor Station to raise the pressure of the H-650 pipeline from 780 psig to 1,450 psig. Mountain Valley does not expect that this compressor station will require dehydration; however, typical filtration and separation equipment to protect the operating equipment will be installed. Mountain Valley's typical plot plan for the Lambert Compressor Station is included in Appendix 1-C2 (CEII). *[Note: Mountain Valley will provide compressor station plot plans in the draft Resource Reports to be filed with the FERC.]*

Russell Compressor Station

Mountain Valley will construct the Russell Compressor Station at approximate MP 26 in Rockingham County, North Carolina. The compressor station will contain one gas-driven turbine that will provide approximately 11,150 hp of compression. The station is expected to include a compressor building, electrical control building, office, and air compressor building. A chain-link security fence will surround the perimeter of the station site upon completion of construction. As currently designed, equipment at the compressor station includes but is not limited to gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, heaters, and auxiliary micro-turbines. Mountain Valley has designed the Russell Compressor Station to raise the pressure of the gas from 900 psig to 1,450 psig depending on

downstream pipeline conditions. Mountain Valley does not expect that this compressor station will require dehydration; however, typical filtration and separation equipment to protect the operating equipment will be installed. Mountain Valley's typical plot plans for the Russel Compressor Station are included in Appendix 1-C2 (CEII). *[Note: Mountain Valley will provide compressor station plot plans in the draft Resource Reports to be filed with the FERC.]*

The Russell Compressor Station will include suction piping that will connect to the H-650 pipeline approximately TBD feet to the TBD direction. Discharge piping from this compressor station to the LN 3600 Interconnect will be also be installed approximately TBD feet and TBD from the compressor station to the interconnect. *[Note: Mountain Valley is designing suction/discharge piping and will provide this information in the draft Resource Reports to be filed with the FERC.]*

1.2.2.2 Pig Launchers and Receivers

Mountain Valley has incorporated launching and receiving facilities to accommodate in-line inspection tools (smart pigs) for periodic internal inspections of the pipeline during operations (see Table 1.2-2 above). A pig launcher is located at the origination point inside the Lambert Compressor Station fence line at approximate MP 0.0, in Pittsylvania County, Virginia. The corresponding pig receiver will be located at MP TBD in Rockingham County, North Carolina, and a second pig launcher will be located at this site. A second pig receiver will be located at the terminus of the pipeline at approximate MP 72 at the T-21 Haw River Interconnect near Graham, North Carolina. The locations of these facilities are included on the alignment sheets found in Appendix 1-A. *[Note: Mountain Valley will provide alignment sheets in the draft Resource Reports to be filed with the FERC.]* The impacts associated with construction and operation of the pig launcher and receiver facilities will be minimal, as they are located within the limits of disturbance associated with the previously described aboveground facilities.

1.2.2.3 Mainline Block Valves and Meter Stations

The Project will have four interconnects with existing Mountain Valley system, including delivery interconnects with East Tennessee and PSNC Energy. The locations of these interconnects are provided in Table 1.2-2 above.

Mainline Valves

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

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

Table 1.2-3
MVP Southgate Project Mainline Valve Locations a/

Name	County, State	Approximate Milepost Location
Lambert Compressor Station	Pittsylvania, VA	0.0
MLV 1	Pittsylvania, VA	12.5
MLV 2	Pittsylvania, VA	18.5
MLV 3	Rockingham, NC	28.5
MLV 4	Rockingham, NC	43.6
MLV 5	Alamance, NC	54.0
MLV 7	Alamance, NC	67.8
MLV 8	Alamance, NC	72.75

a/ All MLV sites will be 50 feet by 50 feet and be contained within the permanent right-of-way.

Meter Stations

Mountain Valley will install meter stations consisting of a custody-transfer flow meter, pressure/flow regulator, over pressure protection, isolation block valves, and associated instrumentation and controls at the proposed gas receipt and delivery points to measure the flow of natural gas between the Project and the interconnecting facility (see Table 1.2-2). Each interconnect will consist of one or more meter runs located inside a fenced and gated site and will contain flow or pressure control. The metering sites will be located as close as practicable to the actual intersection of the Project and the receipt / delivery facilities to keep the length of the interconnecting piping to a minimum. The locations of these facilities are shown on the alignment sheets and maps provided in Appendix 1-A and Appendix 1-B, respectively. *[Note: Mountain Valley will provide alignment sheets and maps in the draft Resource Reports to be filed.]*

The meter stations will include upstream and downstream piping to connect to the H-650 pipeline and third party pipelines. *[Note: Mountain Valley is designing suction/discharge piping and will provide this information in the draft Resource Reports to be filed with the FERC.]*

1.2.2.4 Telecommunications

Mountain Valley will provide primary and backup telecommunications services for the compressor stations, meter stations, and MLV sites. The local service provider will provide primary telecommunications service and back-up is expected to be Very Small Aperture Terminal (VSAT) service. In addition, the compressor station sites will have a communication tower installed inside within the station fence lines.

1.2.2.5 Electric Utility Service

Mountain Valley will commercially purchase electric power for the compressor stations from the local distribution company. A series of microturbine generators will provide backup electric power to the compressor stations. Mountain Valley is currently evaluating backup electric systems and will provide additional information in the draft Resource Reports to be filed with the FERC. Electric services from the local distribution company will supply the meter stations, MLVs, and cathodic protection sites. In the event sites do not have convenient access to electrical services, solar power may be utilized.

1.3 LAND REQUIREMENTS

A summary of Project land requirements is included in Table 1.3-1. Mountain Valley will include land uses affected by the Project in Pre-filing Draft Resource Report 8 (Land Use Recreation, and Aesthetics) to be filed with the FERC.

Table 1.3-1
Land Requirements for the MVP Southgate Project Pipeline/Associated Workspace

Facility	Land Required for Construction (acres)	Land Required for Operation (acres)
H-650 Pipeline a/	881.4	440.0
Contractor Yards	232.9	TBD
Additional Temporary Workspace	72.8	TBD
Access Roads b/	161.1	9.1

a/ Acreage based on 100-foot construction right-of-way and 50-foot permanent right-of-way. Does not account for reduced workspace in sensitive areas.
b/ Acreage based on a 25-foot road width for temporary and permanent access roads.

1.3.1 Pipeline

The pipeline will generally require a 100-foot wide construction right-of-way consisting of a 50-foot permanent right-of-way and 50 feet of temporary workspace. The temporary workspace is necessary for the safe travel of construction vehicles and equipment, stockpiling soil, and installation of erosion and sediment controls. Mountain Valley will reduce the construction right-of-way width at wetland and stream crossings to 75 feet wherever possible. Additional temporary construction workspace ("ATWS") will be

required at certain locations to accommodate special construction techniques or to ensure worker safety. ATWS may also be required to comply with the Virginia Department of Environmental Quality erosion and sediment control requirements. A list of the ATWS areas required for the Project including milepost location, dimensions, current land use, and justification is included in Appendix 1-D. *[Note: Mountain Valley will provide ATWS information in the draft Resource Reports to be filed with the FERC.]*

To the extent practicable, Mountain Valley has routed the new pipeline parallel to existing corridors. As currently proposed, the pipeline is located parallel to existing utility corridors, trails, and roads for approximately 47 percent (34 miles) of the proposed alignment. Locations where segments of the Project are collocated or parallel to existing utility corridors and other rights-of-way are shown in Appendix 1-E. *[Note: Mountain Valley continues to evaluate the site-specific constraints along the proposed H-650 pipeline route and the required construction ROW requirements. Mountain Valley will provide additional information in draft Resource Reports to be filed with the FERC.]*

1.3.2 Aboveground Facilities

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

Table 1.3-2
Land Requirements for the MVP Southgate Project Aboveground Facilities a/

Facility Name	Approximate MP	Land Required for Construction (acres)	Land Required for Operation (acres)
Compressor Stations			
Lambert Compressor Station	0	TBD	TBD
Russell Compressor Station	26	TBD	TBD
Meter Stations			
Lambert Interconnect	0	TBD	TBD
LN 3600 Interconnect	28	TBD	TBD
T-15 Dan River Interconnect	30	TBD	TBD
T-21 Haw River Interconnect	72	TBD	TBD
Pig Launcher/Receiver b/			

Note: Impact calculations do not include associated access roads.

a/ MLVs are not included in aboveground facility calculations because these facilities will be completely within the 50-foot permanent right-of-way and will not require additional land outside of that necessary for the pipeline.

b/ Pig launchers will be within aboveground facility sites, therefore, acreages calculations for the pig launcher/receiver are included with those facilities.

Cathodic Protection

Mountain Valley is evaluating four (4) potential rectifier locations for the Project (see Table 1.3-3). Surface groundbeds (approximate dimensions of 50 feet wide by 500 feet long) will be located perpendicular to the permanent easement. Deep wells, if used, may be contained within the 50-foot permanent right-of-way or adjoining (25 feet by 25 feet additional permanent right-of-way if required). Once site inspections are completed, any impacts associated with ground beds will be quantified. *[Note: Mountain Valley continues to evaluate rectifier locations along the proposed H-650 pipeline route. Mountain Valley will provide additional information in draft Resource Reports to be filed with the FERC.]*

Table 1.3-3
MVP Southgate Project Potential Rectifier and Groundbed Locations

Nearest Milepost	State	County	Cathodic Protection Section a/	Cathodic Protection Groundbed Type
TBD	TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD	TBD

a/ Cathodic Protection Sections are created by installation of isolation

1.3.3 Access Roads

Lengths of new and existing roads to provide access to the pipeline right-of-way during construction and operation of the Project facilities are shown in Appendix 1-F *[Note: Mountain Valley will provide access road information in the draft Resource Reports to be filed with the FERC.]*. Mountain Valley will also provide access road information in Pre-filing Draft Resource Report 8 (Land Use Recreation, and Aesthetics) to be filed with the FERC. This list will not include existing public roads such as interstate, US, state, and county highways unless upgrades are required; however, it does include private roads, drives, lanes, and other roads that will be utilized. Other roads may include existing access roads installed for agricultural, well or construction access, or may be farm roads, all-terrain vehicle paths/trails, etc.

Mountain Valley will leverage the use of existing roads; however, new access roads may be required in locations that do not parallel existing linear infrastructure. Maintenance or upgrading may be required on some of the existing roads prior to use by construction equipment. A number of the existing dirt or gravel access roads will be graded and maintained to prevent rutting. Others may require widening or placement of additional stabilization means including but not limited to gravel or crushed stone on the existing surface to ensure safe travel conditions. Mountain Valley is currently conducting surveys to identify suitable access roads for use during the Project. *[Note: Mountain Valley continues to evaluate the locations of permanent*

and temporary access roads for the Project. Mountain Valley will provide additional information on access roads in the draft Resource Reports to be filed with the FERC.]

1.3.4 Additional Temporary Workspace

ATWS areas will be required for construction activities requiring space outside the standard 100-foot construction right-of-way. ATWS may also be required to comply with the Virginia Department of Environmental Quality erosion and sediment control requirements. Construction activities that may require ATWS include but are not limited to:

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

Mountain Valley will determine the extent of ATWS on a site-specific basis. The ATWS areas will be restricted to the minimum size necessary to safely construct the pipeline with respect to the existing conditions anticipated at the time of construction. Mountain Valley will use the ATWS during construction for the purpose of material storage, storage of excess spoil at crossings, parking, vehicle turning radius, or other worker safety issues. In the case of wetlands and waterbodies, the ATWS will be located in accordance with the setback requirements contained in the FERC Wetland and Waterbody Construction and Mitigation Procedures ("Procedures) and in consultation with other federal and state agencies. If field conditions do not allow for 50-foot setback from wetlands and/or waterbodies, Mountain Valley will request a variance from the FERC Procedures. Mountain Valley will include additional information regarding variances to FERC Procedures V.A.2.a and VI.B.1. ATWS setback requirements in Pre-filing Draft Resource Report 2 (Water Use and Quality) to be filed with the FERC.

Proposed ATWS and ancillary sites required for the Project on the alignment sheets and maps are provided in Appendix 1-A. *[Note: Mountain Valley will provide alignment sheets and maps in the draft Resource*

Reports to be filed with the FERC.] A table that lists all ATWS by milepost, landowner (private, state, federal), area (square feet), current land use, and purpose of the ATWS (road crossing, etc.) are shown in Appendix 1-D. *[Note: Mountain Valley continues to evaluate the locations of ATWS for the Project. Mountain Valley will provide additional information on access roads in the draft Resource Reports to be filed with the FERC.]*

1.3.5 Contractor Yards

Mountain Valley has identified potential pipe storage and contractor staging yards for temporary use during construction. These yards were selected to avoid streams, wetlands, and other sensitive habitats where possible. Mountain Valley will use pipe storage yards to stockpile pipe and fabricate facilities, as necessary. Mountain Valley will use contractor yards during construction to stage construction operations, store materials, park equipment, and set up temporary construction offices. Depending upon the condition of these yards and their current use, some surface grading, drainage improvements, placement of surface materials (e.g., crushed rock), and internal roadways may be required. Table 1.3-4 details land requirements, MP, land ownership, and current land use for contractor yards. Contractor yard locations on aerial mapping are shown in Appendix 1-C1. *[Note: Mountain Valley will provide contractor yard information in the draft Resource Reports to be filed with the FERC.]* Mountain Valley will include additional information on potential contractor yards in Pre-filing Draft Resource Report 8 (Land Use, Recreation, and Aesthetics) to be filed with the FERC.

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

Name	Type	MP	County	State	Location	Land Ownership	Land Use a/	Acres
TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
							TBD	TBD
							TBD	TBD
TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
							TBD	TBD
							TBD	TBD

a/ TBD

1.4 CONSTRUCTION PROCEDURES

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

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

1.4.1 Pipeline

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

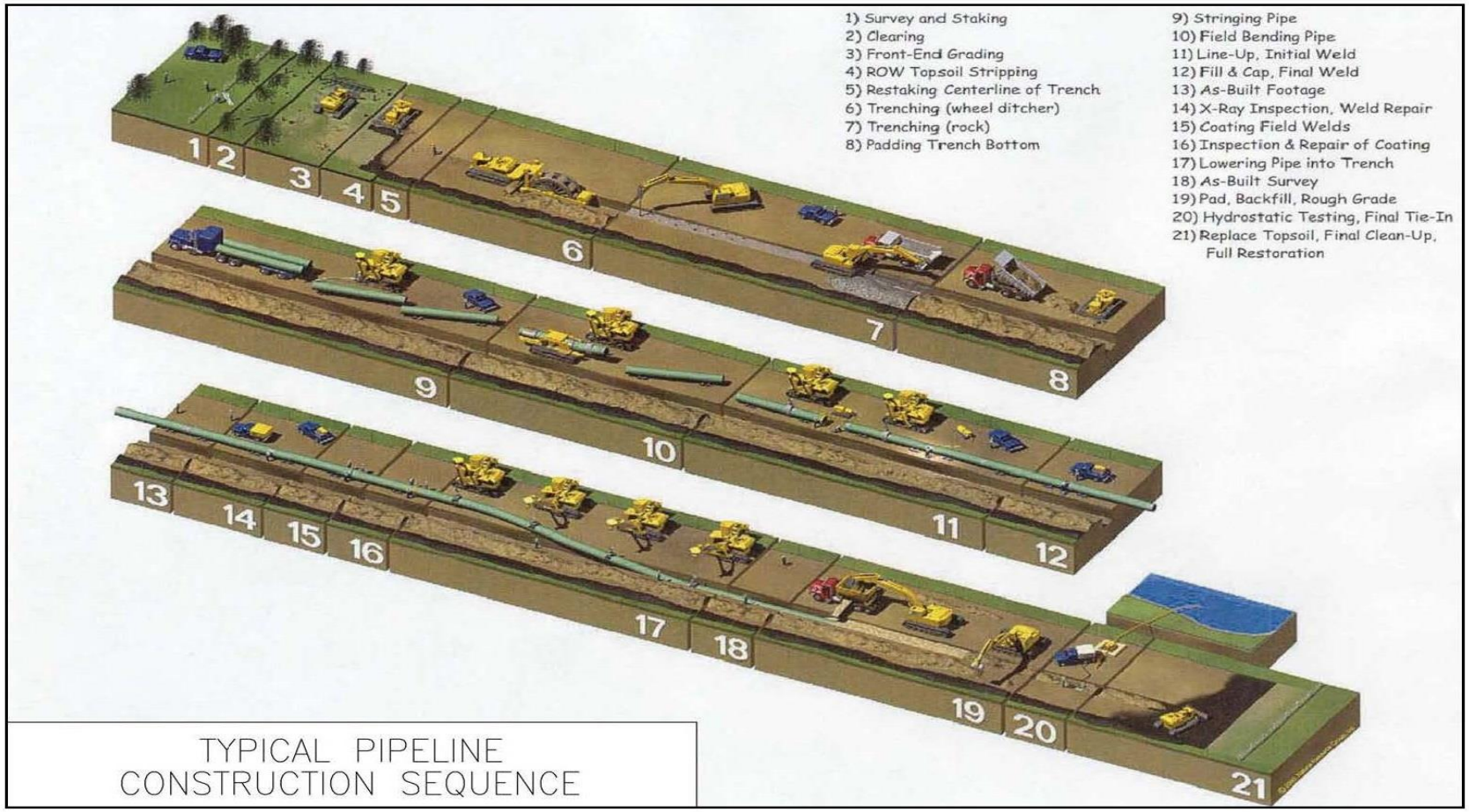


Figure 1.4-1. Typical Pipeline Construction Sequence

1.4.1.1 Standard Construction and Restoration Techniques

Typical Upland Pipeline Construction Procedures

Mountain Valley will conduct construction activities in accordance with applicable federal and state regulations and guidelines, as well as the specific requirements of applicable permits. In addition to adopting the FERC Plan and Procedures, Mountain Valley will develop a Project-specific E&SCP based on field conditions and applicable state requirements and employed in conjunction with the FERC Plan and Procedures. If deviations from the FERC Plan and Procedures are required, Mountain Valley will request a variance from the specific requirement.

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

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

Mountain Valley will utilize TBD construction spreads to construct the pipeline. Table 1.4-1 provides spread by beginning and ending MP, length and construction year. Mountain Valley will construct the majority of the pipeline using conventional open-cut methods, which typically include the steps described in the following paragraphs. Specialized construction techniques for crossing sensitive resources such as wetlands and waterbodies are also provided in the following sections.

Table 1.4-1
Construction Spreads for the MVP Southgate Project

Spread	Begin MP	Ending MP	Mainline Length (Miles)	Construction Year	Spread Length (Miles)
1	0	TBD	TBD	TBD	TBD
2	TBD	TBD	TBD	TBD	TBD
3	TBD	TBD	TBD	TBD	TBD
4	TBD	72	TBD	TBD	TBD

(a) Surveying

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

(b) Clearing and Grading, and Fencing

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

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

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

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

Mountain Valley may windrow, burn, or haul off cleared vegetation depending on the terrain and landowner request. Windrow breaks/openings will allow for landowner passage, per pre-coordination and approval. If removed, Mountain Valley will haul trees/brush off to an approved location for chipping or burning. If left permanently, the brush/slash windrow can provide habitat for wildlife and will not have any impacts

on achieving adequate vegetative cover post-construction. If brush and slash is chipped, it shall be either spread across the right-of-way in accordance with the FERC Plan and Procedures or blown off right-of-way per landowner pre-coordination and approval. Burning is the preferable method for disposing of brush and slash because it minimizes the number of trucks that would be required to remove chips from the right-of-way; it reduces the emissions associated with multiple round trips and reduces safety hazards of trucks entering the right-of-way. Mountain Valley will dispose of, split, grind, or burn stumps to the satisfaction of the property owner and/or company representative in accordance with applicable law.

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

(c) Trenching

Mountain Valley will excavate the pipeline trench with a track-mounted backhoe or similar equipment and only use explosives when necessary in areas where rock substrates are at depths that interfere with conventional excavation or rock-trenching methods. Mountain Valley will include information on blasting, including a Project Blasting Plan, in Pre-filing Draft Resource Report 6 (Geological Resources) to be filed with the FERC. On actively cultivated agricultural tracts, at wetland crossings, and in residential areas, subsoil will be segregated and stockpiled separately from topsoil per the FERC Plan. Mountain Valley will identify locations where topsoil segregation may be implemented in Pre-filing Draft Resource Report 7 (Soils) to be filed with the FERC.

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

(d) Stringing

New steel pipe for the pipeline will be procured and protected with an epoxy coating applied at the factory or at a coating yard (the beveled ends will be left uncoated for welding) and shipped to strategically located materials storage areas, or "pipe yards." Mountain Valley will transport the individual joints to the right-of-way by truck and place along the excavated trench in a single, continuous line that is easily accessible to the construction personnel on the working side of the trench (typically opposite the spoil side). This will allow the subsequent lineup and welding operations to proceed efficiently.

(e) Pipe Bending

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

(f) Pipe Assembly and Welding

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

(g) Non-Destructive Examination and Weld Repair

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

(h) Coating Field Welds, Inspection, and Repair

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

(i) Pipe Lowering

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

(j) Padding and Backfilling

After the pipe is lowered into the trench, Mountain Valley will backfill the trench. Previously excavated materials will be pushed back into the trench using equipment or backhoes. Where the previously excavated

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

(k) Hydrostatic Test and Final Tie-In

Following backfilling of the trench, Mountain Valley will hydrostatically test the pipeline to ensure that it is capable of safely operating at the design pressure. If surface water is utilized for testing, baseline water samples will be taken at the source prior to filling of the pipe and prior to discharge. Test segments of the pipeline will be capped with test manifolds and filled with water and pressurized to a minimum of 1.1 to 1.5 times (based on location class) the maximum designed operating pressure in accordance with the USDOT requirements identified in 49 CFR Part 192 prior to being placed in service. Loss of pressure that cannot be attributed to other factors, such as temperature changes, will be investigated. Leaks detected will be repaired, and the segment will be retested.

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

(l) Cleanup and Restoration

Mountain Valley will conduct post-construction restoration activities in accordance with the measures specified in the FERC Plan and Procedures as applicable. After a segment of pipe is installed, backfilled,

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

Typical Wetland Pipeline Construction

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

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

Hydrological conditions along the construction corridor in areas proposed for open ditch construction will likely dictate the use of either open ditch lay or open ditch push/pull lay methods. Selection of the most appropriate method will depend on site-specific weather conditions, inundation, soil saturation, and soil stability at the time of construction. The conventional open ditch lay method will be the most frequently used technique for installation of the pipeline in wetlands. Mountain Valley will use the push/pull lay method in inundated or saturated wetland areas where groundwater conditions preclude conventional construction. Mountain Valley will include a list of push/pull locations in Pre-filing Draft Resource Report 2 (Water Use and Quality) to be filed with the FERC.

(a) Unsaturated Wetland Crossings

In crossing unsaturated wetlands (wetlands without standing water or saturated soils), construction will be similar to the typical upland construction described in Typical Upland Pipeline Construction Procedures above, with some exceptions, including that only one traffic lane will be provided for construction equipment. Mountain Valley will use low ground pressure equipment if normal construction equipment causes rutting or mixing of wetland topsoil and subsoil, or install temporary equipment mats to allow

passage of equipment with minimal disturbance of the surface and vegetation. Topsoil over the pipe trench will be segregated from subsoils. Mountain Valley will install and maintain erosion control measures to minimize sedimentation within the wetland. Trench plugs will be installed at the entry and exit points of wetlands and waterbodies to prevent the modification of subsurface hydrology.

(b) Saturated Wetland Crossings

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

Typical Waterbody Crossings

Mountain Valley will conduct construction across waterbodies in accordance with the timeframes detailed within the FERC Procedures based on the size / flow regime of the waterbody. The normal trenching operation will skip the waterbody crossing, stopping on each side near the top of bank. Mountain Valley will install the waterbody section of the pipeline by one of the methods described below. In general, pipe will be bent and fabricated as the work progresses along the right-of-way so that the excavation of the waterbody crossing is completed prior to pipe installation by the tie-in crew. Mountain Valley will include locations and methods for waterbody crossings in Pre-filing Draft Resource Report 2 (Water Use and Quality) to be filed with the FERC.

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

(a) Conventional Crossing

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

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

Mountain Valley will follow the FERC Procedures to limit water quality and aquatic resource impacts during and following construction. Mountain Valley will schedule construction activities so that the pipeline trench is excavated immediately prior to pipe laying activities. In accordance with the FERC Procedures, the duration of construction will be limited to 24 hours across minor waterbodies (10 feet wide or less) and 48 hours across intermediate waterbodies (between 10 and 100 feet wide) when blasting or extensive rock excavation is not required.

(b) Dam and Pump Crossing Method

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

(c) Flume Crossing Method

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

(d) Conventional Bore Crossing Method

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

(e) Horizontal Directional Drilling

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

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

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

For HDD crossings, where a thickly vegetated riparian buffer exists, pumps for obtaining water for the drilling process and/or for hydrostatic testing could require that up to a 15-foot wide swath of land be cleared on one side of the crossing to allow equipment access and to lay water pipe from the river to the drilling operation. This may occur over the pipe or temporary access may be utilized if it does less harm to the vegetation. Typical HDD installation plans are shown in Appendix 1-C1. *[Note: Mountain Valley will provide typical HDD plans in the draft Resource Reports to be filed with the FERC.]*. Site-specific HDD plans and geotechnical reports will be included in Pre-filing Draft Resource Report 2 (Water Use and Quality) to be filed with the FERC.

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

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

the FERC.]. Site-specific HDD plans and geotechnical reports will be included in Pre-filing Draft Resource Report 2 (Water Use and Quality) to be filed with the FERC.

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

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

Typical Road and Railroad Crossings

Road crossings will be maintained continuously using provisions such as steel plates or alternate access to minimize inconvenience to the public. Construction of the pipeline across hard surface roads will typically be installed through the roadbed by conventional bore as previously described for waterbody crossings. At points of access to the right-of-way from hard-surfaced roads, a stone pad will be installed as a construction entrance to control mud and dirt tracking onto the highway. Most of the smaller, unpaved roads and driveways will be crossed by open trenching and then restored to pre-construction conditions. If an open-cut road requires extensive construction time, provisions will be made for temporary detours or other measures to allow safe traffic flow during construction. The pipeline will be buried to a depth of at least three feet below the road surface and will be designed to withstand anticipated external loadings. Road and railroad crossing locations will be included in Pre-filing Draft Resource Report 8 (Land Use, Recreation, and Aesthetics) to be filed with the FERC. Typical details of road and railroad crossings are provided in Appendix 1-C1. *[Note: Mountain Valley will provide typical drawings in the draft Resource Reports to be filed with the FERC.]*

Typical Foreign Pipeline Crossings

The Project will cross several transmission, gathering and distribution pipelines and flow lines in accordance with CFR 49 192. The Project will cross under most existing foreign pipelines due to the size of the pipeline and soil cover and separation requirements. The larger spoil volumes from increased excavation depths at these pipeline crossings and the preference not to place spoil or construction equipment over existing pipelines will require ATWS at most crossings. The locations of known foreign pipelines and

other identified underground utilities in relation to the proposed pipeline are listed in Appendix 1-I. *[Note: Mountain Valley will provide foreign pipeline information in the draft Resource Reports to be filed with the FERC.]* While the pipelines are generally discernible in the field, some companies may not participate in the 811 notification system leaving the line operators unidentifiable. Experience shows that additional foreign lines or flow lines will likely be identified during the pre-construction surveys.

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

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

Mountain Valley may require monitoring of excavation activities whenever a contractor is excavating over or near a foreign pipeline. A working combustible gas indicator (when crossing hydro-carbon lines) will

be utilized at the work site, and appropriate safety and rescue equipment will be available based on Occupational Safety and Health Administration standards for working in excavations or confined spaces. In the event accidental damage occurs to a foreign pipeline during construction, the area will be inspected, the owner of the pipe notified, and the pipe repaired.

Typical Construction in Residential Areas

Site-specific plans for residential structures within 50 feet of construction work areas will be included in Pre-filing Draft Resource Report 8 (Land Use, Recreation, and Aesthetics) to be filed with the FERC. Mountain Valley will implement the following measures, at a minimum, to ensure that Project-related impacts to residential properties are minimized to the extent practicable:

- Fence the boundary of the construction work area for a distance of 100 feet on either side of the residence to ensure construction equipment, materials and spoil remain in the construction right-of-way;
- Notify local residents two weeks in advance of construction activities;
- Preserve trees and landscaping to the extent practicable;
- Utilize topsoil segregation procedures, as required, in accordance with the FERC Plan;
- Ensure piping is welded and installed as quickly as reasonably possible consistent with prudent pipeline construction practices to minimize construction time affecting a neighborhood;
- Backfill the trench and complete cleanup as soon as the pipe is laid or temporarily steel plate the trench;
- Decompact areas as necessary
- Restore lawns and landscaping as soon as practical following final clean-up, or as specified in landowner agreements, weather conditions permitting; and
- Complete cleanup (including grading) and installation of permanent erosion control measures within 10 days after the trench is backfilled, weather conditions permitting;
- If weather conditions prevent timely restoration of these areas, maintain and monitor temporary erosion controls until restoration is completed.

Mountain Valley will use additional measures such as high visibility safety fence or jersey barriers to prevent overnight access to the trench. Site-specific Residential Construction Plans for each of the residences within 25 feet of the construction workspace will be included in Pre-filing Draft Resource Report 8 (Land Use, Recreation, and Aesthetics) to be filed with the FERC. These plans will depict the construction area to be disturbed and safety measures to be implemented as described above.

Following completion of major construction activities, Mountain Valley will restore the property in accordance with its Project-specific E&SCP. Property restoration will be in accordance with any agreements between Mountain Valley and the landowner. Mountain Valley will include additional details regarding residential construction, including proposed mitigation measures to be used in residential areas in Pre-filing Draft Resource Report 8 (Land Use, Recreation, and Aesthetics) to be filed with the FERC.

Typical Construction in Commercial and Industrial Areas

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

[Note: Mountain Valley continues to evaluate Project construction in commercial and industrial areas. Mountain Valley will provide additional information in the draft Resource Reports to be filed with the FERC.]

Typical Topsoil Segregation

Mountain Valley will conserve topsoil in actively cultivated and rotated cropland, improved pastureland, and non-saturated wetlands. In residential areas, Mountain Valley will either conserve topsoil or provide topsoil as an alternative to topsoil segregation and conservation. Topsoil will be segregated as described in the FERC Plan (Section IV.B.3), and in other areas at the specific request of the landowner or land management agency, if applicable. The topsoil and subsoil will be temporarily stockpiled in separate windrows on the construction right-of-way. Rock will not be used as upper backfill in rotated or permanent cropland. Additional information regarding topsoil segregation will be provided in Pre-filing Draft Resource Report 7 (Soils) to be filed with the FERC.

1.4.1.2 Special Construction Procedures

Blasting

At this time, the extent of blasting for the Project is unknown. Mountain Valley will minimize the amount of blasting required to the extent practicable. Where unrippable subsurface rock is encountered, blasting for ditch excavation may be necessary. In these areas, Mountain Valley is committed to taking measures to prevent damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, or other water sources. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Where competent

sandstone bedrock occurs in the stream bed, blasting may be used to reduce bedrock so that the trench can be excavated. Blasting will be conducted in accordance with the Project Blasting Plan (see Appendix 6-B of Resource Report 6) that is under development in consultation with applicable federal and state regulatory agencies. Pre- and post- blasting structural surveys will be conducted of occupied structures, water supply wells and water supply springs that will be specified in the Blasting Plan. Additional information on geologic resources and blasting, and depth to bedrock, will be included in Pre-filing Draft Resource Report 6 (Geological Resources) and Pre-filing Draft Resource Report 7 (Soils) to be filed with the FERC.

Rugged Terrain

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

Mountain Valley will use specialized construction methods to ensure the safety of equipment operators, construction personnel, and equipment. Spoil piles adjacent to the trench will be protected by temporary sediment barriers to keep excavated soils on the right-of-way. Trench breakers will be installed in the trench along the pipeline to prevent or slow the movement of water along the trench. The construction right-of-way will be restored to original contours, and permanent slope breakers will be installed in accordance with the FERC Plan and the Project-specific E&SCP. Erosion control blankets or hydroseed, in lieu of mulch, may be installed on steep slopes to provide stabilization for vegetation to help control sediment and water runoff.

In areas where the Project route crosses laterally across the face of a slope or side slope construction, two-tone grading may be required to establish a safe, flat work terrace; this may require ATWS along the construction right-of-way. Mountain Valley will incorporate erosion and sediment control measures as necessary including but not limited to super silt fence, silt fence, sock filtration, erosion control socks, temporary and permanent water bars, ditch breakers, temporary mulch, and erosion control blankets as per Project design specifications based on slope.

On steep slopes, various measures in the FERC Plan and the Project-specific E&SCP may be taken to properly control erosion and sedimentation on the right-of-way. In areas where two-tone construction is used, tree stumps and other organic material will be removed from backfill material along the right-of-way,

since this can lead to soil saturation and eventual slippage. Special attention will be paid to ensure that natural drains alongside slopes are properly restored after construction activities are complete. To accomplish this, additional French drains or rock-lined channels may be constructed to efficiently convey water across or away from the right-of-way. Where possible, compaction on side-cut sections should be completed in 12-inch lifts using a sheep's foot roller.

Karst Area

Mountain Valley continues to evaluate karst topography areas and will include information on areas of potential karst geology in Pre-filing Draft Resource Report 6 (Geological Resources) to be filed with the FERC. *[Note: Mountain Valley continues to evaluate sinkholes and karst related features along the H-650 pipeline route. Mountain Valley will provide additional information in the draft Resource Reports to be filed with the FERC.]*

Trench Dewatering

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

Winter Construction

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

1.4.2 Aboveground Facilities Construction

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

General

Construction activities and storage of construction materials and equipment will be confined within the designated workspace areas associated with the aboveground facilities. Debris and waste generated from

construction will be disposed of as appropriate. Disturbed surface areas will be restored in a timely manner. The facilities will be constructed in accordance with Mountain Valley construction standards and specifications as more generally described in the paragraphs that follow.

Foundations

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

Equipment

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

Testing

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

1.4.3 Restoration

Following construction of the Project, the areas disturbed by construction will be restored to their original grades, condition, and use, to the greatest extent practicable. Aboveground facilities will be fenced. Mountain Valley will complete restoration in accordance with the FERC Plan and Procedures, the Project-specific E&SCP and applicable regulatory approvals and landowner agreements. Restoration will be considered successful if the disturbed surface condition is similar to adjacent undisturbed lands,

construction debris is removed (unless requested otherwise by the landowner or land managing agency), revegetation is successful, proper drainage has been restored, and the appropriate federal and state agencies approve. Mountain Valley will comply with seeding and seed mix specifications if identified by land users and jurisdictional agencies.

1.4.3.1 Pipeline

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

Uplands

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

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

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

Wetlands

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

1.4.3.2 Aboveground Facilities

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

1.4.3.3 Access Roads

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

1.4.3.4 Contractor Yards

Upon completion of construction, all temporary facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the pipe storage and contractor yards. Unless otherwise requested by the landowner, each site will be graded to original contours and the land restored to its original use, to the

greatest extent possible. The site will be re-vegetated, permanent erosion control measures will be installed, and temporary erosion control measures will be removed.

1.4.4 Quality Assurance Measures

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

1.4.4.1 Environmental Training and Inspection

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

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

- Responsible for monitoring and documenting compliance with all mitigation measures required by the FERC's Order and any other grants, permits, certificates, or other authorizing documents;
- Responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract or any other authorizing document;

- Empowered to order correction of acts that violate the environmental conditions of the FERC's Order, or any other authorizing document (e.g., USACE Section 404 permit), including stop work authority;
- A full-time position separate from all other activity inspectors; and
- Responsible for maintaining status reports and training records.

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

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

1.4.5 Construction Schedule and Work Force

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

A preliminary Construction Duration Schedule is provided in Table 1.4-2. Details on workforce required for the Project will be included in Pre-filing Draft Resource Report 5 (Socioeconomics) to be filed with the FERC.

Table 1.4-2
Construction Schedule for Major Components of the MVP Southgate Project a/

Component	Commence Activity	Complete Activity
Clearing	Q1 2020	Q1 2020
Pipeline Construction	Q2 2020	Q4 2020
Compressor Stations	Q2 2020	Q4 2020
Restoration	Q4 2020	Q4 2020
Hydrostatic Testing	Q4 2020	December 2020

a/ Anticipated full in-service date of December 2020

1.5 OPERATIONS AND MAINTENANCE

Following construction of the Project facilities, certain areas along the pipeline alignment (and at aboveground facilities) will have an associated permanent right-of-way or operational area. For pipeline facilities, Mountain Valley will maintain a typical permanent right-of-way of 50 feet in width. MLVs will be contained within the permanent right-of-way. Land requirements for the permanent right-of-way for pipeline facilities will be included in Pre-filing Draft Resource Report 8 (Land Use Recreation, and Aesthetics) to be filed with the FERC. Permanent access roads used for construction will also support ongoing pipeline operations. Land requirements for permanent access roads will be listed in Appendix 1-F. *[Note: Mountain Valley will provide access road information in the draft Resource Reports to be filed with the FERC.]*

Mountain Valley will operate and maintain the Project and aboveground facilities in compliance with Federal regulations provided at 49 CFR Part 192, FERC regulations at 18 CFR § 380.15, and maintenance provisions of the FERC Plan and Procedures and its Project-specific E&SCP. Unless requested by a land management agency, Mountain Valley policy will not to use herbicides or pesticides to maintain the right-of-way or any of its Project facilities. Operations and maintenance considerations for pipeline facilities will be included in Pre-filing Draft Resource Report 11 (Reliability and Safety) to be filed with the FERC.

1.5.1 Pipeline

Following construction of the Project facilities, certain areas along the pipeline alignment (and at aboveground facilities) will have an associated permanent right-of-way or operational area. For pipeline facilities, Mountain Valley will maintain a typical permanent right-of-way of 50 feet in width. MLVs will be contained within the permanent right-of-way. Land requirements for permanent right-of-way for pipeline facilities will be included in Pre-filing Draft Resource Report 8 (Land Use Recreation, and Aesthetics) to be filed with the FERC. Permanent access roads used for construction will also support ongoing pipeline operations. Land requirements for permanent access roads will be listed in Appendix 1-F. *[Note: Mountain Valley's access road information will be provided in the draft Resource Reports to be filed with the FERC.]*

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

- soil erosion that may expose the pipe;
- dead vegetation that may indicate a leak in the line;
- conditions of the vegetation cover and erosion control measures;

- unauthorized encroachment on the right-of-way, such as buildings and other substantial structures; and
- other conditions that could present a safety hazard or require preventive maintenance or repairs.

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

Table 1.5-1
Schedule for Major Components of the MVP Southgate Project a/

Pipe Class	Inspection/Patrol Interval
Highway and Railroad Crossings	
Class 1 and 2	7.5 months but at least twice per year
Class 3	4.5 months but at least twice per year
All Other Locations	
Class 1 and 2	15 months but at least once per year
Class 3	7.5 months but at least twice per year
a/ Intervals comply with 49 CFR § 192.705. Regulations include intervals for Class 3 pipe	

Vegetation on the permanent right-of-way will be maintained by mowing, cutting, and trimming. In uplands, routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands will occur no more than once every 3 years. However, to facilitate periodic corrosion/leak surveys, Mountain Valley may clear a corridor not exceeding 10 feet in width centered on the pipeline at a frequency necessary to maintain the 10-foot corridor in an herbaceous state.

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

1.5.2 Aboveground Facilities

1.5.2.1 Compressor Station

Compressor station personnel will perform operation and maintenance of all equipment. Personnel will perform routine checks of the facilities including calibration of equipment and instrumentation, inspection

of critical components, and scheduled and routine maintenance of equipment. Safety equipment, such as pressure relief devices and fire and gas detection systems will be tested for proper operation. Corrective actions will be taken if problems are identified.

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

1.5.2.2 Meter Stations

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

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

1.6 FUTURE PLANS AND ABANDONMENT

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

1.7 PERMITS AND APPROVALS

Applicable federal, state, and local permits and approvals, responsible agencies, and the anticipated schedule for filing applications or documentation for these permits and approvals for the Project are summarized in Table 1.7-1. Appendix 1-K contains agency correspondence to date. *[Note: Mountain Valley will provide additional agency correspondence information in the draft Resource Reports to be filed with the FERC.]*

Table 1.7-1
Anticipated Permits and Consultations for the MVP Southgate Project

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

Table 1.7-1
Anticipated Permits and Consultations for the MVP Southgate Project

Agency	Permit/ Approval/ Consultation a/	Anticipated Submittal Date	Anticipated Permit Receipt Date
Virginia Department of Conservation and Recreation, Division of Natural Heritage	Consultation for state threatened and endangered species	May 2018	December 2019
Virginia Department of Game and Inland Fisheries	Consultation for state protected wildlife species	May 2018	December 2019
Virginia Department of Transportation	Road bonds and crossing permits	TBD Prior to Construction	TBD Prior to Construction
North Carolina			
North Carolina Department of Environmental Quality ("NCDEQ"), Division of Water Resources	401 Water Quality Certification, Isolated/non-404 wetlands and water permit, and Buffer authorization	November 2018	December 2019
NCDEQ, Division of Water Resources	Registration – Hydrostatic test water source	February 2020	March 2020
NCDEQ, Division of Air Quality	Minor New Source Permit	November 2018	December 2019
NCDEQ, Division of Energy, Mineral and Land Resources	NPDES Permit – Construction Stormwater General Permit and Erosion Control Plan for Oil and Gas Related Construction Activities	April 2019	January 2020
NCDEQ, Natural Heritage Program	Consultation for state threatened and endangered species	May 2018	December 2019
North Carolina Wildlife Resources Commission	Consultation for state threatened and endangered species	May 2018	December 2019
North Carolina Department of Cultural Resources ("SHPO")	Consultation and clearance regarding potential impacts on pre-historic and historic resources eligible for listing on the National Register of Historic Places	May 2018	December 2019
North Carolina Department of Transportation	Road bonds and crossing permits	TBD Prior to Construction	TBD Prior to Construction

a/ Consultations will occur continuously throughout the development of the Project.

1.8 AFFECTED STAKEHOLDERS

Mountain Valley identifies a stakeholder as any individual, agency, or organization that has an interest in the Project. An in-depth plan to actively involve stakeholders was developed and implemented to introduce the Project and keep stakeholders informed of Project activities.

Mountain Valley will work to address and resolve complaints regarding the construction and/or operation of the Project in timely manner. Mountain Valley has an established protocol to resolve any stakeholder and/or landowner concerns prior to and during construction, using the Project hotline (833-MV-SOUTH). The hotline is a toll-free number that serves as a means for stakeholders and/or landowners to contact appropriate Project representatives with questions, concerns, and complaints. Mountain Valley land agents will provide affected stakeholders and/or landowners with the hotline number during construction notification. The call response is a three-step process.

Step 1: Gathering Information

A Mountain Valley representative will contact and request all necessary information to complete the caller information section of the hotline record, including the caller's name, address, phone number, and Project reference. Additionally, any details offered by the caller regarding the purpose of the call will be entered on the hotline record.

Step 2: Defining the Issues

The Mountain Valley representative will work with the caller to help understand and address their concerns. If a representative can resolve the issue, they will record this on the hotline record. Otherwise, the caller will be advised that their concerns have been documented and that they can generally expect a return call within 24 hours from an appropriate Mountain Valley representative. The hotline record documenting the concerns will then be directed to the appropriate right-of-way agent.

Step 3: Resolution

If the issues are resolved during Step 2, a representative will complete the process by documenting how a resolution was reached for the hotline record. If a resolution is not reached during Step 2, the hotline record will be forwarded to the appropriate right-of-way agent who will return the call. The delegation of the issue should generally follow this progression until resolution is reached. If a right-of-way agent receives a direct phone call relating to environmental, construction, or off-right-of-way issues from a landowner during pre-construction, construction, or post-construction activities, the agent will request all necessary information to complete the caller information section of the hotline record including the caller's name, address, phone number, and Project reference. The agent will then proceed to Steps 2 and 3 until a resolution is reached.

1.8.1 Public Participation

Mountain Valley has developed a Public, Stakeholder, and Agency Participation Plan, provided to the Commission in its May 3, 2018 Pre-Filing Request letter. This plan outlines a commitment to engage actively with stakeholders throughout the life cycle of the Project and provides the steps Mountain Valley has identified to ensure successful ongoing communication with stakeholders, including establishing a Project website (www.mvpsouthgate.com), a toll-free phone line (833-MV-SOUTH), and e-mail mail@mvpsouthgate.com Mountain Valley will continue to meet with stakeholders to discuss the ongoing efforts associated with the Project.

Mountain Valley will continue to update its stand alone, interactive Project web site to provide the public with the most recent information, including a Project overview, map of the proposed facilities, list of frequently asked questions, list of Project contacts and announcements of public meetings on the Project. Mountain Valley intends to continue its efforts to keep landowners, public officials, and the relevant permitting agencies fully informed of developments on the Project.

1.8.2 Open Houses

On May 3, 2018, Mountain Valley filed a request with the FERC to implement the Pre-Filing Process for the MVP Southgate Project and the FERC issued a Pre-Filing docket number (PF18-4-000) to place information related to the Project into the public record. On May 15, 2018, the FERC granted Mountain Valley's Pre-Filing request. Mountain Valley indicated in its Pre-Filing request that it would schedule open houses in the Project area to provide landowners, public officials and other stakeholders with information about the Project. The open houses will include subject matter experts available for each subject matter including construction, environmental, regulatory, state and federal relations, and right-of-way. In addition, FERC Staff and FERC's Third Party Contractor (that has been selected to prepare the Environmental Impact Statement for the Project) will attend these additional open houses. To maximize citizen participation, all open houses will be held from 5:30 p.m. to 7:30 p.m. The dates and locations of the additional open houses will be as follows:

- Alamance County: Burlington, North Carolina — June 25, 2018
- Rockingham County: Reidsville, North Carolina — June 26, 2018
- Pittsylvania County: Chatham, Virginia — June 28, 2018

1.8.2.1 FERC Scoping Meetings

Once the FERC issues its Notice of Intent to Prepare an Environmental Impact Statement for the Project, FERC will announce the opening of the scoping process, which the Commission uses to gather input from

the public and interested agencies on the Project. Mountain Valley will support the FERC, as requested, in the scoping meeting process.

1.8.3 Public Agency/Landowner Outreach

Mountain Valley has made efforts to inform the public, especially landowners and public officials, about the proposed Project. The goal of implementing a comprehensive stakeholder outreach program is to identify and potentially resolve issues raised by stakeholders in a timely fashion. Mountain Valley began communicating with regulatory agencies and landowners in April 2018. Key components of the stakeholder outreach program include:

- Identify all key stakeholders along the Project pipeline route;
- Establish channels for two-way communication throughout the Project life cycle;
- Ask for public input at critical stages of planning;
- Keep stakeholders informed throughout the process; and
- Engage local resources.

Mountain Valley will be interacting with and educating the public and receiving feedback on the Project through informational open houses, one-on-one discussions, meetings, written materials and similar means of communication.

A stakeholder list that includes a Project line list of affected landowners will be provided in Appendix 1-L (Privileged and Confidential). *[Note: Mountain Valley will provide a stakeholder list in the draft Resource Reports to be filed with the FERC.]*

1.8.4 Agency Consultations

In addition to its public agency/landowner outreach efforts, Mountain Valley is conducting an extensive planning and consultation process with federal, state and local regulatory agencies, resource agencies and other groups having a stake in the Project. The consultation process has involved briefings, meetings, letter requests for resource information, and telephone discussions and emails. Project agency correspondence to date are provided in Appendix 1-K.

1.9 NON-JURISDICTIONAL FACILITIES

Non-jurisdictional facilities are those facilities related to the Project that are constructed, owned, and operated by others that are not subject to FERC jurisdiction. When making this determination, FERC

requires applicants to address four factors to determine whether FERC environmental review is needed for Project-related non-jurisdictional facilities. These factors are:

(i) whether or not the regulated activity comprises "merely a link" in a corridor type project (e.g., a transportation or utility transmission project);

(ii) whether there are aspects of the non-jurisdictional facility in the immediate vicinity of the regulated activity, which uniquely determine the location and configuration of the regulated activity;

(iii) the extent to which the entire project will be within the Commission's jurisdiction; and

(iv) the extent of cumulative Federal control and responsibility.

Mountain Valley is currently evaluating potential non-jurisdictional facilities associated with the Project and will provide additional information regarding non-jurisdictional facilities including application of the four-factor test, if necessary, in the Pre-filing Draft Resource Report to be filed with the FERC.

1.10 CUMULATIVE IMPACTS

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

The purpose of the cumulative impacts analysis is to identify and describe cumulative impacts that would potentially result from implementation of the Project. Inclusion of actions within the analysis is based on

identifying commonalities of impacts from other actions to potential impacts that would result from the Project. To avoid unnecessary discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, the cumulative impacts analysis for the Project will be conducted using the following guidelines:

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

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

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

and organized by county. If the other projects are near the county border, the adjoining county will also be reviewed.

- Projects older than 5 years will not be evaluated unless they have ongoing air emissions.
- An assumption related to identifying projects to include in the cumulative impact analysis is that information necessary to compile the analysis is available to the public from various local, county, state, and federal sources, and is up to date and accurate. The level of information available varies considerably based on the source. For example, information is available to interested parties in a variety of formats regarding natural gas exploration and production, and current and future natural gas related projects; however, providing an informed cumulative impact analysis requires the gathering of pertinent information from a number of different sources for an individual project. Where publicly available information does not include estimates of disturbance or environmental impacts associated with identified projects the quantitative impacts could not be determined. In these instances, Mountain Valley will use a qualitative comparison for the cumulative impacts assessment.

The following are sources of projects included in this evaluation:

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

Mountain Valley is in the process of conducting a cumulative impact analysis for the Project and will provide the analysis in draft Resource Report 1 to be filed with the FERC.

1.11 REFERENCES

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

FERC. 2013. Wetland and Waterbody Construction and Mitigation Procedures. May.

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-A

Alignment Sheets

[*Not Included with this Draft*]

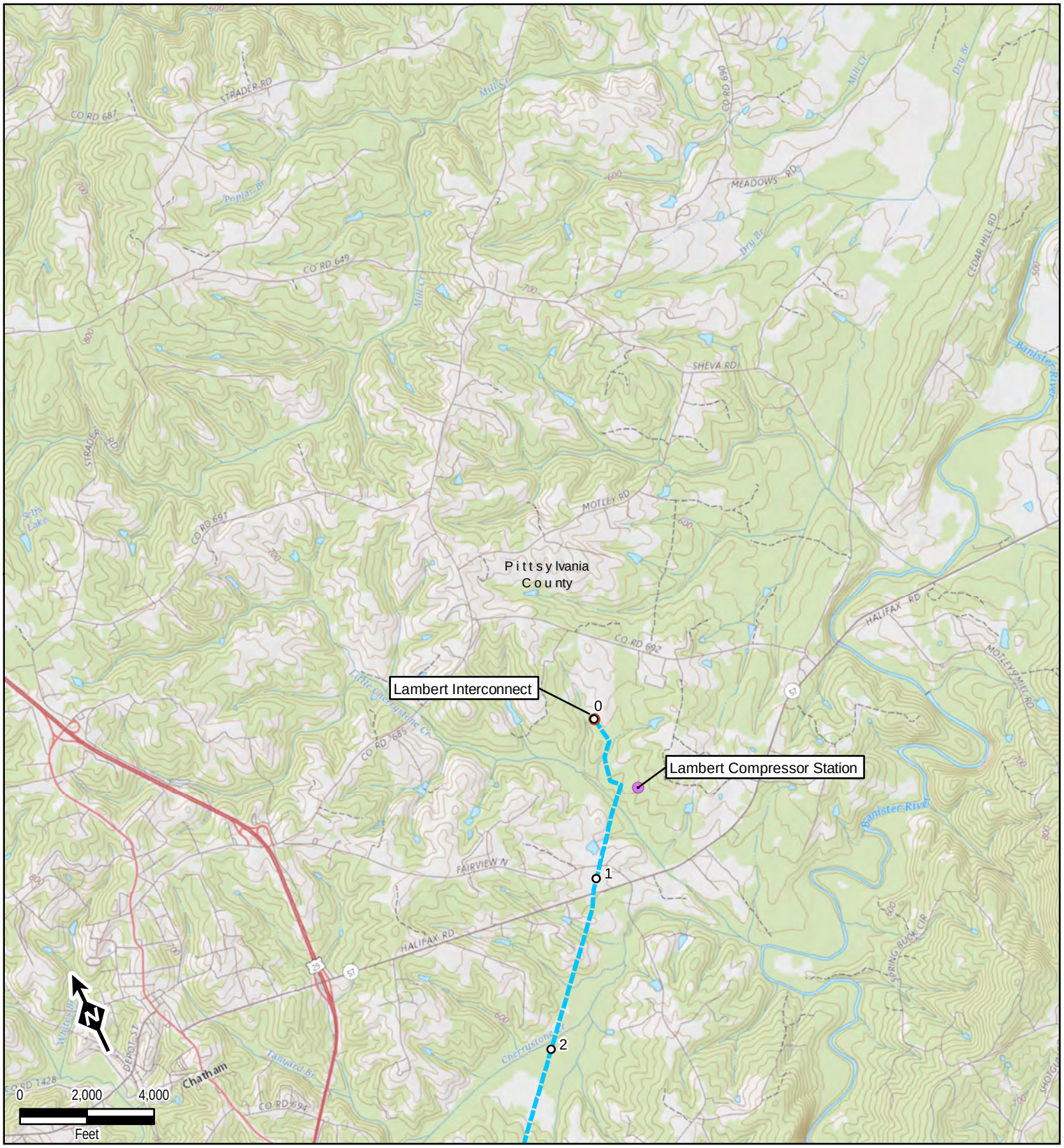
MVP Southgate Project

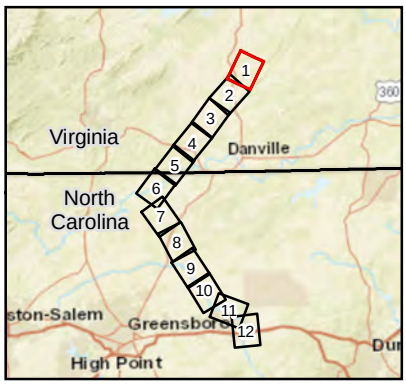
Docket No. PF18-4-000

Resource Report 1

Appendix 1-B

USGS 7.5-Minute Topographic Map Excerpts





Legend

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

Data Sources: ESRI, USGS, TRC, EQT

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USGS Quadrangle Excerpts

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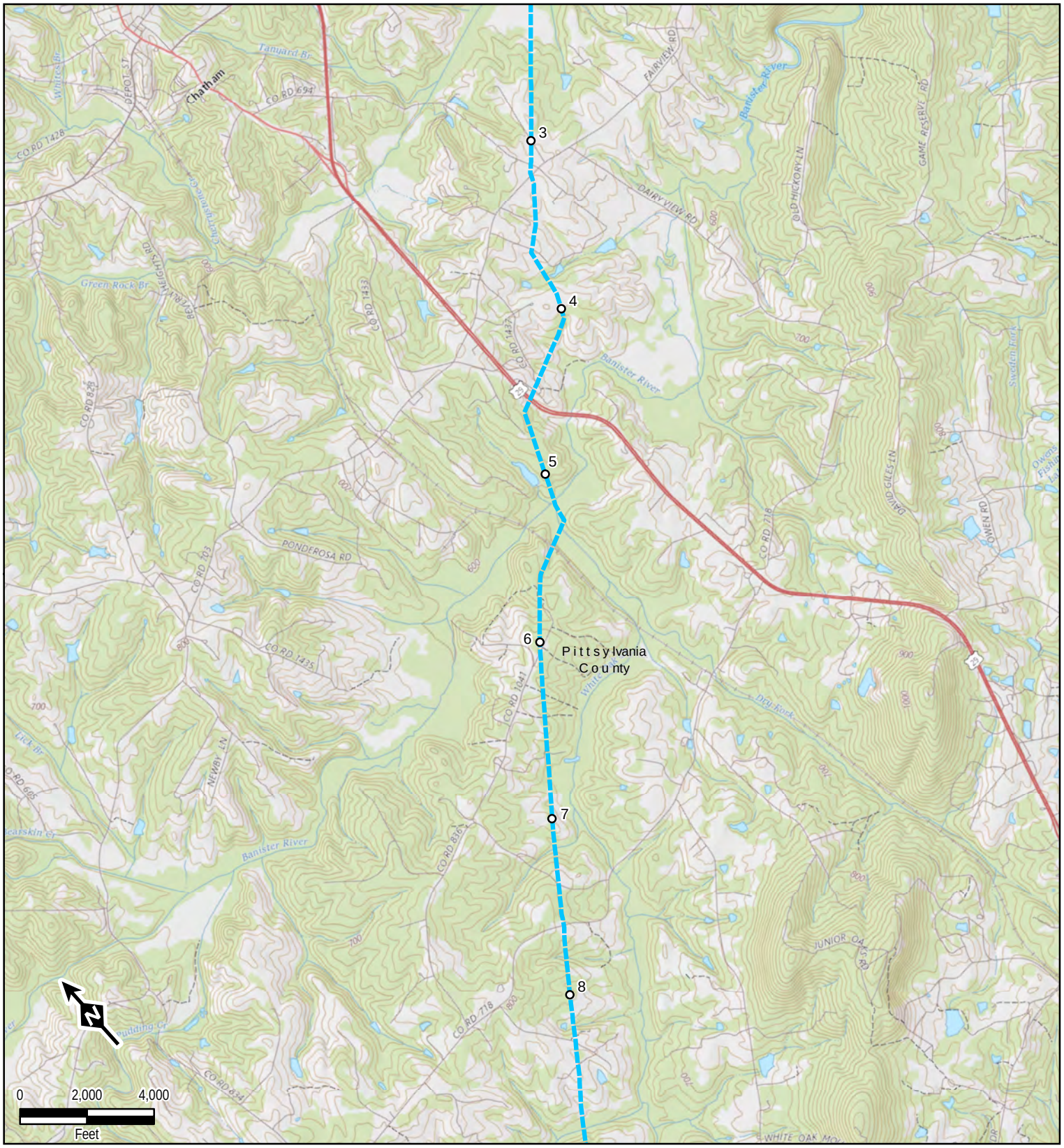

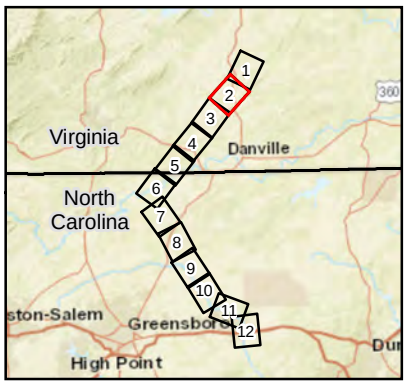

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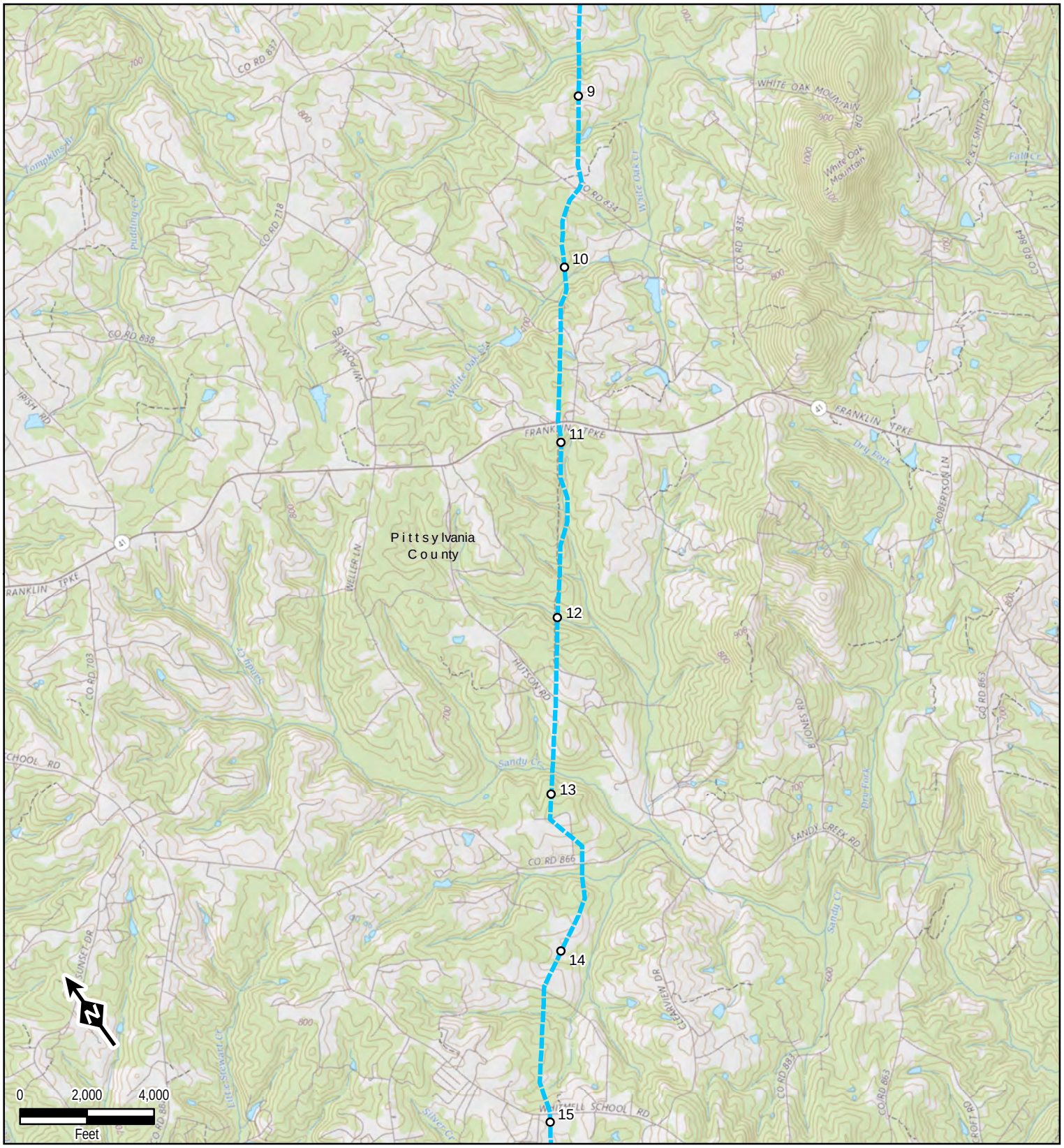

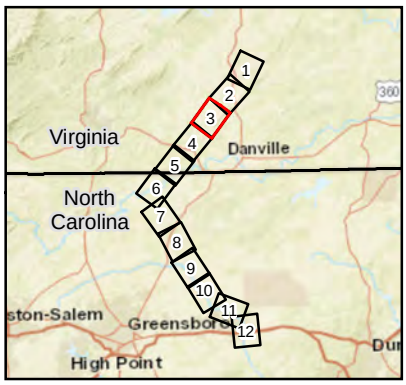

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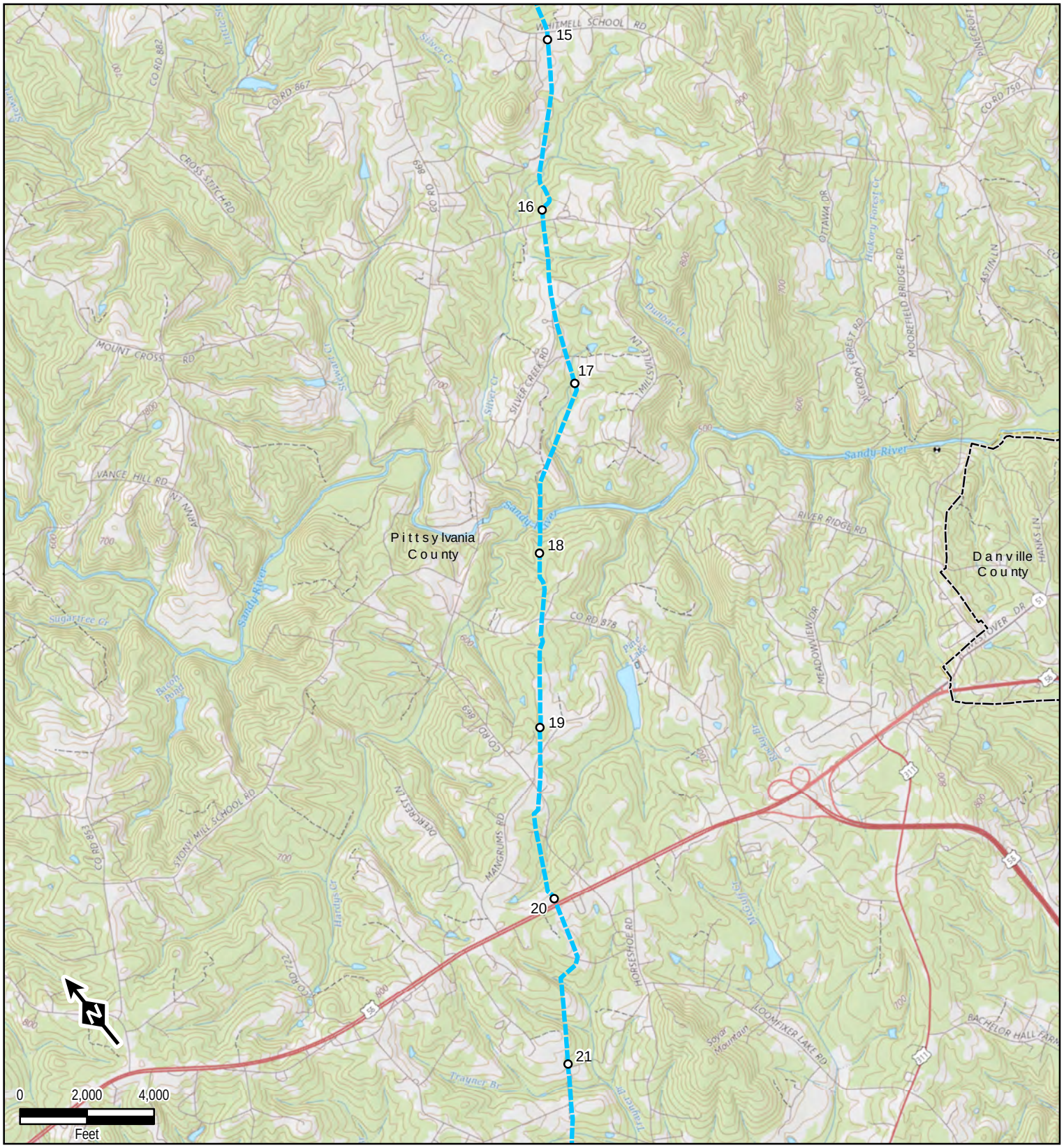

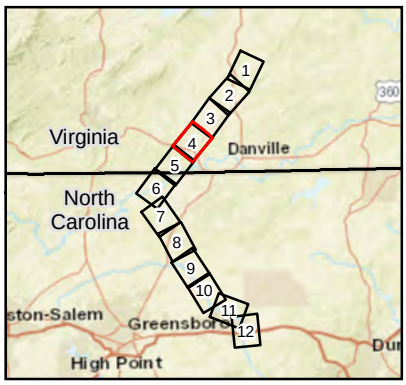

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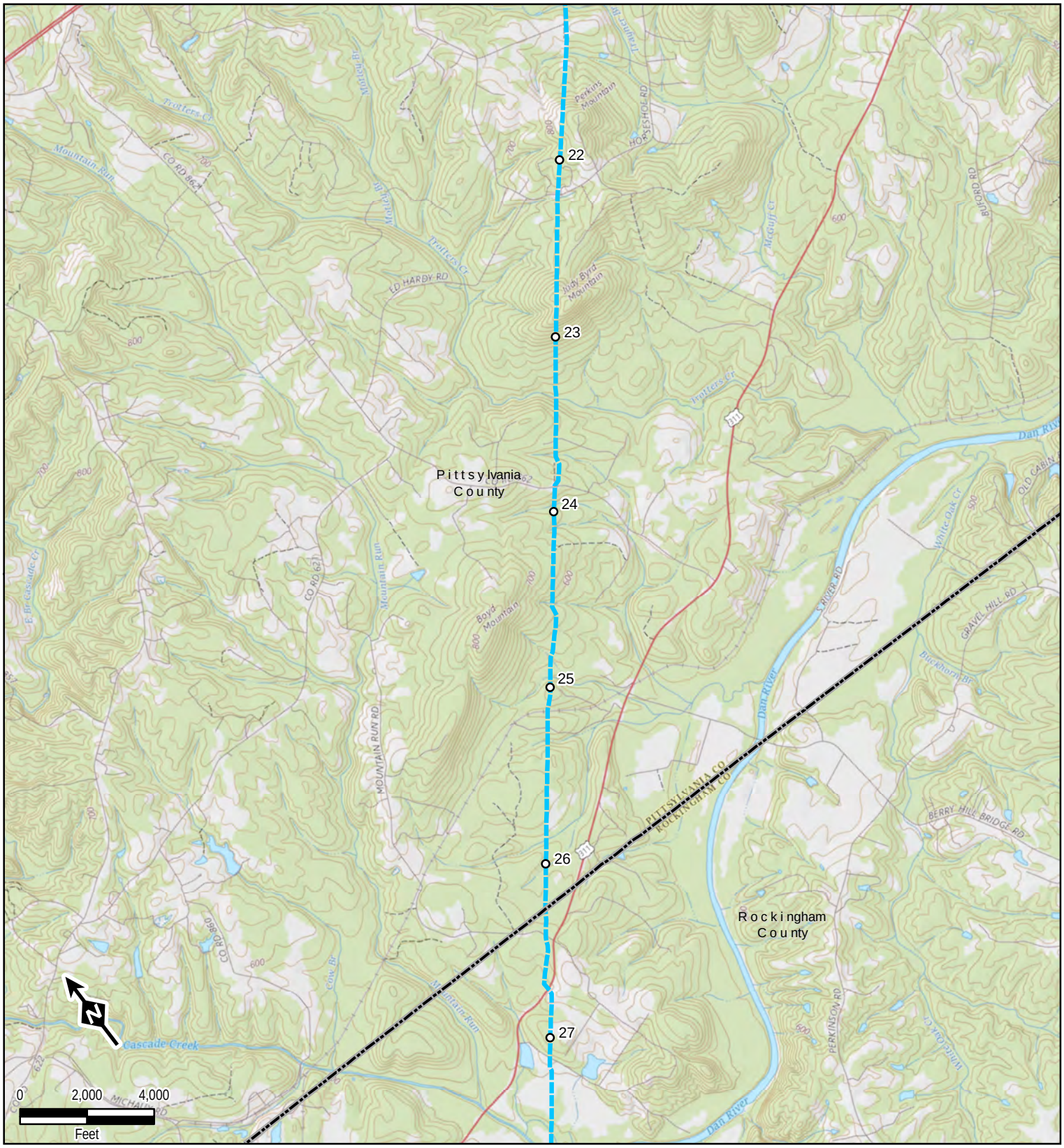

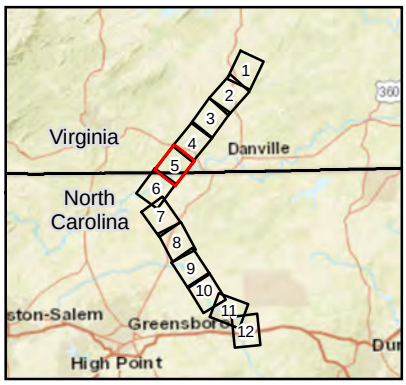

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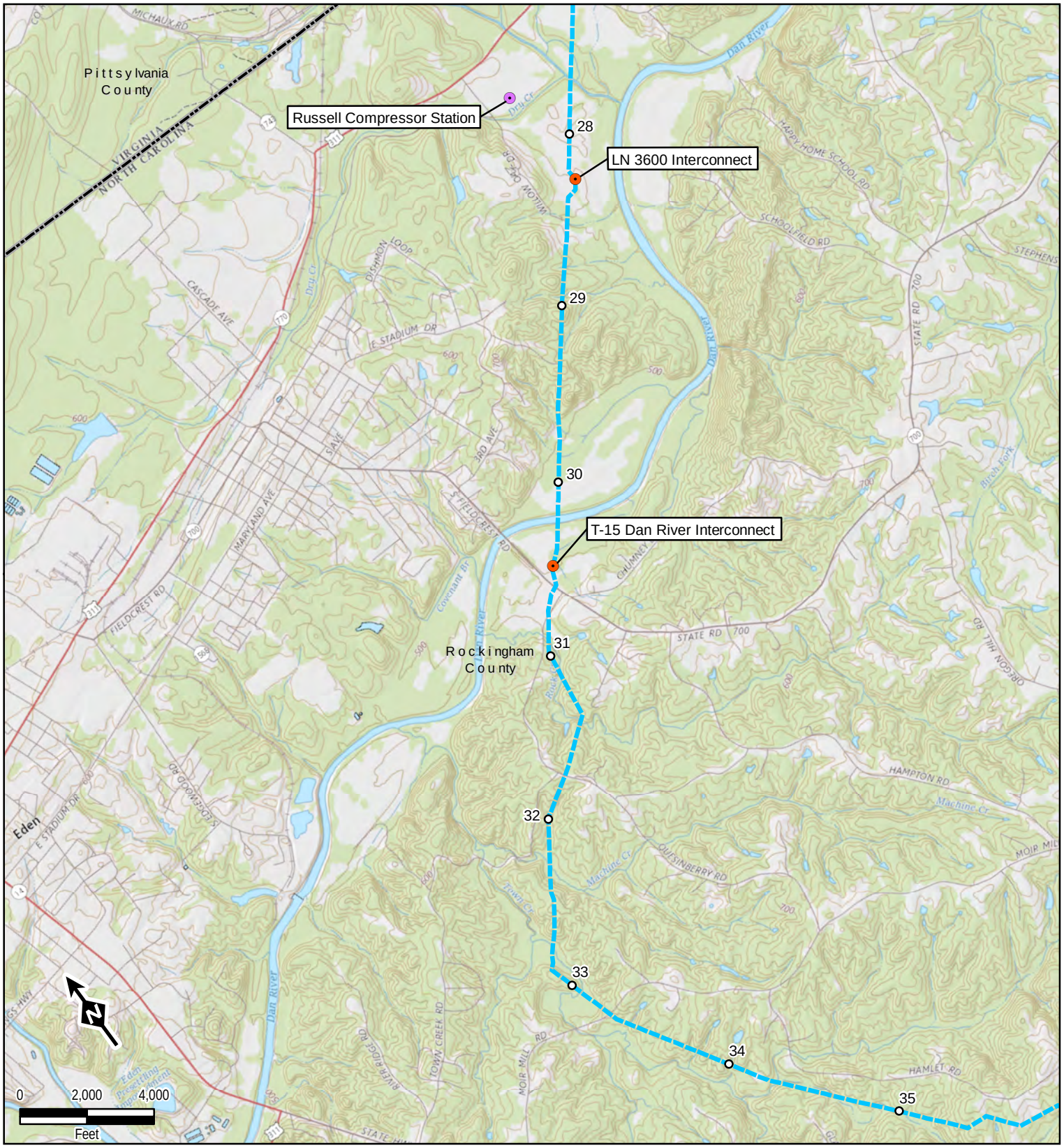

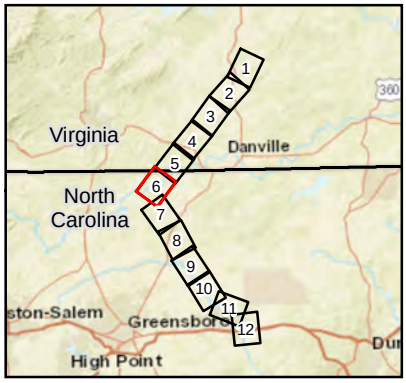

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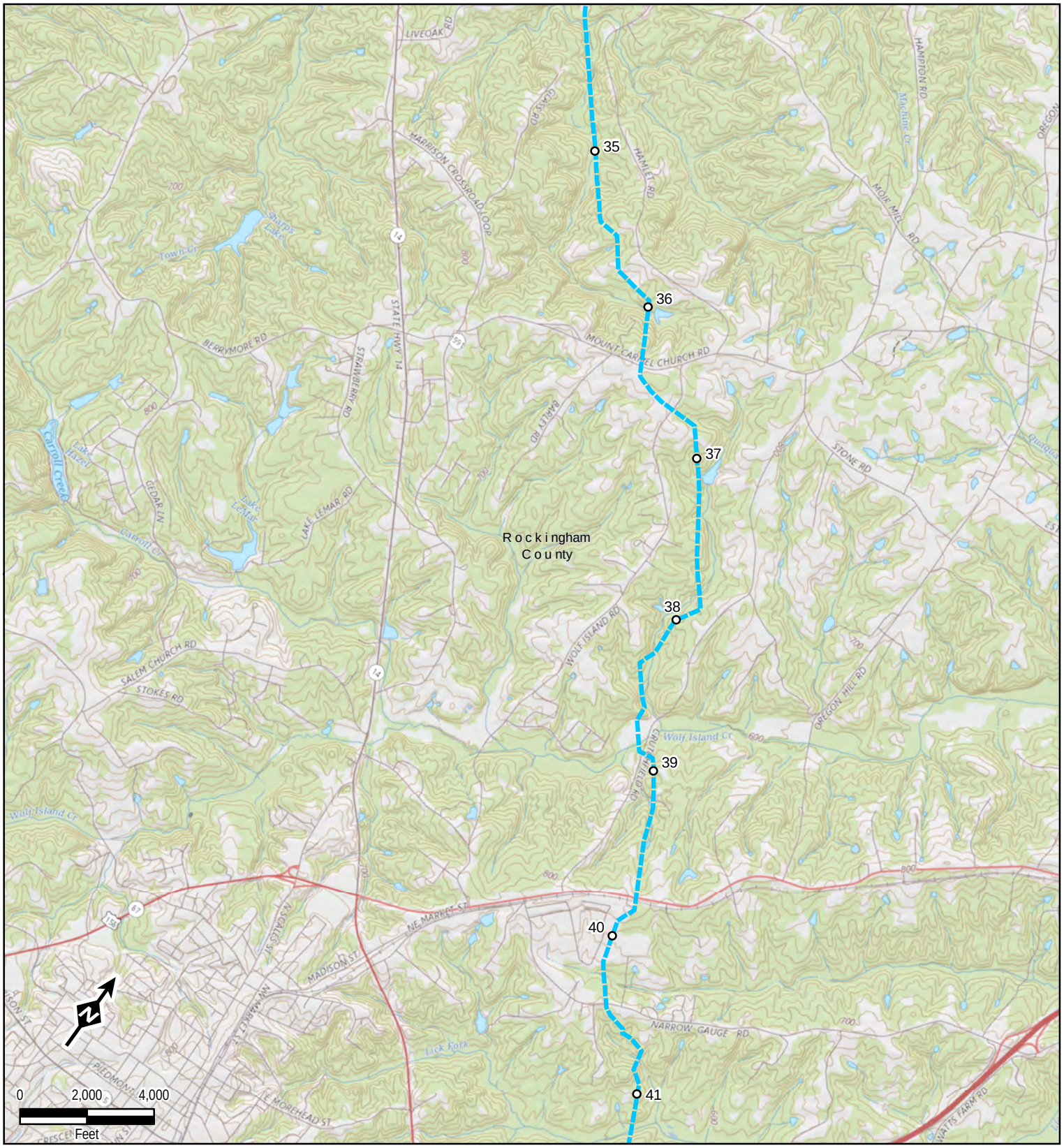

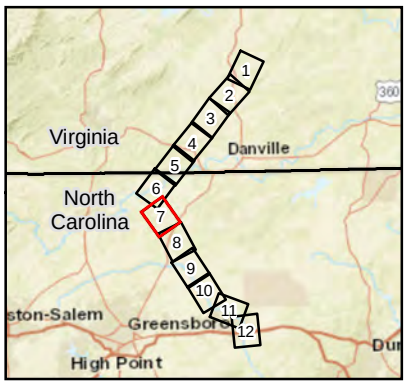

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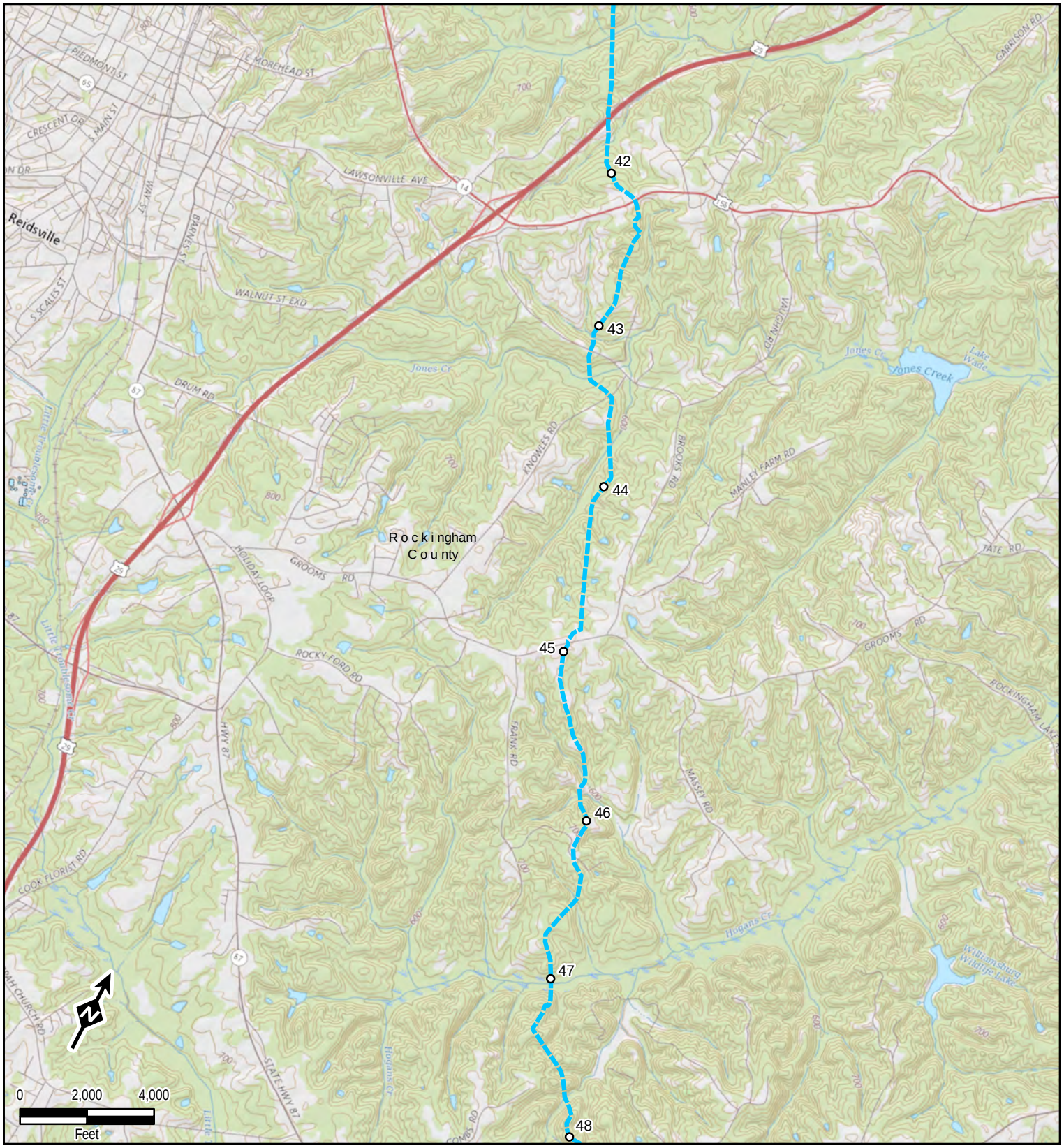

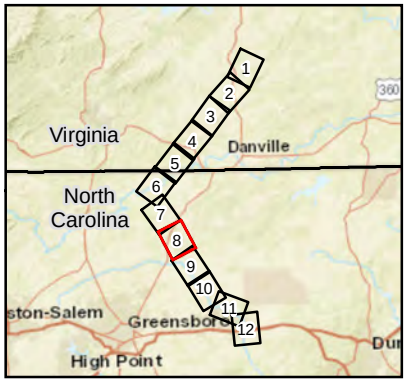

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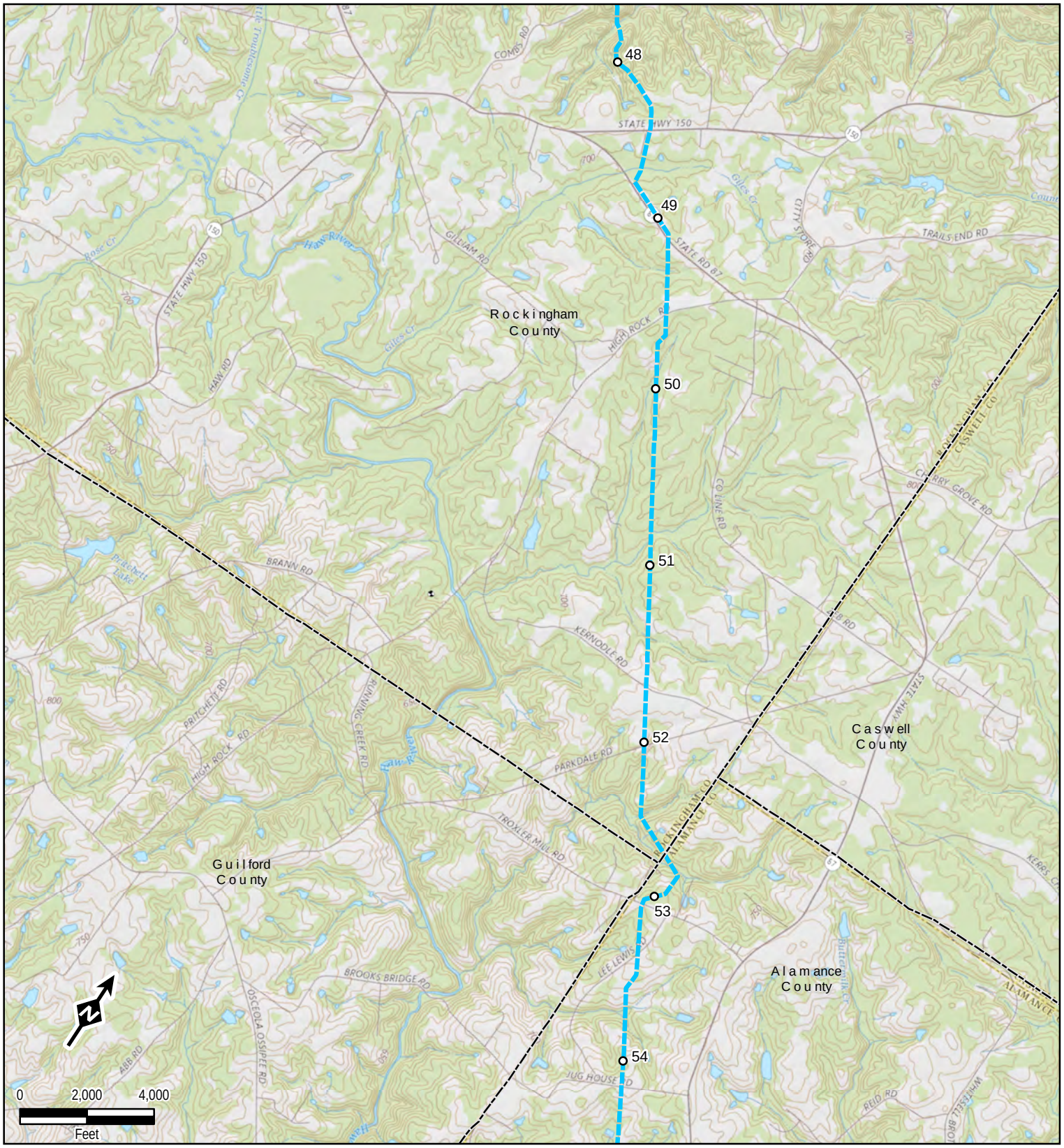

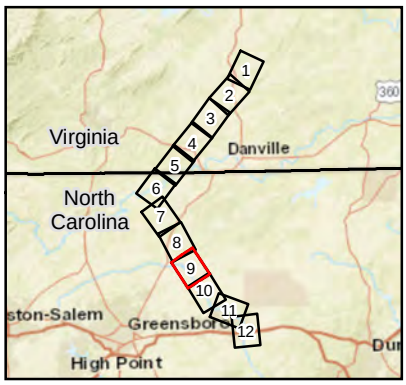

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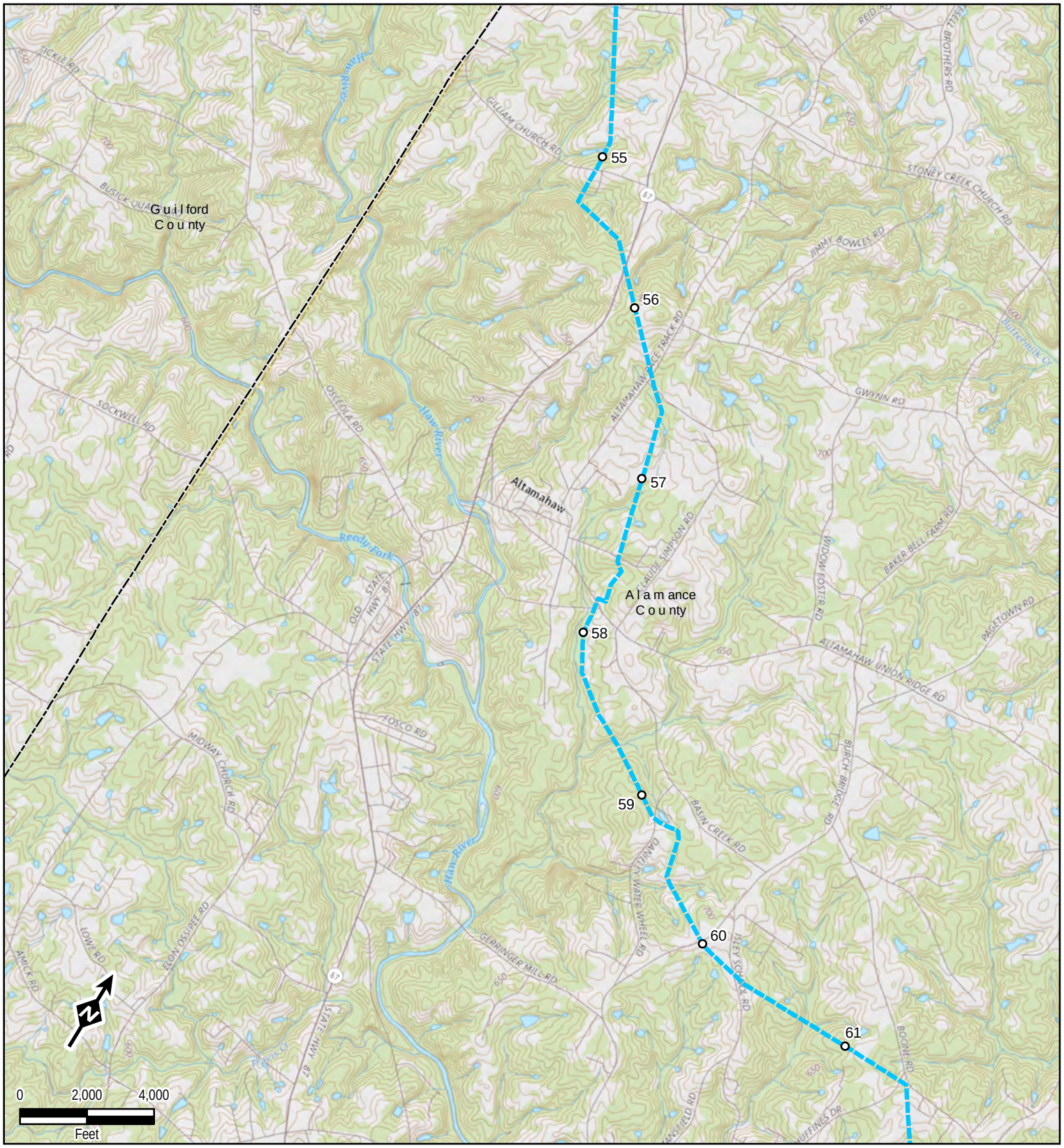

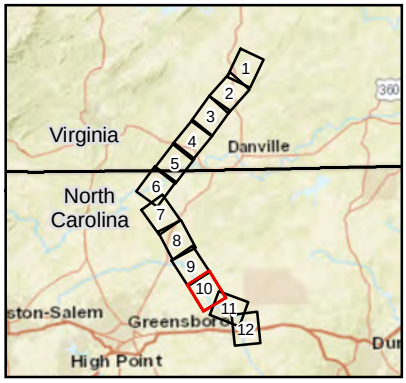

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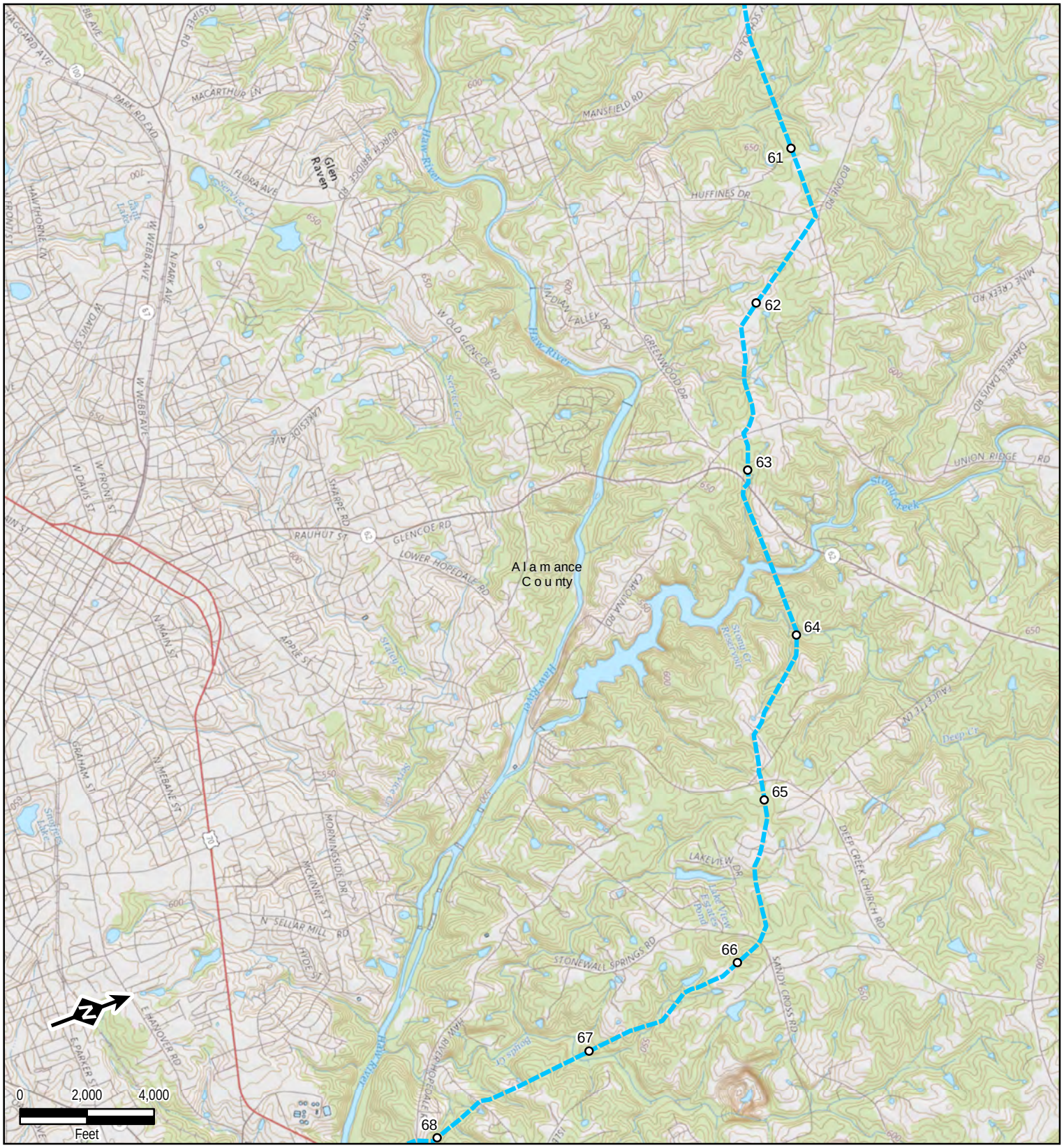

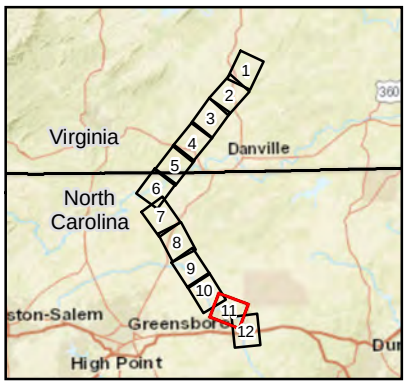

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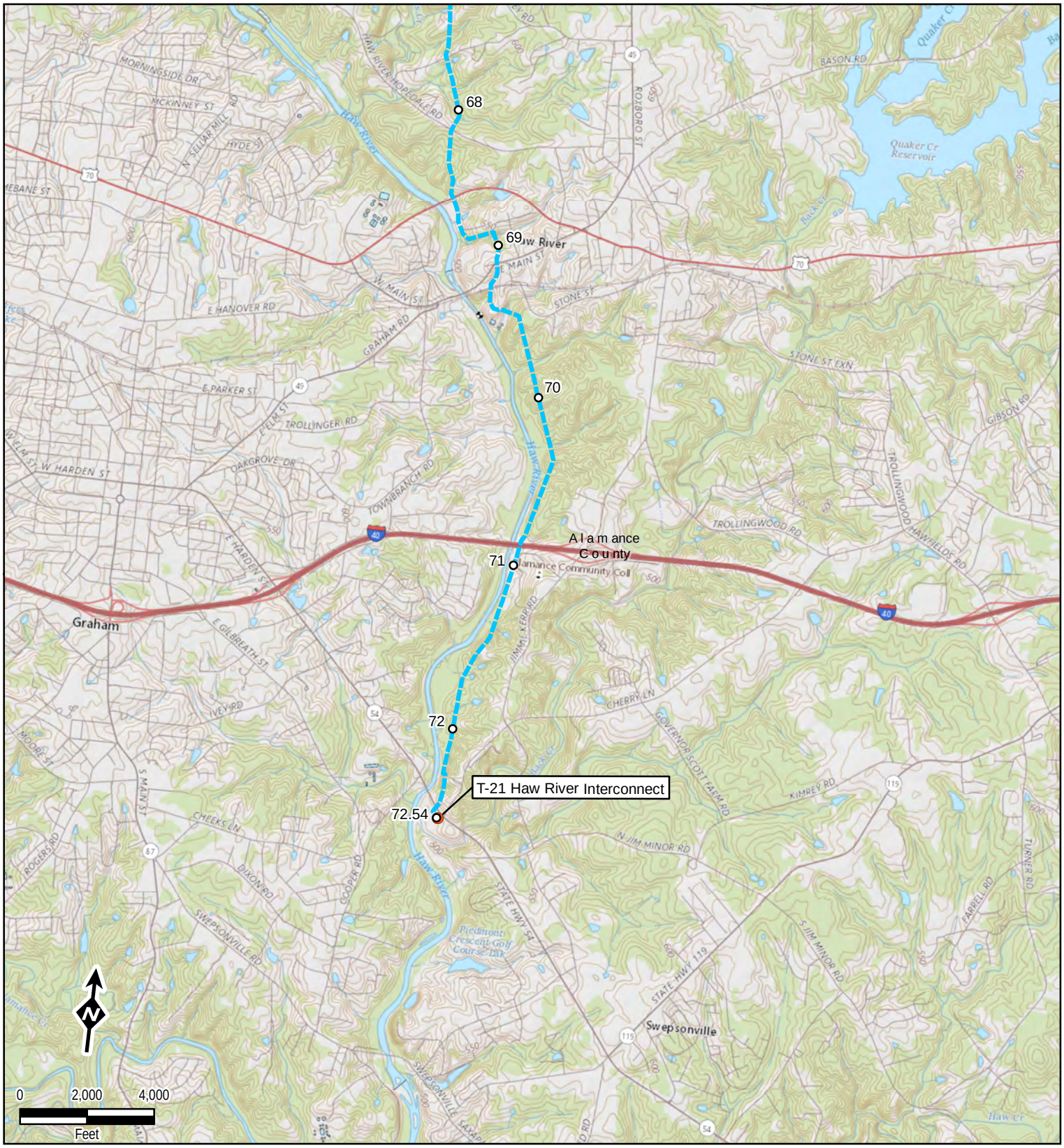

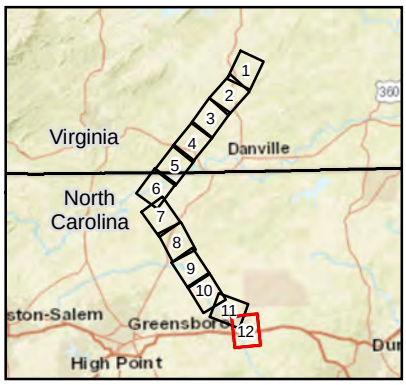

Legend

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

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 4,000 feet
When Printed 8.5x11

Mountain Valley Pipeline, LLC

Appendix 1-B

USGS Quadrangle Excerpts

Sheet 12 of 12

TRC
600 Willowbrook Ln
West Chester, PA 19382

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

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-C1

Typical Drawings

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-C2

Plot Plans (Contains Critical Energy Infrastructure Information – Do Not Release)

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-D

Additional Temporary Workspace Table

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-E

Co-Location Table

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-F

Access Road Table

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-G

Project-Specific Erosion and Sediment Control Plan

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-H

Fire Prevention and Suppression Plan

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-I

Foreign Pipeline Crossings Table

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-J

Winter Construction Plan

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-K

Agency Correspondence

[Correspondence to Date]

North Carolina Correspondence

Mountain Valley PIPELINE LLC

OUTGOING CORRESPONDENCE

From:	Miller, Alex
To:	David.E.Bailey2@usace.army.mil
Cc:	Faul, Travis; Patti, Heather
Subject:	MVP Southgate Proposed CL Shapefile PF18-4
Date:	Monday, June 4, 2018 10:25:10 AM
Attachments:	MVPSG_Prop_Centerline_20180601.zip

Good morning David,

The MVP Southgate Project currently has ~30% of the route delineated in North Carolina. Survey progress was a little slower than forecasted so we added field personnel. We are currently running 3 crews of 3 biologist in North Carolina for the +/- 300' wide survey corridor. By early July, we anticipate have the majority of the tracts available for survey delineated. Updated shapefiles will be provided at major project milestones.

The FERC PM (Amanda Mardiney) or her consulting party (Cardno) will be reaching out to you within the next week or so to see if you are available for a meeting while they are in the area for Open Houses. After reviewing the route, please let me know if you have any concerns.

Disclaimer: The attached shapefile is being provide for a preliminary review of our currently proposed route. The route is subject to change prior to application submittal and is not intended for distribution.

Have a good day,

Alex V. Miller
Environmental Specialist
Gas Infrastructure | NEXTera Energy Resources, LLC
O: 713.374.1599 C: 713.204.3729
Alex.Miller@NextEraEnergy.com

From:	Miller, Alex
To:	sue.homewood@ncdenr.gov
Cc:	Faul, Travis; Patti, Heather
Subject:	MVP Southgate Proposed CL Shapefile PF18-4
Date:	Monday, June 4, 2018 1:03:52 PM
Attachments:	Southgate_Centerline_Export_20180604.zip

Good afternoon Ms. Homewood,

The MVP Southgate Project currently has ~30% of the route delineated in North Carolina. Survey progress was a little slower than forecasted so we added field personnel and will continue to re-evaluate. We are currently running 3 crews of 3 biologist in North Carolina for the +/- 300' wide survey corridor. By early July, we anticipate having the majority of the tracts delineated that are available for survey. Updated shapefiles will be provided at major project milestones.

Disclaimer: The attached shapefile is being provide for a preliminary review of our currently proposed route. The route is subject to change prior to application submittal and is not intended for distribution.

Have a great day,

Alex V. Miller
Environmental Specialist
Gas Infrastructure | NEXTera Energy Resources, LLC
O: 713.374.1599 C: 713.204.3729
Alex.Miller@NextEraEnergy.com

Mountain Valley PIPELINE LLC

INCOMING CORRESPONDENCE

From: Bailey, David E CIV USARMY CESAW (US)
To: Patti, Heather
Subject: RE: Southgate project - pre-app meeting today, 1pm
Date: Monday, May 7, 2018 10:00:48 AM
Attachments: ORM_Upload_Sheet_AqResources_Rapanos_20180111.xlsm

---

Hi Heather. Per our discussion at the meeting last week, here's the aquatic resources upload sheet for you to fill out and include with the PJD request. You would fill out the "AqResources" tab. Some of the fields have drop-down menus and other you would just add your own text. The "Rules". "Ref_Help", and "Format" tabs may be helpful when determining Waters Names, etc. Note that lat and lon need to be in decimal degree format. When complete, you can use the orange shield symbol in the upper left hand corner of the spreadsheet to determine if the information has been entered in the correct format. Note that this is a spreadsheet that I have to upload into our database, so the correct format is crucial.

For a project with as many waters as this one will have, filling this form out correctly will save a lot of time on my end during document processing.

Thanks for your help, and please let me know if you have any questions.

-Dave Bailey

David E. Bailey, PWS
Regulatory Project Manager
US Army Corps of Engineers
CE-SAW-RG-R
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
Phone: (919) 554-4884, Ext. 30.
Fax: (919) 562-0421
Email: David.E.Bailey2@usace.army.mil

-----Original Message-----
From: Patti, Heather [mailto:HPatti@trcsolutions.com]
Sent: Friday, May 4, 2018 8:00 AM
To: Munzer, Olivia <olivia.munzer@ncwildlife.org>; Stancil, Vann F <vann.stancil@ncwildlife.org>; Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>; Homewood, Sue <sue.homewood@ncdenr.gov>
Cc: Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Raffenberg, Matthew <Matthew.Raffenberg@fpl.com>; mstahl@eqt.com; john_ellis@fws.gov
Subject: [Non-DoD Source] Southgate project - pre-app meeting today, 1pm

Morning folks! Just a friendly reminder about our meeting today at 1pm at the Corps' Raleigh field office:

3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
Phone: (919) 554-4884

Agenda:

From: Bailey, David E CIV USARMY CESAW (US)
To: Patti, Heather; Homewood, Sue
Cc: Munzer, Olivia; Miller, Alex; Finio, Alan; Walker, Lisa; Faul, Travis; Webb, Paul; Munzer, Olivia
Subject: RE: [External] MVP - Southgate project - pre-app meeting
Date: Thursday, April 19, 2018 10:11:22 AM

Hi all. We can seat up to 12 in our conference room. At the moment I count 9 attendees. I've reserved the room here, but if it looks like we need more space let's coordinate with NCDWR as Sue suggested. Thanks.
-Dave Bailey

David E. Bailey, PWS
Regulatory Project Manager
US Army Corps of Engineers
CE-SAW-RG-R
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
Phone: (919) 554-4884, Ext. 30.
Fax: (919) 562-0421
Email: David.E.Bailey2@usace.army.mil

-----Original Message-----
From: Patti, Heather [mailto:HPatti@trcsolutions.com]
Sent: Thursday, April 19, 2018 9:08 AM
To: Homewood, Sue <sue.homewood@ncdenr.gov>
Cc: Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>; Munzer, Olivia <olivia.munzer@ncwildlife.org>; Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Webb, Paul <PWebb@trcsolutions.com>
Subject: [Non-DoD Source] Re: [External] MVP - Southgate project - pre-app meeting

Hi Sue,
That sounds great - thank you very much! In attendance will be myself, Alex Miller with nextera energy, and maybe one or two others but I will let you know. Traveling at the moment. Thanks again!

Sent from my iPhone

On Apr 18, 2018, at 4:12 PM, Homewood, Sue <sue.homewood@ncdenr.gov <mailto:sue.homewood@ncdenr.gov> > wrote:

Heather,

Per our discussion this morning, David and I will be available for a meeting at the USACE Raleigh Regulatory Field Office in Wake Forest at 1 pm on Friday May 4th.

I'm also forwarding this message as an invitation to Olivia Munzer with NCWRC. Her contact information is:

Olivia Munzer

Western Piedmont Habitat Conservation Coordinator

Certified Wildlife Biologist ®

NC Wildlife Resources Commission

Sykes Depot, 2430 Turner Rd.

Mebane, NC 27302

Office: 336.290.0056 // Cell: 336.269.0074

olivia.munzer@ncwildlife.org <mailto:olivia.munzer@ncwildlife.org>

Thanks,

Sue Homewood
Division of Water Resources, Winston Salem Regional Office
Department of Environmental Quality

336 776 9693 office
336 813 1863 mobile
Sue.Homewood@ncdenr.gov <mailto:Sue.Homewood@ncdenr.gov>

450 W. Hanes Mill Rd, Suite 300
Winston Salem NC 27105

From: Patti, Heather [mailto:HPatti@trcsolutions.com]
Sent: Wednesday, April 18, 2018 7:14 AM
To: david.e.bailey2@usace.army.mil <mailto:david.e.bailey2@usace.army.mil> ; Homewood, Sue <sue.homewood@ncdenr.gov <mailto:sue.homewood@ncdenr.gov> >
Cc: Miller, Alex <Alex.Miller@nexteraenergy.com <mailto:Alex.Miller@nexteraenergy.com> >; Finio, Alan <AFinio@trcsolutions.com <mailto:AFinio@trcsolutions.com> >; Walker, Lisa <LWalker@trcsolutions.com <mailto:LWalker@trcsolutions.com> >; Faul, Travis <Travis.Faul@nexteraenergy.com <mailto:Travis.Faul@nexteraenergy.com> >; Webb, Paul <PWebb@trcsolutions.com <mailto:PWebb@trcsolutions.com> >

Subject: [External] MVP - Southgate project - pre-app meeting

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Hi David and Sue,

Great talking with you yesterday, David. Sue – I left you a VM, so we haven't spoken directly yet.

We are working with Mountain Valley Pipeline, LLC on a new proposed natural gas pipeline lateral project, spanning approximately 70 miles from southern Virginia into central North Carolina (Rockingham and Alamance Counties). Since it is an interstate pipeline, it will be regulated by FERC. Please see attached project overview, schedule and proposed route map for more details on the project.

We are planning to kickoff survey, wetland delineations and T&E species assessments in May. Before getting underway with fieldwork, we would very much appreciate having an in-person pre-app meeting at a convenient location for you both.

Please let me know of a couple of dates/times in the next couple of weeks, and we can work out a location that works best for you.

Thanks very much!

Heather Patti, PWS
Senior Ecologist

5540 Centerview Drive, Suite 100, Raleigh, NC 27606

T: 919-256-6236 | F: 919-838-9661 | C: 262-623-1079

LinkedIn <Blockedhttp://www.linkedin.com/company/trc-companies-inc> | Twitter <Blockedhttp://twitter.com/TRC_Companies> | Blog <Blockedhttp://blog.trcsolutions.com/> | Flickr <Blockedhttp://www.flickr.com/photos/trcsolutions/> | Blockedwww.trcsolutions.com <Blockedhttp://www.trcsolutions.com/>

- Introductions
- Project purpose, overview, and schedule
- Route evaluation
- Environmental overview, survey, and permitting

Lisa Walker (TRC) will be calling in. See everyone then!

Heather Patti, PWS
Senior Ecologist

5540 Centerview Drive, Suite 100, Raleigh, NC 27606
T: 919-256-6236 | F: 919-838-9661 | C: 262-623-1079 LinkedIn | Twitter | Blog | Flickr |
Blockedwww.trcsolutions.com

-----Original Message-----
From: Patti, Heather
Sent: Friday, April 27, 2018 9:42 AM
To: 'Munzer, Olivia' <olivia.munzer@ncwildlife.org>; Stancil, Vann F <vann.stancil@ncwildlife.org>; Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>; Homewood, Sue <sue.homewood@ncdenr.gov>
Cc: Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Raffenberg, Matthew <Matthew.Raffenberg@fpl.com>; mstahl@eqt.com; john_ellis@fws.gov
Subject: RE: [External] MVP - Southgate project - pre-app meeting

Sounds good. David - I think that brings out head count up to 10, but we should be in good shape if the room fits 12.?

Thanks!
Heather

-----Original Message-----
From: Munzer, Olivia [mailto:olivia.munzer@ncwildlife.org]
Sent: Friday, April 27, 2018 9:35 AM
To: Patti, Heather <HPatti@trcsolutions.com>; Stancil, Vann F <vann.stancil@ncwildlife.org>; Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>; Homewood, Sue <sue.homewood@ncdenr.gov>
Cc: Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Raffenberg, Matthew <Matthew.Raffenberg@fpl.com>; mstahl@eqt.com; john_ellis@fws.gov
Subject: RE: [External] MVP - Southgate project - pre-app meeting

Vann Stancil from NCWRC will also be attending with me. Thank you.
Olivia

Olivia Munzer
Western Piedmont Habitat Conservation Coordinator NC Wildlife Resources Commission

-----Original Message-----

From: Patti, Heather [mailto:HPatti@trcsolutions.com]
Sent: Wednesday, April 25, 2018 4:14 PM
To: Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>; Homewood, Sue <sue.homewood@ncdenr.gov>
Cc: Munzer, Olivia <olivia.munzer@ncwildlife.org>; Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Munzer, Olivia <olivia.munzer@ncwildlife.org>; Raffenberg, Matthew <Matthew.Raffenberg@fpl.com>; mstahl@eqt.com; john_ellis@fws.gov
Subject: RE: [External] MVP - Southgate project - pre-app meeting

CAUTION: External email. Do not click links or open attachments unless verified. Send all suspicious email as an attachment to Report Spam.<mailto:report.spam@nc.gov>

Hi Dave,

Just wanted to touch base in advance of our meeting next week, May 4th at 1pm. We have firmed up in-person attendees from our end, which will include myself, Alex Miller (Nextera), Matt Raffenberg (Nextera), and Megan Stahl at EQT. Also, I spoke with John Ellis over at NCFWS and invited him to attend, so that we can all meet at the same time.

I will send out an agenda this Friday. I believe our head count is still at 9 total, including the folks above plus you, Sue, Karen and Olivia. We would like to show a brief powerpoint presentation introducing the project, which we can do via Skype meeting if that works for you. Also, one or two of our folks from out of state would like to call in - is that a possibility?

Thank you for your help & hosting! We are looking forward to it.

Heather

Heather Patti, PWS
Senior Ecologist

5540 Centerview Drive, Suite 100, Raleigh, NC 27606
T: 919-256-6236 | F: 919-838-9661 | C: 262-623-1079 LinkedIn | Twitter | Blog | Flickr | Blockedwww.trcsolutions.com

-----Original Message-----
From: Bailey, David E CIV USARMY CESAW (US) [mailto:David.E.Bailey2@usace.army.mil]
Sent: Thursday, April 19, 2018 10:09 AM
To: Patti, Heather <HPatti@trcsolutions.com>; Homewood, Sue <sue.homewood@ncdenr.gov>
Cc: Munzer, Olivia <olivia.munzer@ncwildlife.org>; Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Webb, Paul <PWebb@trcsolutions.com>; Munzer, Olivia <olivia.munzer@ncwildlife.org>
Subject: RE: [External] MVP - Southgate project - pre-app meeting

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-Dave Bailey

David E. Bailey, PWS
Regulatory Project Manager

US Army Corps of Engineers
CE-SAW-RG-R
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
Phone: (919) 554-4884, Ext. 30.
Fax: (919) 562-0421
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We would appreciate your feedback on how we are performing our duties. Our automated Customer Service Survey is located at: Blockedhttp://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0
Thank you for taking the time to visit this site and complete the survey.

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Sent: Thursday, April 19, 2018 9:08 AM
To: Homewood, Sue <sue.homewood@ncdenr.gov>
Cc: Bailey, David E CIV USARMY CESAW (US) <David.E.Bailey2@usace.army.mil>; Munzer, Olivia <olivia.munzer@ncwildlife.org>; Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Webb, Paul <PWebb@trcsolutions.com>
Subject: [Non-DoD Source] Re: [External] MVP - Southgate project - pre-app meeting

Hi Sue,
That sounds great - thank you very much! In attendance will be myself, Alex Miller with nextera energy, and maybe one or two others but I will let you know. Traveling at the moment. Thanks again!

Sent from my iPhone

On Apr 18, 2018, at 4:12 PM, Homewood, Sue <sue.homewood@ncdenr.gov <mailto:sue.homewood@ncdenr.gov> > wrote:

Heather,

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I’m also forwarding this message as an invitation to Olivia Munzer with NCWRC. Her contact information is:

Olivia Munzer

Western Piedmont Habitat Conservation Coordinator

Certified Wildlife Biologist ®

NC Wildlife Resources Commission

Sykes Depot, 2430 Turner Rd.

Mebane, NC 27302

Office: 336.290.0056 // Cell: 336.269.0074

olivia.munzer@ncwildlife.org <mailto:olivia.munzer@ncwildlife.org>

Thanks,

Sue Homewood
Division of Water Resources, Winston Salem Regional Office
Department of Environmental Quality

336 776 9693 office
336 813 1863 mobile
Sue.Homewood@ncdenr.gov <mailto:Sue.Homewood@ncdenr.gov>

450 W. Hanes Mill Rd, Suite 300
Winston Salem NC 27105

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Sent: Wednesday, April 18, 2018 7:14 AM
To: david.e.bailey2@usace.army.mil <mailto:david.e.bailey2@usace.army.mil> ; Homewood, Sue <sue.homewood@ncdenr.gov <mailto:sue.homewood@ncdenr.gov> >
Cc: Miller, Alex <Alex.Miller@nexteraenergy.com <mailto:Alex.Miller@nexteraenergy.com> >; Finio, Alan <AFinio@trcsolutions.com <mailto:AFinio@trcsolutions.com> >; Walker, Lisa <LWalker@trcsolutions.com <mailto:LWalker@trcsolutions.com> >; Faul, Travis <Travis.Faul@nexteraenergy.com <mailto:Travis.Faul@nexteraenergy.com> >; Webb, Paul <PWebb@trcsolutions.com <mailto:PWebb@trcsolutions.com> >
Subject: [External] MVP - Southgate project - pre-app meeting

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Thanks very much!

Heather Patti, PWS
Senior Ecologist

5540 Centerview Drive, Suite 100, Raleigh, NC 27606

T: 919-256-6236 | F: 919-838-9661 | C: 262-623-1079

LinkedIn <BlockedBlockedhttp://www.linkedin.com/company/trc-companies-inc> | Twitter <BlockedBlockedhttp://twitter.com/TRC_Companies> | Blog <BlockedBlockedhttp://blog.trcsolutions.com/> | Flickr <BlockedBlockedhttp://www.flickr.com/photos/trcsolutions/> | BlockedBlockedwww.trcsolutions.com <BlockedBlockedhttp://www.trcsolutions.com/>

From:	Homewood, Sue
To:	Patti, Heather; david.e.bailey2@usace.army.mil; Munzer, Olivia
Cc:	Miller, Alex; Finio, Alan; Walker, Lisa; Faul, Travis; Webb, Paul
Subject:	RE: [External] MVP - Southgate project - pre-app meeting
Date:	Wednesday, April 18, 2018 4:12:10 PM

Heather,

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I'm also forwarding this message as an invitation to Olivia Munzer with NCWRC. Her contact information is:

Olivia Munzer
Western Piedmont Habitat Conservation Coordinator
Certified Wildlife Biologist ®
NC Wildlife Resources Commission
Sykes Depot, 2430 Turner Rd.
Mebane, NC 27302
Office: 336.290.0056 // Cell: 336.269.0074
olivia.munzer@ncwildlife.org

Thanks,

Sue Homewood
Division of Water Resources, Winston Salem Regional Office
Department of Environmental Quality

336 776 9693 office
336 813 1863 mobile
Sue.Homewood@ncdenr.gov

450 W. Hanes Mill Rd, Suite 300
Winston Salem NC 27105

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Sent: Wednesday, April 18, 2018 7:14 AM
To: david.e.bailey2@usace.army.mil; Homewood, Sue <sue.homewood@ncdenr.gov>

Cc: Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Webb, Paul <PWebb@trcsolutions.com>
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Heather Patti, PWS
Senior Ecologist

TRC
Results you can rely on

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T: 919-256-6236 | F: 919-838-9661 | C: 262-623-1079

LinkedIn | Twitter | Blog | Flickr | www.trcsolutions.com

From: Homewood, Sue
To: Patti, Heather; Bailey, David E SAW
Subject: RE: [External] MVP - Southgate project - pre-app meeting
Date: Thursday, April 19, 2018 8:22:50 AM

Heather,

I'll be bringing 2 other DWR staff with me, Karen Higgins the supervisor of the 401 Branch, and Paul Wojoski, a new employee in the 401 branch. Depending on how many people will be attending we may be pushing the limits of the USACE conf. room. If you can let us know how many people you think will be coming, we can decide if we need to relocate the meeting to a conference room in the DWR Central Office in downtown Raleigh.

Thanks,

Sue Homewood
Division of Water Resources, Winston Salem Regional Office
Department of Environmental Quality

336 776 9693 office
336 813 1863 mobile
Sue.Homewood@ncdenr.gov

450 W. Hanes Mill Rd, Suite 300
Winston Salem NC 27105

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Sent: Wednesday, April 18, 2018 7:14 AM
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Cc: Miller, Alex <Alex.Miller@nexteraenergy.com>; Finio, Alan <AFinio@trcsolutions.com>; Walker, Lisa <LWalker@trcsolutions.com>; Faul, Travis <Travis.Faul@nexteraenergy.com>; Webb, Paul <PWebb@trcsolutions.com>
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Hi David and Sue,

Great talking with you yesterday, David. Sue – I left you a VM, so we haven't spoken directly yet.

We are working with Mountain Valley Pipeline, LLC on a new proposed natural gas pipeline lateral project, spanning approximately 70 miles from southern Virginia into central North Carolina (Rockingham and Alamance Counties). Since it is an interstate pipeline, it will be regulated by FERC. Please see attached project overview, schedule and proposed route map for more details on the project.

We are planning to kickoff survey, wetland delineations and T&E species assessments in May. Before getting underway with fieldwork, we would very much appreciate having an in-person pre-app meeting at a convenient location for you both.

Please let me know of a couple of dates/times in the next couple of weeks, and we can work out a location that works best for you.

Thanks very much!

Heather Patti, PWS
Senior Ecologist

5540 Centerview Drive, Suite 100, Raleigh, NC 27606
T: 919-256-6236 | F: 919-838-9661 | C: 262-623-1079

LinkedIn | Twitter | Blog | Flickr | www.trcsolutions.com

Mountain Valley PIPELINE LLC

OUTGOING CORRESPONDENCE

Webb, Paul

From: Miller, Alex <Alex.Miller@nexteraenergy.com>
Sent: Tuesday, May 29, 2018 12:06 PM
To: Gledhill-earley, Renee
Subject: RE: Southgate Pipeline Project

Hi Renee,

I received approval to distribute the currently proposed route via shapefile and will get that over to you by tomorrow for dissemination within your organization.

Have a great day,

Alex

From: Gledhill-earley, Renee [mailto:renee.gledhill-earley@ncdcr.gov]
Sent: Tuesday, May 29, 2018 11:02 AM
To: Miller, Alex <Alex.Miller@nexteraenergy.com>
Subject: Southgate Pipeline Project

CAUTION - EXTERNAL EMAIL

Alex: Sorry to be long in getting back to you. Wanted to check with staff on need to meet again and had some out on leave.

We appreciate the offer to meet again, but feel that with the maps we requested, we will be able to move forward using our regular review process and another meeting is not needed.

Thanks for the follow-up and patience.
Renee

--

Renee Gledhill-Earley
Environmental Review Coordinator
State Historic Preservation Office
109 E Jones St MSC 4617 Raleigh, NC 27699
919 807 6579 *office*

Please Note: Requests for project review or responses to our review comments should be sent to our Environmental Review emailbox at environmental.review@ncdcr.gov Otherwise, I will have to return your request and ask that you send it to the proper

mailbox. This will cause delays in your project. Information on email project submittal is at:
http://www.hpo.ncdcr.gov/er/er_email_submittal.html

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

April 27, 2018

Ms. Renee Gledhill-Earley
Environmental Review Coordinator
North Carolina State Historic Preservation Office
109 East Jones Street, Room 258
Raleigh, North Carolina 27601

Via Federal Express and Email

RE: MVP Southgate Project, Rockingham and Alamance Counties, North Carolina

Dear Ms. Gledhill-Earley:

The purpose of this letter is to provide initial information to the North Carolina Historic Preservation Office (HPO) regarding the proposed MVP Southgate Project (Project), and to formally initiate the HPO's review of the Project in accordance with Section 106 of the National Historic Preservation Act (54 U.S.C. 306) and its implementing regulations, 36 CFR Part 800 (Protection of Historic Properties). Additionally, MVP Southgate requests a meeting with you and your staff to discuss the cultural resources studies and agency and tribal consultation for the project.

The proposed Project is an interstate natural gas pipeline project that will be developed, constructed, and owned by Mountain Valley Pipeline, LLC. As proposed, the Project will receive gas from the Mountain Valley Pipeline in Pittsylvania County, Virginia, and extend approximately 70 miles south to new delivery points in North Carolina. As proposed, approximately 46.5 miles of the mainline pipeline will be located in Rockingham and Alamance counties, North Carolina. TRC Environmental Corporation (TRC) is assisting MVP Southgate with environmental documentation and permitting coordination and will be conducting and reporting the cultural resource studies for the Project.

As an interstate natural gas pipeline, MVP Southgate will be regulated by the Federal Energy Regulatory Commission (FERC) and may also require other federal or state permits. The proposed cultural resource investigations in North Carolina will be conducted in accordance with pertinent federal and state regulations, including the FERC Office of Energy Projects' Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017) and Guidance Manual for Environmental Report Preparation (2017), the regulations governing the Section 106 process (36 CFR Part 800, Protection of Historic Properties), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR Part 61), and the HPO's Archaeological Investigation Standards and Guidelines (2017) and Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106-110 Compliance Reports in North Carolina (2016).

The attached documents provide additional information on the Project. A Project Overview fact sheet is provided as Attachment 1, and Attachment 2 provides an overview map of the proposed Project route.

At this time, we are requesting a meeting with you and your staff to discuss the Project and any concerns or recommendations that you might have. I will contact you within the next few days to discuss possible meeting times; in addition, please feel free to contact me at (713) 374-1599 or via email at alex.miller@nee.com. Paul Webb of TRC will be coordinating the cultural resource compliance activities for the Project, and can be reached at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com.

Thank you for your time and consideration. We look forward to working with you on this Project.

Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:

Travis Faul, MVP Southgate
Richard W. Estabrook, MVP Southgate
Tracy Millis, TRC
Lisa Walker, TRC
Paul Webb, TRC

Attachments:

1) MVP Southgate Project Overview
2) Project Location Map

Project Overview

As proposed, the MVP Southgate project is a natural gas pipeline system that spans approximately 70 miles from southern Virginia into central North Carolina – and as an interstate pipeline will be regulated by the Federal Energy Regulatory Commission (FERC). MVP Southgate will be developed, constructed, and owned by Mountain Valley Pipeline, LLC (Mountain Valley).

With a vast supply of natural gas from Marcellus and Utica shale production, the Mountain Valley Pipeline mainline will transport natural gas to markets in the Mid- and South-Atlantic regions of the United States. The MVP Southgate project, as proposed, will receive gas from the Mountain Valley Pipeline mainline in Pittsylvania County, Virginia and extend approximately 70 miles south to new delivery points in Rockingham and Alamance Counties, North Carolina. MVP Southgate would provide low-cost supply access to natural gas produced in the Marcellus and Utica shale regions – for service delivery to PSNC Energy customers, as well as existing and new end-user markets in southern Virginia and central North Carolina.

The pipeline will be regulated under the federal Natural Gas Act, which requires a Certificate of Public Convenience and Necessity from the FERC before construction can commence. As currently proposed, the pipeline will be 16 to 20 inches in diameter and will require approximately 50 feet of permanent easement, with up to 100 feet of temporary easement during construction. In addition, as currently designed, the project would require one compressor station that is anticipated to be located at the beginning of the project in Pittsylvania County, Virginia, on land owned by Mountain Valley.

The Planning and Development Process

Several commercial and engineering aspects must be completed before construction can begin on MVP Southgate. Commercial aspects include securing and confirming capacity commitments, and while the project has a capacity commitment from PSNC Energy, a wholly owned subsidiary of SCANA Corporation, as an anchor shipper, an Open Season is being held to understand additional market interest. The Open Season will provide all market participants, including natural gas producers, marketers, industrial users, and local distribution companies, an opportunity to access capacity on the pipeline. Additional market interest received during the Open Season may change the current project scope

The engineering and environmental considerations include surveying and evaluating preliminary routing to help determine a final route with the least overall impact to landowners, historic and cultural resources, and the environment. An important step in the process is obtaining permission to access landowner property to conduct engineering and environmental surveys. At this stage, we are only seeking permission to access property – and the actual act of surveying will not begin until we receive permission. We may obtain landowner permissions for parcels that are not in the final route; however, a comprehensive evaluation is necessary to determine the route.

To-date, we are seeking landowner permissions in the following counties:

- **Virginia**: Pittsylvania
- **North Carolina**: Alamance and Rockingham

Once a preliminary route is determined, the environmental review process with the FERC will begin. This is referred to as the Pre-Filing Review, which provides for early identification and resolution of environmental issues and allows for direct interaction between FERC staff, community members, and other stakeholders. Once the Pre-Filing Review begins, a series of community open houses will be held along the proposed route corridor.

After the Pre-Filing Review is complete, Mountain Valley will file an application with the FERC for a Certificate of Public Convenience and Necessity. Construction cannot commence until the FERC issues this certificate, which will include the FERC's environmental analysis of the project.

Designing the Route

The proposed MVP Southgate route is being designed to avoid sensitive or protected areas when feasible; limit surface disturbance; and minimize the overall environmental footprint, as well as utilize as many existing gas and electric transmission corridors as possible. The MVP Southgate project team will work diligently with stakeholders, including landowners, community members, local officials, and state and federal agencies to identify the best possible route for the proposed pipeline. The currently proposed route avoids all federal and state parks and wildlife preserves.

Health, Safety, and Environment:

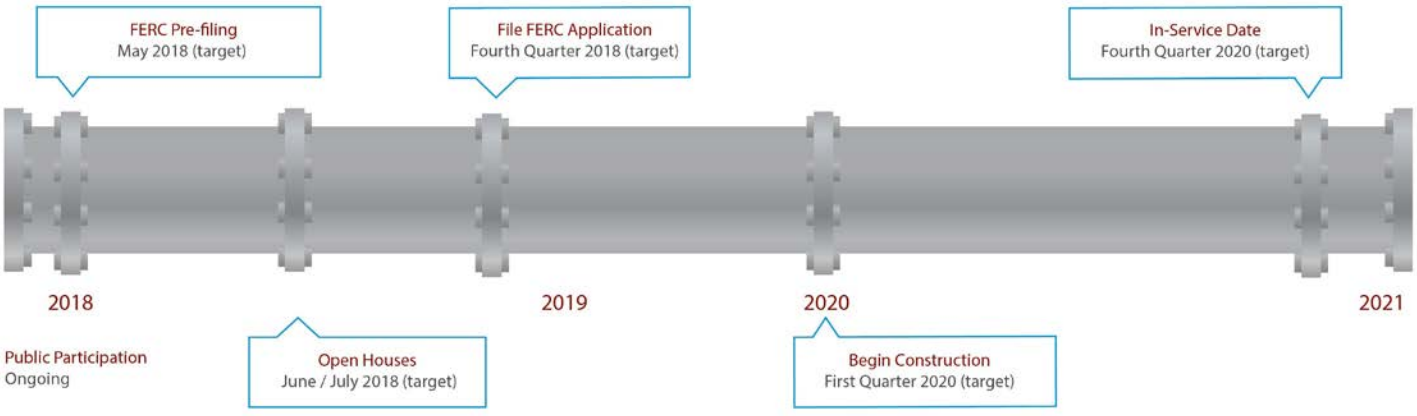
As the lead federal agency, the FERC will oversee the federal permitting process for MVP Southgate and will also coordinate with other federal, state, and local agencies during the environmental review process to identify and address potential environmental concerns.

- U.S. Department of Transportation statistics confirm that natural gas transmission pipelines are the safest form of energy transportation
- Construction and operation of natural gas transmission lines follow strict federal and state guidelines that minimize environmental disturbance
- Safety is a core value and number one priority for Mountain Valley
- Mountain Valley has a steadfast commitment to environmental protection and will conduct its business operation in a sustainable and environmentally responsible manner at all times

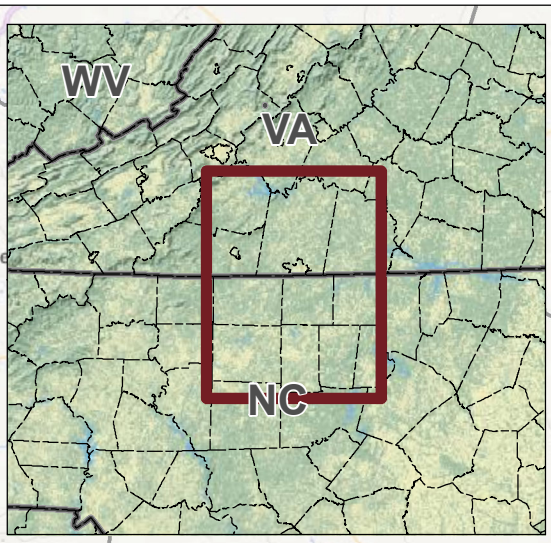
Community Benefits:

- Local communities can receive revenue from taxes paid on the pipeline and compressor station
- States can receive revenue from sales and use taxes paid during the construction of the project
- Potential employment opportunities for local residents during the construction phase of the project
- Increased activity and revenue for restaurants, hotels/motels, and retailers
- Natural gas supply diversity for PSNC Energy customers and other consumers in the region

Proposed Project Schedule



Attachment 2



MVP Southgate Proposed Route (April 2018)

- MVP Southgate Proposed Route
- Mountain Valley Pipeline
- East Tennessee
- Proposed Compressor Station

MVP Southgate Proposed Route_Bing_Roads

MVP SOUTHGATE

NC HPO Introduction

May 10, 2018

Purpose and Agenda

- Introductions
- Project purpose, overview, and schedule
- Route evaluation
- Permitting overview and survey

Market Overview

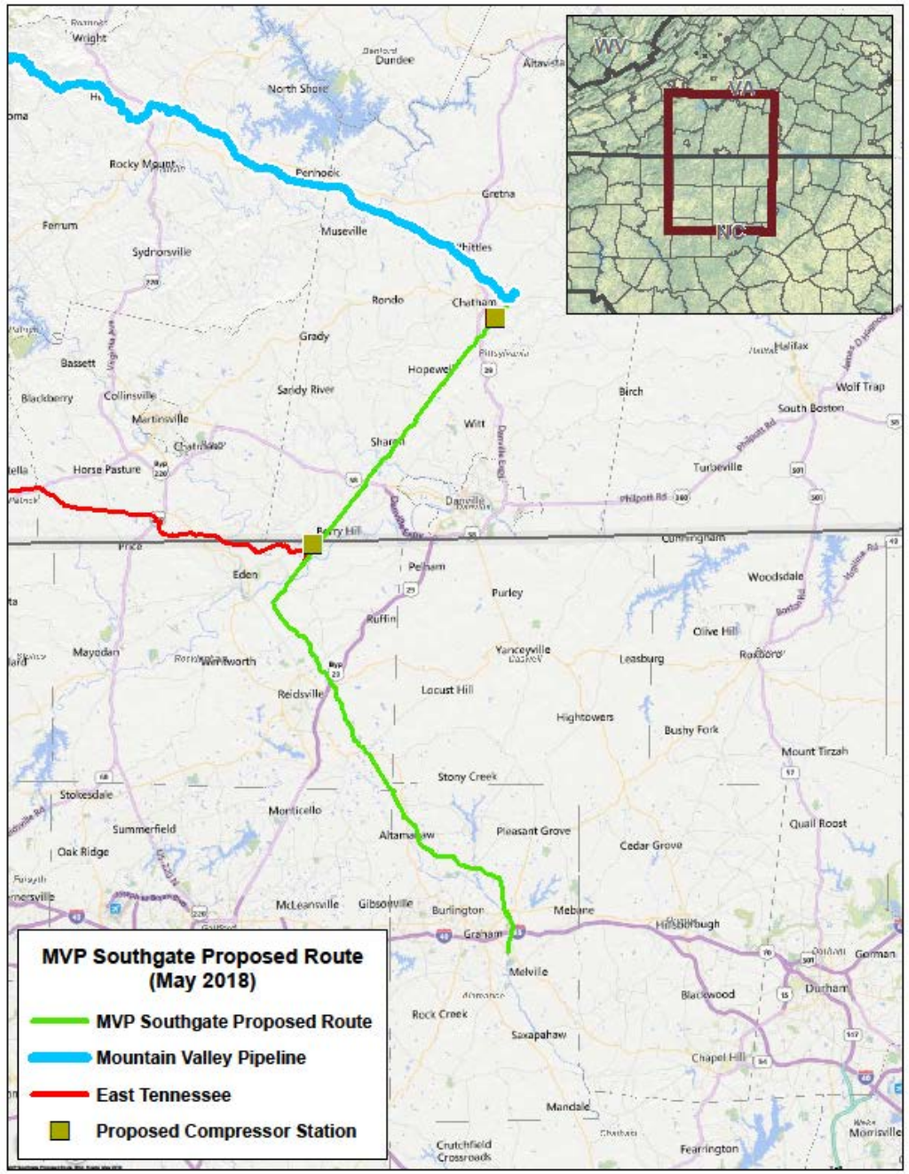
Southeast Markets

- End-users (Power Generation, LDCs, Industrials, etc.) continue to seek incremental gas supply from Appalachia
- Market dynamics and physical constraints driving project need
- Anchor shipper is PSNC Energy, second largest LDC in North Carolina
  - North Carolina PUC supports PSNC Energy's need to acquire incremental transportation to meet the growing demand for incremental and diversified gas supply
  - Signed 20 year, 300,000 Dth/d firm transportation precedent agreement
- Open season in progress (April 11 - May 11, 2018)
  - Robust response from markets -- conversations ongoing
  - Focus markets are in-path

Project Overview

Approximately 70 miles in Virginia and North Carolina

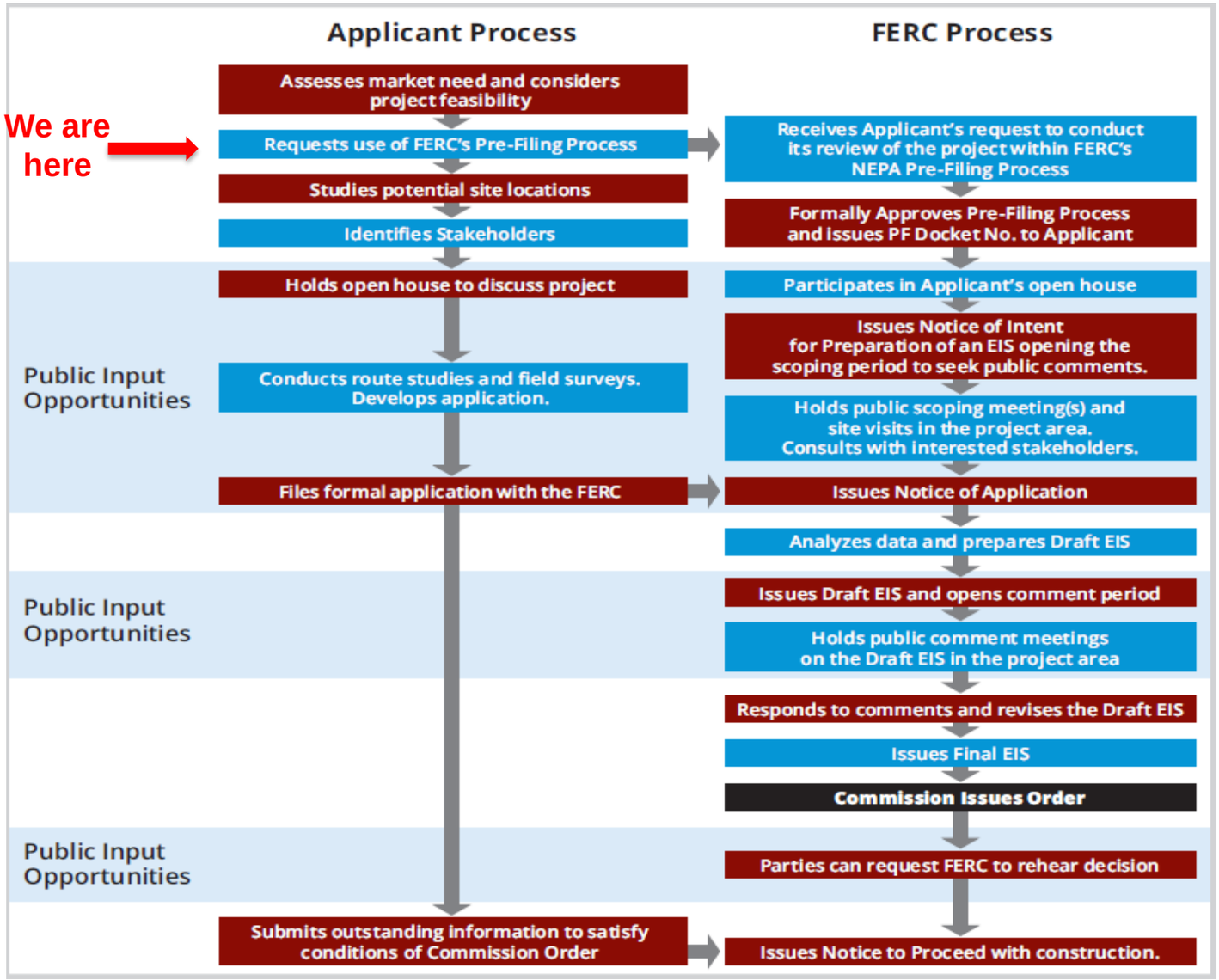
- Extends from MVP mainline terminus in Pittsylvania County, VA to Alamance County, NC
- Pipeline diameter: up to 24 inches
- Compressor stations: 2 (one in each state)
- Four proposed (4) interconnects
- In-service date of Q4 2020
- Mountain Valley Pipeline LLC will be the owner



Proposed Schedule

Milestone	Date
Pre-Filing Request	May 2018
Certificate Application	4th Quarter 2018
Certificate Issued	December 2019
Commence Construction upon Receipt of Authorization	1st Quarter 2020
Commence In-Service of the Project Facilities	4th Quarter 2020

Regulatory Process / Schedule



Multiple Project Routes Evaluated

The preferred route minimizes project impacts

Preferred Route:

- Is the shortest route to reach the four interconnects (~46 miles in NC)
- Maximizes colocation when compared to alternatives
- Minimizes project impacts to sensitive resources
- Is the most constructible route (access, safety, etc.)
- Minimizes forested habitat fragmentation, preferred route is ~34% forested greenfield construction, while all other alternatives are >55%
- Fewest waterbody crossings
  - ~81 stream crossings
  - HDD 2 waterbodies - Dan River and Stony Creek

Consultation/Coordination/Notification

- No plans to cross federal, state, or tribal lands
- FERC is lead federal agency (PF18-04); responsible for Section 106 consultation
- HPO/OSA
- Tribes (Catawba, EBCI, MCN, Tuscarora, Pawmunkey, Delaware Nation (OK), Delaware Tribe, Eastern Shawnee, Chickahominy, Eastern Chickahominy, Upper Mattaponi, Rappahannock, Monacan, Nansemond, Cheyenne River Sioux, Rosebud Sioux)
- Commission on Indian Affairs (Occaneechi Band of Saponi)
- CLGs (Eden, Alamance County [Graham, Haw River])
- Local Historical Societies and Museums
- Others?

Survey Tracking

- Secure, limited access Integra Link site
- Contains all pipeline info (centerline, environmental study corridor, parcels, access roads, landowner permission status, status of surveys, etc.)
- Contains HPO/OSA data on previously recorded properties within one mile of centerline by NRHP status; supplemented by reports, site and structures forms, etc.
- Will contain data on progress of cultural surveys, revisited and newly recorded resources, etc.
- Will be used by project staff to evaluate potential route modifications, etc.

Historic Structures Surveys

- Proposed APE for indirect effects limited to 0.5 miles from disturbance areas (principally above-ground structures and tree clearing areas) reduced appropriately based on line-of-sight, topography and vegetation
- Surveyors will use HPO files, historic topo maps and aerial photography, and field inspection to locate and revisit all previously identified resources recorded more than 5 years ago and to record all newly identified buildings, structures, objects, landscapes, and districts over ~50 years old (including cemeteries) in APE; will be documented per HPO guidelines
- Resulting data entered into HPO database and reported in stand-alone architectural report and addenda
- Identified areas – Haw River (Granite Mill [NR], Holt-Tarbardrey Mill [SL]) within environmental survey corridor; Kerr Scott Farm (NR) within 1,500 ft.

Archaeological Surveys

- Study corridor for archaeology includes 300-foot wide corridor centered on proposed centerline; 50-foot corridor along access roads, and all other disturbance areas (compressor stations, etc.); final APE for direct effects will be limits of ground disturbance
- Surveys along three transects; intensive surface inspection and 30-m shovel testing as appropriate, documented per OSA guidelines. Much of corridor is co-located and one transect will likely be within previously disturbed area
- Data reported in stand-alone archaeological report (and addenda)
- Sensitive areas – Haw and Dan river floodplains; 31RK12 (Sharp site) is 3,750 ft downstream
- Questions – review of Phase II and deep testing (if needed) workplans prior to Phase I report

Coordinating Agencies in the NEPA Review*

Federal	Virginia	North Carolina
Federal Energy Regulatory Commission (FERC)	Virginia Department of Environmental Quality (DEQ)	North Carolina Department of Environmental Quality (DEQ)
US Army Corps of Engineers (ACOE)	Virginia Department of Game and Inland Fisheries	North Carolina Wildlife Resource Commission
US Fish & Wildlife (USFWS)	Virginia Department of Mines, Minerals and Energy	North Carolina Department of Cultural Resources
US Environmental Protection Agency (EPA)	Virginia Department of Conservation and Recreation	
	Virginia Department of Historic Resources	
	Virginia Marine Resource Commission (VMRC)	

*Note: this list is not comprehensive


MVP
SOUTHGATE

General Project Assumptions

- 2017 NWP 12 for Utility Line activities
- Adhere to warmwater fisheries window (Jun 1 – Nov 30)
- All waterbody crossings will use dry crossing methods
- Impacts will be minimized through reduced workspaces, timber matting, and other controls

MVP Southgate Project
Meeting Minutes

Meeting Date:	May 10, 2018
Meeting Location:	North Carolina Historic Preservation Office (HPO), Raleigh, NC
Meeting Leader:	Alex Miller, NextEra, Environmental Specialist
Minutes Prepared By:	Paul Webb, TRC Cultural Resources Lead
Participants:	Renee Gledhill-Earley, HPO Environmental Review Coordinator Katie Harville, HPO Jennifer Brosz, HPO Beth King, HPO Hannah Beckman, HPO Rosie Blewitt-Golsch, HPO/Office of State Archaeology (OSA) Susan Myers, HPO/OSA Megan Stahl, MVP Tracy Millis, TRC, Cultural Resources Field Coordinator

Meeting Purpose:

To introduce Mountain Valley Pipeline, LLC's (MVP) proposed MVP Southgate project to the North Carolina Historic Preservation Office and Office of State Archaeology regulatory staff, answer questions, and solicit preliminary input regarding consulting parties and cultural resource survey and reporting procedures.

Key Takeaways:

- Meeting went well without any significant concerns being raised.
- Make sure all formal consultations come through Environmental Review process and reference ER#18-1041. HPO will not expedite reviews.
- HPO views Southgate as simpler than ACP (their most recent FERC project) and looks forward to working with project team.
- Consult with HPO/OSA staff. DO NOT ASSUME (what their responses will be).

Action Items:

- TRC to prepare generic Phase II and Deep Testing work plans for review by OSA staff.
- TRC to prepare list of additional potential contacts/consulting parties for review by MVP.

Discussion Points:

- Alex Miller introduced the project using a prepared power point presentation (attached), and discussed nature of project, FERC process, schedule, etc. (There was no screen available; no copies of power point left with agency personnel).

- Open houses will occur the last weekend of June and NextEra will reach out to the public to help with routing and any information that the public may have concerning historic sites on the landowners properties

- COE permitting will likely be via NWP #12.

- <u>HPO Initial Response</u>

  Consultation/Coordination/Notification

- Communicate with local historical societies, museums. Adrienne Berney (adrienne.berney@ncdcr.gov, 919/807-7418; info provided by Susan Myers in follow-up email) maintains a list used in the past for FEMA.
- Communicate with Certified Local Governments; discussed those in Alamance and Rockingham counties.
- Communicate with North Carolina Commission on Indian Affairs and state recognized tribes. With all parties but with the Commission in particular, ASK, DON'T TELL; TALK WITH, NOT AT.

Historic Structures

- Beth King will be taking over structures review for both Alamance/Rockingham counties but will likely coordinate with Hannah Beckman (former reviewer for Alamance County) and Jenn Bronz (former reviewer for Rockingham County).
- No stated concerns with APE definition as presented.
- HPO recognizes that most structures will be recorded from side of road lacking interior data, which would restrict their ability to determine eligible based on architecture (NRHP Criterion C). For this reason they will err on the side of not eligible unless eligibility is clearly very evident from exterior. HPO staff feel that unless property owners are interested and motivated, there is no point in pushing the envelope based on exterior data.
- Reviewers want to see .kmz file when available and will provide more input then; their initial review highlighted potential concerns around Town of Haw River.

Archaeology

- Susan Myers will be OSA reviewer for project but is retiring June 29th. Replacement reviewer for these counties not officially identified.
- No stated concerns with procedures as presented.
- OSA staff understands possible survey constraints/prior disturbance along existing pipelines.
- 15-m interval shovel tests adequate for site delineation.
- OSA will review generic site testing/deep testing plans to facilitate fieldwork; will not need to formally review individual testing plans but will discuss. Would like to be kept informed as to what is happening and what reports are coming, etc.
- Make sure to inform them immediately of any cemetery-related issues (a problem with ACP)
- OSA staff felt that ACP did a good job finding sites but not communicating or reporting.
- Potential sensitive areas discussed included Dan and Haw River floodplains; navigational structures in Dan River.
- Beware of possible outlying resources associated with Cascade/Willow Oaks Plantation (which is about 800 feet west of corridor at MP 28).
- Reviewers would like to see .kmz/shape file when available.

Webb, Paul

From: Miller, Alex <Alex.Miller@nexteraenergy.com>
Sent: Monday, June 04, 2018 1:48 PM
To: environmental.review@ncdcr.gov
Cc: katie.harville@ncdcr.gov; Gledhill-earley, Renee; susan.myers@ncdcr.gov; Webb, Paul; Estabrook, Richard; Ramsey, Agnes
Subject: MVP Southgate ER# 18-1041
Attachments: MVP Southgate Detailed Work Plans ER 18-1041.pdf; Southgate_Centerline_Export_20180604.zip

Good afternoon,

The MVP Southgate Project currently has ~15% of the proposed route surveyed in North Carolina. We are currently running 4 crews of archaeologists in North Carolina for the +/- 300' wide study corridor. By the end of July, we anticipate having the majority of the tracts delineated that are available for survey. Updated shapefiles will be provided at major project milestones.

Disclaimer: The attached shapefile is being provide for a preliminary review of our currently proposed route. The route is subject to change prior to application submittal and is not intended for distribution.

Have a great day,

Alex V. Miller
Environmental Specialist
Gas Infrastructure | NEXTera Energy Resources, LLC
O: 713.374.1599 C: 713.204.3729
Alex.Miller@NextEraEnergy.com

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

June 4, 2018

Via Email

Ms. Renee Gledhill-Earley
Environmental Review Coordinator
North Carolina State Historic Preservation Office
109 East Jones Street, Room 258
Raleigh, North Carolina 27601

RE: MVP Southgate Project, Rockingham and Alamance Counties, North Carolina. ER# 18-1041.

Dear Ms. Gledhill-Earley:

We appreciate the time taken by you and your staff to meet with us regarding the MVP Southgate Project (Project) on May 10, 2018, and the input you provided concerning the cultural resources investigations for the Project, both at that meeting and in your letter of May 21st.

As a follow-up to that meeting, we are enclosing detailed work plans for Project Historic Structures Investigations and for Project Archaeological Survey, Testing, and Deep Testing Investigations in North Carolina for HPO review and comment. We are also providing these plans, along with introductory Project materials, to the Federally-recognized Tribes with whom we are coordinating for the Project.

In addition, as requested in your letter, we are enclosing GIS shape files of the proposed Project route in North Carolina. As you are aware, however, this route is currently undergoing review and is subject to change for both environmental and engineering concerns.

We look forward to your review of these work plans and any additional comments that you might wish to provide. In addition, please don't hesitate to contact me at (713) 374-1599 or via email at alex.miller@nee.com, or Paul Webb of TRC at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com, with any questions or concerns that your or your staff might have.

Thank you for your time and consideration. We look forward to working with you on this Project.

Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Travis Faul, MVP Southgate
Richard W. Estabrook, MVP Southgate
Tracy Millis, TRC
Lisa Walker, TRC
Paul Webb, TRC

Attachments:
1) Historic Structures Investigations work plan
2) Archaeological Survey, Testing, and Deep Testing Investigations work plan
3) GIS shape files of Project route in North Carolina

MVP SOUTHGATE PROJECT:
PROPOSED PROCEDURES FOR HISTORIC STRUCTURE SURVEYS IN NORTH CAROLINA

FERC PF 18-04, NC HPO ER# 18-1041

Submitted to:

NORTH CAROLINA HISTORIC PRESERVATION OFFICE
109 E. Jones Street
Raleigh, NC 27601

by:

TRC ENVIRONMENTAL CORPORATION
50101 Governors Drive, Suite 250
Chapel Hill, NC 27517

and

MVP Southgate
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

June 4, 2018

INTRODUCTION

These proposed procedures have been developed to guide historic structure surveys to be conducted by TRC Environmental Corporation (TRC) for the MVP Southgate Project (Project) in North Carolina. The methods follow those outlined in the North Carolina Historic Preservation Office's *Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina* (HPO n.d.) and *Architectural Survey Manual* (HPO 2008), and also take into account the nature of the Project.

HISTORIC STRUCTURES SURVEY

As discussed in a May 10, 2018 meeting between MVP Southgate representatives and the North Carolina Historic Preservation Office (HPO) staff, specified in Federal Energy Regulatory Commission (FERC 2017) procedures, and acknowledged in a May 21, 2018 letter from the HPO (Renee Gledhill-Earley, letter of May 21, 2018), MVP Southgate is conducting a comprehensive historic structures survey of structures that appear to be 50 years old or older and have the potential to be directly or indirectly affected by the proposed Project, including the construction, operation, and maintenance of the proposed pipeline and related appurtenances (compressor and meter station sites, additional workspaces, construction yards, access roads, etc.). Federal regulations define an Area of Potential Effects (APE) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 CRF Part 800.16[d] or CFR 2009b). For this project, the indirect effects APE (APE for historic structures and other above-ground resources) is regarded as the area within which any resources might be within view of proposed vegetation clearing or above-ground construction, or otherwise potentially affected by proposed Project activities. The APE will minimally consist of a 450-foot wide corridor centered on the proposed pipeline centerline, 250-foot corridors centered on access road centerlines, and an area extending 0.5 mile outside the proposed compressor station site, and will be extended as necessary to encompass longer viewsheds if present. The APE will be terminated at 0.5 miles from the proposed pipeline corridor or appurtenance, or where vegetation and/or topography obstructs lines of sight.

The historic structures survey will consist of four tasks: Background Research; Field Survey; Evaluation; and Reporting.

Background Research

TRC will conduct background research in person and using the HPOWEB GIS Service to identify all previously recorded and designated historic architectural resources within the Project APE. These will include all resources listed in or determined eligible for listing in the National Register of Historic Places (NRHP) or as a National Historic Landmark (NHL) as well as all other previously recorded architectural resources and districts, including buildings or structures, cemeteries, historic districts, and rural historic landscapes. TRC will also review relevant historic materials such as published histories of the project area, previous cultural resource studies, and historic maps. The research will help to identify previously unsurveyed resources, and also provide the basis for a historical overview of the project area to be included in the technical report.

Field Survey

TRC will conduct field survey to locate, map, and photograph the historic structural resources within the APE, including updating information on any resources surveyed more than five (5) years ago. Based on a visual exterior inspection and information obtained from the review of historic USGS maps and other sources, TRC will map and photograph any previously unidentified historic resources 45 years old or older.

Fieldwork will include completion of North Carolina Historic Property Survey Summary Forms, along with digital photographic documentation to include one or more views of the surveyed individual resources and representative views of buildings and streetscapes within any historic districts or historic landscapes in the Project APE. The resources will be mapped on the appropriate USGS quad maps and digitally via GPS.

Evaluation

Based on the background research and field survey, TRC will provide a preliminary evaluation of the surveyed resources eligibility for listing in the NRHP, either individually or as part of one or more historic districts. TRC will base its assessment in accordance with guidelines contained in National Register Bulletins 15, *How to Apply the National Register Criteria for Evaluation* (USDOI 1991), and 24, *Guidelines for Local Surveys: A Basis for Preservation Planning* (Derry et al. 1977), along with other guidance.

Many resources will likely be recorded from public rights-of-way without interior access, and TRC anticipates that most such resources will be recommended "not eligible" for the NRHP unless the building's eligibility is obvious. As noted in your May 21, 2018 letter, if a property owner wishes to have their property evaluated further, TRC will work with them to obtain interior access.

Reporting

The results of this fieldwork and evaluation will be compiled and presented as a stand-alone historic structures report for review. This report will include an overview of the project and a historic context for the project area, as well as TRC's eligibility recommendations. Along with the report, TRC will also submit the associated shapefiles, database, and photographs, and property summary reports. In addition to the eligibility recommendations, the report will also include an assessment of any anticipated direct or indirect effects to any resources that are considered unassessed or recommended eligible for the NRHP.

REFERENCES CITED

Derry, Anne, H. Ward Jandl, Carol D. Shull, and Jan Thorman
1977 Guidelines for Local Surveys: a Basis for Preservation Planning. Revised 1985 by Patricia Parker. https://www.nps.gov/nr/publications/bulletins/nrb24/.

Federal Energy Regulatory Commission (FERC)
2017 Guidelines for Reporting on Cultural Resource Investigations for Natural Gas Projects. https://www.ferc.gov/industries/gas/enviro/guidelines/cultural-guidelines-final.pdf.

North Carolina Historic Preservation Office (HPO)
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MVP SOUTHGATE PROJECT:
PROPOSED PROCEDURES FOR ARCHAEOLOGICAL SURVEY, SITE TESTING, AND DEEP TESTING INVESTIGATIONS IN NORTH CAROLINA

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Submitted to:

NORTH CAROLINA HISTORIC PRESERVATION OFFICE
109 E. Jones Street
Raleigh, NC 27601

by:

TRC ENVIRONMENTAL CORPORATION
50101 Governors Drive, Suite 250
Chapel Hill, NC 27517

and

MVP Southgate
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

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INTRODUCTION

These proposed procedures have been developed to guide archaeological survey, site testing, and deep testing investigations conducted by TRC Environmental Corporation (TRC) for the MVP Southgate Project (Project) in North Carolina. The methods presented follow those outlined in the North Carolina Office of State Archaeology's (OSA) *Archaeological Investigations Standards and Guidelines* (December 2017) and also take into account the nature of the Project.

PHASE I SURVEY

As discussed in a May 10, 2018 meeting between MVP Southgate representatives and the North Carolina Historic Preservation Office (HPO) staff, specified in Federal Energy Regulatory Commission (FERC 2017) procedures, and acknowledged in a May 21, 2018 letter from the HPO (Renee Gledhill-Earley, letter of May 21, 2018), MVP Southgate is conducting a comprehensive archaeological survey of areas to be potentially affected by the development of the Project, including the proposed pipeline corridor and related appurtenances (compressor and meter station sites, additional workspaces, construction yards, access roads, etc.).

Survey Areas

The archaeological survey areas (which represent the direct effects Area of Potential Effects (APE) for the Project) will typically consist of a 300-foot wide corridor centered along the proposed pipeline route (which will likely only utilize a 100-foot wide construction corridor) and 50-foot wide corridors centered along proposed access roads, as well as the limits of proposed compressor station sites, workspaces and other facilities. All survey areas will be located in the field using GIS data and aerial photographs, and labeled according to a sequential survey segment number or according to the proposed facility name. No survey or other archaeological investigations will be conducted in any area without approved landowner access or otherwise in accordance with state law, and any landowner restrictions will be noted and followed. The field survey teams will be provided with current data regarding previously recorded cultural resources in the vicinity of the survey area as well as the potential for previously undiscovered cultural resources based on landform characteristics, historical maps, and other data sources.

Survey Techniques

The archaeological survey will begin with a visual inspection of the ground surface and the systematic collection of surface artifacts. (If it is evident that shovel testing will be required and there are no other complicating factors, survey will begin with shovel testing and no walkover will be conducted.) If some portion of the original land surface has been completely destroyed by modern activities (such as grading or industrial development), then no further survey will be conducted in that area beyond developing written and photographic documentation of the destruction and a map indicating the location and extent of the destroyed area.

The archaeological survey will include surface examination of all areas with good ground surface visibility, including cultivated fields as well as areas of ground exposure related to animal burrows, tree falls, dirt roads, or firebreaks. If there is greater than 50% visibility, there is 0–15% slope, and there is no possibility of an accretional/depositional environment (i.e., alluvial or colluvial soil deposition), the surface survey will consist of systematic surface examination at no greater than 10-meter (m) (33 feet) intervals. Surface examination of landforms located on greater than 15% slope will be conducted at 30-m (98.4 feet) intervals.

Where at least some portion of the original land surface remains intact, the landform exhibits 0–15% slope, and sufficient surface visibility is lacking, systematic subsurface testing (shovel testing) will be conducted.

Shovel tests will be round and measure no less than 30 centimeters (cm) in diameter, and will generally be excavated at 30-m (98.4 feet) intervals along 30-m interval transects within the 300-foot study corridor or otherwise at 30-m intervals along access roads within survey areas; shovel tests may also be excavated at closer intervals (down to 5-m intervals) as needed to investigate particular landforms (especially narrow ridgetops and higher landforms near streams and creeks, etc.). Shovel tests will be excavated to 100 cm below surface (cmbs), to hydric soils, or at least 20 cm into the sterile B horizon in upland environments with no potential for alluvial or colluvial deposition.

Three shovel test transects will generally be required to complete the survey. In areas where the survey area includes 300 feet of greenfield (i.e., previously undeveloped) corridor, transects will be placed along the centerline and 100 feet to either side. In areas where the survey area is co-located with an existing utility corridor and includes 150 feet of new right-of-way and 150 feet of existing corridor, shovel test transects will be excavated along the centerline and 100 feet from the centerline within the new right-of-way.

All soil excavated from shovel test pits will be screened through ¼-inch mesh hardware cloth over tarps to facilitate backfilling; if the soil type (for example, heavy clay) prohibits screening, this will be noted in the field and discussed in the report. Sufficient shovel test locations will be recorded via GPS to allow documentation of the location of all transects and shovel tests. Data on each shovel test will be recorded on shovel tests forms using standard USDA terminology (for horizon and texture) and Munsell color terms, and representative soil profiles will be photographed and drawn to scale. All tests will be backfilled promptly.

All artifacts recovered from shovel tests or surface inspection will be collected and bagged in the field according to provenience and natural stratigraphy. Provenience information will be recorded on each bag and on field forms. At a minimum, the following information will be recorded:

- Project Name;
- Survey Segment;
- Field Site Number;
- Transect Number;
- Shovel Test or Surface Transect Number;
- Stratum and Depth (cm below surface);
- Description/Count of Artifacts Collected;
- Date; and
- Excavator's Name or Initials.

If apparent cultural features are encountered within a shovel test, notes will be taken concerning feature type, depth, appearance, etc. No attempt will be made to enlarge the shovel test to recover additional artifacts, but the location will be noted and will be considered as a possible test unit location during site testing.

If shovel tests in alluvial settings do not reach channel gravels (lag deposits), that fact will be noted and the area will be designated as a potential deep testing area (see proposed methods below). If other alternate methods of site detection, including, but not necessarily limited to, metal detecting, remote sensing, plowing and surface collecting, or mechanized stripping are considered necessary, MVP Southgate will consult with OSA staff prior to implementing those approaches. In general, however, such techniques will be reserved for site testing.

Site Delineation

All locations at which pre-modern artifacts (i.e., those over 50 years old) are recovered or cultural features (i.e., foundations, possible pit features, etc.) are identified will be considered archaeological sites regardless of artifact density, as will cemeteries with interments prior to 1968, railroad grades or bridge abutments, and similar features. Ephemeral road traces (i.e., farm or logging roads) or rock piles presumably resulting from historic period field clearing will be noted, but not recorded as archaeological sites.

All site delineation will be conducted on a coordinate system, with N500 E500 assigned to a positive shovel test or surface collection block located near the center of the site (and on the centerline if possible).

Minimally (in the event of a single positive shovel test), at least four additional subsurface tests will be excavated at 15-m intervals in the cardinal directions from the original productive test (tests at 30-m intervals will have been completed as part of the survey). If no other cultural materials are recovered and no other indications of an archaeological site are noted, no additional shovel tests will be excavated. If additional artifacts (or surface features indicative of an archaeological site) are identified, delineation of sites will continue until two negative shovel tests have been excavated or the limits of the direct effects APE are reached. For larger sites, full interior delineation will be conducted at 15-m intervals within the survey area.

Surface sites will be investigated and delineated by collecting artifacts along additional, close-interval transects (generally spaced 5-m apart). In order to assess the nature of subsurface deposits at surface sites, sites in areas with surface visibility of 50% or greater will also be investigated with shovel tests at a density of no less than four per acre, which is roughly comparable to excavating shovel tests at 30-m intervals on transects spaced 30 m apart. At a minimum, one shovel test will be excavated at the location of all surface sites.

Summary data on each resource will be recorded by the Crew Lead on the Project Site Summary Form, and additional notes will be taken as necessary. All shovel test locations will be recorded on a sketch map, and all delineation shovel test locations (positive and negative) will be recorded via GPS. Once site delineation is completed, the site boundaries will be recorded as specified above. Digital color photographs will be taken of the site locations and associated cultural features, as outlined above.

PHASE II TESTING

Research Objectives

In some instances, more intensive Phase II site evaluation/testing may be needed to further evaluate the National Register of Historic Places (NRHP) eligibility of archaeological sites. The purpose of the work will be to evaluate the site's significance in terms of the NRHP *Eligibility Criteria*, as outlined in 36 CFR 60.4 (USDOI 1991). The *Eligibility Criteria* state:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. That are associated with events that have made a significant contribution to the broad pattern of our history; or
>
> B. That are associated with the lives of persons significant in our past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded, or may be likely to yield information important to history or prehistory.

Archaeological sites that are deemed eligible for the NRHP are generally recommended under Criterion D. In order to assess each site's potential under Criterion D, TRC will evaluate the site's integrity as well as its potential for providing new or substantial additional data concerning locally, regionally, or nationally relevant research topics. The work will also consider potential site eligibility under Criteria A, B, and/or C, however, and the final eligibility recommendation will address all four criteria.

The proposed testing strategies will take into account the nature of each site, including the archaeological components present, the nature and depth of deposits, and the type of ground cover. The work will seek to provide documentation of site structure (i.e., the spatial relationships among objects and the sediment matrix) and the recovery of archaeological data (artifacts, floral and faunal remains, contextual information, etc.) that will provide a basis for interpretations of site chronology, integrity, and function. Recovering such data will require documentation of the depth and horizontal extent of deposits, the identification of discrete deposits such as middens, pits, or other features, and the identification and documentation of functionally and chronologically related materials, such as the artifacts that manifest an activity area.

Specific research questions will be developed for each testing project and will vary according to the site age and type. The following questions will be addressed for each component being evaluated, and additional component-specific questions will also be developed as appropriate.

- Does the site appear to represent a single occupation or multiple occupations?
- If multiple occupations are present, what is the apparent horizontal and vertical integrity of the deposits associated with each occupation? How do the current spatial distributions of the artifacts from each occupation present relate to their likely depositional contexts? Is there evidence of appreciable post-depositional disturbances that would restrict research potential, either through bioturbation or due to plowing, logging, etc.?
- What is the apparent chronology of each occupation? Can the site potentially provide absolute chronometric data that can provide more refined intervals for the various occupations and contribute to the refinement of culture-historical chronological sequences?
- Is it possible to separate (horizontally and/or vertically) the artifact signatures of the various occupations (if present)? If individual occupation areas can be distinguished, what types of activities do they appear to represent?
- Does the site contain (or is it likely to contain) discrete pit features or other contexts that can be associated with individual components? Does the site appear to have the potential to produce subsistence data?
- Is there any evidence of postholes, foundations, or other architectural remains, or any indications that any of the site components are associated with multi-seasonal or long-term occupations?
- How did the activities represented by each occupation articulate into the broader settlement and subsistence patterns during the time period(s) represented?
- How representative are the remains and artifact assemblages from each occupation when compared to other sites with similar temporal components?

- For historic sites, is additional written or oral history documentation available that will assist in site interpretation?

- Given these factors, what is the potential that this site can provide additional substantive data that would contribute to our understanding of local, regional, or national prehistory or history.

Supplemental Background Research

TRC is conducting general background research on the archaeology of Rockingham and Alamance counties and the northern North Carolina Piedmont, including gathering archaeological reports and site forms relating to previous investigations and sites along the pipeline corridor. As part of the site evaluations, however, TRC will conduct additional research regarding sites and components similar to those being evaluated. As part of this review, the researchers will consider the methods used to identify sites and define site boundaries, data on artifact types and distributions, and previous recommendations and determinations concerning site integrity and significance. In the event that a site has been previously recorded, TRC will attempt to examine the material previously recorded from the site. In addition, for historic period sites, TRC will conduct additional documentary research, including review of census records, deeds, etc., to gain an understanding of the history of the site and its inhabitants.

Field Methods

Site Mapping and Documentation. The arbitrary coordinate system established during site delineation will be used to record all new shovel tests and larger excavation units. The datum location and grid will be shown on all maps, and the grid coordinates will be included as part of the identification of specific units and their artifact contents. In addition, once the temporary site datum has been relocated and the grid reestablished, the locations of all Phase I shovel tests will be re-established. If individual Phase I shovel tests cannot be recognized, their approximate locations will be identified with a GPS unit with sub-meter accuracy and the locations flagged.

A detailed site map will be prepared based on the Phase I map and will show the locations of the datum, prominent cultural and natural features, all relocated Phase I shovel tests, and all Phase II shovel test and test unit locations. Positive and negative shovel test locations will be differentiated, as will Phase I versus Phase II shovel tests. Any historic cultural features and other landscape features (such as logging roads, streams, etc.) also will be mapped. The final version of this map will be professionally drawn and will include an appropriate legend, a scale, and a north arrow.

All field activities will be documented in a field notebook maintained by the Field Director in which he/she will record daily observations and impressions concerning the progress and results of the work, as well as other relevant data. Standard forms will also be used to document specific aspects of the work, including Shovel Test Forms, Unit Level Forms, Unit Summary Forms, Feature Forms, Bag Lists, and Photo Logs, among others.

A variety of overview photographs will be taken, including general site photographs, photographs of significant cultural and natural features, photographs of various testing activities in progress, and photographs of excavation units and cultural features.

Remote Sensing. Remote sensing (including metal detecting and other techniques) may be employed if appropriate, especially to search for metal artifacts and/or subsurface features on potential early historic period or military sites.

Systematic Shovel Testing. Site testing will generally begin with completion of delineation efforts (if necessary) within the portion of the site situated within the environmental survey corridor (or within 15 m

of the narrower construction corridor if that has been defined). A limited number of additional tests may be placed at 5- to 10-m intervals around high-density tests to gather additional data, define the spatial dimensions of artifact concentrations, and determine the spatial relationships of inferred occupations or components at the site.

Shovel testing methods will follow those outlined above. Data on shovel test provenience and field artifact counts by artifact class and raw material will be entered into an Excel spreadsheet to assist in guiding subsequent investigations. Field assessment of artifacts will permit preliminary assessments of activity areas and component.

Test Unit Excavation. A limited number of larger, hand-excavated test units will then be excavated to gather additional artifact samples and stratigraphic information, and/or to investigate apparent features.

Test units will measure at least 1 × 1 m and will be excavated at least two sterile 10-cm levels deeper than the maximum depth of artifacts recovered in adjacent shovel tests to ensure that the lower deposits are sterile (except in the case of historic sites where excavations may stop at the base of the plowzone or occupation level once the stratigraphy is well understood). All units will be excavated in natural levels and will be subdivided into arbitrary levels so that no excavation layer is thicker than 10 cm, with the exception of the plowzone, which will generally be excavated as a single level. All excavated soil (except for feature contents, see below) will be screened through ¼-inch mesh for uniform artifact recovery, and soil and flotation samples will be taken as appropriate.

The number of units to be excavated will vary according to site size and the number of components or artifact concentrations present. In general, however, TRC anticipates excavation of from four to 16 1 × 1 m units to investigate a typical site.

Each excavated level will be documented on a Level Form, and the base of each level will be cleaned and examined for indications of archaeological features or other disturbance before excavation proceeds. Plan views will be drawn when warranted, and at least one wall profile of each unit will be drawn to scale as well as photographed. All soil horizons and strata will be described in standard scientific terms, including USDA terminology for soil horizons and soil texture, and Munsell color terminology. A catalog of field lot numbers will be maintained to keep track of the number of bags recovered and the date of recovery of artifacts, soil samples, radiocarbon samples, etc. from each test unit. A Unit Summary Form will also be completed for each unit excavated, and all units will be backfilled.

Digital color photographs will be taken to record significant data and information. All photographs will contain a scale, direction indicator (north arrow), and information (written on a menu board with plastic letters and numbers) identifying the site, date, and subject. The north arrow and information boards will be clearly readable in the photographs, but placed so as to not obscure the subject. Photo logs will be maintained for all photographs taken and will include the digital file number, direction of view, subject matter, and date.

Mechanized Stripping. Depending on the site type, vegetation cover, landowner permission, and safety concerns, limited mechanized stripping may be conducted to search for pit features and structural remains. Any stripping will utilize a Gradall or trackhoe equipped with a smooth-bladed bucket to remove the plowzone and search for cultural features at the top of the B horizon. At least one archaeologist will monitor all stripping, clean (shovel shave) the stripped surface as necessary, and identify potential features and postholes. All potential features and postholes will be marked with color-coded pin flags and mapped with a total station or a real-time kinematic (RTK) GPS unit, with appropriate information collected in the data collector. After appropriate investigation, all stripped areas will be returned to as close to their original contours as possible.

Cultural Feature Identification and Excavation. Special attention will be paid to the identification of potential cultural features, including prepared facilities (hearths, pits, wells, etc.), the remains of a discrete and/or narrow range of activities (such as a broken ceramic vessel or lithic debris from tool manufacture), or of a broader range of activities associated with a narrow time interval (such as a sheet midden or refuse-filled pit).

All possible cultural features encountered during unit excavation or stripping will be numbered consecutively, drawn and photographed in plan view, and investigated individually. Slightly different techniques will be used to excavated and record features depending on their size and class (or apparent association with structure patterns). Initially, each feature will be carefully defined by troweling or shovel shaving and mapped using a total station; more detailed individual plan maps will also be drawn of all substantial pits or other features. Photographs will be taken of the feature in plan. Each non-post feature (except those that appear potentially to be human graves) will be cross-sectioned along its long axis. The initial half will be excavated by natural strata (fill zones) if these can easily be recognized, or removed in a single unit if not. The feature will then be mapped and photographed in cross-section, and the remainder of the fill will be excavated by zone. If at any time a feature is determined to be non-cultural in origin (e.g., rodent burrow, tree root), excavation will be terminated. Rock cluster features (such as hearths) will be treated in similar fashion.

All information generated from feature excavation will be recorded on a feature form. Standard soil descriptions will be completed for each fill zone, and data will be recorded concerning form, evidence of burning, etc. Flotation samples (minimal 10 liters in volume) will be taken from each fill zone or feature, depending on its type and significance. The remaining feature fill will be screened through either 1/4-inch mesh or 1/16-inch mesh (window screen), depending on its provenience and logistical concerns. The finer 1/16-inch mesh will be used to maximize recovery of small faunal elements and such diagnostic artifacts as glass beads when appropriate.

Larger flotation samples (up to one half of the feature) will be taken from selected contexts that are known or believed to be rich in archaeobotanical remains. For rock clusters, a representative sample of soil will be retained from within the area of the rocks and immediately below the rocks. Radiocarbon samples will also be taken as appropriate.

Apparent postholes (stains less than 25 cm in diameter that do not appear to be smudge pits or other specialized pit types) that are not part of recognizable structure patterns will be cross-sectioned, and information recorded on diameter, cross-section form, fill type, depth, and associated artifacts. The fill from these posts will be screened through 1/4-inch or 1/16-inch mesh. Potential posts will be categorized as cultural, possibly cultural, or non-cultural based on their shape and other factors.

All posts making up possible structure patterns or palisade lines will be completely described and excavated, and the fill screened or taken for flotation samples as appropriate. Special care will be taken to recover charred wood samples from these posts for species identification or radiocarbon dating when possible. Structure-specific maps will be hand drawn and tied to the total station data. Photographs will also be taken of each individual structure and of representative sections of any palisade lines.

If large numbers of cultural features or postholes are identified and it is clear that the site is eligible for the NRHP, excavations will be limited to that necessary to confirm the integrity of the deposits, assess artifact density, and identify the potential for the preservation of subsistence remains. If the excavations encounter unusual soils or potential depositional environments, we will consult with a geomorphologist regarding the appropriate interpretation of site stratigraphy.

DEEP TESTING

Research Objectives

In some instances, more intensive mechanized deep testing may be needed to search for sites in deep alluvial deposits or to further evaluate the NRHP eligibility of archaeological sites. The nature and scale of deep testing at any specific location will be determined based on site and soil characteristics as well landowner concerns. Should major changes to these methods be needed, TRC will consult with OSA staff prior to their implementation.

Field Methods

Documentation. The location of all deep testing excavations will be recorded via GPS and according to the site grid, if appropriate. All deep testing will be conducted by a Project archaeologist skilled in the interpretation of soil stratigraphy and under the supervision of a geomorphologist. The location, depth, and stratigraphy of each excavated trench or probe will be recorded and documented through digital photography.

Mechanized Trenching. The deep testing will generally consist of the excavation of one or more trenches using a backhoe or trackhoe (preferably equipped with a smooth-bladed bucket), and may be supplemented by hand or mechanical coring or augering. Trenches will measure at least 30 inches in width and will be stepped or shored according to OSHA (2015) standards and TRC safety procedures.

Trenches will generally be placed in a single transect oriented along the proposed project centerline, although supplemental trenches may be placed elsewhere within the workspace as appropriate. Trenches will likely be discontinuous, with individual trench segments placed as necessary to assist in interpreting landform development. No trenches will be placed in wetlands or within 20 feet of a river or stream.

At least one wall of each trench will be cleaned as necessary to record and interpret stratigraphy. Soil profiles will be drawn and photographed, and soil samples will be taken for grain size analysis, AMS dating, and other analyses as appropriate. Should archaeological deposits or potential buried soil horizons be identified, a 50 × 50 cm soil column may be excavated and screened to evaluate potential artifact content. If appropriate, additional soil columns or shovel tests may also be excavated in the floor of the trench. Any cultural features identified will be isolated as feasible and excavated according to the procedures outlined above.

At the conclusion of the excavations, all trenches will be backfilled and the ground surface restored to grade as much as possible.

LABORATORY METHODS

Laboratory Analyses

In most cases, all recovered artifacts will be removed from the field for analysis in the laboratory using standard procedures (see below). If requested by the landowner, however, analyses may be conducted in the field and the artifacts replaced in the individual shovel test or on the surface, as appropriate. Any such in-field analyses will include counts of artifacts by type and provenience along with detailed descriptions and photographs of temporally diagnostic artifacts, but may lack the level of detail that could be obtained in a laboratory setting.

Artifact process and analyses will begin concurrent with the fieldwork and continue until completed. Details of all analytical techniques employed will be provided in the technical report, and a detailed

catalog/inventory of all artifacts by provenience will be provided as an appendix to the report and in electronic format.

Artifact Check-In and Washing. All artifact and sample bags will be inventoried at the end of each day of fieldwork, and all provenience data will be checked against field records at that time. All artifacts and samples will then be boxed according to the type of processing necessary and transferred to the laboratory for washing and analysis. All artifacts will then be washed, stabilized as necessary, and sorted by rough category to facilitate subsequent analysis.

Artifact Analyses. All artifacts will be systematically identified, classified, and analyzed using regionally- and temporally-relevant classification schemes that are appropriate to each particular artifact class.

The Native American ceramic assemblage (if present) will first be sorted into size categories. Sherds smaller than two cm will be counted, weighed, and examined for the presence of pipe fragments or unusual attributes, but will not be subjected to further analysis, unless such analysis is deemed crucial to defining chronologically sensitive attributes from certain discrete features or select unit level contexts. All sherds larger than 2 cm will be subjected to detailed analysis. Each sherd will be characterized according to surface treatment (e.g., net impressed, plain, etc.), adjunct decoration, and location of the extant fragment(s) in the original vessel (e.g., rim, neck, body, etc.). Where relevant, the rim profile configuration, type of rim, and type and location of any decorative elements will be recorded. The temper type and size of the aplastic (inclusion) content will be documented for each ceramic according to raw material type. The type of interior surface treatment will be recorded. The surface decoration and aplastic content from the preliminary analysis will be compared to published type descriptions and regional type collections, and type names will be applied as appropriate.

Lithic artifacts will first be sorted into a number of general categories, including chipped stone tools, chipped stone debitage, groundstone, and fire cracked rock. Chipped stone tools will then be described by general type (e.g., projectile point, biface, unifacial scraper, etc.). When possible, projectile points will be assigned type names based on those developed by previous regional researchers. Relevant measurements (including length, shoulder width, thickness, stem length, neck width, and base width for stemmed points) will be obtained for diagnostic and unbroken specimens, the raw material will be recorded (see below), and the artifact will be weighed. Other chipped stone tools and cores will be described using standard terminology (e.g., Stage II biface fragment, multifacial core, etc.).

Chipped stone debitage will be sorted by size and classified according to reduction stage. All chipped stone artifacts will then be classified by raw material category, which will be defined according to material type and such factors as color, texture, presence of inclusions, etc. as appropriate. Operational definitions for raw material types and other variables will be included in the report, along with primary references for all temporally diagnostic artifact types.

All soapstone (chlorite schist or steatite) and other ground stone artifacts will be individually described. Soapstone artifacts will be described according to form and apparent function, such as vessel fragment, perforated boiling slab, pipe, waste fragment, etc. Fire cracked rock (FCR) and apparent unmodified rock fragments from all contexts will be counted, weighed, and then discarded. This process may take place in the field for non-feature materials; materials from features will be washed and examined in the laboratory before being discarded. Representative samples of FCR from feature contexts may be retained for possible future analyses.

Historic artifacts will be initially divided into principal categories based on composition (i.e., ceramic, glass, metal, etc.) and function, using standardized and well-defined sorting criteria, and then classified according to published artifact descriptions. In addition, date ranges will be assigned to historic artifacts where

possible based on period of manufacture and/or commonly attributable period of usage. Most modern artifacts encountered will be noted, but not generally collected.

Specialized Analyses. If intact pre-modern cultural features or intact cultural strata are discovered, soil samples will be collected for various specialized analyses, including flotation processing and archaeobotanical analysis and radiocarbon/AMS analysis. Flotation samples will be processed using a Flote-Tech soil flotation system, and light and heavy fractions will be bagged separately and selected samples will be analyzed.

Archaeobotanical analysis will be conducted on botanical materials recovered from pre-modern features, identifying specimens to the most specific taxa possible to provide information regarding the use of plants by the site's occupants. Selected recovered faunal remains will be analyzed according to standard analytical techniques, concentrating on identifying the economic use(s) of the specimens by the site's inhabitants.

AMS or conventional radiocarbon samples from features or other selected contexts may be submitted for dating. All samples will be identified by the archaeobotanist prior to dating. Whenever possible, an attempt will be made to conduct AMS dating of identifiable botanical remains (i.e., individual nutshell fragments, maize cupules, etc.) rather than multiple wood charcoal fragments.

Curation. It is anticipated that most of the recovered artifacts will be returned to landowners at the conclusion of the project. If requested by OSA staff, however, MVP Southgate will attempt to procure selected collections for curation in the Office of State Archaeology Research Collection (OSARC) or elsewhere.

REPORTING

Draft and Final Reports. The complete descriptive, analytical, and interpretative results of the background research, fieldwork, and laboratory and data analyses, as well as an assessment of potential project effects on the site, will be provided in the form of a comprehensive draft final report. The report will be fully illustrated with appropriate maps and photographs, and will be professionally edited.

TRC will respond to all agency review comments in a timely manner, and the required printed and electronic copies of the Final Report will be provided.

All site eligibility recommendations will reference all four NRHP criteria, and will be only made for the portion of the site that was investigated for the Project. If any site is recommended eligible for the NRHP, the researchers will also provide an assessment of potential adverse effects to the site as well as recommendations concerning site avoidance or treatment options (including a preliminary research design addressing the information that could potentially be provided by data recovery excavations).

DISCOVERIES OF GRAVES OR HUMAN REMAINS

It is possible that human graves, potential graves, or human remains will be identified during any stage of the archaeological investigations.

If marked graves are identified, Project archaeologists will record the approximate cemetery boundary using GPS, and will record data concerning the number and age of the interments. No shovel tests or other excavations will be conducted within 25 feet of the apparent cemetery boundary without the approval of the North Carolina State Archaeologist. All cemeteries containing graves older than 50 years will be recorded as archaeological sites per OSA procedures.

In the event that potential graves (generally, oval to rectangular pit features containing mottled subsoil and organic fill) are identified during excavations, fieldwork will be halted within 25 feet of the location. Information regarding their number, location, and likely cultural affiliation will be provided to the State Archaeologist and the FERC Archaeologist assigned to the Project, and subsequent tribal notifications will be conducted at their direction. MVP Southgate anticipates that potential grave pits will be drawn, photographed, and re-covered with soil without any additional investigation.

If human remains or potential funerary objects are exposed during the work, the remains and/or funerary objects will be re-covered and work within 25 feet will stop immediately. TRC will immediately notify the North Carolina State Archaeologist and the FERC archaeologist. The State Archaeologist will then conduct additional notifications and consultation as needed in accordance with North Carolina General Statute 70-3, *The Unmarked Human Burial and Skeletal Remains Protection Act*, and additional tribal notifications and consultations will also be conducted following FERC procedures.

Throughout the fieldwork, analysis, and reporting, TRC will ensure that the treatment of any human remains and associated funerary objects discovered within the project area complies with all applicable state and federal laws and the Advisory Council on Historic Preservation's (2007) *Policy Statement Regarding Treatment of Burial Sites, Human Remains and Funerary Objects*.

REFERENCES CITED

Advisory Council on Historic Preservation (ACHP)
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2017 Guidelines for Reporting on Cultural Resource Investigations for Natural Gas Projects. https://www.ferc.gov/industries/gas/enviro/guidelines/cultural-guidelines-final.pdf.

Occupational Safety and Health Administration (OSHA)
2015 Trenching and Excavation Safety. https://www.osha.gov/Publications/osha2226.pdf.

Office of State Archaeology (OSA)
2017 Archaeological Investigations Standards and Guidelines. https://files.nc.gov/dncr-arch/OSA_Guidelines_Dec2017.pdf.

United States Department of Interior (USDOI)
1991 National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation. U.S. Department of the Interior, National Park Service, Washington, D.C.

Mountain Valley PIPELINE LLC

INCOMING CORRESPONDENCE

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

May 21, 2018

Alex Miller alex.miller@nexteraenergy.com
NextEra Energy Resources, LLC
601 Travis Street
Houston, TX 77002

Re: MVP Southgate Project, Construct Interstate Pipeline, Rockingham and Alamance Counties, ER 18-1041

Dear Mr. Miller:

Thank you for your letter of April 27, 2018, and meeting with us on May 10, 2018, regarding the above project.

Based on the general route map initially provided, about 80 archaeological sites have been recorded within a mile of the project corridor, with 20 of these possibly within the corridor. Once a tentative corridor map is available, please provide a shapefile of its route.

The project area has received little systematic survey to determine the location or significance of archaeological resources. Both prehistoric and historic period sites are likely. Cemeteries may also be expected.

Prior to the initiation of any ground disturbing activities within the project area, we recommend that a comprehensive survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project.

We acknowledge that TRC Environmental Corporation (TRC) has been chosen as the archaeological firm to conduct this work.

In addition to a standard subsurface archaeological survey through shovel testing, we also recommend limited mechanical stripping be conducted in portions of the project area that have especially high probability for archaeological remains.

One paper copy and one digital copy (MS Word on disc) of the resulting archaeological survey report, and one digital copy (MS Word on disc) of each site form should be submitted to the OSA for review and comment as soon as they are available and well in advance of any earth moving activities. It is preferred that report and forms be submitted simultaneously. PDF-A (Archival format) is preferred but a high-quality standard PDF file is also acceptable. Please note that we are not requesting paper copies of the site forms.

We understand the tight schedule for the project and anticipate frequent communication with TRC about the progress of their survey, including updates about discovered sites they anticipate may merit additional investigation. As much as possible please tie requests for review and comment to deadlines, submitting them to the environmental.review@ncdcr.gov mailbox.

We look forward to working with you and TRC throughout the life of the project.

We approve of the plan to survey structures within a 0.5 mile radius of the corridor with adjustments made for topography and visual impediments. Please note that we are unlikely to concur with an "eligible" finding for architecture, based solely on exterior views of a property with no information about a building's interiors, unless the building's eligibility is strikingly obvious. If a property owner objects to a "not eligible" determination and would like to have their property re-evaluated, they will need to provide greater access to the architectural historian/consultant.

For more information and resources regarding SHPO guidelines for architectural survey, please visit our online resources page (http://www.hpo.ncdcr.gov/digital/NCHPO_Digital_Start_Page.html).

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

Webb, Paul

From: Myers, Susan <susan.myers@ncdcr.gov>
Sent: Thursday, May 17, 2018 3:02 PM
To: Webb, Paul
Subject: FW: List of historical museums, etc.

Paul,

Hi. Please see below for the list of county resources and suggestions Adrienne provided. Thanks.

Susan

SUSAN MYERS
Assistant State Archaeologist and Site Registrar
Office of State Archaeology

109 E Jones St MSC 4619 Raleigh, NC 27699-4619
919 807 6556 *office*
919 715 2671 *fax*
susan.myers@ncdcr.gov

NC DEPARTMENT OF
NATURAL AND CULTURAL RESOURCES

Facebook Twitter Instagram YouTube

From: Berney, Adrienne
Sent: Thursday, May 17, 2018 2:47 PM
To: Myers, Susan <susan.myers@ncdcr.gov>
Subject: RE: List of historical museums, etc.

MARC—Museum and Archives of Rockingham County http://www.themarconline.org/index.html
Alamance—in addition our State Historic Site…
Glencoe Textile Museum http://www.textileheritagemuseum.org/
Scott Family Collection at Alamance Community College http://www.textileheritagemuseum.org/
Alamance County Historical Museum http://www.alamancemuseum.org/

Alas, none of these are Federation Members. If you'd like to dig a bit deeper, you could also contact the county arts councils and public libraries.

Webb, Paul

From: Myers, Susan <susan.myers@ncdcr.gov>
Sent: Tuesday, May 22, 2018 3:21 PM
To: Webb, Paul
Subject: FW: more Alamance & Rockingham listings

Here you go.

SUSAN MYERS
Assistant State Archaeologist and Site Registrar
Office of State Archaeology

109 E Jones St MSC 4619 Raleigh, NC 27699-4619
919 807 6556 *office*
919 715 2671 *fax*
susan.myers@ncdcr.gov

Facebook Twitter Instagram YouTube

From: Berney, Adrienne
Sent: Friday, May 18, 2018 1:50 PM
To: Myers, Susan <susan.myers@ncdcr.gov>
Subject: more Alamance & Rockingham listings

Hi Susan,

For another query, one of the archivists found a version of the old NCECHO directory for me. Here are some more Alamance & Rockingham Co. leads (some duplicate what I already came up with), though warning that the contact info is 15+ years old.

- Primitive Baptist Library
  The Primitive Baptist Library collects and preserves records of the Primitive Baptist Church and other writings both published and unpublished that reflect the doctrines of the church or illuminate the church's history. Collections are made available to all whose interests might be served by these materials. Collections include church publications, private manuscripts, photographs, rare books, and various other items pertaining to the Primitive Baptist community in the south. *Location:* 4023 Highway 87 North, Elon NC 27244 View photographs
  Phone: (336) 584-8390; Contact: Glen Berry

- Haw River Historical Association; Haw River Historical Museum
  The Haw River Town Museum, located in one of the oldest buildings in Haw River, houses and exhibits an extensive collection of artifacts, photographs, and other items documenting the history of Haw River. Specific focuses include notable individuals from Haw River, the textile industry in Haw River, and the historic architecture of Haw River. L*ocation:* 509 West Main Street, Haw River NC 27258 View photographs Phone: (336) 578-0784; Contact: Gail Knauff
- Elon University; Carol Grotnes Belk Library
  The University Archives at Elon University consists of the printed and photographic history of the university. Among the materials the Archives contains are yearbooks, college catalogs, alumni magazines, campus newspapers, and the minutes of the faculty, the academic council and the board of trustees. The photographs cover the period from the founding until the present day. Special Collections include Elon authors; the McClendon Civil War collection of books about the Civil War from the Confederate viewpont; the Johnson Collection of southern authors, signed volumes presented to the library, and representative publications of speakers who have spoken on campus; Church History Collection of materials relating to the Christian Church (O'Kelly) and the Southern Conference of the Christian Church; and the complete works of childrens' author Jane Belk Moncure. *Location:* 100 Campus Drive, Elon 27244 View photographs Phone: (336) 278-6681 Contact: Katie Nash
- Alamance Battleground State Historic Site
  On the location of this historic site in 1771, an armed rebellion of backcountry farmers-called Regulators-fought against royal governor William Tryon's militia. Alamance Battleground State Historic Site preserves these grounds and interprets the history of the battle and the Regulator movement. Visitors can tour the eighteenth-century Allen House, the battlefield, and the battlefield monuments. These features, together with the visitor center's twenty-one minute video, Alamance, offer a vivid account of this colonial battle, as well as the pressures of colonial policies that precipitated the revolt. Phone: (336) 227-4785 Contact: Bryan Dalton
- Alamance County Historical Museum, Inc. - Oak Grove Plantation
  The Alamance County Historical Museum collects, preserves, displays, and interprets records, relics and artifacts, which contribute to an understanding and appreciation of the historical development of Alamance County and the North Carolina piedmont. The museum documents to area's nascent textile industry (1837-1920) and interprets 19th century farm life through the preservation of Oak Grove Plantation, a property listed on the National Register of Historic Places and the ancestral home of legendary textile magnate E. M. Holt, founder of Holt Textile Mills and producer of the famous Alamance Plaids. *Location:* 4777 South NC Highway 62, Burlington NC 27215 View photographs Phone: (336) 226-8254 Contact: Dr. Bill Vincent
- Cedarock Park (Alamance County Recreation and Parks) Cedarock Historical Farm
  Cedarock Historical Farm at Cedarock Park seeks to preserve the agricultural history of Alamance County and to share that agricultural heritage with the public through maintenance of the Garrett farm and educational programs designed to expose children of all ages to traditional piedmont farming practices. The farm is the ancestral home of John and Polly Garrett first settled in 1830 with a small log cabin. In 1835, the Garretts built a larger two-story frame house, which was occupied over the course of the next several generations. Both structures as well as several barns and outbuildings survive today. Cedarock Historical Farm presents a dynamic series of educational programs and exhibits that include antique farm equipment demonstrations, living history events, and many school group tours. The farm also raises and cares for a diverse array of farm animals typical of a traditional 19th century Alamance County farm including a working mule team. *Location:* 4242 R. Dean Coleman Road, Burlington NC 27215 View photographs Contact: Terry Isley
- Snow Camp Historic Site
  Snow Camp Historic Site seeks to share the history of the Snow Camp community and early Quakers and to highlight their contributions to the county and the state through the collection and preservation of historic structures and the presentation of the historical outdoor dramas The Sword of Peace and Pathway to Freedom. *Location:* 1 Drama Road, Snow Camp NC 27349 View photographs Phone: (336) 376-6948 Contact: James Wilson
- Textile Heritage Museum
  The Textile Heritage Museum is a non-profit organization established in Alamance County as a permanent institution for the study, education, and enjoyment of the piedmont's rich textile heritage, which extends back

into the 19th century and reaches forward into the 21st century. The Museum is housed in the former Glencoe Mill Office and Company Store, and tours include the museum as well as the mill buildings, the dam, and surrounding structures. Glencoe, which is on the Haw River, provides a unique opportunity for visiting an intact 1880's mill village. Most of the mill village houses in the South were either sold to individuals or completely destroyed. The Glencoe buildings and houses are being preserved and renovated for the enjoyment of new homeowners, tourists and guests. Visitors can stroll along the banks of the Haw River and learn how waterpower fueled the Southern Industrial Revolution. Collections include photographs and artifacts pertaining to textile mills and mill villages. Exhibits explore connections between science, history, art, humanities, and economics, and explain the textile industry's development and changes the industry brought to the South. Educational programs, activities and demonstrations enable children and adults to better understand life in a mill and mill village at the turn of the 20th century. *Location:* Historic Glencoe Mill Village 2406 Glencoe Street Burlington NC View photographs Phone: (336) 260-0038 Contact: Kathy Barry and Jerrie Nall

- Alamance Community College, Learning Resources Center
  Scott Family Collection
  Alamance Community College's Scott Family Collection preserves and makes available to the public a variety of Scott Family materials. The Scotts of Alamance County have been leaders in North Carolina business, agribusiness, education, medicine, religion, and government for over one hundred years. Scott Family members of note include Henderson Scott, an early postmaster in the Hawfields community; Robert Walter Scott (1861-1929), an innovative master farmer and supporter of the Farmer's Alliance; his son W. Kerr Scott, NC Governor 1949-1952 and US Senator 1955-1958; Elizabeth Scott Carrington, founder of the nursing school at UNC-CH; and her nephew Robert "Bob" Scott, NC Governor 1968-1972. Elizabeth Scott Carrington and Bob Scott donated the land on which Alamance Community College sits. The collection includes family letters, photographs, maps, artifacts, and other formats, and continues to be enhanced by donations from the Scott heirs. The Scott Collection is open to visitors Monday, Tuesday, Thursday, and Fridays 8-5, Wednesdays 1:30-4:30. *Location:* Alamance Community Center 1247 Jimmie Kerr Road, Graham NC 27253 View photographs Phone: (336) 506-4203 Contact: Peggy Boswell
- Alamance County Arts Council
  Captain James and Emma Holt White House
  Alamance County Arts Council is committed to shaping the cultural identity of Alamance County by making art a tangible presence in the lives of its citizens. The Arts Council strives to enhance the quality of life by engaging people in a diverse array of art through the delivery of programming and education, provision of facilities, advocacy and funding, and collection and display of works of visual art in the Captain James and Emma Holt White House and public buildings throughout the county. *Location:* 213 South Main Street, Graham NC 27253 View photographs Phone: (336) 226-4495 Contact: Cary Worthy
- May Memorial Library (Headquarters of Alamance County Public Libraries)
  May Memorial Library Local History Collection
  The Local History Collection at May Memorial Library seeks to collect, preserve, and make available to the public published works, manuscript materials, photographs, maps, and other items for the study of local history in Burlington and Alamance County. Topics of interest highlighted by the collection include genealogy, the textile industry, other industries such as Western Electric, and local businesses. *Location:* 342 South Spring Street, Burlington NC 27215 View photographs Phone: (336) 229-3588 Contact: Lisa Kobrin
- Graham Historical Society, Graham Historical Museum
  The Graham Historical Museum seeks to share the history of Graham, North Carolina, through the collection, preservation, and display of artifacts, documents, photographs, ephemera, and other items pertaining to Graham and its citizens past and present. The museum is located in Graham's historic first fire station and municipal building and houses one of Graham's first fire trucks. Other collections of particular interest include early Graham town records and material on Graham natives Tom Zachary, 1930's baseball star, and Jeanne Swanner Robertson, Miss North Carolina 1963. *Location:* 135 West Elm Street, Graham NC 27253 View photographs Phone: (336) 513-4773 Contact: Jerry Peterman
- Occaneechi Band of the Saponi Nation
  The Occaneechi Band of the Saponi Nation headquarters and tribal office exits to address the social, cultural, educational, and economic needs of tribal members. Their collection of artifacts, manuscript material,

photographs, and other items documents the history of the Occaneechi of northeastern Alamance County's Little Texas community. *Location:* 103 East Center Street, Mebane NC 27302 View photographs Phone: (919) 304-3723 Contact: Forest Hazel

- Mebane Historical Society, Inc. Mebane Historical Museum
  The Mebane Historical Museum collects and makes available to the public artifacts, documents, and photos pertaining to the history of Mebane. This museum began with the personal collection of Milton McDade, a long-time resident of Mebane whose passion was collecting local history and telling the story of Mebane's past. The City of Mebane generously provides the Museum with its permanent home in Parks and Recreational building at the corner of Second Street and W. Jackson in Mebane, NC. The Museum is open to the public Wednesday-Friday, 10:00 am to 2:00 pm, and Saturday from 10:00 am to 3:00 pm. *Location:* 209 W. Jackson St., Mebane NC 27302 View photographs Phone: (919) 563-5450 Contact: Traci Davenport
- Alamance Regional Medical Center Library
  The Alamance Regional Medical Center Library primarily serves the staff and patients of the hospital and the general public by providing access to their large and up-to-date collection of publications pertaining to medicine, medical treatment, and health care. The library also has a smaller selection of books, CD's, DVD's, videos, and periodicals geared more towards consumer health. In addition to these materials, two remarkable special collections documenting the history of the hospital and medical profession in Alamance County are also available by appointment - the ARMC Foundation Collection and the Alamance-Caswell Medical Society Alliance Auxiliary Collection. *Location:* 1240 Huffman Mill Road, Burlington NC 27216 View photographs Phone: (336) 538-7000 Contact: Marian Blecker
- Rockingham County Public Library; Madison Public Library - Genealogical Collection
  The Madison Public Library, built in 1935, houses one of the finest genealogy collections in the area. The library has a wide collection of North Carolina and Virginia census, marriage and death records, wills, deeds, Revolutionary and Civil War records, family history books and county heritage books. Many records as well as early county newspapers are on microfilm. Family Tree Maker, a genealogy computer program, is also now available for public use. *Location:* 140 East Murphy Street, Madison NC 27025 View photographs Phone: (336) 548-6553 Contact: Patrick Fitzgerald
- Rockingham Community College
  Gerald B. James Library--Rockingham County Historical Collections
  The Historical Collections of Rockingham Community College Foundation, Inc., collect, preserve, exhibit, and make available for public use published materials, rare books, documents, and museum artifacts. The emphasis of the Collection is the heritage of Rockingham County and adjacent areas, but materials that relate to the instructional program of the College will be accepted. This huge and varied collection is open to the public and includes manuscripts, letters, maps, microforms, rare books, reference books, newspapers, vast vertical files, and the college archives. For more information on the Collections, visit http://www.rockinghamcc.edu/library/hcr.htm. *Location:* Hwy 65 and County Home Road, Wentworth NC 27375 View photographs
  from NC ECHO's visit to this institution Phone: (336) 342-4261 Contact: Robert W. Carter, Jr.
- Rockingham County Historical Society, Inc.; Wright Tavern
  The Rockingham County Historical Society, Inc., maintains the Wright Tavern (built in 1816) and an historic post office building in Wentworth, aids in the preservation of the county's written, oral, and architectural heritage of various municipal historic preservation groups, and catalogs and maintains the Rockingham County Historical Collections housed in the Gerald B. James Library at Rockingham Community College. They also maintain a collection of historic Rockingham County structures at the community college. The Society provides support for genealogists answering queries in the newsletter, sponsoring genealogy workshops, providing support to the Genealogy Collection at the Madison Branch of the Rockingham County Public Library and helping to discover lost cemeteries and offers a large selection of historical and scenic sites in the county that can be visited. *Location:* N.C. 65 Main Street, Wentworth NC View photographs
  from NC ECHO's visit to this institution Phone: (336) 342-5901; Contact: Bob Carter
- City of Reidsville; Governor David Settle Reid House
  The Governor David Settle Reid House, built in 1881, was the home of Governor Reid for the last ten years of his life. Reid was one of six governors from Rockingham County, and the city of Reidsville is named in honor of his

family. This Victorian home was the first structure in Reidsville to be listed on the National Register of Historic Places. It is now home to the Reidsville Chamber of Commerce and is open to the public for their education and enjoyment. *Location:* 321 SE Market Street, Reidsville NC 27320 View photographs Phone: (336) 349-1065 Contact: Donna Setliff

- Rockingham Community College; Historical Village
  Photographs of four structures built from the mid-19th-century through the early 20th century. The buildings were moved from various locations within Rockingham County to the campus of tobacco barn and a corn crib, as well as a one room school house. *Location:* 215 Wrenn Memorial Road, Wentworth NC 27375 View photographs Phone: (336) 342-4261 Contact: Mary Gomez

Adrienne Berney
Outreach Coordinator
109 E Jones St
MSC 4610 Raleigh, NC 27699-4610
919 807 7418

Webb, Paul

From: Gledhill-earley, Renee <renee.gledhill-earley@ncdcr.gov>
Sent: Tuesday, May 22, 2018 2:13 PM
To: Miller, Alex
Cc: Webb, Paul; Estabrook, Richard; Myers, Susan; Harville, Katie E; Mintz, John; greg.richardsone@doa.nc.gov
Subject: RE: [External] Southgate Pipeline Project

Alex:
Having discussed with the reviewers, we do not feel the need for another meeting. What we will look forward to is a more detailed map once you can provide it. And, to hear that you have been in consultation with not just the federally recognized tribes, but also with the NC Commission on Indian Affairs and the state recognized tribes to discuss the pipeline and get their feed-back.
Thanks for your cooperation and consideration.
--

Renee Gledhill-Earley
Environmental Review Coordinator
State Historic Preservation Office
109 E Jones St MSC 4617 Raleigh, NC 27699
919 807 6579 *office*

From: Miller, Alex [mailto:Alex.Miller@nexteraenergy.com]
Sent: Thursday, May 17, 2018 4:08 PM
To: Gledhill-earley, Renee <renee.gledhill-earley@ncdcr.gov>
Cc: Webb, Paul (PWebb@trcsolutions.com) <PWebb@trcsolutions.com>; Estabrook, Richard <Richard.Estabrook@nexteraenergy.com>
Subject: [External] Southgate Pipeline Project

Hi Renee,

I appreciate the time of you and your staff dedicated last week to introduce the Southgate Pipeline Project in Rockingham and Alamance counties. Our Pre-filing (PF18-4) was accepted by the FERC this week and Amanda Mardiney will be our FERC Project Manager, with Cardno as the third-party contractor. We will be hosting Open Houses the week of June 25th and I would like to facilitate and introduction with your team and them while they are in the area. If you are

receptive to that, I will send out another Doodle in the next week or two to see what time would work best for everyone again.

Regards,

Alex V. Miller
Environmental Specialist
Gas Infrastructure | NEXTera Energy Resources, LLC
O: 713.374.1599 C: 713.204.3729
Alex.Miller@NextEraEnergy.com

Webb, Paul

From: DCR - Environmental_Review <Environmental.Review@ncdcr.gov>
Sent: Friday, April 27, 2018 9:35 AM
To: Webb, Paul
Subject: RE: [External] MVP Southgate Project, Rockingham and Alamance Counties

Thank you for your email submission. Please check the below guidelines to ensure your request can be processed. Please allow 30 days for a response.

1. **Only one project per email**
2. Include a project description, address/location, and a map showing project boundaries
3. *.pdf* attachments are preferred.
4. *.zip, .tif, downloads, or links to websites* cannot be processed.
5. Message size should be no larger than 25 MB
6. *.kmz* files will be accepted if available

From: Myers, Susan
Sent: Thursday, May 17, 2018 7:47 AM
To: Berney, Adrienne <adrienne.berney@ncdcr.gov>
Subject: RE: List of historical museums, etc.

Adrienne,

No worries; thanks very much for what can be gathered.

Susan

SUSAN MYERS
Assistant State Archaeologist and Site Registrar
Office of State Archaeology

109 E Jones St MSC 4619 Raleigh, NC 27699-4619
919 807 6556 *office*
919 715 2671 *fax*
susan.myers@ncdcr.gov

Facebook Twitter Instagram YouTube

From: Berney, Adrienne
Sent: Wednesday, May 16, 2018 12:02 PM
To: Myers, Susan <susan.myers@ncdcr.gov>
Subject: RE: List of historical museums, etc.

Sorry to take so long getting back to you, Susan. The NC ECHO contact list is now dead ☹ I'll gather what I can for you tomorrow.

From: Myers, Susan
Sent: Thursday, May 10, 2018 3:53 PM
To: Berney, Adrienne <adrienne.berney@ncdcr.gov>
Cc: Blewitt, Rosemarie <Rosemarie.Blewitt@ncdcr.gov>
Subject: List of historical museums, etc.

Adriene,

Hi. Rosie and I attended a meeting this afternoon about an upcoming project in Rockingham and Alamance counties. As part of the background, the applicant and the archaeological firm would like to consult with any historical societies or museums in the vicinity that might have an interest. I vaguely remembered a contact list you and Lerae had to use for contacting folks in case of emergencies within their regions. Am I remembering correctly? Would you share with us? Thanks very much!

Best,

Susan

SUSAN MYERS
Assistant State Archaeologist and Site Registrar
Office of State Archaeology

109 E Jones St MSC 4619 Raleigh, NC 27699-4619
919 807 6556 *office*
919 715 2671 *fax*
susan.myers@ncdcr.gov

Virginia Correspondence

Mountain Valley PIPELINE LLC

INCOMING CORRESPONDENCE

From:	rene.hypes@dcr.virginia.gov
To:	Patti, Heather
Cc:	rr ProjectReview (DGIF)
Subject:	MVP Southgate
Date:	Friday, June 8, 2018 11:24:47 AM
Attachments:	76026, TRC, MVP Southgate.pdf 31800583, 76026, MVP Southgate Invoice.pdf

---

Ms. Patti,

Please find attached the DCR-DNH comments, invoice and map for the above referenced project. The comments are in pdf format and can be printed for your records. Also species rank information is available at http://www.dcr.virginia.gov/natural-heritage/help for your reference.

Along with our comments there is an invoice for our services. Please submit a copy of the invoice with payment to the Treasurer of Virginia, Department of Conservation and Recreation, Finance, 600 East Main Street, 24th Floor Richmond, VA 23219. Payment is due within 30 days of the invoice date.

Please send a confirmation e-mail upon receipt of our comments. Thank you for the opportunity to provide this information.

S. Rene' Hypes
Project Review Coordinator
Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, 24th Floor
Richmond, Virginia 23219
804-371-2708 (phone)
804-371-2674 (fax)
rene.hypes@dcr.virginia.gov

Conserving VA's Biodiversity through Inventory, Protection and Stewardship
http://www.dcr.virginia.gov/natural-heritage/

Mountain Valley PIPELINE LLC

OUTGOING CORRESPONDENCE

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

April 27, 2018

Mr. Roger Kirchen
Director, Review and Compliance Division
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Via Federal Express and ePIX

RE: MVP Southgate Project, Pittsylvania County, Virginia

Dear Mr. Kirchen:

The purpose of this letter and the accompanying ePIX submittal is to provide initial information to the Virginia Department of Historic Resources (DHR) regarding the proposed MVP Southgate Project (Project), and to formally initiate the DHR's review of the Project in accordance with Section 106 of the National Historic Preservation Act (54 U.S.C. 306) and its implementing regulations, 36 CFR Part 800 (Protection of Historic Properties). Additionally, MVP Southgate requests a meeting with you and your staff to discuss the cultural resources studies and agency and tribal consultation for the project.

The proposed Project is an interstate natural gas pipeline project that will be developed, constructed, and owned by Mountain Valley Pipeline, LLC. As proposed, the Project will receive gas from the Mountain Valley Pipeline in Pittsylvania County, Virginia, and extend approximately 70 miles south to new delivery points in North Carolina. As proposed, approximately 23.5 miles of the mainline pipeline will be located in Pittsylvania County, Virginia. TRC Environmental Corporation (TRC) is assisting MVP Southgate with environmental documentation and permitting coordination and will be conducting and reporting the cultural resource studies for the Project.

As an interstate natural gas pipeline, MVP Southgate will be regulated by the Federal Energy Regulatory Commission (FERC) and may also require other federal or state permits. The proposed cultural resource investigations in Virginia will be conducted in accordance with pertinent federal and state regulations, including the FERC Office of Energy Projects' Guidelines for Reporting on Cultural Resources Investigations for Natural Gas Projects (2017) and Guidance Manual for Environmental Report Preparation (2017), the regulations governing the Section 106 process (36 CFR Part 800, Protection of Historic Properties), the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (36 CFR Part 61), and the DHR's Guidelines for Conducting Historic Resources Survey in Virginia (2017).

The attached documents provide additional information on the Project. A Project Overview fact sheet is provided as Attachment 1, and Attachment 2 provides an overview map of the proposed Project route.

At this time, we are requesting a meeting with you and your staff to discuss the Project and any concerns or recommendations that you might have. I will contact you within the next few days to discuss possible meeting times; in addition, please feel free to contact me at (713) 374-1599 or via email at alex.miller@nee.com. Paul Webb of TRC will be coordinating the cultural resource compliance activities for the Project, and can be reached at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com.

Thank you for your time and consideration. We look forward to working with you on this Project.

Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:

Travis Faul, MVP Southgate
Richard W. Estabrook, MVP Southgate
Tracy Millis, TRC
Lisa Walker, TRC
Paul Webb, TRC

Attachments:

1) MVP Southgate Project Overview
2) Project Location Map

Project Overview

As proposed, the MVP Southgate project is a natural gas pipeline system that spans approximately 70 miles from southern Virginia into central North Carolina – and as an interstate pipeline will be regulated by the Federal Energy Regulatory Commission (FERC). MVP Southgate will be developed, constructed, and owned by Mountain Valley Pipeline, LLC (Mountain Valley).

With a vast supply of natural gas from Marcellus and Utica shale production, the Mountain Valley Pipeline mainline will transport natural gas to markets in the Mid- and South-Atlantic regions of the United States. The MVP Southgate project, as proposed, will receive gas from the Mountain Valley Pipeline mainline in Pittsylvania County, Virginia and extend approximately 70 miles south to new delivery points in Rockingham and Alamance Counties, North Carolina. MVP Southgate would provide low-cost supply access to natural gas produced in the Marcellus and Utica shale regions – for service delivery to PSNC Energy customers, as well as existing and new end-user markets in southern Virginia and central North Carolina.

The pipeline will be regulated under the federal Natural Gas Act, which requires a Certificate of Public Convenience and Necessity from the FERC before construction can commence. As currently proposed, the pipeline will be 16 to 20 inches in diameter and will require approximately 50 feet of permanent easement, with up to 100 feet of temporary easement during construction. In addition, as currently designed, the project would require one compressor station that is anticipated to be located at the beginning of the project in Pittsylvania County, Virginia, on land owned by Mountain Valley.

The Planning and Development Process

Several commercial and engineering aspects must be completed before construction can begin on MVP Southgate. Commercial aspects include securing and confirming capacity commitments, and while the project has a capacity commitment from PSNC Energy, a wholly owned subsidiary of SCANA Corporation, as an anchor shipper, an Open Season is being held to understand additional market interest. The Open Season will provide all market participants, including natural gas producers, marketers, industrial users, and local distribution companies, an opportunity to access capacity on the pipeline. Additional market interest received during the Open Season may change the current project scope

The engineering and environmental considerations include surveying and evaluating preliminary routing to help determine a final route with the least overall impact to landowners, historic and cultural resources, and the environment. An important step in the process is obtaining permission to access landowner property to conduct engineering and environmental surveys. At this stage, we are only seeking permission to access property – and the actual act of surveying will not begin until we receive permission. We may obtain landowner permissions for parcels that are not in the final route; however, a comprehensive evaluation is necessary to determine the route.

To-date, we are seeking landowner permissions in the following counties:

- **Virginia**: Pittsylvania
- **North Carolina**: Alamance and Rockingham

Once a preliminary route is determined, the environmental review process with the FERC will begin. This is referred to as the Pre-Filing Review, which provides for early identification and resolution of environmental issues and allows for direct interaction between FERC staff, community members, and other stakeholders. Once the Pre-Filing Review begins, a series of community open houses will be held along the proposed route corridor.

After the Pre-Filing Review is complete, Mountain Valley will file an application with the FERC for a Certificate of Public Convenience and Necessity. Construction cannot commence until the FERC issues this certificate, which will include the FERC's environmental analysis of the project.

Designing the Route

The proposed MVP Southgate route is being designed to avoid sensitive or protected areas when feasible; limit surface disturbance; and minimize the overall environmental footprint, as well as utilize as many existing gas and electric transmission corridors as possible. The MVP Southgate project team will work diligently with stakeholders, including landowners, community members, local officials, and state and federal agencies to identify the best possible route for the proposed pipeline. The currently proposed route avoids all federal and state parks and wildlife preserves.

Health, Safety, and Environment:

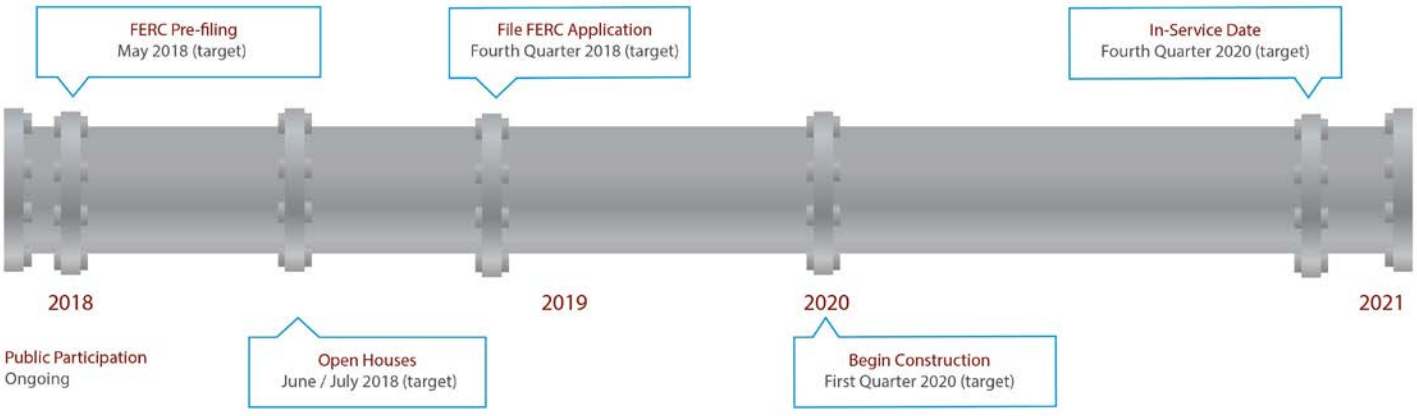
As the lead federal agency, the FERC will oversee the federal permitting process for MVP Southgate and will also coordinate with other federal, state, and local agencies during the environmental review process to identify and address potential environmental concerns.

- U.S. Department of Transportation statistics confirm that natural gas transmission pipelines are the safest form of energy transportation
- Construction and operation of natural gas transmission lines follow strict federal and state guidelines that minimize environmental disturbance
- Safety is a core value and number one priority for Mountain Valley
- Mountain Valley has a steadfast commitment to environmental protection and will conduct its business operation in a sustainable and environmentally responsible manner at all times

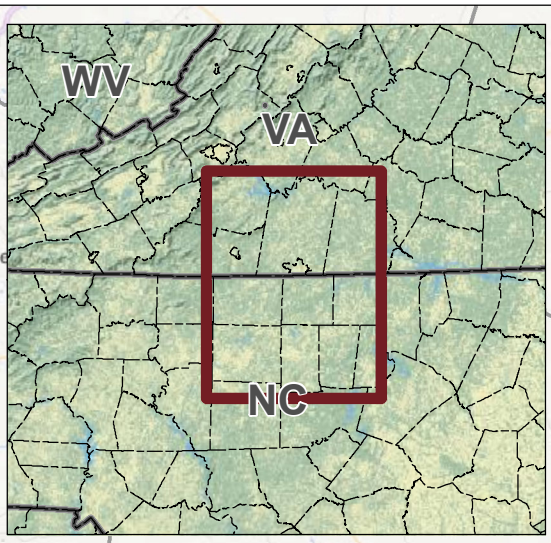
Community Benefits:

- Local communities can receive revenue from taxes paid on the pipeline and compressor station
- States can receive revenue from sales and use taxes paid during the construction of the project
- Potential employment opportunities for local residents during the construction phase of the project
- Increased activity and revenue for restaurants, hotels/motels, and retailers
- Natural gas supply diversity for PSNC Energy customers and other consumers in the region

Proposed Project Schedule



Attachment 2



MVP Southgate Proposed Route (April 2018)

- MVP Southgate Proposed Route
- Mountain Valley Pipeline
- East Tennessee
- Proposed Compressor Station

MVP Southgate Proposed Route_Bing_Roads


Franklin
Henry
FV-016
PY-098
BR-039
PY-002
PY-030
PY-030
VA-065
PY-084
Pittsylvania
MVP Southgate Proposed Route
PY-076
Danville
WY-049
Rockingham
Caswell
bing
© 2018 Microsoft Corporation Earthstar Geographics SIO

MVP Southgate Project
Meeting Minutes

Meeting Date:	May 17, 2018
Meeting Location:	Virginia Department of Historic Resources (VDHR), Richmond, VA
Meeting Leader:	Alex Miller, NextEra, Environmental Specialist
Minutes Prepared By:	Paul Webb, TRC Cultural Resources Lead
Participants:	Roger Kirchen, VDHR, Director Review and Compliance Mark Holma, VDHR Project Review Architectural Historian Libby Cook, VDHR Project Review Analyst Justin Curtis, AquaLaw Agnes Ramsey, NextEra Rich Estabrook, NextEra (via phone) Tracy Millis, TRC Cultural Resources Field Coordinator Phil Hayden, TRC Architectural Historian (via phone)

Meeting Purpose:

To introduce Mountain Valley Pipeline, LLC's (MVP) proposed MVP Southgate project to the Virginia Department of Historic Resources regulatory staff, answer questions, and solicit preliminary input regarding consulting parties and cultural resource survey and reporting procedures.

Key Takeaways:

- Meeting went well without any significant concerns being raised
- New communications should not come through ePIX; reference VDHR# 2018-3545
- VDHR recommended putting together a general work plan but they do not intend review individual Phase II plans or deep testing plans
- VDHR wants Architectural History procedures to follow those used on MVP Mainline

Action Items:

- TRC to prepare general work plan and provide to VDHR, they may or may not comment.
- TRC to prepare list of additional potential contacts/consulting parties for review by MVP.
- TRC to contact Mike Pulice, the POC for architectural resources in Pittsylvania County

Discussion Points:

- Alex Miller introduced the project using a prepared power point presentation (attached), and discussed nature of project, location and mileage, FERC process, schedule, etc. (There was no screen available; no copies of power point left with agency personnel).

- There are no federal, state, or tribal lands along the route in Virginia; there are no historic districts or battlefields.

- NextEra plans tribal outreach with multiple tribes, including new Federally-recognized tribes in Virginia. VDHR noted that there are still four state-recognized tribes to possibly consider [Mattaponi, Nottoway, Cheroenhaka Nottoway, and Patawomeck] as well as others seeking recognition. VDHR confirmed that the Virginia Council of Indians was disbanded a few years ago and there is no longer an umbrella organization for the state recognized tribes, however. As a result, the VDHR said that the individual state tribes would need to be

consulted independently.

- The VDHR noted that the SHPO has no responsibilities to consult with federally recognized tribes. Roger Kirchen added that the VDHR does not maintain a list of county interests for federal or state recognized tribes

- The project will also reach out to other potential cultural resource stakeholders (e.g., CLGs, etc.) There is only one CLG (Danville) along the route in Virginia.

- Please work with landowners as much as possible. Tell then results in field if they ask, try to provide written summaries. VDHR often gets calls from landowners frustrated that they do not have information, would like to avoid this. Some landowners may not allow materials to be removed from their property; make sure to have procedures for in field analysis in place.

- Roger Kirchen will handle archaeological review; Mark Holma will handle historic structures. Libby Cook will assist. Mark Holma indicated that his office will assume eligibility of a historic property until it is determined otherwise.

- VDHR recommended reaching out to Mike Pulice, the point of contact for architectural resources in Pittsylvania County, to discuss potential concerns for rural historic districts, newly identified historic properties

- Most of the corridor in Virginia is co-located with Transco; precise right-of-way configuration not yet determined. NextEra said that the current route alignment was based on 55% co-location and that other alternate routes were 35% co-location. Alex mentioned that, while the route has been determined, they are making minor design changes and that he will provide a shapefile to the VDHR in a few weeks. Depending on right-of-way configuration, one or more archaeological survey transects may fall within previously disturbed areas.

- About 12 miles of the route in Virginia are along a previously surveyed corridor (Potomac Expansion Project), that project was done ca. 2006 and used a predictive model, but report does not contain detail regarding the location of high/medium/low probability areas or of intensive shovel testing. For that reason TRC doesn't anticipate relying on much of that data, but will use it where appropriate. That report also contained some deep testing information (Cherrystone Creek and Bannister River) that may be useful. VDHR concurs with that approach; will consider use of previous archaeological data if appropriate.

- Archaeological site eligibility recommendations should relate to the entire site and not just portion within right-of-way; for example, do not recommend portion of site within corridor as not eligible, but say that site is unassessed but that portion of site within corridor does not have research value and would not contribute to eligibility.

- VDHR wants architectural survey procedures to follow those used on MVP Southgate (four step process, etc.) VDHR requires resurvey of all historic structures recorded more than five years ago.

MVP SOUTHGATE

VA DHR Introduction

May 17, 2018

Purpose and Agenda

- Introductions
- Project purpose, overview, and schedule
- Route evaluation
- Permitting overview and survey

Market Overview

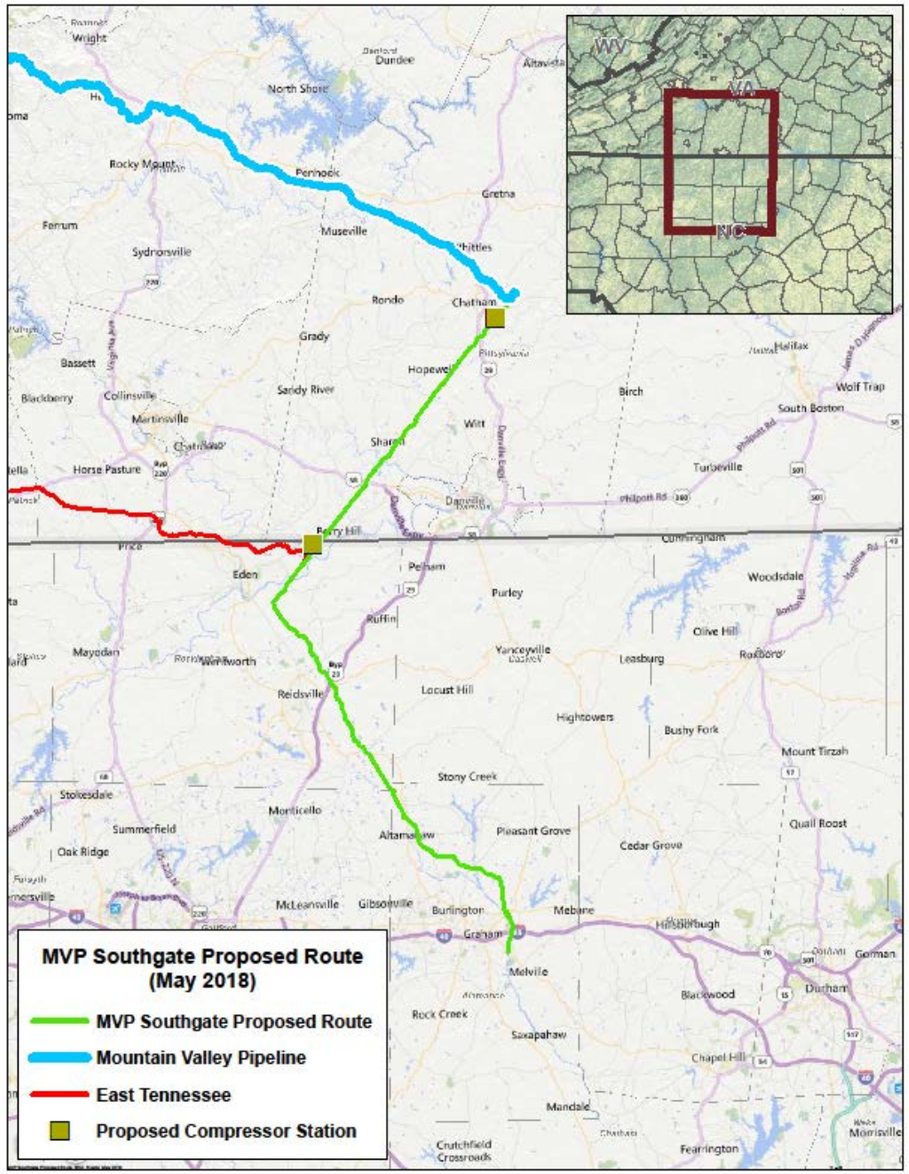
Southeast Markets

- End-users (Power Generation, LDCs, Industrials, etc.) continue to seek incremental gas supply from Appalachia
- Market dynamics and physical constraints driving project need
- Anchor shipper is PSNC Energy, second largest LDC in North Carolina
  - North Carolina PUC supports PSNC Energy's need to acquire incremental transportation to meet the growing demand for incremental and diversified gas supply
  - Signed 20 year, 300,000 Dth/d firm transportation precedent agreement

Project Overview

Approximately 70 miles in Virginia and North Carolina

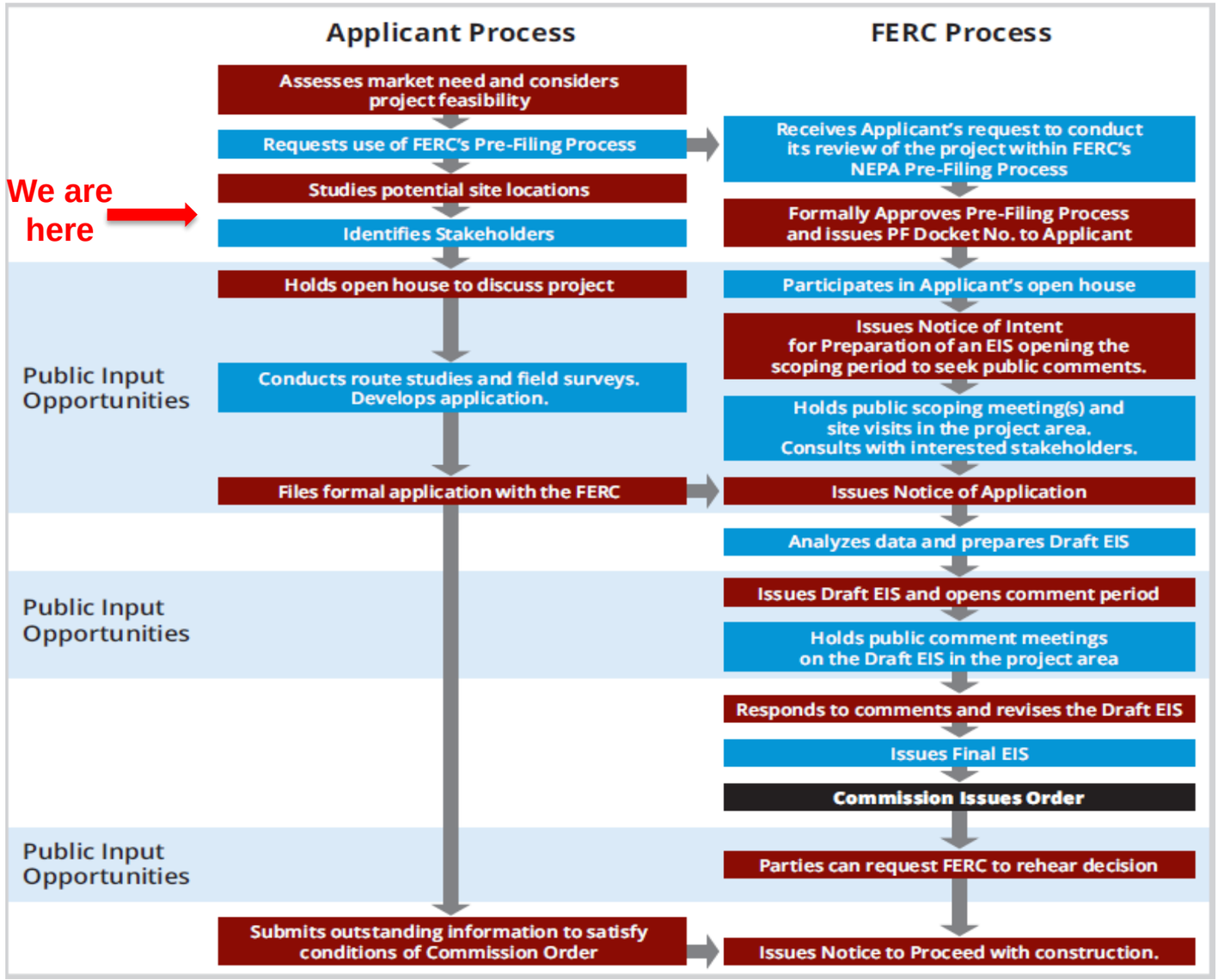
- Extends from MVP mainline terminus in Pittsylvania County, VA to Alamance County, NC
- Pipeline diameter: up to 24 inches
- Compressor stations: 2 (one in each state)
- Four proposed (4) interconnects
- In-service date of Q4 2020
- Mountain Valley Pipeline LLC will be the owner



Proposed Schedule

Milestone	Date
Pre-Filing Request Accepted (PF18-4)	May 15, 2018
Certificate Application	4th Quarter 2018
Certificate Issued	December 2019
Commence Construction upon Receipt of Authorization	1st Quarter 2020
Commence In-Service of the Project Facilities	4th Quarter 2020

Regulatory Process / Schedule



Multiple Project Routes Evaluated

The preferred route minimizes project impacts

Preferred Route:

- Is the shortest route to reach the four interconnects (~24 miles in VA)
- Maximizes colocation when compared to alternatives
- Minimizes project impacts to sensitive resources
- Is the most constructible route (access, safety, etc.)
- Minimizes forested habitat fragmentation, preferred route is ~34% forested greenfield construction, while all other alternatives are >55%
- Fewest waterbody crossings
  - ~81 stream crossings
  - HDD 2 waterbodies - Dan River and Stony Creek

Consultation/Coordination/Notification

- No plans to cross federal, state, or tribal lands
- FERC is lead federal agency (PF18-04); responsible for Section 106 consultation
- Virginia Department of Historic Resources
- Tribes (Catawba, EBCI, MCN, Tuscarora, Pawmunkey, Delaware Nation (OK), Delaware Tribe, Eastern Shawnee, Chickahominy, Eastern Chickahominy, Upper Mattaponi, Rappahannock, Monacan, Nansemond, Cheyenne River Sioux, Rosebud Sioux)
- CLG (Danville)
- Local Historical Societies and Museums (e.g., Pittsylvania Historical Society)
- Others?

Survey Tracking

- Secure, limited access Integra Link site
- Contains all pipeline info (centerline, environmental study corridor, parcels, access roads, landowner permission status, status of surveys, etc.)
- Contains VDHR (V-CRIS) data on previously recorded properties within one mile of centerline by NRHP status; supplemented by reports, site and structures forms, etc.
- Will contain data on progress of cultural surveys, revisited and newly recorded resources, etc.
- Will be used by project staff to evaluate potential route modifications, etc.

Historic Structures Surveys

- Proposed APE for indirect effects limited to 0.5 miles from disturbance areas (principally above-ground structures and tree clearing areas) reduced appropriately based on line-of-sight, topography and vegetation
- Surveyors will use DHR files, historic topo maps and aerial photography, and field inspection to locate and revisit all previously identified resources recorded more than 5 years ago and to record all newly identified buildings, structures, objects, landscapes, and districts over ~50 years old (including cemeteries) in APE; will be documented per DHR guidelines
- Resulting data will be reported in stand-alone architectural report and addenda

Archaeological Surveys

- Study corridor for archaeology includes 300-foot wide corridor centered on proposed centerline; 50-foot corridor along access roads, and all other disturbance areas (compressor stations, etc.); final APE for direct effects will be limits of ground disturbance
- Surveys along six transects; intensive surface inspection and 15-m interval shovel testing as appropriate, documented per DHR guidelines. Much of corridor is co-located and one transect will likely be within previously disturbed pipeline corridor
- Data reported in stand-alone archaeological report (and addenda)
- Questions – use of previous survey data; DHR review of Phase II and deep testing (if needed) workplans prior to Phase I reporting

Coordinating Agencies in the NEPA Review*

Federal	Virginia	North Carolina
Federal Energy Regulatory Commission (FERC)	Virginia Department of Environmental Quality (DEQ)	North Carolina Department of Environmental Quality (DEQ)
US Army Corps of Engineers (ACOE)	Virginia Department of Game and Inland Fisheries	North Carolina Wildlife Resource Commission
US Fish & Wildlife (USFWS)	Virginia Department of Mines, Minerals and Energy	North Carolina Department of Cultural Resources
US Environmental Protection Agency (EPA)	Virginia Department of Conservation and Recreation	
	Virginia Department of Historic Resources	
	Virginia Marine Resource Commission (VMRC)	

*Note: this list is not comprehensive


MVP
SOUTHGATE

Webb, Paul

From: Miller, Alex <Alex.Miller@nexteraenergy.com>
Sent: Monday, June 04, 2018 3:47 PM
To: roger.kirchen@dhr.virginia.gov
Cc: marc.holma@dhr.virginia.gov; libby.cook@dhr.virginia.gov; Estabrook, Richard; Webb, Paul; Millis, Tracy
Subject: MVP Southgate (2018-3545)
Attachments: MVP Southgate VADHR Detailed Work Plans.pdf; Southgate_Centerline_Export_20180604.zip

Good afternoon Roger,

The MVP Southgate Project has two field crews working this week on the +/- 300' wide study corridor. By the end of July, we anticipate having the majority of the tracts assessed that are available to us. Attached is our proposed work plan for your review and zipped shapefile. Updated shapefiles will be provided at major project milestones.

Disclaimer: The attached shapefile is being provide for a preliminary review of our currently proposed route. The route is subject to change prior to application submittal and is not intended for distribution.

Have a great day,

Alex V. Miller
Environmental Specialist
Gas Infrastructure | NEXTera Energy Resources, LLC
O: 713.374.1599 C: 713.204.3729
Alex.Miller@NextEraEnergy.com

625 Liberty Avenue, Suite 1700 | Pittsburgh, PA 15222
833-MV-SOUTH | mail@mvpsouthgate.com
www.mvpsouthgate.com

June 4, 2018

Mr. Roger Kirchen
Director, Review and Compliance Division
Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Via FedEx

RE: MVP Southgate Project, Pittsylvania County, Virginia. VDHR# 2018-3545

Dear Mr. Kirchen:

We appreciate the time taken by you and your staff to meet with us regarding the MVP Southgate Project (Project) on May 17, 2018, and the input you provided concerning the cultural resources investigations for the Project.

As a follow-up to that meeting, we are enclosing detailed work plans for Project Historic Structures Investigations and for Project Archaeological Survey, Testing, and Deep Testing Investigations in Virginia for VDHR review and comment. We are also providing these plans, along with introductory Project materials, to the Federally-recognized Tribes with whom we are coordinating for the Project.

In addition, we are enclosing GIS shape files of the proposed Project route in Virginia. As you are aware, however, this route is currently undergoing review and is subject to change for both environmental and engineering concerns.

We look forward to your review of these work plans and any additional comments that you might wish to provide. In addition, please don't hesitate to contact me at (713) 374-1599 or via email at alex.miller@nee.com, or Paul Webb of TRC at (919) 530-8446 x222 or via email at pwebb@trcsolutions.com, with any questions or concerns that your or your staff might have.

Thank you for your time and consideration. We look forward to working with you on this Project.

Sincerely,

Alex V. Miller
Environmental Specialist
MVP Southgate

cc:
Travis Faul, MVP Southgate
Richard W. Estabrook, MVP Southgate
Tracy Millis, TRC
Lisa Walker, TRC
Paul Webb, TRC

Attachments:
1) Historic Structures Investigations work plan
2) Archaeological Survey, Testing, and Deep Testing Investigations work plan
3) GIS shape files of Project route in Virginia

MVP SOUTHGATE PROJECT:
PROPOSED PROCEDURES FOR HISTORIC STRUCTURE SURVEYS IN VIRGINIA

FERC PF 18-04, VDHR# 2018-3545

Submitted to:

VIRGINIA DEPARTMENT OF HISTORIC RESOURCES
2801 Kensington Avenue
Richmond, VA 23221

by:

TRC ENVIRONMENTAL CORPORATION
50101 Governors Drive, Suite 250
Chapel Hill, NC 27517

and

MVP Southgate
625 Liberty Avenue, Suite 1700
Pittsburgh, PA 15222

June 4, 2018

INTRODUCTION

These proposed procedures have been developed to guide historic structure surveys to be conducted by TRC Environmental Corporation (TRC) for the MVP Southgate Project (Project) in Virginia. The methods presented follow those outlined in the Virginia Department of Historic Resources' (VDHR) *Guidelines for Conducting Historic Resources Surveys in Virginia* (2017) and guidance provided by VDHR staff in our May 17, 2018 meeting, and also take into account the nature of the Project.

HISTORIC STRUCTURES SURVEY

As discussed in a May 17, 2018 meeting between MVP Southgate representatives and the VDHR staff and specified in Federal Energy Regulatory Commission (FERC 2017) guidelines, MVP Southgate is conducting a comprehensive historic structures survey of structures that appear to be 50 years old or older and have the potential to be directly or indirectly affected by the proposed Project, including the construction, operation, and maintenance of the proposed pipeline and related appurtenances (compressor and meter station sites, additional workspaces, construction yards, access roads, etc.). Federal regulations define an Area of Potential Effects (APE) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 CRF Part 800.16[d] or CFR 2009b). For this Project, the indirect effects APE (APE for historic structures and other above-ground resources) is regarded as the area within which any resources might be within view of proposed vegetation clearing or above-ground construction, or otherwise potentially affected by proposed Project activities. The APE will minimally consist of a 450-foot wide corridor centered on the proposed pipeline centerline, 250-foot corridors centered on access road centerlines, and an area extending 0.5 mile outside the proposed compressor station site, and will be extended as necessary to encompass longer viewsheds if present. The APE will be terminated at 0.5 miles from the proposed pipeline corridor or appurtenance, or where vegetation and/or topography obstructs lines of sight.

The historic structures survey will consist of four tasks: Background Research; Field Survey; Evaluation and Effects Recommendations; and Reporting.

Background Research

TRC will conduct background research in person and using the Virginia Cultural Resources Information System (VCRIS) to identify all previously recorded and designated historic architectural resources within the Project APE. These will include all resources listed in or determined eligible for listing in the National Register of Historic Places (NRHP) or Virginia Landmarks Register (VLR) or as a National Historic Landmark (NHL) as well as all other previously recorded architectural resources and districts, including buildings or structures, cemeteries, historic districts, and rural historic landscapes. TRC will also review relevant historic materials such as published histories of the project area, previous cultural resource studies, and historic maps. The research will help to identify previously unsurveyed resources, and also provide the basis for a historical overview of the project area to be included in the technical report.

Field Survey

TRC will conduct field survey to locate, map, and photograph the historic structural resources within the APE, including updating information on any resources surveyed more than five (5) years ago. Based on a visual exterior inspection and information obtained from the review of historic USGS maps and other sources, TRC will document any previously unidentified structural resource 50 years old or older, including buildings, structures, and objects, as well as cemeteries and such above-ground features as railroad grades and bridge abutments. Data collection will take place from public rights-of-way and will include physical descriptions, locational data, multiple digital photographs, and site plans for each above-ground resource

(including individual resources as well as potential historic districts or historic landscapes) in the Project APE. The resources will be mapped on the appropriate USGS quad maps and digitally via GPS.

Evaluation and Effects Recommendations

Based on the background research and field survey, TRC will provide a preliminary evaluation of the surveyed resources' eligibility for listing in the NRHP, either individually or as part of one or more historic districts. TRC will base its assessment in accordance with guidelines contained in National Register Bulletins 15, *How to Apply the National Register Criteria for Evaluation* (USDOI 1991), and 24, *Guidelines for Local Surveys: A Basis for Preservation Planning* (Derry et al. 1977), along with other guidance.

Many resources will likely be recorded from public rights-of-way without interior access. Per VDHR guidance, TRC will assume that structures that cannot be fully evaluated are NRHP-eligible for the purpose of assessing effects.

TRC will assess potential effects to NRHP-eligible historic structures and other above-ground resources using the four-step process outlined in the MVP Mainline Criteria of Effects report (Dye and Marshall 2017:Appendix B). In brief, this process involves sequential consideration of topography (Step 1); vegetation and other factors affecting viewsheds (Step 2); historic significance and aspects of integrity (Step 3); and photographic simulations (Step 4). If a no effect determination is made for a resource at each step of the process, it will be dropped from further consideration.

Reporting

The results of this fieldwork and evaluation will be compiled and presented as a stand-alone historic structures report for review. This report will include an overview of the project and a historic context for the project area, detailed information on each resource, as well as TRC's eligibility and effects recommendations. Along with the report, TRC will also submit the associated survey forms.

REFERENCES CITED

Derry, Anne, H. Ward Jandl, Carol D. Shull, and Jan Thorman
1977 Guidelines for Local Surveys: a Basis for Preservation Planning. Revised 1985 by Patricia Parker. https://www.nps.gov/nr/publications/bulletins/nrb24/.

Dye, Hannah, and Sydne Marshall
2017 Mountain Valley Pipeline Project Criteria of Effects Report, Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania Counties, Virginia. Tetra Tech, Inc. Parsippany, New Jersey.

Federal Energy Regulatory Commission (FERC)
2017 Guidelines for Reporting on Cultural Resource Investigations for Natural Gas Projects. https://www.ferc.gov/industries/gas/enviro/guidelines/cultural-guidelines-final.pdf.

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1991 National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation. U.S. Department of the Interior, National Park Service, Washington, D.C.

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FERC PF 18-04, VDHR# 2018-3545

Submitted to:

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2801 Kensington Avenue
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Dye, Hannah, and Sydne Marshall
2017 Mountain Valley Pipeline Project Criteria of Effects Report, Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania Counties, Virginia. Tetra Tech, Inc. Parsippany, New Jersey.

Federal Energy Regulatory Commission (FERC)
2017 Guidelines for Reporting on Cultural Resource Investigations for Natural Gas Projects. https://www.ferc.gov/industries/gas/enviro/guidelines/cultural-guidelines-final.pdf.

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2017 Guidelines for Conducting Historic Resources Survey in Virginia. http://www.dhr.virginia.gov/pdf_files/SurveyManual_2017.pdf.

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1991 National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation. U.S. Department of the Interior, National Park Service, Washington, D.C.

Mountain Valley PIPELINE LLC

INCOMING CORRESPONDENCE

Webb, Paul

From: yy EADCRMPORTAL <ePIX@dhr.virginia.gov>
Sent: Friday, April 27, 2018 4:11 PM
To: Webb, Paul
Subject: MVP Southgate Project (2018-3545) | e-Mail #01218

Dear Mr. Paul Webb TRC Environmental Corp:

Thank you for submitting your application through the ePIX system and requesting the comments of the Department of Historic Resources on the referenced project. Your application is being processed and our 30-day review period will start on the next business day after submission. You will be notified if your application is insufficient or if additional materials are required for our review.

You may view the submitted application and track our review of this project through your ePIX account under "My Projects" (http://solutions.virginia.gov/epix/secure/dashboard.aspx). When our review is complete, comments will be emailed to you and attached to the application in your ePIX account. No project activities that have the potential to impact historic properties should take place until the lead agency has provided a notice to proceed.

If you wish or are asked to submit additional materials in support of your application, documents must be submitted electronically to the appropriate reviewer. Submissions with a total size of less than 10mb may be submitted via email. Submissions larger than 10mb must be made through VITAShare (https://vitashare.vita.virginia.gov).

Please reference the assigned DHR File Number on all future correspondence.

If you have any questions concerning the review process or if we may provide any further assistance, please do not hesitate to contact me. We look forward to working with you on this project.

Sincerely,

Roger Kirchen
Office of Review and Compliance
Division of Resource Services and Review

Print

Create New Application

This electronic form is to be used for the submission of new projects only. If you wish to submit addtional information in support of an existing project, please contact the reviewer assigned to that project.

Before using this form, please understand that the information being requested is important to our review. Incomplete information may lead to delays in the review of your project. Please read all questions carefully and respond as completely as possible. For security purposes, *your ePIX session will timeout after 20 minutes of inactivity* and any unsaved changes will be discarded. To ensure that no information is lost, we recommend saving your application after the completion of each section. If you have questions concerning the completion of this application, please contact DHR staff at ePIX@dhr.virginia.gov.

SECTION I. CONTACT INFORMATION

Submitted By

Mr. Paul Webb TRC Environmental Corp
50101 Governors Drive, Suite 250
Chapel Hill, NC 27517
919 530-8446
919 530-8525

Please indicate what your role in this project is:

Applicant RoleConsultant tasked with initiating consultation

If Other, please specify

SECTION II. GENERAL PROJECT INFORMATION

Project NameMVP Southgate Project

Agency Project Number

Associated DHR File Number

Project Street Address

Independent Cities and/or Counties (multiple cities/counties are allowed):

City/County Name
Pittsylvania

Town/Locality, if applicable

Agency Involvement

Please select one of the following options as they relate to the project you are submitting:

◉ My project involves a federal or state agency and requires review by DHR under the National Historic Preservation Act (Sections 106 or 110), Virginia Environmental Impact Reports Act or other provision of state or federal law.

○ I am seeking Technical Assistance from DHR in the assessment of potential impacts of my project on historic resources (e.g. federal or state involvement anticipated, initial project scoping, local government proffer or ordinance).

It is important that you know the nature of the federal or state involvement in your project. Please note that there are a number of state-managed programs that are federally funded (e.g. Transportation Enhancement Grants, some recreational trail grant programs, and many DHCD programs). Understanding the involvement of the agency and the program is helpful for our review.

In some cases there are multiple agencies involved in a project. In these cases, there is generally a "lead" agency. In order to help clarify this, please list the agencies in the order of their involvement in the project. If, for example, there are two agencies providing funding, please provide the contact information for the primary source of federal funding first.

Please select the agency, relationship, contact and click the **Select** button:

Agency	Relationship
Federal Energy Regulatory Commission	Federally Permitted

SECTION III. PROJECT DESCRIPTION and CURRENT AND PAST LAND USE

We need to know as much as possible about the project that is being proposed as well as the current condition of the property. In the fields below, you will be required to provide descriptions that are no longer than 2000 characters. Additional and more detailed information can be uploaded and attached at the end of the application.

Overview and existing conditions

Please provide a general description of the project.

Project Description

The proposed Project is an interstate natural gas pipeline project that will be developed, constructed, and owned by Mountain Valley Pipeline, LLC. As proposed, the Project will receive gas from the Mountain Valley Pipeline in Pittsylvania County, Virginia, and extend approximately 70 miles south to new delivery points in North Carolina. As proposed, approximately 23.5 miles of the mainline pipeline will be located in Pittsylvania County, Virginia.

How many acres does the project encompass?

Number of Acres285

Please describe the current condition and/or land use of the project area (e.g. paved parking lot, plowed field).

Current Condition: The current condition and land use vary along the corridor, but approximately 80% proposed Project route in Virginia is co-located with an existing natural gas pipeline.

Please describe any previous modifications to the property, including ground disturbance.

Previous Modifications: Prior modifications and ground disturbance along the corridor vary.

Work involving buildings or structures

Does the project involve the rehabilitation, addition to, alteration, or demolition of any building structure over 50 years of age?

Buildings Over 50 Years: No

If yes, please describe the work that is proposed in detail. Current photographs of affected building or structure, architectural or engineering drawings, project specifications and maps may be uploaded at the end of the application.

Details: No direct effects to any buildings or structures over 50 years of age are proposed at this time.

Work involving ground disturbance

Is there any ground-disturbance that is part of this project?

Ground Disturbance: Yes

If yes, describe the nature and horizontal extent of ground-disturbing activities, including construction, demolition, and other proposed disturbance. Plans, engineering drawings, and maps may be uploaded on the next page at the end of the application.

Extent of Activities: Detailed plans are presently under development, but the project will involve some vegetation clearing, topsoil segregation, and construction over portions of the proposed 100-foot wide temporary construction easement; trenching for the pipeline, construction of a compressor station and other ancillary facilities, and use of temporary and permanent access roads.

What is the depth of the ground disturbance? If there are several components to the project, such as new building, utility trenches, and parking facilities, provide the approximate depth of each component.

DepthDetailed plans are presently under development.

How large is the area where ground-disturbing activities will take place? (in acres)

Area Size285+ acres construction easemen

SECTION IV. AREA OF POTENTIAL EFFECT (APE)

The Area of Potential Effects (APE) is defined as the geographic area or areas within which a project may directly or indirectly cause changes in the character or use of historic properties, if they exist. It is not necessary for an historic property to be present in order to define an APE.

An example of a direct effect is the demolition of an historic building while an indirect effect would be the alteration of an historic setting resulting from the construction of a communications tower or the introduction of noise as the result of the construction of factory. An area such as the footprint of a proposed building is obviously within the APE, but you must also consider visual effects on the property and the limits of all ground-disturbing activity. So, any project may have two APEs - one for direct effects and one for indirect effects.

Please see our guidance on Defining Your APE for more detailed information on defining direct and indirect APEs. If you are using DHR's Data Sharing System, you should indicate the APE on the DSS map. For instructions on how to do this, consult the DSS general use guidelines.

Please provide a brief summary of and justification for the APE and upload your APE map at the end of the application. The written boundary description must match the submitted APE map.

MVP Southgate plans to consult with the VDHR regarding the APEdefinition of APEs for direct and indirect effects.

SECTION V. CONSULTING PARTIES AND PUBLIC INVOLVEMENT

The views of the public, Indian tribes and other consulting parties (e.g. local governments, local historical societies, affected property owners, etc.) that may have an interest in historic properties that may be affected by the project are essential to informed decision-making. In some cases, the public involvement necessary for other environmental reviews such as that under the National Environmental Policy Act (NEPA) may be sufficient for the Section 106 process, but the manner in which the public is involved must reflect the nature and complexity of the proposed project and its effects on historic resources.

What consulting parties have you identified that have an interest in this project? Please describe your previous and future efforts to involve consulting parties.

Consulting Parties	MVP Southgate currently plans to initiate coordination with 14 federally recognized Native American Tribes per FERC procedures, including the Catawba Indian Nation, the Eastern Band of Cherokee Indians, the Muscogee (Creek) Nation, the Tuscarora Nation, the Pawmunkey Tribe, the Delaware Nation of Oklahoma, the Delaware Tribe of Indians, the Eastern Shawnee Tribe of Oklahoma, the Chickahominy Tribe, the Chickahominy Tribe Eastern Division, the Upper Mattaponi Indian Tribe, the Rappahannock Tribe, the Monacan Indian Nation, and the Nansemond Tribe. As the lead federal agency, the FERC will be responsible for formal consultation with these and any other potential consulting parties under Section 106 of the National Historic Preservation Act and its implementing regulations.

Please provide information on any previous or future efforts to involve the public, including public hearings, public notices, and other efforts.

Public Involvement	MVP Southgate will hold open houses to provide the public with information on the project as well as engage in other outreach efforts.

SECTION VI. PREVIOUSLY IDENTIFIED HISTORIC RESOURCES

In order for this application to be considered complete, you must determine if there are any known historic resources in the APE and provide this information to us. This step is generally referred to as a DHR Archives Search. More information on how to acquire this information can be found in our guidance document Obtaining an Archives Search.

Has any portion of the APE been previously surveyed for archaeological and/or architectural resources?

Surveys Yes

If yes, describe and provide the names of any reports that you are aware of.

Survey Reports	VA-065 - Cultural Resource Survey Potomac Expansion Project: Pittsylvania Loop, Campbell Loop, and Fairfax Replacement, Pittsylvania, Campbell, and Fairfax Counties, Virginia.

Are there any previously recorded archaeological sites or architectural resources, including historic districts or battlefields within the APE?

Recorded Resources Yes

You must upload in Section VIII of this application the Archives Search Map showing previously recorded resources in the APE and the DSS reports for all previously recorded resources.

SECTION VII. ADDITIONAL CONTACTS TO THE APPLICATION

Last Name	First Name	Organization
Faul	Travis	
Estabrook	Richard	
Millis	Tracy	
Miller	Alex	
Bose	Kimberly	Federal Energy Regulatory Commission

SECTION VIII. UPLOAD FILES FOR THE APPLICATION

Document Name	File Name	Note
Map of previously recorded resources	MVP Southgate Route with previous surveys.jpg	
Other - Introductory letter and map	MVP_Southgate_VDHR_Letter_042718_submitted with ePIX.pdf	

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 1

Appendix 1-L

Stakeholder List

Government and Non-Government Organizations Landowners (Privileged and Confidential)

[*Not Included with this Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Resource Report 10 – Summary of Alternatives

June 14, 2018

Resource Report 10 – Filing Requirements	
Filing Requirement	**Location in Environmental Report**
Address the "no action" alternative (Sec. 380.12(l)(1)).	Section 10.2
For large projects, address the effect of energy conservation or energy alternatives to the project (Sec. 380.12(l)(1)).	Section 10.3
Identify system alternatives considered during the identification of the project and provide the rationale for rejecting each alternative (Sec. 380.12(l)(1)).	Section 10.4
Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g., wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route (Sec. 380.12(l)(2)(ii)).	Section 10.5 and 10.6
Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site (Sec. 380.12(l)(2)(ii)).	Section 10.6

RESOURCE REPORT 10
SUMMARY OF ALTERNATIVES
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RESOURCE REPORT 10
SUMMARY OF ALTERNATIVES

LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Atlantic Coast Pipeline
Bcf/d	billion cubic feet per day
Certificate	Certificate of Public Convenience and Necessity
East Tennessee	East Tennessee Natural Gas, LLC
EIA	U.S. Energy Information Administration
FERC or Commission	Federal Energy Regulatory Commission
Mountain Valley	Mountain Valley Pipeline, LLC
Project	MVP Southgate Project
Transco	Transcontinental Gas Pipe Line Company, LLC
U.S.	United States

RESOURCE REPORT 10 – SUMMARY OF ALTERNATIVES

10.1 INTRODUCTION

Mountain Valley Pipeline, LLC ("Mountain Valley") is seeking a Certificate of Public Convenience and Necessity ("Certificate") from the Federal Energy Regulatory Commission ("FERC" or "Commission") pursuant to Section 7(c) of the Natural Gas Act to construct and operate the MVP Southgate Project ("Project"). The Project will be located in Pittsylvania County, Virginia and Rockingham and Alamance counties, North Carolina. Mountain Valley proposes to construct approximately 72-miles of 24-inch-diameter natural gas pipeline (known as the H-650 pipeline) to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States ("U.S."). See Resource Report 1 (General Project Description) for additional Project information.

10.1.1 Environmental Resource Report Organization

This Resource Report contains a summary of alternatives that Mountain Valley is considering. The alternatives considered must achieve all or some portion of the Project objectives. The range of alternatives considered includes the no action alternative, other energy alternatives, system alternatives, major route alternatives, minor route variations, and compressor station and meter station site alternatives.

10.1.2 Purpose and Need

The purpose of the Project is to: (1) meet the growing needs of natural gas users in the southeastern U.S.; (2) add a new natural gas transmission pipeline to provide competition and enhance the reliability and resiliency of the existing pipeline infrastructure in North Carolina and southern Virginia; and (3) provide North Carolina and southern Virginia with direct pipeline access to the Marcellus and Utica gas regions in West Virginia, Ohio and southwestern Pennsylvania. See Resource Report 1 (General Project Description) for additional information on the Project purpose and need.

10.2 NO ACTION ALTERNATIVE

The No Action Alternative for the Project would avoid the temporary and permanent environmental impacts associated with construction and operation of the currently proposed Project. However, the No Action Alternative would not achieve the Project's purpose and need as stated in Section 10.1.2 above and in Resource Report 1 (General Project Description). Under the No Action Alternative, North Carolina and southern Virginia will not receive the significant benefits associated with the Project.

Mountain Valley would not be able to meet the specific transportation needs for natural gas as agreed to by its customers if the Project is not constructed. On a broader scale, implementing the No Action Alternative would not support the goal of increasing consumer access to stable and reliable natural gas supplies in the

southeastern United States ("U.S"). If adequate natural gas supplies were not available in the region, consumers would need to seek other fuel sources, many of which are environmentally less desirable.

In recent years, the North American natural gas market has seen enormous growth in production and demand. The U.S. Energy Information Administration ("EIA") estimates that total natural gas consumption in the U.S will increase from 27.6 trillion cubic feet in 2017 to 35.6 trillion cubic feet in 2050, with a large portion of this increased demand occurring in the electric generation sector (EIA 2018a). A sizable portion of growth in natural gas production is occurring in the Appalachian Basin, with Marcellus Shale production alone increasing from 10 billion cubic feet per day ("Bcf/d") in 2013 to approximately 20 Bcf/d in October 2017 (EIA 2018b). The increased demand for natural gas is expected to be especially high the southeastern U.S., and in particular North Carolina, as its population continues to grow. The Project is expected to benefit North Carolina (and parts of Virginia) by connecting the additional supply to the increased market demand. In doing so, the Project will bring clean-burning, domestically-produced natural gas supplies to support the growing demand for natural gas, provide increased supply diversity, and improve supply reliability.

If the purpose and need of the Project are to be met without construction of the Project facilities, other projects and activities would be needed resulting in their own environmental impacts. This would result in the transfer of environmental impacts from one project to another, but would not necessarily eliminate or reduce impacts. The No Action Alternative is not considered a viable option because it does not meet the current Project objectives.

10.3 ENERGY ALTERNATIVES

Use of certain alternative fuels to supply the needs of the market served by the Project could potentially be an alternative to the Project. In general, potential alternative energy sources to the Project could include renewable energy, energy conservation, alternative fossil fuels, nuclear, and fuel cells.

10.3.1 Renewable Energy Sources

Other energy sources, such as wind, solar, geothermal, and biomass, are increasing in capacity and benefit the energy market by diversifying the fuels used to generate electricity; however, these renewable energy sources are not expected to be capable of meeting the increased energy needs provided by natural gas and the associated infrastructure. Renewable energy sources are also not completely or economically interchangeable with natural gas, which has a variety of uses other than just electricity generation, such as home heating, cooking and industrial use.

In 2017, renewable energy sources contributed 10,500 trillion British thermal units to the U.S. power supply (EIA 2018c). This amount accounted for a 12 percent share of the total energy consumption in the U.S. (EIA 2018c). However, none of these renewable energy sources have been fully developed in the U.S. or

in the Project area for large-scale application or to the point where they would be viable energy alternatives to the Project (ACEEE 2005). Conversely, even if smaller-scale, or individual, renewable energy sources could be combined to meet the energy needs for the market area served by the Project, the number of such individual projects would be substantial, and land requirements will likely substantially increase compared to those required for the Project. Because these resources, individually and collectively, would require coordinated efforts, substantial capital investments by developers as well as ancillary systems (e.g. electric transmission lines), associated environmental impacts, and indefinite durations to bring such facilities into service would not meet the commercial needs of the Project's shipper(s). It is evident that these energy options are not viable alternatives to the Project.

Wind

Although wind projects have no emissions during operations, construction and maintenance activities associated with such developments can affect environmental resources. In the Project area, the windiest sites tend to be located along higher elevation ridgetops. Ridgetop locations can have adverse visual, vegetation, and wildlife (primarily bird and bat) impacts.

Wind power is not a viable alternative to meet the purpose and need of the Project. Wind power is not generally an option for home heating and industrial demand. Wind power will not result in a new natural gas transmission pipeline to provide competition and enhance the reliability and resiliency of the existing pipeline system in North Carolina and Virginia. To the extent that generating electricity from wind can be considered a project alternative, wind has some drawbacks. The turbines for wind projects require a large area around them clear of trees and other turbines to maximize the effect of the wind and avoid interference. Every wind turbine has a range of wind speeds in which it will produce at its rated, or maximum, capacity. At slower wind speeds, the production falls off dramatically. If the wind speed decreases by half, power production decreases by a factor of eight. Thus, wind capacity is commonly lower than its design factor. Therefore, the use of wind power is not considered a viable alternative to meet the Project objectives.

Solar

Solar power is not a viable alternative to meet the purpose and need of the Project. Solar power is not generally an option for home heating and industrial demand. Solar power will not result in a new natural gas transmission pipeline to provide competition and enhance the reliability and resiliency of the existing pipeline system in North Carolina and Virginia. To the extent that generating electricity from solar can be considered a project alternative, solar has some drawbacks. Although solar projects have no emissions during operations, construction and maintenance activities associated with such developments can affect environmental resources. Solar requires large expanses of land and is an intermittent source of electricity, including during times of peak demand.

Some of the largest completed utility scale solar photovoltaic power plants have area efficiency of about 8 to 10 acres per megawatt on a national basis (NREL 2013). The mid-Atlantic region would require slightly more land at 11.5 acres per megawatt primarily due to lower solar irradiance and higher undulating terrain features than other regions of the U.S. where solar power development is prominent. For every 1,000 megawatts of power (equivalent to an average capacity of a large-scale natural gas-fired combined cycle power plant), the land requirements in the mid-Atlantic region would be approximately 11,500 acres of permanent disturbance. Because of these extensive land requirements, solar power is not being developed at a pace that would provide for the projected energy needs of the market.

Unlike a solar installation, the majority of the area affected by the Project will be restored and allowed to revert to pre-construction conditions. In addition, the right-of-way will be maintained in an herbaceous condition (rather than an impervious or shaded surface that would be found in a solar field) that can provide habitat for flora and fauna in the long term. The land requirements required by solar power to generate the amount of energy equivalent to satisfy the purpose and need of the proposed Project would be prohibitive. Therefore, the use of solar power is not a viable alternative to meet the Project objectives.

Geothermal

Geothermal energy is available only at tectonic plate boundaries or at volcanic hotspots. Due to a lack of these features in the Project area, geothermal energy would not be available for development as an alternative to natural gas.

Biomass

Combustion of biomass uses biomass feedstock, which, if properly grown, represents a renewable resource. In 2016, biomass fueled almost 5 percent of Virginia's total net electricity generation with wood and wood waste, municipal solid waste, and landfill gas (EIA 2017a). Although much of North Carolina's electricity generation from biomass comes from wood and wood waste and from landfill gas, the state also has abundant biomass resources from agricultural and animal waste. Biomass and solar resources together supply almost 5 percent of North Carolina's utility-scale net generation (EIA 2017b).

Biomass is not a viable alternative to meet the purpose and need of the Project. Biomass is not generally an option for home heating and industrial demand. Biomass will not result in a new natural gas transmission pipeline to provide competition and enhance the reliability and resiliency of the existing pipeline system in North Carolina and Virginia. To the extent that generating electricity from biomass can be considered a project alternative, this would result in air pollutant emissions from the burning of biomass materials. Therefore, the use of biomass energy as an alternative to the Project is not practical and would not provide a significant environmental advantage over the Project.

10.3.2 Energy Conservation

Energy conservation measures have an increasing role in reducing future energy demand in the U.S. The Energy Policy Act of 2005 provides guidelines to: (1) diversify America's energy supply and reduce dependence on foreign sources of energy; (2) increase residential and business' energy efficiency and conservation (e.g., Energy Star Program); (3) improve vehicular energy efficiency; and (4) modernize the domestic energy infrastructure.

Energy conservation reduces the demand or growth in demand for natural gas and other energy sources. It is possible that the development and implementation of additional cost-effective conservation measures could have some effect on the demand for natural gas. However, substantial new development in technology would be needed before the magnitude of such energy conservation measures necessary to equal the amount of energy transported by the proposed Project could be implemented.

10.3.3 Alternative Fossil Fuels, Nuclear, and Fuel Cells

While other fossil fuels such as coal and oil, nuclear power, and fuel cells can be viable alternatives to generating electricity, they currently do not have the capacity or infrastructure in place to be viable alternatives to alleviate Project Shippers increasing customer demand for direct natural gas supply. In addition, these fuels generally are not used directly for home heating and industrial uses. In addition, these fuels generally are not used directly for home heating and industrial uses.

Coal

Although historically a viable alternative to natural gas for power generation, coal is not as clean-burning as natural gas. In addition, although coal can be used for home heating, it generally is not an alternative for natural gas home heating. Coal emits greater regulated pollutants (e.g., sulfur dioxide and nitrogen dioxide), greenhouse gases (e.g., carbon dioxide), and particulate matter, which require the installation of costly air pollution controls. Coal is associated with significant mine pollution control problems, reclamation issues, storage problems, and costly pollution controls at the burner. Energy generated from the burning of coal is considered a major contributor to acid rain, which continues to be an international ecological and economic problem. Coal also contributes significantly more greenhouse gas emissions than natural gas. In addition, the mining and transportation of coal to end users have additional and more complex adverse environmental impacts. The relative environmental benefits and efficiency of natural gas make it an attractive alternative to oil and coal-fired generation. Therefore, coal is not a preferred alternative for replacing the natural gas to be supplied by the Project.

Oil

Oil is not a viable alternative energy source for meeting future power generation needs in the market area served by the Project. The construction of an oil transmission pipeline has no advantage over natural gas

pipeline transmission in regards to area requirements. In addition, oil typically requires tank distribution and increased air pollutant emissions when burned. These aspects of oil use create the potential for increased adverse environmental impacts, including the increased risk of oil spills, air quality degradation, and potential impacts associated with land use development required for the construction of new, or expansion of existing, refineries to process the oil. State and federal air pollution control regulations promote the use of clean fuels to minimize adverse air quality impacts. Use of oil as an alternative energy source would unnecessarily increase adverse air quality impacts, and these increased impacts may conflict with federal and state long-term energy environmental policies aimed toward improving air quality in non-attainment areas. Electrical regional utilities and industrial users have increasingly converted power plants from oil to natural gas because oil is more expensive than natural gas and produces more emissions than natural gas. Therefore, oil is not a viable alternative for replacing the natural gas to be supplied by the Project.

Nuclear

Nuclear energy development is an option that is considered environmentally viable for electric generation, especially in terms of limiting pollutant air emissions. Nuclear power is, however, not generally an option for home heating and industrial demand. Environmental and regulatory challenges concerning safety and security, the disposal of toxic materials (i.e., spent fuel), and alterations to hydrological/biological systems need to be addressed before any new nuclear power generation facilities could be constructed. Extensive regulatory requirements need to be met in the planning and building of new nuclear facilities, and there is significant uncertainty as to the timing and cost of bringing new nuclear facilities into service. Moreover, the time required to design, permit, and construct a nuclear generation facility is measured in years and would be significantly greater than the amount of time required to design, permit, and construct a natural gas pipeline. Since the nuclear energy alternative would not be available to meet the timeframe required for energy demands by the market, use of nuclear energy is not a viable alternative to the Project.

Fuel Cells

Fuel cells are a developing alternative for generating electricity directly and cleanly from fossil fuels or hydrogen. Small-scale fuel cell research and development is active, but reliable fuel cell systems representing a magnitude of energy supply equivalent to the Project are not expected to be available or cost-effective in the near future. Therefore, this fuel supply is not a viable alternative to the Project.

10.4 SYSTEM ALTERNATIVES

System alternatives are alternatives to the proposed action that would make use of other existing, modified, or proposed pipeline systems to meet the purpose and need of the proposed Project. If available as a viable alternative, a system alternative could make it unnecessary to construct all or part of the Project, although some modifications or additions to the alternative systems would be required to increase their capacity or

provide receipt and delivery capability consistent with that of the Project. These modifications or additions would result in environmental impacts that may be less than, comparable to, or greater than those associated with construction of the Project. System alternatives that would result in significantly less environmental impact might be preferable to the Project. However, a viable system alternative must also be technically and economically feasible and practicable, and must satisfy necessary contractual commitments (including timing) made with shippers supporting the development of the Project. The systems evaluated as potential alternatives to the Project are discussed below.

10.4.1 Surface Transportation System Alternatives

A surface transportation system alternative would involve the liquefaction of natural gas at the receipt points along the H-650 pipeline and transportation of the liquid volumes to the delivery points where regasification facilities would be installed. Rail and truck transportation options are not as safe and reliable as pipelines, as will be discussed and demonstrated statistically in Resource Report 11 (Reliability and Safety). Installation of processing facilities to liquefy and subsequently re-gasify natural gas would require extensive permitting; require large tracts of land for a regasification facility, and contain associated air emissions from the liquefaction/regasification process. In addition, the development or improvement of the industrial, roadway and rail infrastructure necessary to transport liquefied natural gas would be required. Therefore, transporting the Project's natural gas volumes as a liquid by trucks and rail is not considered a viable alternative to the Project pipeline facilities and was eliminated from further consideration.

10.4.2 Transco Pipeline System and Cardinal Pipeline

Transco Pipeline System

The Transcontinental Gas Pipe Line Company, LLC ("Transco") system encompasses approximately 10,000 miles from Texas to New York with a peak delivery capacity of approximately 9.25 million dekatherms per day. Mountain Valley's H-650 pipeline would be located adjacent or in close proximity to Transco's system for approximately 33.0 miles in Virginia and North Carolina.

[*Note: Mountain Valley will include a detailed analysis of this system alternative in the draft Resource Reports to be filed with the FERC.*]

Cardinal Pipeline System

The Cardinal Pipeline system in North Carolina is an approximate 105-mile gas intrastate pipeline system that transports natural gas from Rockingham County from the existing Transco pipeline to a point southeast of Raleigh. Cardinal is owned by affiliates of Transco, Public Service Company of North Carolina, Inc., and Piedmont Natural Gas Company and operated by Transco.

[*Note: Mountain Valley will include a detailed analysis of this system alternative in the draft Resource Reports to be filed with the FERC.*]

10.4.3 Atlantic Coast Pipeline Project

Atlantic Coast Pipeline, LLC, is a joint venture comprised of subsidiaries of Dominion Resources (Dominion), Duke Energy, Piedmont Natural Gas Company, and AGL Resources. The Atlantic Coast Pipeline ("ACP") project, which is currently under construction, would consist of approximately 564 miles of natural gas transmission pipeline and associated aboveground facilities in West Virginia, Virginia, and North Carolina. The purpose of the project as stated by ACP is to deliver natural gas from supply areas in West Virginia to growing markets in Virginia and North Carolina.

[*Note: Mountain Valley will include a detailed analysis of this system alternative in the draft Resource Reports to be filed with the FERC.*]

10.4.4 East Tennessee Natural Gas System

The East Tennessee Natural Gas system extends from southwest Virginia to an interconnection with Transco in Rockingham County, North Carolina near the Virginia border.

[*Note: Mountain Valley will include a detailed analysis of this system alternative in the draft Resource Reports to be filed with the FERC.*]

10.5 ROUTE ALTERNATIVES

10.5.1 Pipeline Routing

During Project development, Mountain Valley conducted an extensive review of potential pipeline routes to identify potential pipeline corridors, and then further refined the review to determine the most feasible route within the most favorable corridor. One of Mountain Valley's primary objectives with respect to pipeline routing was to avoid (if possible) or minimize crossings of major population centers and significant natural resources. Mountain Valley also attempted to route its pipeline adjacent to existing rights-of-way, where feasible.

Sources of existing information, such as field reconnaissance, aerial photography, topographic maps from the U.S. Geological Survey, and National Wetland Inventory maps, were used during the route identification and evaluation processes.

As proposed, the Project involves the installation of approximately 72 miles of natural gas pipeline and appurtenant facilities (e.g., compressor station, meter stations, valve settings and launcher/ receiver equipment) within a new right-of-way. Mountain Valley has evaluated major and minor route alternatives to maximize constructability, minimize impacts to sensitive resources or to avoid encroachments, and will continue to do so, as discussed in the following sections.

10.5.2 Major Pipeline Route Alternatives

Mountain Valley has evaluated major pipeline route alternatives as part of the planning and design process for the Project. The analysis for the alternative pipeline routes is based on environmental and land use impacts, as well as permanent easement acquisitions and overall Project costs. The primary objective in performing this analysis is to develop the most direct route that could connect customers to the available supply system that would also avoid or minimize potential adverse environmental impacts and engineering constraints to the greatest extent practicable. Mountain Valley will evaluate pipeline routing options based on potential adverse environmental impacts, existing land usage, constructability, safety, and feasibility considerations.

The selection of the major route alternatives involves several steps.

- Development of routing criteria;
- Identification of potential routing alternatives;
- Collection of data relative to each alternative;
- Evaluation of potential environmental and land use impacts;
- Evaluation of routing alternatives against routing criteria; and
- Determination of the most cost-effective technical solution

This section will examine the major route alternatives that were identified during the initial planning stage of the Project. Existing information sources were used to identify and evaluate the primary routing of the Project.

The major route alternatives are shown on Figure 10.5-1 and summarized in Table 10.5-1 below.

Figure 10.5-1: Major Route Alternatives

[*Note: Mountain Valley is in the process of developing Figure 10.5-1 to be provided in the draft Resource Reports to be filed with the FERC.*]

10.5.2.1 Route Alternative TBD

[*Note: Mountain Valley is in the process of compiling the necessary information for the major route alternatives. An analysis will be provided in the draft Resource Reports to be filed with the FERC.*]

Table 10.5-1

Comparison of Route Alternative TBD and the Preferred Route

Feature	Route Alternative TBD	Preferred Route
General		
Total length (miles)		
Length adjacent to existing ROW (miles)		
Land disturbed within construction ROW (acres) a/		
Land Use		
Populated areas b/ within ½ mile (number)		
National Forest System lands crossed (miles)		
National Forest Wilderness crossed (miles)		
Scenic Trail crossings (number)		
Recreational Area crossings (number)		
NRHP designated or eligible historic districts crossed (miles)		
Landowner parcels crossed (number)		
Residences within 50 feet of construction work space (number)		
Resources		
Forested land crossed (miles)		
Forested land affected during construction (acres)		
Forested land affected during operation (acres)		
Wetlands (NWI) crossed (feet) d/		
Forested wetlands crossed (feet) d		
Forested wetlands affected by construction (acres)		
Forested wetlands affected by operation (acres)		
Perennial waterbody crossings (number) d/		
New River crossings (number)		
Shallow bedrock crossed (miles)		
Steep slope (>20 percent) crossed (miles)		
Karst area crossed (miles)		

a/ Assuming 100-foot-wide construction ROW.
b/ TBD.
c/ TBD.
d/ TBD.

ROW = right-of-way
NRHP = National Register of Historic Places
NHD = U.S. Geological Survey National Hydrography Dataset
NWI = U.S. Fish and Wildlife Service National Wetland Inventory

10.5.3 Minor Route Variations or Deviations

Route variations and deviations differ from route alternatives in that they are identified to enhance constructability, reduce impacts on localized features, sensitive resources, terrain, and/or provide appropriate space to allow for the safe operation and maintenance of the pipeline. They are typically shorter than route alternatives and may not always display a clear environmental advantage other than avoiding or reducing the impact to specific features or resources.

After selection of the preferred route, route alignment changes were evaluated using both desktop and field survey data to address construction constraints and to reduce impacts to landowners and sensitive environmental resources within the route alignment. The preferred route and the route variations are shown on Figure 10.5-TBD.

Route Variation TBD

[*Note: Mountain Valley is in the process of compiling the necessary information for the minor route variations and deviations. An analysis will be provided in the draft Resource Reports to be filed with the FERC.*]

Figure 10.5-2: Minor Route Variations and Deviations

[*Note: Mountain Valley is in the process of developing Figure 10.5-2, which will be provided in the draft Resource Reports to be filed with the FERC.*]

10.6 ABOVEGROUND FACILITY ALTERNATIVES

10.6.1 Compressor Station Design Alternatives

Mountain Valley conducted a hydraulic analysis to determine the optimum horsepower and compression to provide the increased volumes of natural gas necessary to meet the purpose and need of the Project. As a result, Mountain Valley determined that two new compressor stations were necessary to meet the compression requirements for the increased delivery volume and delivery locations. The compressor station site selection process was influenced by multiple factors including land availability for purchase, property suitability for siting the new compressor stations: engineering design and construction, pipeline design limitations, land/workspace requirements, site elevation, road access, interconnecting pipe, and environmental and landowner constraints.

[*Note: Current sites under evaluation for the proposed compressor stations are identified in Resource Report 1. The site selection process associated with the proposed compressor stations is currently ongoing, and additional information regarding preferred and alternative locations will be provided in the draft Resource Reports to be filed with the FERC.*]

10.6.1.1 Electric Driven Compressor Units

The proposed Project compressor stations will include centrifugal turbines powered by natural gas, with the natural gas obtained directly from the pipeline. While compressor stations can be powered by electric motor driven compressors in some instances, this is not feasible for the Project because of the lack of the necessary amount of power required for each compressor station site.

To use electric driven compressor units, electric power at high voltage would be supplied by overhead transmission lines to a substation that would be located at each compressor station site. The substation would step down the voltage for electric driven compressor motors and other miscellaneous loads. Additionally, electric driven motors located at each compressor station could require a liquid cooled variable frequency drive, primarily to start the motor and then for speed control of the compressor. For these reasons, the use of electric driven compressor units is not a reasonable alternative for the proposed Project compressor stations.

10.6.2 Meter Station Alternatives

[Note: Mountain Valley is evaluating the design requirements for the proposed meter stations. Information regarding potential alternatives to the new meter stations will be provided in the draft Resource Reports to be filed with the FERC.]

10.7 REFERENCES

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