MVP Southgate Project

Docket No. PF18-4-000

Draft

Resource Report 2 – Water Use and Quality

August 2018

MVP Southgate Project
Draft Resource Report 2 – Water Use and Quality

Resource Report 2 – Filing Requirements	
Information	**Location in Resource Report**
Minimum Filing Requirements	
1. Identify all perennial surface waterbodies crossed by the proposed project and their water quality classification. (§ 380.12(d)(1)) • Identify by milepost • Indicate if potable water intakes are within 3 miles downstream of the crossing.	Section 2.3.1.3, 2.3.2.2, 2.3.2.4, Appendix 2-A
2. Identify all waterbody crossings that may have contaminated waters or sediments. (§ 380.12(d)(1)) • Identify by milepost • Include offshore sediments.	Section 2.3.2.5
3. Identify watershed areas, designated surface water protection areas, and sensitive waterbodies crossed by the proposed project. (§ 380.12(d)(1)) • Identify by milepost	Section 2.3.1.1, 2.3.2, and 2.3.2.4
4. Provide a table (based on NWI maps if delineations have not been done) identifying all wetlands, by milepost and length, crossed by the proposed project, and the total acreage and acreage of each wetland type that would be affected by construction. (§ 380.12(d)(l&4))	Section 2.4, Appendix 2-B
5. Discuss construction and restoration methods proposed for crossing wetlands, and compare them to staff's Wetland and Waterbody Construction and Mitigation Procedures. (§ 380.12(d)(2))	Section 2.4.3 and 2.4.4
6. Describe the proposed waterbody construction, impact mitigation, and restoration methods to be used to cross surface waters and compare to the staff's Wetland and Waterbody Construction and Mitigation Procedures. (§ 380.12(d)(2)) • Although the Procedures do not apply offshore, the first part of this requirement does apply. Be sure to include effects of sedimentation, etc. This information is needed on a mile-by-mile basis and will require completion of geophysical and other surveys before filing. (See also Resource Report 3.)	Section 2.3.1.4 and 2.3.6
7. Provide original National Wetlands Inventory (NWI) maps or the appropriate state wetland maps, if NWI maps are not available, that show all proposed facilities and include milepost locations for proposed pipeline routes. (§ 380.12(d)(4))	Appendix 2-J
8. Identify all U.S. Environmental Protection Agency (EPA) - or state-designated aquifers crossed. (§ 380.12(d)(9)) • Identify the location of known public and private groundwater supply wells or springs within 150 feet of construction.	Sections 2.2.1, 2.2.3.1 and 2.2.3.2
Additional Information Often Missing and Resulting in Data Requests	
9. Identify proposed mitigation for impacts on groundwater resources.	Section 2.2.4
10. Discuss the potential for blasting to affect water wells, springs, and wetlands, and associated mitigation.	Section 2.2.4.2

Resource Report 2 – Filing Requirements		
	Information	**Location in Resource Report**
11.	Identify all sources of water required for construction (e.g. hydrostatic testing, dust suppression, horizontal directional drills [HDD]), the quantity of water required, and methods for withdrawal. Identify the treatment of discharge, discharge volumes, rates, and locations, and any waste products generated.	Section 2.3.3, 2.3.4, 2.3.5
12.	Identify operating water requirements for proposed liquefied natural gas facilities, including the water use, source(s), and volumes.	Not Applicable (no liquefied natural gas facilities)
13.	If underground storage of natural gas is proposed, identify how water produced from the storage field will be disposed.	Not Applicable (no underground storage)
14.	If salt caverns are proposed for storage of natural gas, identify the source locations, the quantity required, the method and rate of water withdrawal, and disposal methods.	Not Applicable (no salt cavern storage)
15.	Provide a site-specific construction plan for each proposed HDD crossing in accordance with section V.B.6.d of the Federal Energy Regulatory Commission's *Wetland and Waterbody Construction and Mitigation Procedures*.	Appendix 1-C1 of Resource Report 1
16.	Provide a site-specific construction plan for crossing each waterbody greater than 100 feet wide. Include a discussion on the feasibility of a trenchless crossing method.	Appendix 1-C1 of Resource Report 1
17.	Identify mitigation measures to avoid impacts on springs; especially those used for drinking water or livestock.	Section 2.2.4.1
18.	Identify mitigation measures to ensure that public or private water supplies are returned to their former capacity or replaced in the event of damage resulting from construction.	Section 2.2.4.1
19.	In addition to identifying perennial surface waterbodies crossed or affected by the project, also identify intermittent and ephemeral waterbodies.	Sections 2.3.1.3 and Appendix 2-A
20.	Show the locations of wetlands and waterbodies relative to the construction and permanent rights-of-way and additional temporary workspaces on mile posted alignment sheets or aerial photography.	Appendix 1-A of Resource Report 1
21.	If wetlands would be filled or permanently lost, describe proposed measures to compensate for permanent wetland losses. Include copies of any compensatory mitigation plans and discuss the status of agency consultations/approvals.	Section 2.4.4
22.	Describe measures to avoid or minimize impacts on forested wetlands. If impacts are unavoidable, describe proposed measures to restore forested wetlands following construction	Section 2.4.4
23.	Describe techniques to be used to minimize turbidity and sedimentation impacts associated with offshore trenching, if applicable.	Not Applicable (no offshore trenching)

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WATER USE AND QUALITY
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LIST OF ACRONYMS AND ABBREVIATIONS

ATWS	additional temporary workspace
BMPs	best management practices
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
EDR	Environmental Data Resources Inc.
E&SCP	Erosion and Sediment Control Plan
FEMA	Federal Emergency Management Agency
FERC or Commission	Federal Energy Regulatory Commission
GPM	gallons per minute
HDD	horizontal directional drilling
HUC	hydrologic unit code
MGD	million gallons per day
MVP	Mountain Valley Pipeline, LLC
NCDEQ	North Carolina Division of Environmental Quality
NHD	National Hydrography Database
NRI	National Rivers Inventory
PEM	palustrine emergent
PFO	palustrine forested
Plan	FERC Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC Wetland and Waterbody Construction and Mitigation Procedures
Project	Mountain Valley Southgate Project
PSS	palustrine scrub/shrub
SDWA	Safe Drinking Water Act
SPCC Plan	Spill Prevention, Control and Countermeasure Plan
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States. Environmental Protection Agency
USGS	United States Geological Society
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDH-ODW	Virginia Department of Health – Office of Drinking Water

RESOURCE REPORT 2
WATER USE AND QUALITY

2.1 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. The Project proposes to construct approximately 72 miles of 24-inch-diameter natural gas pipeline (known as the H-650 pipeline) to provide timely, cost-effective access to new natural gas supplies to meet the growing needs of natural gas users in the southeastern United States ("U.S."), including for the Project's anchor shipper, a local distribution company serving customers in North Carolina. See Resource Report 1 (General Project Description) for additional Project information.

2.1.1 Environmental Resource Report Organization

Resource Report 2 is prepared and organized according to the FERC *Guidance Manual for Environmental Report Preparation* (February 2017). This report is organized into three major sections and a separate section listing the sources used to prepare this report. Section 2.2 describes groundwater resources, Section 2.3 describes surface water resources, and Section 2.4 describes wetlands. A list of waterbodies and wetlands crossed by Project is provide in Appendix 2-A and 2-B, respectively.

2.2 GROUNDWATER RESOURCES

2.2.1 Aquifers – Geology, Hydrology, Quality, and Uses

Information on major aquifers discussed in this section is based on the Ground Water Atlas of the United States (USGS, 2000), Water Resources Investigations Report (USGS, 1996), and Aquifer Susceptibility in Virginia (USGS, 2003). Aquifer systems have generally been characterized based on physiographic provinces in both Virginia and North Carolina. Groundwater aquifers used for public and private water sources can be located in unconsolidated depositional units or lithified bedrock units, depending on their location. Unconsolidated surficial deposits, such as alluvium, alluvial fans, and colluvium, are found in all the aquifer system areas. These surficial aquifers are discontinuous both in extent and in terms of their aquifer characteristics and are not commonly used as potable water sources in the Project area. As a result, surficial aquifers have not been mapped by state agencies or otherwise documented in the area of the Project. Bedrock aquifers are the primary source of groundwater in the Project area. Aquifer systems in the Project area are summarized by county in Table 2.2-1 and shown on Figure 2-C-1 in Appendix 2-C.

Table 2.2-1

Aquifers Crossed by the MVP Southgate Project

Facility / State / County	Approximate Mileposts / Aboveground Facilities	Aquifer System Name	Dominant Lithology
H-650 pipeline			
Virginia			
Pittsylvania	0.0 - 4.6	Early Mesozoic basin aquifers	Sandstone aquifers
	4.6 - 4.8	Piedmont and Blue Ridge Crystalline-rock aquifers	Igneous and metamorphic-rock aquifers
	4.8 - 26.3	Early Mesozoic basin aquifers	Sandstone aquifers
North Carolina			
Rockingham	26.3 - 32.6	Early Mesozoic basin aquifers	Sandstone aquifers
	32.6 - 52.7	Piedmont and Blue Ridge Crystalline-rock aquifers	Igneous and metamorphic-rock aquifers
Alamance	52.7 - 72.6	Piedmont and Blue Ridge Crystalline-rock aquifers	Igneous and metamorphic-rock aquifers
Aboveground Facilities			
Virginia			
Pittsylvania	0.2 mile east of MP 0.3 - Lambert Compressor Station/Interconnect	Early Mesozoic basin aquifers	Sandstone aquifers
North Carolina			
Rockingham	1.2 miles west of MP 26.9 - Russell Compressor Station	Early Mesozoic basin aquifers	Sandstone aquifers
	1.1 miles west of MP 27.4 - LN 3600 Interconnect	Early Mesozoic basin aquifers	Sandstone aquifers
	30.5 - T-15 Dan River Interconnect	Early Mesozoic basin aquifers	Sandstone aquifers
Alamance	72.6 - T-21 Haw River Interconnect Meter Station	Piedmont and Blue Ridge Crystalline-rock aquifers	Igneous and metamorphic-rock aquifers
Sources: USGS, 2000			

In Virginia, Pittsylvania County is part of the Piedmont physiographic province. The Virginia State Water Resources Plan (VDEQ, 2015) notes that the structural complexity of the groundwater/surface water system in areas of fractured rock and karst terrain creates some practical limitations regarding characterization of such resources. The geologic units that underlie several meters of saprolite regolith in Pittsylvania County are fractured and highly deformed crystalline bedrock that are not designated as individual aquifers. Aquifer characterization in the Project area is highly dependent on well data in the immediate vicinity of the Project, and generalized information regarding aquifer depths and yields are highly variable across entire aquifer extents. The Project has initiated consultation with Virginia Department of Environmental Quality ("VDEQ") regarding well yields and well depth for aquifers within the Project area. Consultations are ongoing at this time as the Project continues to coordinate with VDEQ. Since site-specific data is

publicly unavailable for the immediate Project area, generalized well yields and well depths for aquifers crossed by the Project are discussed in Section 2.2.1.1.

In North Carolina, the Project is located in Rockingham and Alamance counties that are within the Piedmont regional aquifer system. In Rockingham County, the amount of groundwater available is estimated to average 0.32 million gallons per day ("MGD") per square mile. Continuously pumped wells spaced about 2,500 feet apart may be expected to yield 0.08 MGD in the northwestern part of the county and 0.05 MGD in the southeastern part of the county. The City of Eden, located west of the Project, is underlain by sedimentary rock (sandstone, shale, mudstone, and conglomerate) of the Triassic age. Groundwater wells drilled in Triassic range from 70 to 150 feet and are reported to yield as much as 50 gallons per minute ("GPM"). The City of Reidsville, located southwest of the Project, is underlain by metamorphic rocks which are weathered to a depth of 50 feet. Groundwater wells in this area are typically drilled to depths of 75 to 250 feet, and can yield as much as 30 GPM (Jackson, 1972).

In Alamance County, the predominant rock types are mafic volcanic rocks, felsic volcanic rocks, granite, and diorite. The majority of the Project in Alamance County is underlain by mafic volcanic rocks and may have small bodies of diorite, which are found throughout the county. In general, due to the fractures and bedding characteristics and amply overlying soils cover, the rocks in Alamance County form some of the best aquifers in the Piedmont, producing average to above-average well yields. Above-average well yields are found where soil cover is thickest and in low, flat areas. Average well depths exceed 100 feet and average well yields can range from an average of 7 GPM (diorite rock) to 21 GPM (mafic volcanic rock). It is estimated that 0.1 MGD per square mile can be withdrawn from aquifers in most of the county. In areas underlain by granite, this figure can generally be doubled. The probable yield of continuously pumped wells spaced about one-half mile apart is in the order of 0.05 MGD in the areas underlain by granite and 0.03 MGD in the remainder of the county. The city of Burlington is predominantly underlain by granite and greenstone schist that has weathered as deep as 80 feet. Well yields in Burlington can range from 0 to 200 GPM but average 20 to 30 GPM (Jackson, 1972).

2.2.1.1 Major Aquifers – Geology and Hydrology

Piedmont Regional Aquifer System

The Project is located solely within the Piedmont regional aquifer system. The Piedmont physiographic province is underlain by crystalline-rock and undifferentiated sedimentary-rock aquifers in the Project area. Hard, crystalline igneous and metamorphic formations dominate this region with some areas of sedimentary rocks and weathered bedrock deposits overlying the bedrock. The size and number of fractures and faults in the bedrock that store and transmit groundwater decrease with depth; therefore most significant water supplies are found within a few hundred feet of the surface. Most of the rocks that compose the crystalline-rock and undifferentiated sedimentary-rock aquifers are crystalline metamorphic and igneous rocks of many types. Within the Piedmont physiographic province, the Project is specifically located within crystalline-rock aquifers and aquifers within early Mesozoic basins. The main types of crystalline rocks are coarse-grained gneisses and schists of various mineral compositions; however, fine-grained rocks, such as phyllite and metamorphosed volcanic rocks, are common in places. Wells in crystalline rocks yield from less than 1 GPM to more than 100 GPM and range in depth from 60 to 500 feet. In general, recharge is highly variable in the Piedmont province because it is determined by local precipitation and runoff which are highly variable and influenced by topographic relief and the capacity of the land surface to accept infiltrating water. The location of the Project within the western part of the Piedmont province receives

less precipitation because it is in the rain shadow of the Blue Ridge Mountains. The majority of recharge in the Piedmont provinces takes place in interstream areas. Almost all groundwater recharge is from precipitation that enters the aquifers through the porous regolith.

Crystalline-Rock Aquifers

Crystalline-Rock Aquifers are among the most common and widespread aquifers in the Piedmont Province. In general, in crystalline-rock areas, the regolith and fractures in the bedrock serve as the primary places for the transmission of water. The porosity of the regolith ranges from 20 to 30 percent. Most of the fractures in crystalline rocks are steeply inclined, intersecting openings that are more numerous at shallow depths. Ground water movement is general along short flow paths from interstream recharge areas to the nearest stream.

Aquifers in Early Mesozoic Basins

Unlike crystalline-rock aquifers, aquifers in Early Mesozoic Basins compose a small percent of the total area in the Piedmont province. Within the early Mesozoic basin, the Project is located within the Dan River Danville Basin, which contains sedimentary rocks consisting of sandstone, siltstone, mudstone, shale and local conglomerate.

In general, the rocks of the early Mesozoic basins originally had considerable effective porosity between the grains. Due to compaction and cementation, the pores in most of the strata are now reduced in size and poorly interconnected causing only a small part of the ground water to move between pores. The groundwater in the Mesozoic rocks moves primarily along joints, fractures and bedding planes. Since some sedimentary rocks contain more interconnected openings than others, the ground-water system in the early Mesozoic basins consists of a series of aquifers of tabular form that alternate with confining units that are tens of feet thick. Aquifers in the early Mesozoic basins north of North Carolina generally yield more water than other noncarbonated aquifers in the Piedmont province likely due to the original, intergranular pore space in the Mesozoic rocks being insufficient to store and transmit appreciable quantities of water.

2.2.1.2 Water Quality

The quality of water from aquifers in the different rock types of the Piedmont province is generally suitable for drinking and other uses; however locally high concentrations of iron, manganese, and sulfate can affect this suitability. Large iron concentrations can be caused by corrosion or the action of iron-fixing bacteria on iron and steel casings and well fittings. Some crystalline rocks and some sedimentary rocks in early Mesozoic basins contain minerals that when weathered can contribute iron and manganese to ground water. The potential for contamination in crystalline rock is high because of rapid movement of water in fractures, joints, and bedding planes.

In Rockingham County, North Carolina, the chemical quality of the groundwater in Eden is suitable for most domestic use and some industrial processes, but the water may locally be very hard and contain high iron concentrations. In Reidsville, a partial analysis from one well indicated that the chemical quality of groundwater is acceptable for most uses, but hardness may be a localized problem (Jackson, 1972).

In Alamance County, North Carolina, the chemical quality of the groundwater in all parts of the County is acceptable for most domestic and industrial uses. However, in some locations the concentrations of iron and hardness-causing constituents are higher than desirable. For public water supply, the groundwater is of

acceptable quality and no problems that conventional treatment procedures would not correct, except where pollution may be a factor, have been reported (Jackson, 1972).

The Project proposes the use of a 100-foot-wide construction right-of-way, and the pipeline trench would be excavated to a depth of about 6 to 10 feet in most locations. For these areas, the Project is not anticipated to have any impacts to groundwater resources or require additional mitigation measures. This is due to the surficial nature of the disturbance, the relatively short-term nature of the disturbance, and because the aquifers are typically much deeper than any proposed disturbance area. The use of other construction techniques and their potential effect on groundwater are discussed in Section 2.2.4.1.

2.2.1.3 Water Use

According to the United States Geological Society ("USGS") Estimated Water Use in the United States Report (2015), 81 percent of Virginians used domestic water sources provided by public suppliers (USGS, 2015). An estimated 48 percent of North Carolina's population receives its drinking water supplies from the ground (NCDEQ, 2018c). Approximately 125 million gallons of groundwater per day was withdrawn to supply the 19 percent of all Virginians who rely on self-supplied groundwater (private wells) for domestic supplies, and approximately 169 million gallons of groundwater per day was withdrawn to supply 35 percent of all North Carolinians who rely on self-supplied groundwater for domestic supplies (USGS, 2015, NCDEQ, 2018c). While both Virginia and North Carolina's groundwater is generally of good quality, both the quality and quantity can vary. Reliance on groundwater is also highly variable across both states, depending on a variety of geographic, geologic, and socioeconomic factors.

Water use data is available from Virginia's Water Use Plan (VDEQ, 2015) by hydrologic unit code ("HUC") watershed. The Project is located entirely within the Roanoke River Basin in Virginia. Groundwater wells provide source water for most of the community water systems in Roanoke River Basin in Virginia. An estimated 16,136 people used private groundwater wells for residential water supply during 2015. The estimated 2015 groundwater use in Pittsylvania County was 1.417 MGD by community water systems, 3.096 MGD by small private users, 0.079 MGD by large private users, and 8.488 MGD for agricultural use.

According to most recently available data from USGS South Atlantic Water Science Center's 2010 North Carolina Water Use Report (USGS, 2010), in Alamance County, a total of approximately 23.85 MGD of groundwater was withdrawn, with approximately 17.06 MGD going to the public supply, 3.28 MGD used for domestic, 2.90 MGD for irrigation, and relatively minimal amounts used for industrial, thermoelectric, mining, livestock and aquaculture. In Rockingham County, a total of approximately 133.37 MGD of groundwater was withdrawn in 2010, with approximately 107 MGD used for thermoelectric, 16.62 MGD used for public supply, 6.08 MGD for irrigation, 2.93 MGD for domestic use, and relatively minimal amounts used for industrial, mining, livestock and aquaculture.

2.2.1.4 Groundwater in Karst Terrain

Surface water in karst terrain in the Project area generally flows from higher elevations to sinks when it reaches limestone and dolostone rock formations. These soluble rock formations form the sinkholes, insurgencies, and caves that form the basis for the karst hydrology that includes sinking streams, springs, and complex underground flow conditions.

As outlined in Table 6.5-1 of Resource Report 6, less than 3 miles of the Project is located where karst terrain has the potential to occur in Pittsylvania County, Virginia. As outlined in Section 6.5.1, there is no mapped karst terrain in North Carolina. Qualified geologists contracted by the Project are currently evaluating the Project alignment to confirm the presence of karst terrain and, if present, develop a Project-specific Karst Management Plan. *[Note: The Project continues to evaluate sinkholes and karst related features along the H-650 pipeline route. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

2.2.2 Sole-Source Aquifers

The United States Environmental Protection Agency ("USEPA") defines a sole- or principal-source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer (USEPA, 2015). USEPA guidelines also stipulate that these areas can have no alternative drinking water sources that could physically, legally, or economically supply all those who depend upon the aquifer for drinking water (USEPA, 2015).

No sole-source aquifers have been designated in the Project area according to USEPA Regions 3 and 4 (USEPA, 2015). There is one designated sole-source aquifer in Virginia (SSA32, Prospect Hill Aquifer) located approximately 175 miles north of the Project in the northern part of the state in Clark County, which will not be impacted by the Project. North Carolina has no designated sole-source aquifers within the state.

2.2.3 Water Supply Resources

2.2.3.1 Public Water Supply Wells and Springs

Initial information on public wells and springs located within one-mile of the Project alignment was obtained from USEPA's Safe Drinking Water Information System (USEPA, 2016b), and digital location information for public supplies was obtained from the Virginia Department of Environmental Quality ("VDEQ") (VDEQ, 2018a), and the NCDEQ (NCDEQ, 2018a).

According to publicly available data, there are no public water supply wells or springs located within 150 feet of the Project construction work area. The Project is in consultation with VDEQ Water Supply Department and NCDEQ Division of Water Resources regarding the locations of public water supply wells and springs within the Project area. Consultations are ongoing at this time as the Project continues to coordinate with VDEQ and NCDEQ.

If any public water supply well or spring is identified within 150 feet of the Project workspace areas, the Project will identify the well or spring on the construction alignment sheets (to be provided within the Project Implementation Plan). Mitigation measures for protection of public water supplies are further described in Section 2.2.4.1.

2.2.3.2 Private Water Resources (Wells)

Private water wells in the area of the Project are primarily completed in bedrock aquifers. As outlined in Section 2.2.1, wells in this area can range in depth from 60 to 500 feet. In general, bedrock aquifers are not expected to be impacted by the Project with the implementation of mitigation measures and procedures described in Section 2.2.4. Potential impacts to bedrock aquifers include impacts from blasting and trenching during construction. See Resource Report 6 and for areas of karst terrain conditions and Sections 2.2.1.4 and 2.2.4.

The Project is in the process of conducting landowner and civil surveys where access is granted, which includes efforts to identify private water resources within 150 feet of the proposed alignment work area. Table 2.2-2 lists the private wells identified by civil surveys where access has been granted.

Table 2.2-2

Private Wells within 150 feet of the Project Construction Workspace a/

County, State	Milepost	Line List Number	Distance from Project Construction Workspace (Feet) b/
Pittsylvania, Virginia	4.5	VA-PI-030.000	12
Pittsylvania, Virginia	6.3	VA-PI-036.000	0
Pittsylvania, Virginia	6.3	VA-PI-036.000	0
Pittsylvania, Virginia	6.4	VA-PI-036.000	0
Pittsylvania, Virginia	6.4	VA-PI-036.000	0
Pittsylvania, Virginia	6.4	VA-PI-036.000	0
Pittsylvania, Virginia	6.4	VA-PI-036.000	0
Pittsylvania, Virginia	6.5	VA-PI-037.000	130
Pittsylvania, Virginia	6.5	VA-PI-037.000	0
Pittsylvania, Virginia	6.5	VA-PI-037.000	24
Pittsylvania, Virginia	6.5	VA-PI-037.000	0
Pittsylvania, Virginia	6.6	VA-PI-037.000	65
Pittsylvania, Virginia	6.6	VA-PI-037.000	0
Pittsylvania, Virginia	6.6	VA-PI-037.000	87
Pittsylvania, Virginia	21.9	VA-PI-167.000	110
Rockingham, North Carolina	45.0	NC-RO-139.000	70
Alamance, North Carolina	56.7	NC-AL-028.000	8
Alamance, North Carolina	53.5	NC-AL-000.065	63
Alamance, North Carolina	68.6	NC-AL-150.000 NC-AL-151.000	4
Alamance, North Carolina	69.5	NC-AL-184.000	18
Alamance, North Carolina	69.5	NC-AL-184.000	41

a/ Private wells identified by civil survey where access has been granted
b/ Wells with a distance of 0 feet from Project Construction Workspace are located within the current construction workspace.

Through implementation of the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* ("Plan") (2013) and FERC's *Wetland and Waterbody Construction and Mitigation Procedures* ("Procedures") (2013), the Project does not anticipate private wells to be impacted as a result of Project construction or operations.

2.2.3.3 Springs and Swallets

Springs of Virginia (Virginia Division of Water Resources and Power 1930) provides information on springs based on largely anecdotal information, and the exact location of the springs listed in the publication is not available. VDEQ is in the process of locating, characterizing and publishing a database of springs

throughout Virginia; however that information is not available at this time. Based on an online map of the "Spring Database 2016", no springs have been recorded within Pittsylvania County (VDEQ, 2016b).

No publicly available data on springs in North Carolina is available. Consultations are ongoing with the NCDEQ Division of Water Resources regarding the locations of springs within the Project area. The Project has attempted to augment published data and nomenclature on wells and springs with information obtained from landowners where survey access has been obtained. As additional survey access is obtained, the Project will continue to conduct surveys to identify springs within 150 feet of the Project workspace areas and the Project will provide any additional information gathered regarding springs within the final Resource Report 2 included with the Certificate application.

The Project will survey affected landowners to request the locations of known springs to help minimize or avoid potential impacts to private springs that are used for potable water supply purposes. If springs are identified that could be affected by construction activities, the Project will consult with the appropriate regulatory agencies and with individual landowners to minimize impacts. Springs, if used for domestic, livestock, or agriculture, purposes may be tested and evaluated, and repaired or replaced, as outlined in Section 2.2.4.1.

2.2.3.4 Wellhead or Source Water Protection Areas

Under a 1986 amendment to the Safe Drinking Water Act ("SDWA"), each state is required to develop and implement a wellhead protection program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. The SDWA was later updated in 1996 to require the development of a broader-based source water assessment program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach.

In 1999, the Virginia Department of Health – Office of Drinking Water ("VDH-ODW") developed a Source Water Assessment Program, as a result of the 1996 Amendments to the SDWA, Section 1453. By 2003, all existing drinking water sources were assessed. The objective of the Source Water Assessment Program is to facilitate and promote the implementation of source water protection measures. To achieve this, VDH-ODW delineates an assessment area for each drinking water source and creates an inventory of potential sources of contamination. This information is used to make a susceptibility determination of the drinking water source in relation to the potential source of contaminants found in the assessment area. VDH-ODW submits annual progress reports to the USEPA regarding the protection status of community water systems in Virginia. A source water protection program annual survey is typically performed from June to August of each year (VDH-ODW, 2018). The Project has initiated consultation with VDH-ODW regarding source water protection areas within the Project area. Consultations are ongoing at this time as the Project continues to coordinate with VDH-ODW.

According to the NCDEQ's Source Water Assessment Program Plan (NCDENR, 1999), Wellhead Protection can be broadly defined as a program that reduces the threat to the quality of groundwater used for drinking water by identifying and managing recharge areas to specific wells or wellfields. Wellhead Protection is accomplished in part by defining a Wellhead Protection Area. A Wellhead Protection Area is defined as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are likely to move toward and reach such water well or wellfield". The NCDEQ believes that the most appropriate level for Wellhead Protection Program implementation is at the County level. There are five steps taken in North Carolina to implement the Wellhead Protection

Program; setting up a local planning team, delineating wellhead protection area, inventory of potential contamination sources, managing the wellhead protection area and administration of the wellhead protection program. The Project has initiated consultation with NCDEQ Drinking Water Protection Program regarding source water protection areas within the Project area. Consultations are ongoing at this time as the Project continues to coordinate with NCDEQ.

Adherence to the FERC Plan and Procedures and implementation of best management practices ("BMPs") during construction and restoration will prevent or mitigate impacts to the wellhead protection areas in both states. Continuing measures to identify and protect public water supplies are addressed in Section 2.2.4.1.

2.2.3.5 Potential Contaminated Groundwater

USEPA's Facility Registry Service database (USEPA, 2018) was used to identify documented contaminated sites located within 0.5 miles of the Project. The database includes information on regulated sites for hazardous waste handling, releases to air, and federal cleanup sites. As outlined in Resource Report 8, a search is being completed by Environmental Data Resources, Inc ("EDR") to identify potential and actual sources of contamination to nearby groundwater resources along the proposed Project facilities. Information from EDR is a compilation of a variety of available federal, state, and local government databases within information on known locations of current and historic contamination. *[Note: The Project will provide the results from the EDR review in Appendix 2-D within the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

USEPA documented sites with potentially contaminated groundwater within 0.5 mile of the Project are listed in Table 2.2-3.

Table 2.2-3

Documented Potential Contaminated Groundwater Sites within 0.5 mile of the Construction Right-of-Way

Milepost	Facility	Relation to Route	Distance from Construction ROW (feet)	Distance from Construction ROW (miles)
0.0	Transco Gas Pipeline Corp Station 165	NNE	861	0.2
4.6	Sartomer USA LLC	NW	2201	0.4
5.6	CCP Composites US	NNW	2531	0.5
13.4	Elkay Wood Products Co.	SE	420	0.1
13.4	Owens-Brockway Glass Container	SE	1873	0.4
30.7	Millercoors LLC – Eden Brewery	NW	811	0.2
30.9	Loparex Incorporated	NW	334	0.1
40.1	Zarn Incorporated	WSW	2299	0.4
43.4	Keystone Foods	WSW	938	0.2
44.2	Ball Metal Beverage Container Corporation	WSW	1429	0.3
44.3	Metzeler Automotive Profile Systems North Carolina Incorporated	WSW	2547	0.5
68.8	City of Burlington – East Burlington Waste Water Treatment Plant	SW	1117	0.2
69.2	Texfi Industries Incorporated Haw River Dyeing	E	280	0.1
69.3	Cone Mills Corporation	W	756	0.1
71.0	Stericycle Incorporated	ESE	1973	0.4

Source: USEPA, 2018

The closest USEPA documented site to the Project is VerTex Sportswear, Inc., located near milepost 69.2 approximately 280 feet east of the Project in Haw River, North Carolina. The last update to information pertaining to this registered facility was in April 2015 and it appears the facility is no longer functioning (USEPA, 2018). The probability of encountering contaminated soil and groundwater resources during construction is expected to be low. If contaminated soil or groundwater is encountered during construction, The Project will notify the affected landowner and will coordinate with the appropriate federal and state agencies in accordance with applicable notification requirements. See Appendix 2-H for the Project's Unanticipated Discovery of Contaminated Soils Plan. *[Note: The Project is preparing an Unanticipated Discovery of Contaminated Soils Plan. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

2.2.4 Construction Impacts and Mitigation

Construction, operation, and maintenance of the Project facilities are not anticipated to have significant or long-term impacts on groundwater resources. Impacts will be minimized or avoided by implementation of the construction practices outlined in the FERC Plan and Procedures and as described in the mitigation measures detailed below.

Although no impacts to groundwater supply or quality are expected due to the limited depth of excavation and the short duration of open trench and typical depths to the groundwater table, the Project will employ accepted measures and procedures to minimize potential impacts. Construction activities associated with the Project that have the potential to impact groundwater include shallow excavations, blasting for trench excavation, hydrostatic test discharges, horizontal directional drill ("HDD") and potential spills or leaks of contaminants from the refueling of construction vehicles or storage of fuel, oil, and other fluids. The Project proposes to implement construction practices designed to avoid impacts on groundwater during construction. These practices will include the FERC Plan and Procedures and a Project-specific Spill Prevention, Control, and Countermeasures Plan ("SPCC") Plan. During construction, the construction contractors will adhere to these general practices related to groundwater protection including:

- Enforcing restrictions on refueling locations and storage of contaminants; and
- Installation of permanent trench plugs, where needed, to maintain existing groundwater flow patterns.

Additional information on groundwater impacts and mitigation associated with construction is provided in the following sections.

2.2.4.1 Aquifers and Groundwater Sources

In areas of shallow groundwater, construction activities may temporarily affect shallow, near-surface aquifers. Grading and clearing, trenching and blasting, trench dewatering and hydrostatic test discharge activities could temporarily alter overland water flow and groundwater recharge, or could result in minor fluctuations in groundwater levels. Overland construction could potentially increase turbidity through erosion and sedimentation. Dewatering if the pipeline trench may require the temporary pumping of groundwater in areas where there is near-surface water table. Construction activities may affect shallow aquifers and could cause minor temporary fluctuations in groundwater levels and/or increased turbidity. Impacts will be minimized or avoided by implementation of the construction practices outlined in the FERC Plan and Procedures and in this section.

As outlined in Section 2.2.1, surficial aquifers are discontinuous both in extent and in terms of their aquifer characteristics and are not commonly used as potable water sources in the Project area. Although bedrock aquifers are most common in the Project area, construction activities such as trenching, blasting, dewatering, and backfilling may encounter shallow alluvial aquifers and could cause minor, localized fluctuations in groundwater levels and/or increased turbidity. Ground disturbance associated with typical pipeline construction is generally within 6 to 10 feet of the existing ground surface. A depth of 10 feet is above most surficial aquifers utilized as a potable water source, and most existing wells that might be drilled in a shallow aquifer will be cased to at least 20 feet. Most alluvial aquifers exhibit rapid recharge and groundwater movement; therefore, it is likely that such aquifers would quickly re-establish equilibrium and turbidity levels would rapidly subside.

Surficial aquifers could experience minor disturbances from changes in overland water flow and recharge caused by clearing and grading of the right-of-way. The ability of soil to absorb water can be altered through near-surface compaction by heavy construction vehicles. This minor impact would be temporary and is not expected to significantly affect groundwater resources or quality. The majority of groundwater use along the Project alignment uses deeper bedrock aquifers. Impacts to bedrock aquifers are not expected since construction activities are not likely to occur at a depth that would impact the bedrock aquifers in the Project area. The use of HDDs to cross expansive or sensitive resource areas could potentially impact ground water quality. *[Note: The Project is in the preliminary stages of the HDD evaluation process. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Potential impacts would be greatest in areas of shallow aquifers, including shallow karst areas. In these areas, potential impacts would be avoided by implementing the FERC Procedures and BMPs.

Trench Dewatering

Groundwater depth varies based on a number of factors including site elevation and setting, weather, seasonality, and surficial geology. Accordingly, the depth to groundwater varies along the Project route based on these conditions. Shallow groundwater along the Project alignment would generally coincide with wetland areas (see Section 2.4) and locations near springs (see Section 2.2.3) and karst geological conditions (see Section 2.2.1.4). The excavated trench for pipeline installation would be most likely to intercept shallow groundwater in these locations. Typical installation depth is anticipated to be approximately 6-10 feet below existing grade. As described in Section 2.2.1, bedrock aquifers are predominant along the entire extent of the Project. Typical depths to groundwater in bedrock aquifers in higher elevation settings are 60 to 500 feet as described in Section 2.2.1.1. Therefore, in most upland portions of the route, groundwater will not be encountered during trench excavation. However, the trench will intersect the water table in some wetland and floodplain areas that are crossed. Accordingly, temporary trench dewatering is anticipated to be required in wetland areas.

Dewatering of the pipeline trench, the only activity requiring pumping of groundwater, may be necessary in areas where there is a high water table. However, pipeline construction activities within a particular location are typically completed within several days, and any lowering of localized groundwater is expected to be temporary. The Project will dewater into well-vegetated upland areas, or into filtration structures if vegetation is insufficient.

Private Wells and Springs

For private wells and spring identified within 150 feet of the construction works area, the Project will clearly mark the wellhead or spring and surround it with silt fence and/or safety fence (if landowner access is provided) as a precaution for construction equipment and activities. To further mitigate the potential for land disturbance associated with the pipeline to impact a water resource, the Project will implement the FERC's Plan and Procedures for stormwater-runoff control and control of petroleum and hazardous materials. In the event that the water resource is affected or a significant potential for impact arises, the Project will be responsible for notifying the owner/operator of the well / spring.

The potential for impact to a water supply well from ground disturbance associated with Project construction would be indicated by negative effects on water quality well before, and in a more demonstrable manner than water yields. The Project will conduct pre-construction testing of private wells located within 150 feet of the construction workspace. Upon request by a landowner who had a pre-construction test, a post-construction test will be performed. The Project will evaluate landowner complaints or damage associated with construction. In the unlikely event that a private well is impacted by Project construction, the Project will negotiate a settlement with the landowner that will include a temporary water supply to affected homeowners while their well is repaired or replaced. If an impact occurs to a livestock well or an irrigation well, the Project will provide a temporary water source to sustain livestock while a new permanent water supply well is constructed. The Project will not provide temporary water sources for crops, but would compensate landowners for any losses in crops resulting from irrigation system damage.

Water supply identification, characterization and pre-construction sampling are addressed in further detail in the Water Resources Identification and Testing Plan (Appendix 2-E). *[Note: The Project is preparing a Water Resources Identification and Testing Plan. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Karst Areas

As described in Resource Report 6, karst terrain is a landscape formed by the dissolution of soluble bedrock. The primary mitigation measure related to construction impacts to karst terrain and associated water resources is avoidance of these features is described Resource Report 6. *[Note: The Project continues to evaluate potential land subsidence for the MVP Southgate Project. Additional information will be provided in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]* Construction erosion and sediment control measures will be strictly followed to prevent overland flow of water and sediment toward or into a stream, spring or wellhead. If blasting is required to advance pipeline construction, additional monitoring and safeguards for structures and water supplies will be specified in the blasting plan to be provided in Resource Report 6.

Public Water Supplies and Source Water Protection

The Project is conducting consultation with state agencies responsible for oversight of drinking water supplies to gather information on the water source(s) and distribution systems in the Project area. *[Note: The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

2.2.4.2 Blasting Impacts on Water Supply Wells and Mitigation Measures

Although mechanical methods of removing bedrock are preferred, blasting may be conducted to excavate the pipeline trench in areas of shallow bedrock. If blasting is required in an area near water supply wells, blasting could cause temporary changes in water quality and/or yield. The Project will implement the following measures to avoid, minimize, and mitigate potential impacts to water supply wells from blasting:

- Blasting will be conducted in a manner to minimize possible impacts on nearby water supply wells. Use of controlled blasting techniques should avoid the impacts of blasting and limit rock fracture to the immediate vicinity of detonation along the trench line, and contain impact to within the construction right-of-way. Blasting will be conducted by highly trained contractors;
- If blasting is conducted within 150 feet of an active water well, the Project will conduct a pre-construction evaluation of the well with landowner permission. The well will be sampled for water quality parameters and, if deemed necessary based on the specifics of the setting and location, yield testing may be recommended. Upon request by a landowner who had a pre-construction test, a post-construction test will be performed. Landowners will be contacted by a Project representative and a qualified independent contractor will conduct the testing; and
- The Project will evaluate, on a timely basis, landowner complaints regarding potential damage resulting from blasting to wells, homes, or outbuildings. If the damage is substantiated, the Project will negotiate a settlement with the landowner that may include repair or replacement.

2.2.4.3 Contaminated Groundwater Impacts and Mitigation Measures

Although the probability of encountering contaminated groundwater resources during construction is expected to be low, should existing contaminated groundwater be encountered, it could pose health and safety concerns to construction workers and potentially elevate overall environmental risk through increased exposure. The Project's Environmental Inspectors will be trained to detect direct and indirect evidence of soil and/or groundwater contamination. If contaminated soil or groundwater is encountered during construction, the Project will notify the affected landowner and will coordinate with the appropriate federal and state agencies in accordance with applicable notification requirements.

The Project will operate and maintain the Project and aboveground facilities in compliance with United States Department of Transportation ("USDOT") regulations provided at 49 Code of Federal Regulations ("CFR") Part 192, the FERC's regulations at 18 CFR Part 380.15, and maintenance provisions of the FERC Plan and Procedures. The permanent easement will predominantly be maintained with mechanized clearing equipment. Herbicide treatment will only be used to control invasive species present within upland areas in the permanent easement, as necessary.

2.3 SURFACE WATER RESOURCES

Surface water resources identified in the vicinity of the Project include rivers, streams, associated tributaries, ponds, lakes, and catchment basins. This section describes the surface water resources crossed by the Project and the measures proposed by the Project to mitigate potential adverse effects on those resources. To determine the surface water resources crossed by the Project, this report relied on watershed data from USGS, delineated stream data up to and including June 29, 2018, the National Hydrography Database ("NHD") maintained by USGS (USGS, 2018b), and the 303(d)/305(b) reports submitted by the states to the USEPA. Field delineations were conducted in 2018 within a 300 to 400–foot-wide survey

corridor associated with the pipeline, access roads, additional temporary workspace ("ATWS"), contractor yards, and proposed aboveground facility sites where land access was granted. The Project has completed field delineation of waterbodies along approximately 56 percent of the pipeline alignment. The remainder of the alignment has either not been surveyed or is located within parcels where survey access permission has not been granted.

2.3.1 Waterbody Crossings

2.3.1.1 Surface Water Basins

The United States is divided and sub-divided into successively smaller hydrologic units that are classified into four levels and HUCs: regions (HUC 2), sub-regions (HUC 4), basins (HUC 6), and sub-basins (HUC 8). Sub-basins are further divided into watersheds (HUC 10). The Project is located within the USGS designated 03-South Atlantic-Gulf Region (USGS, 2018a). In Virginia, the Project will cross the Roanoke and Yadkin Rivers Basin, three sub basins and five watersheds (VDEQ, 2018b). In North Carolina, the Project will cross the Roanoke River Basin and the Cape Fear River Basin, three sub basins and five watersheds (NCDEQ, 2018b). Table 2.3-1 identifies these major regions and their respective sub-basins by 8-digit HUC and watershed by 10-digit HUC. Watersheds are shown on Figure 2-C-2 in Appendix 2-C.

Table 2.3-1

Watersheds Crossed by the MVP Southgate Project

Major Region (2-digit HUC)	County/State	Sub-basin (8-digit HUC)	Watershed (10-digit HUC)
03- South Atlantic-Gulf Region	Pittsylvania/ Virginia	Banister River (03010105)	Stinking River-Banister River (0301010502)
	Pittsylvania/ Virginia	Banister River (03010105)	Cherrystone Creek-Banister River (0301010501)
	Pittsylvania/ Virginia	Upper Dan (03010103)	Wolf Island Creek-Dan River (0301010310)
	Pittsylvania/ Virginia Rockingham/ North Carolina	Upper Dan (03010103)	Cascade Creek-Dan River (0301010309)
	Pittsylvania/ Virginia Rockingham/ North Carolina	Lower Dan (03010104)	Hogans Creek-Dan River (0301010401)
	Rockingham/ North Carolina	Upper Dan (03010103)	Lower Smith River (0301010308)
	Rockingham, Alamance/ North Carolina	Haw River (03030002)	Headwaters Haw River (0303000202)
	Alamance/ North Carolina	Haw River (03030002)	Back Creek-Haw River (0303000204)
	Alamance/ North Carolina	Haw River (03030002)	Big Alamance Creek (0303000203)

Source: VDEQ, 2018b and NCDEQ, 2018b

2.3.1.2 Flood Zones

The Project has reviewed Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Mapping for areas crossed by the Project and recorded the location of 100-year flood zones (FEMA, 2018). A summary of 100-year flood zones crossed by the Project is listed in Table 2.3-2 and shown on Figure 2-C-3 in Appendix 2-C.

Table 2.3-2

FEMA 100-year Flood Zones crossed by the MVP Southgate Project

State/County	Flood Zone a/	Entry Mile Post	Exit Mile Post	Length Crossed (feet)
Virginia				
Pittsylvania	A	0.5	0.6	555
	AE	1.6	2.4	4357
	AE	5.1	5.4	1986
	AE	6.8	6.8	173
	A	8.7	8.8	292
	A	10.1	10.1	135
	AE	12.8	12.9	211
	AE	13.5	13.6	318
	A	15.8	15.8	192
	AE	17.8	17.9	263
	A	23.3	23.3	55
North Carolina				
Rockingham	AE	27.2	27.8	3230
	AE	28.0	28.0	90
	AE	28.0	28.1	321
	AE	28.5	28.5	204
	AE	29.7	29.7	22
	AE	29.7	30.6	4674
	AE	30.6	30.7	330
	AE	30.8	30.8	140
	AE	30.8	30.9	441
	AE	31.0	31.0	45
	AE	31.1	31.1	81
	AE	32.2	32.3	235
	AE	32.3	32.3	64
	AE	32.3	32.3	15
	AE	32.3	32.3	20
	AE	32.7	32.8	545
	AE	33.1	33.2	470
	AE	33.2	33.2	32
	AE	38.7	38.9	886
	AE	41.2	41.3	303
	AE	43.3	43.4	442
	AE	46.5	46.5	88
	AE	47.0	47.1	341

Table 2.3-2

FEMA 100-year Flood Zones crossed by the MVP Southgate Project

State/County	Flood Zone a/	Entry Mile Post	Exit Mile Post	Length Crossed (feet)
	AE	48.7	48.7	353
	AE	50.9	50.9	195
Alamance	AE	53.7	53.8	221
	AE	54.7	54.7	125
	AE	56.5	56.5	113
	AE	56.7	56.7	268
	AE	57.1	57.2	310
	AE	57.9	57.9	8
	AE	58.7	58.7	322
	AE	60.8	60.8	76
	AE	60.8	60.8	47
	AE	63.6	63.6	10
	AE	63.6	63.7	334
	AE	63.9	63.9	99
	AE	64.0	64.0	346
	AE	65.5	65.5	133
	AE	67.1	67.1	153
	AE	68.6	68.6	222
	AE	68.6	68.8	894
	AE	69.5	69.5	225
	AE	69.8	69.9	320
	AE	70.3	70.4	254
	AE	70.5	70.5	253
	AE	70.5	70.6	115
	AE	70.9	70.9	328
	AE	71.0	71.4	2536
	AE	72.1	72.1	124
	AE	72.2	72.3	839
	AE	72.5	72.6	282

a/ Flood Zone A – Areas subject to inundation by the 1-percent annual chance flood event determined using approximate methodologies.
Flood Zone AE – Areas subject to inundation by the 1-percent annual chance flood event determined by detailed methods.

There are two permanent access roads and three meter stations located within the FEMA 100-year flood zone in North Carolina. The permanent access roads will displace approximately 0.4 acres of floodplain total, and the meter stations will displace a total of approximately 2.0 acres. The T-15 Dan River Interconnect meter station, the T-21 Haw River Interconnect meter station and the LN 3600 Interconnect meter station will displace approximately 1.5 acre, 0.5 acre and less than 0.1 acre, respectively, within the 100-year floodzone. Permanent access road PA-AL-194 will displace approximately 0.1 acre within the 100-year floodzone and permanent access road PA-RO-082 will displace approximately 0.3 acre within the 100-year floodzone. Temporary access roads located within floodplains may have a temporary effect on

flood storage but will be restored after construction unless requested to be maintained by the landowner or agency.

2.3.1.3 Pipeline Crossings

In North Carolina, waterbodies were delineated in accordance with the Division of Water Quality's *Identification Methods for the Origins of Intermittent and Perennial Stream* version 4.11 effective September 1, 2010. As outlined in the VDEQ's *Perennial Stream Field Identification Protocol* effective May 2013, waterbody delineations conducted in Virginia adopted the North Carolina guidance noted above. The following waterbody information is based on the NHD dataset and field data collected where survey access has been obtained through June 29, 2018. In areas where survey access has not been granted, a detailed desktop analysis taking into account several components (aerial imagery, NHD data, and hydrological conditions from nearby delineated resources) was conducted to determine approximate resource boundaries. Appendix 2-A lists waterbodies crossed or affected by the Project. Appendix 2-G provides a list of areas that have not been surveyed as of this filing. Appendix 1-A in Resource Report 1 depicts waterbodies crossed by the Project on the detailed alignment sheets. Table 2.3-3 is a summary of waterbodies crossed by pipeline of the Project.

Table 2.3-3

Summary of Waterbodies Crossed by the Pipeline of the MVP Southgate Project a/

State	Flow Type	Number of Waterbodies Crossed
Virginia	Ephemeral	2
	Intermittent	27
	Perennial	25
	Virginia Total	**54**
North Carolina	Ephemeral	22
	Intermittent	57
	Perennial	69
	Pond	1
	North Carolina Total	**149**
	Project Total	**203**

a/ Based on data from field delineation as of June 29, 2018 where access has been obtained to the pipeline corridor, approximated and NHD data elsewhere. Table only includes waterbodies that cross the centerline of the Project.

The Project will implement its Project-specific Erosion and Sediment Control Plan ("E&SCP") that will outline BMPs to minimize impacts on various resources, including waterbodies. Major waterbodies (over 100 feet wide at water's edge) will be assessed on a case by case basis to determine the best crossing method, and the Project will prepare site-specific construction and restoration plans for each major waterbody crossing. Table 2.3-4 is a summary of the number of FERC classification of waterbodies crossed by the pipeline of the Project. The Project will cross two major waterbodies, both located in North Carolina: Dan River (237 feet wide at milepost 30.2) in Rockingham County, and Stoney Creek Reservoir (304 feet wide at milepost 63.6) in Alamance County. The Project is proposing to cross these two waterbodies using HDDs. *[Note: The Project is preparing site-specific construction and restoration plans for major waterbody crossings. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Table 2.3-4

Summary of FERC Classification of Waterbody Crossings by the Pipeline of the MVP Southgate Project a/

State	Minor b/	Intermediate c/	Major d/	Total
Virginia	44	10	0	**54**
North Carolina	112	35	2	**149**
Total	**156**	**45**	**2**	**203**

a/ Based on data from field delineation as of June 29, 2018 where access has been obtained to the pipeline corridor, approximated and NHD data elsewhere. Table only includes waterbodies that cross the centerline of the Project.

b/ FERC classified Minor Waterbodies – waterbodies less than or equal to 10 feet wide at the water's edge

c/ FERC classified Intermediate Waterbodies – waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge

d/ FERC classified Major Waterbodies – waterbodies greater than 100 feet wide at the water's edge

2.3.1.4 Waterbody Crossing Methods

For all crossings, the Project will follow the FERC Procedures and the Project-specific E&SCP, as well as BMPs to limit water quality and aquatic resource impacts during and following construction across all waterbodies. Federal and State permitting erosion and sediment control requirements will be followed.

Construction methods at waterbody crossings will vary based on the characteristics of the waterbody at the time of crossing and will be performed consistent with applicable regulatory approvals. The Project will follow FERC's Procedures and its Project-specific E&SCP to limit water quality and aquatic resource impacts during and following construction. The crossing method planned for each waterbody is listed in Appendix 2-A. The crossing methods are designed to maintain water flow and minimize changes in waterbody flow characteristics. All in-stream work will be conducted during low-flow periods to the extent practicable. Detailed descriptions and typical details of the various waterbody crossings are provided in Resource Report 1.

A summary of the types of waterbody crossing methods, as well as cleanup and restoration, is described in Resource Report 1.

2.3.2 Sensitive Waterbodies

Sensitive surface waters generally include the following:

- Outstanding or exceptional quality waterbodies;
- Waterbodies that contain threatened or endangered species, or critical habitat;
- Waterbodies located in sensitive and protected watershed areas;
- Waterbodies that are crossed less than 3 miles upstream of potable water intake structures;
- Waters that do not meet the water quality standards associated with their designated beneficial uses;
- Rivers on or designated to be added to the Nationwide Rivers Inventory ("NRI") or a State River Inventory;

- Waters that have been designated for intensified water quality management and improvement; and
- Waters that support fisheries of special concern (including trout streams).

Several waterbodies crossed by the Project possess one or more of the above characteristics of sensitive surface waters. The following sections discuss these sensitive waterbodies.

Measures to minimize impacts on sensitive waterbodies are discussed in more detail in Resource Report 3 due to their importance to fishery resources. Where impact on sensitive waterbodies cannot be avoided due to the linear nature of the pipeline, and if measures beyond those required by the FERC Procedures are required as a result of state permitting, the Project will develop additional mitigation measures during state permitting.

2.3.2.1 National or State Wild and Scenic Rivers

The Project reviewed rivers that are included on the NRI and those that may be designated as wild and scenic. The sources viewed include the NRI (NPS, 2017), the National Wild and Scenic River System (National Wild and Scenic Rivers System, 2018), and The Wild and Scenic Rivers Act (16 USC 1271-1287).

The NRI is a listing of more than 3,200 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values considered to be of more than local or regional significance (NPS, 2017). The National Park Service maintains the NRI as a list of river segments that potentially qualify as national wild, scenic, or recreational river areas. All federal agencies must seek to avoid or mitigate actions that would adversely affect any NRI segments. The segment of the Dan River crossed by the Project in North Carolina possess outstandingly remarkable values of cultural, fish, geologic, historic, recreational, scenic and wildlife (NPS, 2017). This segment of the Dan River in North Carolina crossed by the Project is described as "Popular recreational stream with diversified scenic and physiographic features; significant archaeological and geologic values; 200 foot bluffs and 1000 foot deep gorge area" (NPS, 2017). The Project is proposing to HDD the Dan River to minimize any potential impacts to the river. The Project consulted with NPS regarding this segment of the Dan River. NPS indicated that the use of HDD to cross the Dan River will reduce potential impacts, and that BMPs should be utilized to further minimize potential impacts. The Project will implement applicable BMPs outlined in the Project E&SCP (NPS, 2018).

The National Wild and Scenic River System was created by Congress in 1968 to preserve certain rivers with outstanding natural, cultural and recreational values in a free-flowing condition. Rivers are designated as wild, scenic or recreational. The Project does not cross federally designated wild and scenic rivers (National Wild and Scenic Rivers System, 2018).

Virginia Department of Conservation and Recreation administers the Virginia Scenic River program to identify, designate and help protect rivers and streams that possess outstanding scenic, recreational, historic and natural characteristics of statewide significance for future generations. In addition to existing designated state scenic rivers, other river segments have been deemed qualified or worthy of further study. Although no designated segments are crossed by the Project, the Virginia Department of Conservation and Recreation lists one waterbody crossed by the Project, the Sandy River, as qualified for potential designation (VDCR, 2013). The Project has initiated consultation with the Virginia Department of Conservation and Recreation. Consultations are ongoing as the Project continues to coordinate with the Department of Conservation and Recreation.

North Carolina Division of Parks and Recreation administers river designations intended to protect certain free flowing rivers or segments with outstanding natural, scenic, educational, recreational, geologic, fish and wildlife, historic, scientific or other cultural values. There are three river classifications, Natural, Scenic, and Recreational, designated by the NC DPR. According to the DPR, there are only 5 rivers that qualify as natural, scenic and/or recreational in North Carolina, and the Project does not cross any of the 5 rivers (NCDPR, 2016).

2.3.2.2 State-Designated Use and Exceptional Waters

Virginia and North Carolina classify surface waters to evaluate water quality. Each system includes a "designation use" that describes the potential or realized capacity of a waterbody to provide defined ecological benefits and recreational values for residents and visitors. A summary of the use designation system for each state is provided below. State water classifications for waterbodies crossed by the Project route are detailed in Appendix 2-A.

In Virginia, the VDEQ assigns six primary classifications for surface waters; aquatic life, fish consumption, public water supplies, recreation, shellfishing, and wildlife. The primary classifications of waterbodies crossed by the Project are defined as follows;

- *Aquatic life use*: supports the propagation, growth, and protection of a balances indigenous population of aquatic life which may be expected to inhabit a waterbody;
- *Fish consumption use*: supports game and marketable fish species that are safe for human health;
- *Public water supply use*: supports safe drinking water;
- *Recreation use*: supports swimming, boating, and other recreational activities;
- *Wildlife use*: supports the propagation, growth, and protection of associated wildlife.

Additional subcategories have been designated for aquatic life classifications, but those additional subcategories do not apply to any waterbodies within the Project area. The majority of the streams crossed by the Project have not been assessed by the state and therefore do not have a designation. Waterbodies that have been assessed by the state, and are crossed by the Project, have one or multiple of the following designations: aquatic life, public water supply, wildlife, fish consumption, and recreation (see Appendix 2A).

The Virginia Department of Game and Inland Fisheries ("VDGIF") has established a classification system for trout waters based on aesthetics, productivity, resident fish population and stream structure. In general, these include natural trout waters with wild trout habitat, and stockable trout waters with cold-water habitat not suitable for wild trout but adequate for year-round hold-over of stocked trout (9 VAC 260-370). Remaining streams are considered unsuitable for trout due to one or more of the following conditions: summer temperatures; a significant population of warm-water gamefish; insufficient flow; and intolerable water quality. The Project does not cross any VDGIF designated trout waters (VDGIF, 2018).

The Commonwealth of Virginia further designates all surface waters in Virginia into one of three levels, or tiers, of antidegradation protection as set forth by the Antidegradation Policy found in the state code, 9VAC25-260-30. The crossing of Tier I waters requires satisfying the adopted water quality standards. The crossing of Tier II waters permits negative effects on water quality only in limited circumstances. Tier III waters are considered to be of exceptional quality and, as such, the Antidegradation Policy prohibits any

increased pollutant discharge. However, activities causing temporary sources of pollution may be allowed where they are demonstrated to be temporary and affected waters are returned to equal or better conditions within a minimal timeframe. Tier III waters are designated by name within the code.

According to the VDEQ Exceptional State Waters Program, there are no Tier III waterbodies located within the Project area nor within Pittsylvania County (VDEQ, 2018c).

In North Carolina, surface water classifications are designations applied to surface waterbodies, such as streams, rivers, and lakes, that define the best uses to be protected within these waters (for example swimming, fishing, drinking water supply) and carry with them an associated set of water quality standards to protect those uses. Surface water classifications are one tool that state and federal agencies use to manage and protect all streams, rivers, lakes, and other surface waters in North Carolina. Classifications and their associated protection rules may be designed to protect water quality, fish and wildlife, or other special characteristics. Each classification has associated standards that are used to determine if the designated uses are being protected. Many waterbodies in North Carolina can have multiple overlapping designations to protect different uses or special characteristics of the waterbody.

The North Carolina Division of Water Resources ("DWR") assigns primary classifications to all surface waters in North Carolina. All waters must at least meet the standards for Class C (fishable / swimmable) waters. The other primary classifications provide additional levels of protection for primary water contact recreation (Class B) and drinking water (Water Supply Classes I through V). Supplemental classifications are sometimes added by DWR to the primary classifications to provide additional protection to waters with special uses or values (NCDEQ, 2018d).

In North Carolina, the pipeline will cross multiple streams with one or multiple of the following designations; Class C, Water Supply II ("WS-II"), Water Supply IV ("WS-IV"), Water Supply V ("WS-V"), Nutrient Sensitive Waters (NSW), and High Quality Waters ("HQW").

- *Class C* is a primary classification and is described as "Waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner."

- *Water Supply II* is a primary classification and is described as "Waters used as sources of water supply for drinking, culinary, or food processing purposes where a WS-I classification is not feasible. These waters are also protected for Class C uses. WS-II waters are generally in predominantly undeveloped watersheds. All WS-II waters are HQW by supplemental classification."

- *Water Supply IV* is a primary classification and is described as "Waters used as sources of water supply for drinking, culinary, or food processing purposes where a WS-I, II or III classification is not feasible. These waters are also protected for Class C uses. WS-IV waters are generally in moderately to highly developed watersheds or Protected Areas."

- *Water Supply V* is a primary classification and is described as "Waters protected as water supplies which are generally upstream and draining to Class WS-IV waters or waters used by industry to supply their employees with drinking water or as waters formerly used as water supply. These waters are also protected for Class C uses."

- Nutrient Sensitive Waters is a supplemental classification and is described as "Supplemental classification intended for waters needing additional nutrient management due to being subject to excessive growth of microscopic or macroscopic vegetation."

- High Quality Waters is a supplemental classifications and is described as "Supplemental classification intended to protect waters which are rated excellent based on biological and physical/chemical characteristics through Division monitoring or special studies, primary nursery areas designated by the Marine Fisheries Commission, and other functional nursery areas designated by the Marine Fisheries Commission. The following waters are HQW by definition: WS-I, WS-II, SA, ORW, and PNA."

The NCDEQ has a supplemental classification ("TS") intended to protect freshwaters that have conditions that shall sustain and allow for trout propagation and survival of stocked trout on a year-round basis. The NC Wildlife Resources Commission also designates qualified streams as trout waters. According to publicly available data, the Project does not cross any NCDEQ or NC Wildlife Resources Commission designated trout streams (NCDEQ 2018b, NCWRC, 2018). The Project has initiated consultation with NCDEQ in regards to water classifications for surface classifications within the Project area. Consultations are ongoing at this time as the Project continues to coordinate with NCDEQ.

The FERC Procedures require a construction window from June 1 through September 30 for all crossings of coldwater fisheries and a construction window from June 1 through November 30 for other fisheries (warmwater and warmwater/coolwater). All waterbody crossings for the Project are designated as warmwater fisheries. The FERC Procedures state these construction windows may be modified by state agencies. The allowable construction windows for fisheries of special concern crossed by the Project are included in Resource Report 3.

2.3.2.3 Waters Containing Federally or State-listed Threatened or Endangered Species or Critical Habitat

Resource Report 3 provides details and species descriptions of threatened and endangered species identified as potentially occurring along the Project, including aquatic species and the waterbodies where these species potentially occur. The proposed pipeline does not cross waterbodies containing critical habitats for federally or state-listed species (USFWS, 2018). Additional information for threatened and endangered species, including suitable habitat within the Project area is presented in Section 3.5 of Resource Report 3.

2.3.2.4 Surface Water Protection Areas and Public Surface Water Supplies

As outlined in the Water Supply Watershed Protection Program, the North Carolina DWR has a cooperative program of water supply watershed management and protection administered by local governments consistent with statewide management requirements. The water supply watershed protection program establishes minimum statewide water supply watershed protection requirements applicable to each classification to protect surface water supplies by (i) controlling development density, (ii) providing for performance-based alternatives to development density controls that are based on sound engineering principles, or (iii) a combination of both (i) and (ii). The Project crosses designated protected and critical watersheds. A "critical" designation is applied to the area adjacent to a water supply intake or reservoir where risk associated with pollution is greater than from the remaining portions of the watershed. The critical area is defined as extending half mile from the normal pool elevation of the reservoir in which the intake is located or to the ridge line of the watershed (whichever comes first); or half mile upstream from

and draining to the intake located directly in the stream or river, or to the ridge line of the watershed (whichever comes first). A "protected" designation is applied to areas adjoining and upstream of the critical area in a WS-IV water supply in which protection measures are required. The boundary of protected areas are defined as within five miles of the normal pool elevation of the reservoir and draining to water supply reservoirs or to the ridge line of the watershed (whichever comes first); or 10 miles upstream and draining to the intake located directly in the stream or river, or to the ridge line of the watershed (whichever comes first). (NCDEQ, 1998)

The Project crosses two protected watersheds and one critical watershed in North Carolina. The two protected watersheds crossed are associated with Stony Creek (WS-II) and Haw River (WS-IV). The critical watershed is associated with Stony Creek. The Project crosses a total of approximately 7.1 miles of protected watersheds throughout Rockingham and Alamance counties and 1.5 miles of critical watershed between milepost 63 and milepost 64.5 in Alamance County.

Consultations with VDEQ are ongoing in regards to surface water supplies and surface water protection areas. According to publicly available data, there are no public surface water supplies within 0.5 mile of the Project workspace in Virginia or North Carolina.

There is typically downstream movement of existing sediments within the streams during large storm events. Additionally, the streams in this area receive significant sediment input from industry, accidental erosion, and other non-point sources. Public surface water intake facilities are designed to filter out large debris and to remove sediment from the raw water intakes depending on the water quality and adjust the treatment processes as necessary (USEPA, 2004a). Mitigation measures specified in the FERC Plan and Procedures and the Project-specific E&SCP to address potential impacts to public water supplies from the construction right-of-way in Section 2.3.6.

2.3.2.5 Contaminated Sediments and Impaired Waters

The Project has reviewed the National Sediment Quality Survey for information regarding contaminated sediments at all waterbody crossings. None of the watersheds in the Project area are listed as containing areas of probable concern for sediment contamination (USEPA, 2004b). Sampling locations for sites with Tier 1, 2, and 3 contaminated sediments were viewed in the National Sediment Inventory Database (NOAA, 2007).

As part of state water quality assessments, Section 303(d) of the federal Clean Water Act mandates that states must prepare a list of all waters that do not meet the water quality criteria for their designated uses and develop for each criterion a Total Maximum Daily Load ("TMDL"), which establishes the maximum allowable discharge into a waterbody to better control pollutant levels. To determine whether impaired waterbodies will be affected by the Project, the Project reviewed the 303(d) lists for states crossed by the Project that are included in USEPA Categories 4 and 5. Category 4 lists waterbodies where TMDLs have been completed or cannot be completed due to the nature of the contamination, and Category 5 lists waterbodies where TMDLs need to be developed by the state (USEPA, 2016a).

The Virginia DEQ released the final 2016 305(b)/303(d) Water Quality Assessment Integrated Report (Integrated Report) on April 2, 2018. This report is a summary of the water quality conditions in Virginia from January 1, 2009 through December 31, 2014 (VDEQ, 2016a). This report satisfies the requirements of the United States Clean Water Act sections 305(b) and 303(d) and the Virginia Water Quality Monitoring, Information and Restoration Act. The goals of Virginia's water quality assessment program

are to determine whether waters meet water quality standards, and to establish a schedule to restore waters with impaired water quality. As outlined in Section 2.3.2.2, there are six surface water designated uses in Virginia; aquatic life, fish consumption, public water supplies, recreation, shellfishing, and wildlife.

The majority of the waterbodies crossed by the Project in Virginia either have not been assessed for impairment, or the data collected resulted in a "Category 3a Indeterminate" designation. Three waterbodies crossed by the Project in Virginia are designated as "Category 4a Impaired" (Little Cherrystone Creek, White Oak Creek (crossed twice by the Project) and Sandy Creek) due to a pollutant caused impairment for the streams' recreational state surface water designation.

The North Carolina DEQ released the final 2016 305(b)/303(d) Integrated Report on April 11, 2018, this report is a summary of water conditions in North Carolina between 2010 and 2014 (NCDEQ, 2016). The water quality assessment process is a framework used by North Carolina Division of Water Resources to interpret data and information to determine whether a waterbody is meeting water quality standards. As outlined in Section 2.3.2.2, all waters in North Carolina must at least meet the standards for fishable/swimmable waters (Class C), and additional primary designations include water contact recreation (Class B) and drinking water (Water Supply Classes I through V), along with several other supplemental classifications.

Similar to Virginia, the majority of the waterbodies crossed by the Project in North Carolina have not been assessed for impairment, or the data collected resulted in a "Category 3a – Inconclusive Data" designation. In North Carolina, the 303(d) list consists of only Category 5 designations. According to the 2016 NCDEQ data, there are no designated impaired waterbodies crossed by the Project in North Carolina.

Table 2.3-5 provides a summary of impaired waterbodies crossed by the Project route. The Project will cross all streams in Virginia and North Carolina in accordance with the FERC Plan and Procedures and the Project-specific E&SCP.

Table 2.3-5

Impaired Waterbodies Crossed by the MVP Southgate Project

State/County	MP	Waterbody Name	Crossing Method	Causes of Impairment
Virginia				
Pittsylvania	0.6	AS-NHD-2317 / Little Cherrystone Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment – E.coli
	5.2	S-F18-3 / White Oak Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment – E.coli
	5.3	S-D18-2 / White Oak Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment – E.coli
	12.9	AS-NHD-2320 / Sandy Creek	Dry Crossing	Recreation – Category 4a - pollutant caused impairment– E.coli
Source: VDEQ 2016				

The Project will construct all of its pipeline crossings using a dry construction technique (e.g., dam and pump and / or flume) if there is flowing water at the time of construction. The Dan River and Stoney Creek Reservoir will be crossed using the HDD construction method. Best management practices will be

implemented during construction to control soil erosion and sedimentation down gradient of areas as described in Section 2.3.5. With the implementation of these measures, no additional impairment to designated waterbodies in the Project areas is anticipated.

The Project is in the process of obtaining a federal and state database search report from EDR for the area within 0.25 mile of the proposed Project facilities. *[Note: The Project will provide the results from the EDR review in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

2.3.2.6 North Carolina Jordan Lake Riparian Buffer Area

In North Carolina, the Jordan Lake impoundment was created in 1983 by damming the Haw River near its confluence with the Deep River. Jordan Lake spans several county boundaries and supplies drinking water to approximately 500,000 people and offers recreational opportunities (swimming, boating, fishing) to residents (TCH, 2018, USACE, 2018). In December of 1963, the USACE Wilmington District took stewardship of Jordan Lake, proposing an earthen dam with a multi-level intake tower in the interest of flood control, water supply, water quality control, recreation and other purposes (USACE, 2018). In a joint effort to improve the low water quality of Jordan Lake, the Wilmington District and NCDWR have enacted the Jordan Lake Nutrient Strategy, consisting of the Jordan Lake Rules that are a nutrient management strategy designed to restore the water quality in the lake by reducing the amount of pollution entering upstream. Specific issues addressed by the rules include reducing pollution from wastewater discharges, stormwater runoff from new and existing development, agricultural and fertilizer application (NCDWR, 2018). In an effort to further define the Jordan Lake Nutrient Strategy program, a riparian buffer zone watershed upstream of Jordan Lake was developed which outlines the stormwater and buffer permit program for the watershed. The Jordan Lake watershed is divided into three Jordan subsheds, the Lower New Hope, Upper New Hope and the Haw subshed (NCDWR, 2018).

Although Jordan Lake is located approximately 25 miles southeast of the southern extent of the Project, the Project crosses the Jordan Lake riparian buffer zone watershed, specifically the Haw subshed, for a total of approximately 24 miles in Rockingham (4 miles) and Alamance (20 miles) counties. See Section 2.3.6 below for additional information regarding Jordan Lake riparian buffer zone watershed.

2.3.3 Hydrostatic Test Water

The pipeline will be hydrostatically tested to ensure that it is capable of safely operating at the design pressure. Test segments of the pipeline will be capped and filled with water. Municipal water used for testing, as applicable. The water in the pipe will be pressurized and held for a minimum of 8 hours in accordance with the USDOT Pipeline and Hazardous Materials Safety Administration Office of Pipeline Safety requirements identified in 49 CFR Part 192 prior to being placed in service. Any loss of pressure that cannot be attributed to other factors, such as temperature changes, will be investigated. Leaks detected will be repaired and the segment will be retested.

Upon completion of the test, the water may be pumped to the next segment for testing, or the water may be discharged. The test water will be discharged through an energy-dissipating device in compliance with National Pollutant Discharge Elimination System permit conditions. Additional potential sources for hydrostatic test water include local Public Service District systems. The Project will contact the Public Service Districts to determine if there is capacity in their system (both yield and storage) to provide all or portions of water needed for specific pipeline segments. Where seasonal surface flows are limited and

public supplies are not viable options, installation of groundwater supply wells may also be considered where hydrogeologic conditions are favorable.

The total volume of water used for hydrostatic testing is proposed to be approximately 8,450,000 gallons (see Table 2.3-6). Each of the construction spreads will likely be broken down into smaller test sections. The hydrostatic test has been designed such that the water should only need to be drawn from the identified source once. From there, it will be transferred into the next test section, which has been chosen to be smaller than the first. By this method, no additional water will be needed within a construction spread, since the large volume initially drawn will be transferred to increasing smaller sections that require less volume. Hydrostatic tests are anticipated to take place in 2020. To the extent practicable, the Project will discharge within the same watershed from that water was withdrawn and will avoid discharging near perennial streams.

Test water will contact only new pipe, and no chemicals will be added to the test water unless otherwise approved by FERC and applicable federal and/or state regulatory agencies. An exception would be that if a municipal water source with chlorinated water is used for testing, addition of a dechlorinating agent may be required prior to discharge depending on the discharge location.

The Project will comply with conditions of National Pollutant Discharge Elimination System permits as applicable. The Project has not applied for agency approval for the discharge of hydrostatic test water at this time, but anticipates submitting this application in accordance with the applicable state guidelines.

Test water will be drawn from two municipal sources and, after testing, will be discharged to upland areas in the same watershed as the source from which it was obtained. Water discharged over land will be directed through containment structures such as hay bale structures and filter bags. The discharge rate will be regulated using valves and energy dissipation devices to prevent erosion.

Once a segment of pipe has been successfully tested and dried, the test cap and manifold will be removed, and the pipe will be connected to the remainder of the pipeline. No desiccant or chemical additives will be used to dry the pipe. The Project will implement Section VII of the FERC Procedures regarding hydrostatic testing, as well as any specifications in applicable regulatory approvals.

Table 2.3-6

Proposed Hydrostatic Test Water Use Summary

Anticipated Year of Construction	Construction Spread	Segment Name	Beginning MP	Ending MP	Length of Section (feet)	Required Water (gal)	Proposed Water Source			Proposed Test Water Discharge Location		
							MP	Proposed Water Source	Watershed	MP	Watershed	Volume
2020	1	1	0.0	30.5	161,040	3,550,000	0	Municipal	TBD	0	Roanoke River Basin	3,500,000
2020	2	2	30.5	72.59	222,235	4,900,000	30.5	Municipal	TBD	30.5	Cape Fear River Basin	Hauled to a disposal facility
Hydrostatic Test Water Total						8,450,000						

2.3.4 HDD Water

The HDD method utilizes a drilling fluid comprised of a water and bentonite clay mixture (typically a 97:3 mixture), often referred to as a bentonite slurry, to facilitate the drilling process. Bentonite clay is classified as a non-toxic/non-hazardous substance. Due to the unique characteristics of bentonite, the slurry is capable of absorbing 10 times its own weight in water and swells up to 19 times its dry volume. The combined bentonite and water mixture serves the following purposes: lubricate and cool the drill head; seal and fill the porous space on the circumference of the drilled hole; form a cake-like substance to help prevent the walls of the drill hole from collapsing inward; and suspend the cuttings for removal through the drilling process. Water usage associated with each of the HDDs proposed for the Project is presented in Table 2.3-7. *[Note: The Project is in the preliminary stages of the HDD evaluation process. The Project will provide additional information in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]* There are several additives that are typically included in the bentonite slurry, and some may be used for the HDDs associated with the Project. Information about these potential additives, their composition and ingredients, potential hazards, first aid measures, accidental release measures, as well as a number of other safety issues will be included in the SPCC Plan. *[Note: The Project continues to prepare the SPCC Plan for the MVP Southgate Project. Additional information will be provided in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Table 2.3-7

Estimated Water Usage for the MVP Southgate Project HDDs

State, HDD Name	MP (Ending) of the HDD	Maximum Estimated Volume (gallons)		Water Source
		Hydrostatic Test Water	HDD Operations	
North Carolina				
Dan River HDD	TBD	TBD	TBD	Municipal/ TBD
Stony Creek Reservoir HDD	TBD	TBD	TBD	Municipal/ TBD

2.3.5 Dust Control

Water will be required for dust suppression during construction. Watering trucks would spray only enough water to control the dust or to reach the optimum soil moisture content to create a surface crust. Runoff should not be generated during this procedure. Water may be obtained through municipal sources or withdrawn from surface water or groundwater sources. The locations and amount of disbursement of water will be decided by the spread lead environmental inspector. All applicable permits/approvals would be obtained prior to withdrawal. During construction, the Project will implement fugitive dust control measures as described in Section 9.2.6 of Resource Report 9.

2.3.6 Construction and Operation Impacts and Mitigation

The construction method utilized at each waterbody crossing will vary with the characteristics of the specific waterbody and will be performed consistent with permit conditions outlined in the regulatory

permit approvals. The preferred crossing method of minor and intermediate waterbodies at the time of crossing will be open-cut or dry ditch crossing methods as described in the FERC Procedures and summarized in Resource Report 1. In additional to reducing the construction workspace to 75 feet through waterbody crossings, implementation of the FERC Plan and Procedures and the Project's Project-specific E&SCP, specifically with respect to construction time windows, erosion and sedimentation control, bank stabilization, and bank revegetation, will minimize short- and long-term impacts on the waterbodies crossed by the Project route. The Project will continue to consult with state agencies during the permitting process to identify additional site-specific impact avoidance and mitigation measures.

The Project will restore pipeline facility temporary workspaces, including the areas within FEMA flood zones, as closely as practicable to pre-construction contours. Restoration of pre-construction contours will preserve the existing flood storage capacity of the FEMA flood zones in temporary construction workspace. Approximately 2.4 acres of 100-year floodzone in North Carolina will be permanently altered as a result of the Project. The Project will obtain the necessary state and/or local permits required in Virginia and North Carolina, specifically working with the Rockingham County and Alamance County Planning Departments.

The Project will abide by state requirements / permit conditions for the Jordan Lake riparian buffer watershed. Implementation of the FERC Plan and Procedures, the Project's E&SCP and the applicable state permit conditions will minimize any potential impacts to surface waterbodies within the Jordan Lake riparian buffer watershed.

All ATWS will be located at least 50 feet away from waterbodies, unless otherwise approved by FERC through a site-specific exception to the FERC *Procedures*. The Project will limit the amount of vegetation cleared between the waterbody and the ATWS. ATWS areas closer than 50 feet to a waterbody and justification are listed in Appendix 2-F.

Crossings will be aligned as close to perpendicular to the axis of the waterbody channel as engineering and site-specific conditions allow. If the pipeline route parallels a waterbody, the Project will attempt to maintain at least 15 feet of undisturbed vegetation between the waterbody (and adjacent wetland, if present) and the construction workspace. There are three locations along the Project where maintaining 15 feet of undisturbed vegetation is not feasible, these locations are listed in Appendix 2-F and described below.

At approximately milepost 38.5, the construction workspace parallels a waterbody within 15 feet. There is a slope to the southwest of the current alignment that restricts the construction workspace to be shifted further from the waterbody. In addition to the sloped area, shifting the alignment to the southwest would create an increase of wetland impacts in this area. At approximately milepost 39.5 there is a wetland and stream complex that parallels the workspace within 15 feet. Similar to milepost 38.5, there is a sloped area southwest of the construction workspace which restricts the construction workspace to be shifted further from this wetland and stream complex. At milepost 62.5 there is a stretch of construction workspace that parallels a waterbody within 15 feet and, similar to the above instances, the terrain is dictating where the construction workspace is most feasible and safe. There is sloped terrain to the south of the construction workspace, a larger waterbody intersecting the workspace nearby and an agricultural pond to the north of the current alignment. The current alignment is situated to have the least impact to surrounding wetlands and waterbodies, as well as being most feasible and safe.

Impacts to Waterbodies from Crossings and Mitigation Measures

Construction of the pipeline could result in minor, short-term impacts to waterbodies. These impacts could occur because of in-stream construction activities, use of access roads, or construction on slopes and riparian areas adjacent to stream channels. Clearing and grading of stream banks, removal of riparian vegetation, in stream trenching, trench dewatering, and backfilling could result in stream bank modification, increased sedimentation, turbidity, increase in temperature, and decreased dissolved oxygen concentrations. An increase in soil compaction and vegetation clearing could potentially increase runoff and subsequent stream flow or peak flows. In the unlikely event of a leak or breach in the pipeline, the natural gas will rise to the ground surface and dissipate in the air. There are no liquids in the pipeline that would be released to groundwater or surface water in the unlikely event of a leak.

The following is a description of potential impacts due to the different waterbody crossing methods. Descriptions of waterbody crossing methods are summarized in Section 2.3.1.4 above, and described in more detail in Resource Report 1.

Open-cut: As described in Section 1.4.1.1 of Resource Report 1, the Project will cross waterbodies with no discernable flow at the time of construction using the conventional crossing methods, unless otherwise required. Temporary impacts from crossing a flowing waterbody can include a short-term increase in the sediment load in the waterbody during the period of trenching and backfilling, increased vulnerability of stream banks to erosion, streambank sloughing, increased turbidity and sedimentation downstream of the crossing location, and without proper mitigation, increased potential for sediment input from the construction right-of-way. Sustained periods of exposure to high levels of suspended solids can cause loss of fish egg and fry, reduced natural fish movements, fish vacating areas of high suspended solids, and other adverse impacts on fisheries resources. Additionally, fine silts and colloids that cloud waterbodies could result in diminished visual aesthetics for anglers and other recreational users; these materials could also impact potable water supplies drawn from surface water intakes. Temporary increases in turbidity will be minimized with the use of BMPs/temporary erosion and sediment controls (sediment barriers). As described in the FERC Procedures, waterbody banks will be stabilized and temporary sediment barriers will be removed within 24 hours of completing in stream construction activities. Stream beds will be recontoured as closely as possible to pre-construction conditions. The Project will implement the FERC Plan and Procedures such that restoration shall be considered successful if the right-of-way surface condition is similar to adjacent undisturbed lands, revegetation is successful, and proper drainage has been restored.

Dry crossing methods (Dam and Pump / Flume): Temporary construction-related impacts would be limited primarily to short periods of increased turbidity during the installation of temporary upstream and downstream dams prior to pipeline installation, and following installation of the pipeline when the dams are removed, and flow across the restored work area is re-established. Streambed and bank stabilization will be completed before returning flow to the waterbody channel.

Specific measures to minimize or avoid impacts to waterbodies for the different waterbody crossing methods proposed include:

<u>Dam and Pump</u>

- Sufficient pumps, including on-site backup pumps, will be used to maintain downstream flows;
- Pumps will be placed in secondary containment and properly aligned to prevent streambed scour at pump discharge;

- Dams will be constructed with materials that prevent sediment and other pollutants from entering the waterbody;
- Pump intakes will be screened to minimize entrainment of fish; and
- Dams and pumps will be continuously monitored to ensure proper operation throughout the waterbody crossing.

Flume

- Sand bags, sand bag and plastic sheeting diversion structures, or the equivalent will be used to develop an effective seal and to divert stream flow through the flume pipe;
- Flume pipes will be installed after blasting (if necessary), but before trenching;
- Flume pipes will remain in place until trenching, pipe laying, backfilling, and initial streambed restoration efforts are complete;
- Flume pipes will be properly aligned to prevent bank erosion and streambed scour; and
- All flume pipes and dams that are not part of the equipment bridge will be removed as soon as final cleanup of the streambed and bank is complete.

Impacts to Waterbodies from Potential Releases of Fuels, Lubricants, and Coolants, and Mitigation Measures

The use of heavy equipment to complete pipeline installation across waterbodies may increase the potential for accidental releases of fuels, lubricants, and coolants. Such releases could adversely affect aquatic species and contaminate public water supplies that rely on surface water intakes located downstream of the waterbody crossing. To mitigate these potential impacts, construction equipment, vehicles, hazardous materials, chemicals, fuels lubricating oils, and petroleum products will not be parked, stored, or serviced within a 100-foot radius of any waterbody or wetland. The Project will install signs along the right-of-way, including ATWS and contractor yards, to identify such areas.

The Project will develop a Project-specific SPCC Plan for implementation before and during construction. The SPCC Plan will describe preventive measures such as personnel training, equipment inspection, and refueling procedures to reduce the likelihood of spills. It will also include mitigation measures, such as containment and cleanup, to minimize potential impacts if a spill occurs. Riparian areas and floodplains will not be used as staging or refueling areas. Chemicals, solvents, and fuels will be kept at least 100 feet from streams and riparian areas and will be placed within secondary containment. Secondary containment consisting of materials that are impervious to the material being stored (e.g., diking and/or earthen berms with liner) will be used around liquids materials handling and storage areas to prevent spilled material from reaching the waters of the state. Areas that require containment include: (i) liquids stored in drums such as oils, chemicals, and hazardous waste, (ii) bulk storage tanks, and (iii) tanker trucks if parked at one location for more than two days. No chemicals or fuel will be transferred within 100 feet of stream banks. Drip pans or other suitable containment devices will be installed to collect all vehicle fluids when performing on-site maintenance. All waste fluids will be removed from the site and disposed of properly. The Project will minimize the potential impacts of spills of hazardous materials by adhering to this Project-specific SPCC Plan, which will be available in the field during construction. *[Note: The Project continues to prepare the SPCC Plan for the MVP Southgate Project. Additional information will be provided in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Impacts to Waterbodies from Turbidity and Sediment Runoff and Mitigation Measures

Pipeline construction across waterbodies and disturbance within the construction footprint for other facilities could result in increased potential for turbidity and sediment runoff from the construction right-of-way. Following FERC's Procedures, temporary erosion controls would be installed during construction to reduce sediment runoff into waterbodies. Permanent erosion controls would be installed within the pipeline right-of-way for operation and maintenance to reduce stormwater flow into streams.

To reduce turbidity and sedimentation caused by construction and vehicular traffic crossing waterbodies for access to the Project right-of-way, the Project will install temporary equipment bridges within the approved construction right-of-way that would remain in place throughout construction. Equipment bridges would be constructed using methods and materials such as clean rock or gravel and culverts, equipment mats, portable prefabricated bridges, and railcars. If excessively soft soils are encountered in the streambed, or if high water flows occur, portable bridges may be utilized at minor stream crossings in lieu of flume pipes. Equipment bridges would be designed to accommodate normal to high stream flow during the period of construction.

To minimize turbidity caused by erosion, trench spoil excavated from within streams flowing at the time of construction would be stored at least 10 feet from the top of the bank, unless impractical due to topography. Sediment barriers such as silt fences and straw/hay bales will be placed around the spoil piles to prevent spoil flow into the waterbody.

Once the pipe is placed in the trench, the excavated material would be replaced and the stream banks and streambed would be restored to their pre-construction contours. Stream banks and riparian areas will be stabilized by using erosion-control devices and appropriate seed mixtures approved by the landowner/agency.

Riparian canopy or stabilizing vegetation would not be removed if possible. Crushing or shearing streamside woody vegetation is preferable to complete removal. Any area where vegetation is removed in conjunction with stream crossings would be stabilized immediately following the completion of the crossing.

Impacts to Waterbodies from Hydrostatic Testing Discharges and Mitigation Measures

Potential exists for scour, erosion and potential for sediment transport to adjacent waterbodies from hydrostatic testing discharges. To mitigate these potential impacts, water discharged over land will be directed into energy dissipation devices, filter bags, or straw bale structures, which will be removed upon completion of testing. Typical drawings provided in the Project's Project-specific E&SCP include a typical hydrostatic test dewatering structure. The actual discharge methodology will be confirmed based upon field conditions. The hydrostatic test dewatering structure will be placed on a vegetated upland site that will allow water to flow away from the structure and any nearby work areas. The discharge rate will be regulated using valves and energy dissipation devices to prevent erosion and sediment transport. These measures will minimize scour, erosion, and sediment transport from hydrostatic testing.

Impacts to Waterbodies from Rock Blasting and Mitigation Measures

Temporary impacts from blasting of rock to excavate the pipeline trench in an open-cut crossing of a flowing waterbody can include a short-term increase in the sediment load in the waterbody during the period of trenching and injury to fish and mussels from the shock wave created by the blast. Table 2.3-8 identifies

waterbodies that will be crossed in areas where existing data shows potential for bedrock to be encountered within the trench depth (i.e., shallow bedrock) and where blasting could be required to excavate the trench.

Table 2.3-8

Waterbodies Crossed by the Pipeline in Areas of Shallow Bedrock a/

State/County	Milepost	Waterbody Name b/	Flow Type
Virginia			
Pittsylvania	23.1	AS-F18-43 / S-F18-43 / Tributary to Trotters Creek	Intermittent
	24.5	AS-F18-34 / S-F18-34 / Tributary to Dan River	Perennial
	24.8	S-F18-32/AS-F18-32 / Tributary to Dan River	Intermittent
	24.9	S-F18-33/AS-F18-33 / Tributary to Dan River	Perennial
North Carolina			
Rockingham	32.6	S-A18-150 / Tributary to Town Creek	Ephemeral
	39.1	S-B18-72 / Tributary to Wolf Island Creek	Ephemeral
	40.6	S-B18-51 / Tributary to Lick Fork	Perennial
	40.8	S-B18-52 / Tributary to Lick Fork	Perennial
	44.1	S-C18-25 / Tributary to Jones Creek	Perennial
	44.2	S-A18-102 / Tributary to Jones Creek	Perennial
	44.2	S-A18-103 / Tributary to Jones Creek	Ephemeral
	45.8	S-B18-71/AS-B18-71 / Tributary to Hogans Creek	Perennial
	45.9	S-B18-68 / Tributary to Hogans Creek	Perennial
	46.5	AS-NHD-1509 / Tributary to Hogans Creek	Intermittent
	47.5	S-C18-79 / Tributary to Hogans Creek	Perennial
	47.6	S-A18-90 / Tributary to Hogans Creek	Perennial
Alamance	67.6	AS-NHD-1551 / Tributary to Boyds Creek	Intermittent
	68.4	S-B18-11 / Tributary to Haw River	Intermittent
	70.6	S-A18-107 / Tributary to Haw River	Intermittent
	72.4	S-A18-118/AS-A18-118 / Tributary to Haw River	Ephemeral

a/ Analysis includes all waterbodies delineated as of June 29, 2018 crossed by the pipeline.
b/ Approximated waterbodies are indicated as "AS" in the Waterbody Name, and unless associated with a delineated stream, the AS Flow Type is also approximated.

To avoid these potential impacts, the following mitigation measures will be implemented by the Project:

- The Project will adhere to the FERC Plan and Procedures and will develop a Project-specific Blasting Plan to follow when blasting rock in an open-cut crossing of a waterbody. Blasting for trench excavation will be considered only after all other reasonable means of excavation are determined to be unlikely to achieve the required results. Blasting in smaller (generally less than 20 feet wide) or intermittent streams, would be avoided during high flow events, and/or done during dry periods to the extent possible.

Waterbodies in Karst Areas

Working under or through streams in karst areas could provide direct conduits for rapid surface water flow into subsurface karst features and potentially impact subsurface karst features and the stream. *[Note: The*

Project continues to evaluate potential land subsidence for the MVP Southgate Project. Additional information will be provided in the final Resource Reports included with the Certificate application expected to be filed in November 2018.] Waterbodies that are crossed by the pipeline within karst areas are included in Table 2.3-9.

Table 2.3-9

Waterbodies Crossed by the Pipeline in Karst Areas a/

State/County	Milepost	Waterbody Name	Flow Type
Virginia			
Pittsylvania	0.1	S-F18-6 / Tributary to Little Cherrystone Creek	Intermittent
	0.2	S-F18-9 / Tributary to Little Cherrystone Creek	Intermittent
	0.6	AS-NHD-2317 / Little Cherrystone Creek	Perennial
	0.8	AS-NHD-2384 / Tributary to Little Cherrystone Creek	Intermittent
	15.8	AS-NHD-2358 / Tributary to Silver Creek	Perennial
	16.3	AS-NHD-2397 / Tributary to Silver Creek	Intermittent

a/ Analysis includes all waterbodies delineated as of June 29, 2018 crossed by the pipeline.
b/ Approximated waterbodies are indicated as "AS" in the Waterbody Name and the AS Flow Type is also approximated.

2.4 WETLAND RESOURCES

The United States Army Corps of Engineers ("USACE") and USEPA jointly define wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Environmental Laboratory, 1987). The FERC defines wetlands as any area that is not in actively cultivated or rotated cropland and that satisfies the requirements of the current federal methodology for identifying and delineating wetlands. Wetlands generally include swamps, marshes, bogs, and similar areas.

2.4.1 Wetland Delineation Methodology

The Project conducted wetland delineations in accordance with the 1987 USACE Wetlands Delineation Manual (Environmental Laboratory, 1987) and the regional USACE supplements applicable to the Project. The Eastern Mountains and Piedmont Regional Supplement was used for the Project facilities (USACE, 2012). Wetland data discussed in this section of Resource Report 2 is based on field delineations where survey access has been granted and detailed desktop analysis taking into account several components (aerial imagery, National Wetland Inventory data [USFWS, 2009], and hydrological conditions from nearby delineated resources) where survey access has not been granted. The Project has completed field delineation of wetlands along approximately 56 percent of the pipeline alignment. The remainder of the alignment has either not been surveyed to date or is located within parcels where survey access permission has not been granted. Appendix 2-B lists the wetland crossings for both approximated and survey field data. Appendix 2-G provides a list of areas that have not been surveyed as of this filing, Appendix 2-I provides a wetland delineation report, and Appendix 2-J depicts National Wetland Inventory mapping along the Project. In addition to delineated resources in areas where survey permission was granted, the approximate resource boundaries further assist with the preliminary routing of the pipeline in an effort to

minimize wetland impacts. The Project attempted to minimize the number and extent of wetland crossings to the extent practicable while maintaining a safe, constructible alignment. Table 2.4-1 is a summary of wetlands crossed by the Project. Wetland boundaries are depicted on the alignment sheets located in Appendix 1-A of Resource Report 1.

Table 2.4-1

Summary of Wetlands Crossed by the MVP Southgate Project

State / County	Wetland Type	Length of Pipeline Crossing (Feet)	Acres Impacted a/	
			Construction	Operation
Virginia				
Pittsylvania	PEM	236	0.2	0.0
	PEM/PFO	1,260	2.5	0.7
	PFO	1,584	3.6	1.0
	PFO/PSS	64	0.1	0.0
	PSS	110	0.1	0.0
Virginia Total		***3,254***	***6.5***	***1.8***
North Carolina				
Rockingham	PEM	1,329	2.3	0.2
	PEM/PFO	2,831	3.4	1.7
	PEM/PFO/PSS	110	0.3	0.0
	PEM/PSS	87	0.3	0.0
	PFO	708	1.2	0.5
	PSS	200	0.7	0.0
Alamance	PEM	338	0.6	0.1
	PEM/PFO	800	1.3	0.5
	PEM/PSS	123	0.2	0.0
	PFO	1,412	2.6	1.0
	PSS	0	0.0	0.0
North Carolina Total		***7,988***	***12.8***	***4.1***
Project Total		***11,242***	***19.3***	***5.9***

a/ Construction impacts are impacts associated with all areas within the construction workspace limits, temporary and permanent. Operation impacts are impacts associated with vegetation maintenance (10 feet in PEM and PSS wetlands and 30 feet in PFO wetlands)

2.4.2 Types of Wetlands

The wetland classification system follows the naming convention found in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, 1979). This classification includes five major systems, including marine, estuarine, riverine, lacustrine, and palustrine. The Palustrine System includes all non-tidal wetlands dominated by trees, shrubs, emergents, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppm.

Three wetland classes are located in the Project survey corridor: palustrine emergent ("PEM"), palustrine scrub/shrub ("PSS"), palustrine forested ("PFO"). Classes describe the general appearance of the habitat in terms of either the dominant life form of the vegetation or the physiography and composition of the substrate. Life-forms (e.g., trees, shrubs, and emergents) are used to define classes because they are easily recognizable, do not change distribution rapidly, and have traditionally been used to classify wetlands. The four classes are as follows:

Palustrine Emergent ("PEM") – Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. PEM wetlands within the study corridor were typically dominated by sedges (e.g. *Carex crinata, Carex vulpinoidea*, *Carex scoparia*, *Carex lurida*), jewelweed (*Impatiens capensis*), soft rush (*Juncus effusus*), dark green bulrush (*Scirpus atrovirens*), sensitive fern (*Onoclea sensibilis*), tapertip rush (*Juncus acuminatus*), panicled aster (*Symphyotrichum lanceolatum*), rice cut grass (*Leersia oryzoides*).

Palustrine Scrub/Shrub ("PSS") – Scrub/shrub wetlands are characterized by woody vegetation that is generally less than 6 meters (~20 feet) tall. The woody angiosperms (i.e., small trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season. PSS wetlands within the study corridor are typically dominated by black willow (*Salix nigra*), red maple (*Acer rumbrum*), American sycamore (*Platanus occidentalis*), sweetbay magnolia (*Magnolia virginiana*), black elder (*Sambucus nigra*), smooth alder (*Alnus serrulata*), sedges (e.g. *Carex lurida*, *Carex scoparia*), sensitive fern, jewelweed, and soft rush.

Palustrine Forested ("PFO") – Forested wetlands are characterized by woody vegetation that is 6 meters in height or taller. The woody angiosperms (i.e., trees or shrubs) in this broad leaved deciduous community have relatively wide, flat leaves that are shed annually during the cold or dry season. PFO wetlands within the study corridor are typically dominated by green ash (*Fraxinus pennsylvanica*), red maple, sweetgum (*Liquidambar styraciflua*), American elm (*Ulmus Americana*), willow oak (*Quercus phellos*), swamp dewberry (*Rubus hispidus*), poison ivy (*Toxicondendron radicans*), and American sycamore.

2.4.3 Wetland Crossing Methods

Crossing of jurisdictional wetlands will be completed in accordance with applicable state and federal approvals and the FERC Plan and Procedures. The FERC Plan and Procedures were developed to provide a standard set of wetland crossing methods that allow practical installation of a pipeline while avoiding and minimizing short and long-term impacts on wetlands to the greatest extent practical. Operation of construction equipment in wetlands will be limited to that needed to clear the right-of-way, dig the trench, fabricate the pipe, install the pipe, backfill the trench, and restore the right-of-way. The Project will segregate the topsoil up to one foot in depth over the trench line in wetlands where hydrologic conditions permit this practice (where soils are not saturated). Restoration and monitoring of wetland crossings will be conducted in accordance with the FERC Plan and Procedures to ensure successful wetland revegetation. Other Federal and State permit seeding requirements will be considered where applicable.

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

conditions preclude conventional construction. Selection of the push/pull method will be decided during construction by the construction supervisor and/or the Project representative depending on the conditions at the time of construction.

Where wetlands cannot be avoided, the Project will seek to minimize impacts through the use of specialized wetland construction procedures. In accordance with FERC Procedures, fuel will not be stored within 100 feet of wetlands or other waterbodies during construction with the exception of pumps and HDD equipment. The Project is committed to constructing the Project in accordance with FERC Plan and Procedures and the Project's Project-specific E&SCP. Erosion control measures such as silt fences, interceptor dikes, and hay bale structures will be installed and maintained to minimize sedimentation within the wetland. Trench plugs will be installed where necessary to prevent the unintentional draining of water from the wetland. Upon completion of construction, the right-of-way will be restored, and a 10-foot wide strip centered on the pipeline will be maintained in an herbaceous state during operation. General wetland crossing methods are described in Section 1.4.1.1 of Resource Report 1; actual crossing methods will be dependent upon actual conditions in the field and agency requirements.

2.4.4 Construction and Operation Impacts and Mitigation

Although the majority of the wetland impacts will be temporary, there will be permanent wetland impacts associated with aboveground facilities for the Project. The Project will initiate consultation with applicable state and / or federal agencies regarding mitigation measures for permanent wetland impacts. Temporary construction impacts in wetlands may include temporary loss of herbaceous and scrub/shrub vegetation; wildlife habitat disruption; soil disturbance associated with grading, trenching, and stump removal; soil compaction; sedimentation and turbidity increases; and hydrological profile changes. Impacts to forested wetlands may include conversion to emergent and/or scrub/shrub wetland types as a result of tree removal within the construction and operational right-of-way. Operation of construction equipment through wetlands will be limited to only that necessary for each stage of pipeline installation. Topsoil segregation techniques will be used in unsaturated wetlands to preserve the seed bank and to facilitate successful restoration. Wetland crossing methods will be determined based on site-specific conditions. Wetlands with soils that can support construction equipment may be crossed using the open-ditch method, as described above, with the use of equipment mats to prevent soil rutting.

Wetland soils (hydric soils) are susceptible to compaction with operation of construction equipment over wet soils, thereby reducing the porosity and moisture-holding capacity of the soils and interfering with the hydrology of the wetland. In order to minimize compaction, the Project will limit construction traffic to only that required to accomplish the construction. Low-ground-pressure equipment will be used, or temporary equipment mats will be installed to allow passage of equipment with minimal disturbance of the surface soils and vegetation. Compacted areas will be tilled as necessary. Further discussion of soil compaction, construction activities in hydric soils, and restoration is included in Resource Report 7.

Outside of wetland areas, the width of the permanent right-of-way will be maintained in accordance with the FERC Plan, utilizing both mowing equipment and hand-cutting at least every three years; however, a ten-foot wide section directly over the pipeline may be maintained more regularly. In wetland areas, routine vegetation, mowing, or clearing will not occur over the entire permanent right-of-way. Woody vegetation with roots within 15 feet of the pipeline will be selectively cut and removed.

General Wetland Impact Minimization Measures

- In addition to wetlands crossing avoidance or minimization during route design and selection of appropriate crossing techniques, the Project will limit wetland impacts by adherence to the FERC Plan and Procedures and applicable permit requirements;
- Trees will be cut to grade, but stumps will only be removed directly over the trench line, or where safety concerns dictate otherwise. This will allow existing vegetation to recover more rapidly in the remainder of the right-of-way once the equipment mats and spoil piles have been removed;
- Operation of construction equipment in wetlands will be limited to that needed to clear the right-of-way, excavate the trench, fabricate the pipe, install the pipe, backfill the trench, and restore the right-of-way;
- After the pipeline is installed in the trench, the Project will backfill the ditch with the spoil excavated from the wetland. If dewatering of the trench is necessary, it will be conducted in a manner designed to prevent heavily silt-laden water from entering a waterbody or undisturbed portions of the wetland. Following backfilling, the segregated topsoil will be spread over the area from which it was stripped and restored to approximate pre-construction contour. The Project will remove any timber riprap, equipment mats, or other material from the wetland after construction;
- No herbicides or pesticides will be used in or within 100 feet of a wetland or waterbody, unless specified by a federal or state agency; and
- In general, the Project will seed wetland areas that are not inundated with annual rye to provide soil stabilization while allowing the natural seedbank to revegetate the wetland area. Topsoil segregation in unsaturated wetlands will preserve the native seed source, which will facilitate regrowth of wetland herbaceous and/or woody plant species through natural succession. The Project will document communications with the USACE and appropriate state agencies regarding the development of any additional wetland mitigation measures that may be required as conditions of specific permits.

Impacts to Forested Wetlands and Mitigation Measures

After the pipeline is constructed, the Project will periodically remove woody species within 15 feet of the pipeline to facilitate post-construction inspections along the permanently maintained pipeline right-of-way. USDOT regulations limit the re-growth of trees over the pipeline. This operational requirement would result in the conversion of some forested wetlands to emergent and/or scrub/shrub wetland types.

Crossing of the pipeline through forested wetlands has been minimized to the extent practicable through Project siting. Clearing for construction within forested wetlands and vegetation maintenance during pipeline operation will be limited per the FERC Procedures such that only the minimum width needed for pipeline protection and surveillance is maintained in an effort to reduce temporal impacts to forested wetlands.

As required by the FERC Procedures, the Project will maintain no more than a 10-foot-wide strip centered over the pipeline in an herbaceous state and will only remove woody vegetation within a 30-foot-wide strip centered over the pipeline. This will result in a 10-foot wide strip of herbaceous vegetation centered over the pipeline flanked by a potential shrub (PSS wetland type) strip of 10-foot width on either side.

Impacts to Adjacent Wetlands from Hydrological Profile Changes and Mitigation Measures

Hydrological profile changes from construction activities could adversely affect undisturbed wetlands adjacent to the construction right-of-way. To avoid these impacts, pre-construction wetland conditions including contours in the construction right-of-way will be restored to the extent possible. Hydric soils are susceptible to compaction and rutting depending on the saturation levels. The Project will minimize compaction and rutting of hydric soils by limiting access during wet periods, use low-ground pressure equipment, or temporary equipment mats to allow passage of equipment with minimal disturbance of the surface and vegetation.

The Project will follow FERC's Procedures requiring the use of trench breakers or installation of trench plugs in areas of shallow groundwater and on slopes. Trench breakers (or plugs) would prevent local shallow groundwater and recharge (via precipitation) from flowing along the pipeline trench and away from wetlands. Trench plugs are installed after the pipeline is installed in the trench and prior to trench backfilling.

Impacts to Adjacent Wetlands from Accidental Spills and Mitigation Measures

During construction, accidental spills of fuels, oils or other hazardous materials during wetland crossings could adversely affect adjacent undisturbed wetlands or reduce the successful restoration of wetlands in the construction right-of-way. To avoid these impacts, the Project will develop a Project-specific SPCC Plan for implementation during construction. Section 2.3.5 above describes preventive measures such as personnel training, equipment inspections, and refueling procedures to reduce likelihood of spills included in the SPCC. *[Note: The Project continues to prepare the SPCC Plan for the MVP Southgate Project. Additional information will be provided in the final Resource Reports included with the Certificate application expected to be filed in November 2018.]*

Alternative Measures to the FERC Procedures

ATWS areas may be required on either side of wetland crossings to stage construction, fabricate the pipeline, and store materials. ATWS areas will, to the extent practicable, be located in upland areas a minimum of 50 feet from the wetland edge. In most instances the ATWS is located beyond 50 feet of the wetland. However, there are locations where the Project has located ATWS within 50 feet of the wetland due to topography or other constraints. A list of ATWS located within 50 feet of wetlands and justification is included in Appendix 2-F.

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MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-A
Waterbodies Crossed by MVP Southgate Project

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
H-650 Pipeline								
Virginia								
Pittsylvania								
S-F18-6	0.1	Trib. To Little Cherrystone Creek	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
S-F18-9	0.2	Trib. To Little Cherrystone Creek	Intermittent	7	Minor	WWH		Conventional or Dry Crossing
AS-F18-10	0.4	Trib. To Little Cherrystone Creek	Intermittent	3	Minor	WWH		Conventional or Dry Crossing
AS-NHD-2317	0.6	Little Cherrystone Creek	Perennial	20	Intermediate	WWH	AL, R	Dry Crossing
AS-NHD-2384	0.8	Trib. To Little Cherrystone Creek	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
S-E18-18/AS-E18-18	1.3	Trib. To Cherrystone Creek	Intermittent	4	Minor	WWH		Conventional or Dry Crossing
AS-NHD-2349	1.6	Trib. To Cherrystone Creek	Perennial	5	Minor	WWH		Dry Crossing
AS-NHD-2311	1.9	Cherrystone Creek	Perennial	27	Intermediate	WWH	AL, FC, R, W	Dry Crossing
S-E18-2	3.4	Trib. To Banister River	Intermittent	8	Minor	WWH		Conventional or Dry Crossing
S-D18-6	3.8	Trib. To Banister River	Intermittent	10	Minor	WWH		Conventional or Dry Crossing
S-D18-10	4.2	Trib. To Banister River	Intermittent	6	Minor	WWH		Conventional or Dry Crossing
S-D18-9	4.3	Trib. To Banister River	Intermittent	4	Minor	WWH		Conventional or Dry Crossing
S-E18-4/AS-E18-4	5.1	Trib. To Banister River	Intermittent	3	Minor	WWH		Conventional or Dry Crossing
S-E18-3/AS-E18-3	5.2	Banister River	Perennial	48	Intermediate	WWH		Dry Crossing
S-F18-3	5.2	Trib. To White Oak Creek	Perennial	35	Intermediate	WWH	AL, PWS, R, W	Dry Crossing
S-D18-2	5.3	White Oak Creek	Perennial	21	Intermediate	WWH	AL, PWS, R, W	Dry Crossing
S-D18-15	6.2	Trib. To White Oak Creek	Ephemeral	0	Minor	WWH		N/A
S-D18-36	6.8	Trib. To White Oak Creek	Intermittent	0	Minor	WWH		N/A
S-E18-7/AS-E18-7	7.1	Trib. To White Oak Creek	Intermittent	4	Minor	WWH		Conventional or Dry Crossing
S-E18-6/AS-E18-6	7.2	Trib. To White Oak Creek	Intermittent	8	Minor	WWH		Conventional or Dry Crossing
S-D18-13/AS-D18-13	7.8	Trib. To White Oak Creek	Perennial	2	Minor	WWH		Dry Crossing

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-F18-13/AS-F18-13	8.2	Trib. To White Oak Creek	Intermittent	10	Minor	WWH		Conventional or Dry Crossing
S-E18-16/AS-E18-16	8.7	Trib. To White Oak Creek	Intermittent	8	Minor	WWH		Conventional or Dry Crossing
S-E18-14/AS-E18-14	8.8	Trib. To White Oak Creek	Perennial	10	Minor	WWH		Dry Crossing
WB-E18-24/AWB-E18-24	9.2	Trib. To White Oak Creek	Intermittent	37	Intermediate	WWH		Dry Crossing
S-F18-15	10	Trib. To White Oak Creek	Perennial	3	Minor	WWH		Dry Crossing
S-F18-17	10.1	White Oak Creek	Perennial	8	Minor	WWH		Dry Crossing
S-E18-22/AS-E18-22	10.2	Trib. To White Oak Creek	Intermittent	3	Minor	WWH		Conventional or Dry Crossing
S-F18-23	11.2	Trib. To Sandy Creek	Perennial	0	Minor	WWH		N/A
S-F18-20	11.2	Trib. To Sandy Creek	Perennial	5	Minor	WWH		Dry Crossing
S-F18-28	11.5	Trib. To Sandy Creek	Intermittent	0	Minor	WWH		N/A
S-F18-20	11.5	Trib. To Sandy Creek	Perennial	26	Minor	WWH		Dry Crossing
S-F18-20	11.5	Trib. To Sandy Creek	Perennial	0	Intermediate	WWH		N/A
AS-NHD-2394	11.7	Trib. To Sandy Creek	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
AS-NHD-2354	12	Trib. To Sandy Creek	Perennial	5	Minor	WWH		Dry Crossing
AS-NHD-2320	12.9	Sandy Creek	Perennial	23	Intermediate	WWH	AL, R, W	Dry Crossing
AS-NHD-2355	13.5	Trib. To Sandy Creek	Perennial	5	Minor	WWH		Dry Crossing
S-D18-22/AS-D18-22	14.4	Trib. To Sandy Creek	Perennial	12	Intermediate	WWH		Dry Crossing
AS-NHD-2358	15.8	Trib. To Silver Creek	Perennial	5	Minor	WWH		Dry Crossing
AS-NHD-2397	16.3	Trib. To Silver Creek	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
AS-NHD-2359	16.9	Trib. To Sandy River	Perennial	0	Minor	WWH		N/A
AS-NHD-2359	16.9	Trib. To Sandy River	Perennial	5	Minor	WWH		Dry Crossing
AS-NHD-2359	17.4	Trib. To Sandy River	Perennial	5	Minor	WWH		Dry Crossing
AS-NHD-2321	17.9	Sandy River	Perennial	86	Intermediate	WWH	AL, R, W	Dry Crossing
S-E18-42/AS-E18-42	18.1	Trib. To Hardys Creek	Perennial	4	Minor	WWH		Dry Crossing
AS-NHD-2398	19.8	Trib. To Sandy River	Intermittent	5	Minor	WWH		Conventional or Dry Crossing

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Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
AS-NHD-2399	20.5	Trib. To Trayner Branch	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
AS-NHD-2400	20.7	Trib. To Trayner Branch	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
S-D18-34/AS-D18-34	21.1	Trayner Branch	Perennial	4	Minor	WWH		Dry Crossing
AS-NHD-2404	21.4	Trib. To Trayner Branch	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
AS-NHD-2405	22.2	Trib. To Trotters Creek	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
S-F18-43/AS-F18-43	23.1	Trib. To Trotters Creek	Intermittent	0	Minor	WWH		N/A
S-F18-42/AS-F18-42	23.3	Trib. To Trotters Creek	Ephemeral	9	Minor	WWH		Conventional or Dry Crossing
S-F18-40/AS-F18-40	23.3	Trotters Creek	Perennial	20	Intermediate	WWH	AL, R, W	Dry Crossing
S-F18-38/AS-F18-38	23.7	Trib. To Dan River	Intermittent	4	Minor	WWH		Conventional or Dry Crossing
S-F18-35/AS-F18-35	23.9	Trib. To Dan River	Ephemeral	4	Minor	WWH		Conventional or Dry Crossing
S-E18-34/AS-E18-34	24.1	Trib. To Dan River	Perennial	0	Minor	WWH		N/A
S-F18-34/AS-F18-34	24.5	Trib. To Dan River	Perennial	0	Minor	WWH		N/A
AS-F18-32	24.8	Trib. To Dan River	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
AS-F18-33	24.9	Trib. To Dan River	Perennial	4	Minor	WWH		Dry Crossing
AS-NHD-2417	25.3	Trib. To Dan River	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
AS-NHD-2365	25.9	Trib. To Dan River	Perennial	5	Minor	WWH		Dry Crossing
AS-NHD-2418	26	Trib. To Dan River	Intermittent	5	Minor	WWH		Conventional or Dry Crossing
North Carolina								
Rockingham								
S-B18-99	26.7	Trib. To Cascade Creek	Intermittent	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-43	27.5	Trib. To Cascade Creek	Perennial	32	Intermediate	WWH	Class C	Dry Crossing
S-A18-42	27.5	Trib. To Cascade Creek	Intermittent	18	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-A18-40	27.7	Cascade Creek	Perennial	79	Intermediate	WWH	Class C	Dry Crossing
S-A18-156	27.7	Trib. To Cascade Creek	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-31	28.5	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A

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Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-A18-32	28.5	Trib. To Dan River	Perennial	7	Minor	WWH	Class C	Dry Crossing
S-A18-34	28.5	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-36	28.6	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-37	28.8	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-B18-49	28.9	Trib. To Dan River	Perennial	3	Minor	WWH	Class C	Dry Crossing
S-B18-47	29.2	Trib. To Dan River	Ephemeral	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-160	29.5	Trib. To Dan River	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-47	29.7	Trib. To Dan River	Perennial	3	Minor	WWH	Class C	Dry Crossing
S-A18-17	30.2	Dan River	Perennial	237	Major	WWH	Class C	HDD
S-B18-35	30.4	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-35	30.4	Trib. To Dan River	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-52	30.9	Rock Creek	Perennial	12	Intermediate	WWH	Class C	Dry Crossing
S-A18-52/AS-A18-52	31.1	Rock Creek	Perennial	35	Intermediate	WWH	Class C	Dry Crossing
S-B18-105	31.1	Trib. To Rock Creek	Intermittent	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-102	31.2	Trib. To Rock Creek	Perennial	2	Minor	WWH	Class C	Dry Crossing
S-B18-95	31.4	Rock Creek	Perennial	28	Intermediate	WWH	Class C	Dry Crossing
S-A18-143/AS-A18-143	31.9	Trib. To Machine Creek	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
AS-A18-140	31.9	Trib. To Machine Creek	Perennial	0	Minor	WWH	Class C	N/A
S-A18-140	32	Trib. To Machine Creek	Perennial	0	Minor	WWH	Class C	N/A
S-A18-144	32	Trib. To Machine Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-144	32.1	Trib. To Machine Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-140	32.1	Trib. To Machine Creek	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-A18-148	32.2	Trib. To Machine Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-147	32.3	Machine Creek	Perennial	23	Intermediate	WWH	Class C	Dry Crossing
S-A18-150	32.6	Trib. To Town Creek	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing

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Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-A18-153	32.7	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-151	32.7	Town Creek	Perennial	57	Intermediate	WWH	Class C	Dry Crossing
S-A18-151	33.1	Town Creek	Perennial	48	Intermediate	WWH	Class C	Dry Crossing
S-A18-154	33.1	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-154	33.1	Trib. To Town Creek	Intermittent	0	Minor	WWH	Class C	N/A
AS-NHD-1514	33.4	Trib. To Town Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
AS-C18-52	33.5	Trib. To Town Creek	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-51/AS-C18-51	33.6	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Conventional or Dry Crossing
AS-NHD-1525	33.8	Trib. To Town Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-49	34	Trib. To Town Creek	Intermittent	4	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-38	34.3	Trib. To Town Creek	Intermittent	25	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-C18-39	34.6	Trib. To Town Creek	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-38	34.7	Trib. To Town Creek	Intermittent	50	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-C18-44	34.7	Trib. To Town Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-53	34.8	Trib. To Town Creek	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-38	34.9	Trib. To Town Creek	Intermittent	10	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-74	34.9	Trib. To Town Creek	Ephemeral	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-38	35.1	Trib. To Town Creek	Intermittent	60	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-C18-38	35.1	Trib. To Town Creek	Intermittent	17	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-C18-73	35.1	Trib. To Town Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-38	35.2	Trib. To Town Creek	Intermittent	17	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-C18-38	35.2	Trib. To Town Creek	Intermittent	17	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-C18-57	35.2	Trib. To Town Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-72	35.4	Trib. To Town Creek	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-36	36	Trib. To Town Creek	Ephemeral	3	Minor	WWH	Class C	Conventional or Dry Crossing

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Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-C18-35/AS-C18-35	36.1	Trib. To Town Creek	Intermittent	10	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-93	36.9	Trib. To Wolf Island Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-94	37.1	Trib. To Wolf Island Creek	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-97	37.2	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Dry Crossing
S-A18-101	37.3	Trib. To Wolf Island Creek	Perennial	2	Minor	WWH	Class C	Dry Crossing
S-B18-117/AS-B18-117	37.8	Trib. To Wolf Island Creek	Perennial	10	Minor	WWH	Class C	Dry Crossing
S-A18-2	38.3	Trib. To Wolf Island Creek	Perennial	20	Intermediate	WWH	Class C	Dry Crossing
S-A18-9	38.5	Trib. To Wolf Island Creek	Perennial	3	Minor	WWH	Class C	Dry Crossing
AS-A18-8	38.8	Wolf Island Creek	Perennial	42	Intermediate	WWH	Class C	Dry Crossing
S-B18-72	39.1	Trib. To Wolf Island Creek	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-73	39.1	Trib. To Wolf Island Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-74	39.2	Trib. To Wolf Island Creek	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-B18-74	39.7	Trib. To Wolf Island Creek	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-B18-108	40.2	Trib. To Lick Fork	Perennial	27	Intermediate	WWH	Class C	Dry Crossing
S-B18-109	40.2	Trib. To Lick Fork	Ephemeral	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-51	40.6	Trib. To Lick Fork	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-B18-52	40.8	Trib. To Lick Fork	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-B18-57	41.2	Trib. To Lick Fork	Perennial	2	Minor	WWH	Class C	Dry Crossing
S-B18-56	41.2	Lick Fork	Perennial	34	Intermediate	WWH	Class C	Dry Crossing
S-A18-171	41.2	Trib. To Lick Fork	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-44/AS-B18-44	41.7	Trib. To Lick Fork	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-41	41.8	Trib. To Lick Fork	Perennial	26	Intermediate	WWH	Class C	Dry Crossing
AS-B18-89	42.3	Trib. To Jones Creek	Ephemeral	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-92	43.1	Trib. To Jones Creek	Perennial	14	Intermediate	WWH	Class C	Dry Crossing
S-A18-176	43.3	Jones Creek	Perennial	16	Intermediate	WWH	Class C	Dry Crossing

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Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-C18-80	43.8	Trib. To Jones Creek	Intermittent	4	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-105	43.8	Trib. To Jones Creek	Perennial	53	Intermediate	WWH	Class C	Dry Crossing
S-C18-25	44.1	Trib. To Jones Creek	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-A18-103	44.2	Trib. To Jones Creek	Ephemeral	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-102	44.2	Trib. To Jones Creek	Perennial	3	Minor	WWH	Class C	Dry Crossing
AS-B18-71	45.8	Trib. To Hogans Creek	Perennial	10	Minor	WWH	Class C	Dry Crossing
S-B18-68	45.9	Trib. To Hogans Creek	Perennial	3	Minor	WWH	Class C	Dry Crossing
AS-NHD-1509	46.5	Trib. To Hogans Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-76/AS-C18-76	47.1	Hogans Creek	Perennial	21	Intermediate	WWH	Class C	Dry Crossing
S-C18-78	47.1	Trib. To Hogans Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-79	47.5	Trib. To Hogans Creek	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-A18-90	47.6	Trib. To Hogans Creek	Perennial	2	Minor	WWH	Class C	Dry Crossing
AS-NHD-1508	47.8	Trib. To Hogans Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-92	48.1	Trib. To Hogans Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-60	48.7	Giles Creek	Perennial	4	Minor	WWH	Class C, WS-IV, NSW	Dry Crossing
S-A18-55/AS-A18-55	49.3	Trib. To Giles Creek	Perennial	3	Minor	WWH	Class C	Dry Crossing
S-A18-183	50	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-A18-185	50	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Conventional or Dry Crossing
AS-A18-182	50	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Conventional or Dry Crossing
AS-NHD-305	50.9	Trib. To Haw River	Perennial	29	Intermediate	WWH	Class C	Dry Crossing
S-C18-22	51.3	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
WB-C18-19	51.4	Trib. To Haw River	Pond	0	Major	WWH	Class C	N/A
S-C18-21	51.4	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A
S-C18-15/AS-C18-15	52.1	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
AS-NHD-1557	52.5	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing

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Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
Alamance								
S-B18-94	52.8	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-A18-84	53.7	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-A18-87	53.8	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Dry Crossing
S-A18-89	54.1	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-63	54.6	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-C18-62	54.7	Trib. To Haw River	Perennial	4	Minor	WWH	Class C	Dry Crossing
S-C18-60	55	Trib. To Haw River	Intermittent	4	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-61	55	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-61	55	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-68	55.3	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Dry Crossing
S-B18-59	55.3	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Dry Crossing
S-B18-59/AS-B18-59	55.3	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Dry Crossing
S-B18-65	56.5	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-120	56.5	Trib. To Haw River	Perennial	2	Minor	WWH	Class C	Dry Crossing
WB-A18-121	56.5	Trib. To Haw River	Pond	10	Minor	WWH	Class C	Dry Crossing
S-A18-122	56.6	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-125	56.7	Trib. To Haw River	Perennial	31	Intermediate	WWH	Class C	Dry Crossing
S-A18-126	56.7	Trib. To Haw River	Ephemeral	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-131	56.9	Trib. To Haw River	Ephemeral	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-132	57.1	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Dry Crossing
S-A18-134	57.2	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-2	57.9	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-13	58.7	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-11	58.7	Trib. To Haw River	Perennial	79	Intermediate	WWH	Class C	Dry Crossing

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-C18-12	58.7	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
AS-NHD-1549	59.7	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-30	60.8	Trib. To Haw River	Intermittent	13	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-C18-28	60.8	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-78	61.8	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-77	61.8	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-70	62.5	Trib. To Haw River	Perennial	14	Intermediate	WWH	Class C	Dry Crossing
S-A18-71	62.5	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-25	63	Trib. To Stony Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-23	63.1	Trib. To Stony Creek	Ephemeral	4	Minor	WWH	Class C	Dry Crossing
S-B18-24	63.1	Trib. To Stony Creek	Perennial	0	Minor	WWH	Class C	N/A
S-B18-12	63.1	Trib. To Stony Creek	Perennial	6	Minor	WWH	Class C	Dry Crossing
S-B18-22	63.1	Trib. To Stony Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-22	63.1	Trib. To Stony Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-26	63.1	Trib. To Stony Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-12	63.1	Trib. To Stony Creek	Perennial	6	Minor	WWH	Class C	Dry Crossing
S-B18-29	63.1	Trib. To Stony Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-29	63.1	Trib. To Stony Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-12	63.1	Trib. To Stony Creek	Perennial	6	Minor	WWH	Class C	Dry Crossing
S-B18-14	63.2	Trib. To Stony Creek	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-14	63.2	Trib. To Stony Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-B18-12	63.2	Trib. To Stony Creek	Perennial	21	Intermediate	WWH	Class C	Dry Crossing
S-B18-15	63.5	Trib. To Stony Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-16*/AS-B18-16	63.6	Stony Creek	Perennial	304	Major	WWH	Class C, WS-II, HQW, NSW	HDD
AS-B18-20	63.9	Trib. To Deep Creek	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
AS-NHD-1547	64	Deep Creek	Perennial	25	Intermediate	WWH	Class C, WS-II, HQW, NSW	Dry Crossing
S-B18-83	65.1	Trib. To Boyds Creek	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
AS-NHD-1548	65.5	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-87	65.8	Trib. To Boyds Creek	Ephemeral	1	Minor	WWH	Class C	Conventional or Dry Crossing
AS-NHD-1555	66.5	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-180	66.6	Trib. To Boyds Creek	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-177	66.6	Trib. To Boyds Creek	Perennial	0	Minor	WWH	Class C	N/A
S-B18-80	66.7	Trib. To Boyds Creek	Perennial	1	Minor	WWH	Class C	Dry Crossing
AS-NHD-1558	67.1	Boyds Creek	Perennial	17	Intermediate	WWH	Class C, WS-V, NSW	Dry Crossing
AS-NHD-1551	67.6	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-2	67.8	Trib. To Boyds Creek	Ephemeral	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-4	67.8	Trib. To Boyds Creek	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-6	67.9	Trib. To Boyds Creek	Ephemeral	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-7	67.9	Trib. To Boyds Creek	Perennial	3	Minor	WWH	Class C	Dry Crossing
AS-NHD-1552	68.1	Trib. To Boyds Creek	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-8	68.3	Trib. To Haw River	Intermittent	13	Intermediate	WWH	Class C	Conventional or Dry Crossing
S-B18-11	68.4	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-10	68.6	Trib. To Haw River	Ephemeral	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-15	68.7	Trib. To Haw River	Intermittent	4	Minor	WWH	Class C	Conventional or Dry Crossing
AS-NHD-1559	69	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-70	69.2	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-C18-70	69.3	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
AS-A18-113	69.3	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-115	69.5	Trib. To Haw River	Perennial	6	Minor	WWH	Class C	Dry Crossing
AS-NHD-1553	69.9	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-C18-82/AS-C18-82	70	Trib. To Haw River	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-C18-81	70.3	Trib. To Haw River	Perennial	24	Intermediate	WWH	Class C	Dry Crossing
S-A18-109	70.5	Trib. To Haw River	Perennial	5	Minor	WWH	Class C	Dry Crossing
S-A18-108	70.6	Trib. To Haw River	Intermittent	2	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-107	70.6	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-64	71.1	Trib. To Haw River	Perennial	26	Intermediate	WWH	Class C	Dry Crossing
S-A18-65	71.2	Trib. To Haw River	Intermittent	1	Minor	WWH	Class C	Conventional or Dry Crossing
S-A18-68	71.4	Trib. To Haw River	Perennial	3	Minor	WWH	Class C	Dry Crossing
AS-NHD-1560	71.7	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
AS-NHD-1556	71.9	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Conventional or Dry Crossing
AS-A18-118	72.4	Trib. To Haw River	Ephemeral	1	Minor	WWH	Class C	Conventional or Dry Crossing
Aboveground Facilities								
North Carolina								
Rockingham								
S-B18-35 - Meter Station	30.4	Trib. To Dan River	Intermittent	3	Minor	WWH	Class C	Conventional or Dry Crossing
S-B18-107 - Meter Station	30.5	Trib. To Dan River	Ephemeral	0	Minor	WWH	Class C	N/A
AS-NHD-1513 - CY-05	30.7	Dry Creek	Intermittent	0	Minor	WWH	Class C	N/A
AS-APP-1569 - CY-05	30.8	Trib. To Dry Creek	Pond	0	Minor	WWH	Class C	N/A
Temporary Access Roads								
Virginia								
Pittsylvania								
AS-F18-10/S-F18-10	0.4	Trib. To Little Cherrystone Creek	Intermittent	0	Minor	WWH		N/A
S-F18-10	0.4	Trib. To Little Cherrystone Creek	Intermittent	7	Minor	WWH		Bridge or Flume
S-D18-20	2.4	Trib. To Cherrystone Creek	Intermittent	0	Minor	WWH		N/A
S-D18-20	2.4	Trib. To Cherrystone Creek	Intermittent	3	Minor	WWH		Bridge or Flume

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-F18-3	5.2	Trib. To White Oak Creek	Perennial	24	Intermediate	WWH	AL, PWS, R, W	Bridge or Flume
S-D18-17	5.8	Trib. To Banister River	Intermittent	12	Intermediate	WWH		Bridge or Flume
S-D18-17	5.8	Trib. To Banister River	Intermittent	12	Intermediate	WWH		Bridge or Flume
AS-NHD-2339	6	White Oak Creek	Perennial	5	Minor	WWH	AL, PWS, R, W	Bridge or Flume
S-D18-13	7.8	Trib. To White Oak Creek	Perennial	0	Minor	WWH		N/A
S-D18-28	13.8	Trib. To Sandy Creek	Perennial	7	Minor	WWH		Bridge or Flume
S-D18-26	13.8	Trib. To Sandy Creek	Perennial	8	Minor	WWH		Bridge or Flume
AS-NHD-2357	14.4	Trib. To Sandy Creek	Perennial	5	Minor	WWH		Bridge or Flume
AS-NHD-2359	16.9	Trib. To Sandy River	Perennial	5	Minor	WWH		Bridge or Flume
AS-NHD-2359	17.3	Trib. To Sandy River	Perennial	5	Minor	WWH		Bridge or Flume
S-E18-45	17.6	Trib. To Silver Creek	Ephemeral	0	Minor	WWH		N/A
AS-NHD-2401	20.7	Trib. To Trayner Branch	Intermittent	5	Minor	WWH		Bridge or Flume
AS-NHD-2344	21.4	Trayner Branch	Perennial	5	Minor	WWH		Bridge or Flume
S-E18-39	22.7	Trib. To Trotters Creek	Intermittent	4	Minor	WWH		Bridge or Flume
S-E18-38	22.7	Trib. To Trotters Creek	Intermittent	5	Minor	WWH		Bridge or Flume
S-E18-40	22.8	Trib. To Trotters Creek	Intermittent	5	Minor	WWH		Bridge or Flume
S-E18-41	22.9	Trib. To Trotters Creek	Ephemeral	3	Minor	WWH		Bridge or Flume
S-F18-38	23.8	Trib. To Dan River	Intermittent	5	Minor	WWH		Bridge or Flume
S-E18-32	24.1	Trib. To Dan River	Intermittent	5	Minor	WWH		Bridge or Flume
North Carolina								
Rockingham								
WB-A18-45	27	Trib. To Dan River	Pond	0	Minor	WWH	Class C	N/A
S-A18-27	28.5	Trib. To Dan River	Intermittent	0	Minor	WWH	Class C	N/A
S-A18-23	28.5	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-19	29.9	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/
S-A18-19	29.9	Trib. To Dan River	Perennial	0	Minor	WWH	Class C	N/A
S-B18-38	30.4	Trib. To Dan River	Ephemeral	0	Minor	WWH	Class C	N/A
S-C18-50	34.1	Trib. To Town Creek	Ephemeral	0	Minor	WWH	Class C	N/A
S-A18-1	38.1	Trib. To Wolf Island Creek	Ephemeral	1	Minor	WWH	Class C	Bridge or Flume
S-B18-42	41.9	Trib. To Lick Fork	Intermittent	1	Minor	WWH	Class C	Bridge or Flume
AS-NHD-1564	50.3	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Bridge or Flume
S-C18-71	50.3	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
S-C18-18	51.6	Trib. To Haw River	Ephemeral	0	Minor	WWH	Class C	N/A
Alamance								
WB-A18-88	53.9	Trib. To Haw River	Pond	0	Minor	WWH	Class C	N/A
S-A18-125	57	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-70	62.4	Trib. To Haw River	Perennial	0	Minor	WWH	Class C	N/A
S-A18-72	62.5	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
S-B18-18	64	Trib. To Deep Creek	Intermittent	1	Minor	WWH	Class C	Bridge or Flume
AS-APP-1565	65.3	Trib. To Boyds Creek	Pond	0	Minor	WWH	Class C	N/A
AS-NHD-1550	65.3	Trib. To Boyds Creek	Intermittent	0	Minor	WWH	Class C	N/A
WB-A18-16	68.7	Trib. To Haw River	Pond	0	Minor	WWH	Class C	N/A
S-A18-15	68.7	Trib. To Haw River	Intermittent	0	Minor	WWH	Class C	N/A
Permanent Access Road								
North Carolina								
Alamance								
AS-NHD-1554	58.9	Trib. To Haw River	Intermittent	5	Minor	WWH	Class C	Bridge or Flume

a/ "S" indicates stream, "WB" indicates pond, "AS" indicates approximate stream or pond.

b/ MP is closest milepost to waterbody.

c/ Perennial: flowing throughout the year for all or most years, Intermittent: flowing water during certain times of the year, Ephemeral: flowing water only during short periods of the year. For delineated waterbodies, flow type in North Carolina was determined using the NCDWQ Stream Identification Form Version 4.11 and flow type in Virginia has been field estimated. For

Appendix 2-A

Waterbodies Crossed by MVP Southgate Project

Facility/ State/ County/ Waterbody ID a/	Approx. MP b/	Waterbody Name	Flow Type c/	Crossing Width (Feet) d/	FERC Class e/	Fishery Classification f/	State Water Quality Classification g/	Crossing Method h/

approximated waterbodies, flow type was estimated based on aerial imagery unless the approximated stream is directly associated with a delineated waterbody in which the approximated waterbody was assigned the same flow type as the associated delineated waterbody.

d/ Crossing width is the intersection of the waterbody and the centerline of the pipeline or access road. For approximated streams, the crossing width was measure using aerial imagery if wide enough to discern, and defaulted to 5 feet if too narrow to be measured using aerial imagery. If the crossing width is "0", the waterbody is not crossed by the centerline.

e/ FERC Classification from the 2013 FERC Procedures. Minor (≤10 feet); Intermediate (>10 - ≤100 feet); Major (>100 feet).

f/ WWF - Warm Water Fish.

g/ Virginia Water Quality Classifications (VDEQ, 2016a). North Carolina Water Quality Classifications (NCDEQ, 2018c). In Virginia AL = Aquatic Life, R = Recreation, W = Wildlife, FC = Fish Consumption, PWS = PUBLIC Water Source. In North Carolina WS-II = Water Supply II, WA-IV = Water Supply IV, WS-V = Water Supply V, HQW = High Quality Waters, NSW = Nutrient Sensitive Waters

h/ HDD: Horizontal Directional Drill. Conventional Crossing will only be used when there is no discernable flow within the waterbody at the time of crossing. Dry Crossing will consist of either Flume, Dam and Pump, or Cofferdam. N/A indicates that the waterbody is not crossed by centerline.

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-B
Wetlands Crossed by the MVP Southgate Project

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
H-650 Pipeline **Virginia** **Pittsylvania**							
W-F18-7	PFO	0.1	11	0.0	0.0	0.0	0.0
W-F18-8	PFO	0.2	0	0.0	0.0	0.0	0.0
W-F18-8	PFO	0.2	0	0.0	0.0	0.0	0.0
W-F18-8	PFO	0.3	0	0.0	0.0	0.0	0.0
AW-NWI-1345	PFO	0.6	239	0.8	0.8	0.2	0.2
W-G18-2	PFO	1.2	0	0.0	0.0	0.0	0.0
AW-NWI-1344	PFO	1.6	0	0.0	0.0	0.0	0.0
AW-NWI-1344	PFO	1.6	0	0.0	0.0	0.0	0.0
AW-NWI-1341	PEM, PFO	1.7	844	1.8	1.3	0.5	0.4
AW-NWI-1343	PFO	2.1	0	0.2	0.2	0.0	0.0
AW-NWI-1343	PFO	2.2	0	0.0	0.0	0.0	0.0
W-D18-5	PFO	3.8	44	0.1	0.1	0.0	0.0
W-D18-5	PFO	3.8	1	0.0	0.0	0.0	0.0
W-D18-11	PFO	4.2	0	0.0	0.0	0.0	0.0
W-D18-11	PFO	4.2	5	0.0	0.0	0.0	0.0
W-D18-7	PEM, PFO	5.1	382	0.5	0.5	0.3	0.3
AW-D18-7	PEM, PFO	5.1	0	0.2	0.2	0.0	0.0
W-E18-5	PFO	5.2	16	0.0	0.0	0.0	0.0
W-E18-4	PFO	5.2	71	0.2	0.2	0.1	0.1
W-D18-1	PFO	5.3	0	0.0	0.0	0.0	0.0
W-D18-1	PFO	5.4	543	1.2	1.2	0.4	0.4
AW-D18-1	PFO	5.4	0	0.0	0.0	0.0	0.0
W-D18-10	PFO	6.7	0	0.0	0.0	0.0	0.0

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-D18-10	PFO	6.8	18	0.1	0.1	0.0	0.0
W-D18-14	PFO	7.8	0	0.0	0.0	0.0	0.0
AW-F18-14	PFO	8.2	6	0.0	0.0	0.0	0.0
W-F18-14	PEM	8.2	0	0.0	0.0	0.0	0.0
W-F18-14	PFO	8.2	0	0.0	0.0	0.0	0.0
AW-F18-14	PFO	8.2	4	0.0	0.0	0.0	0.0
W-F18-14	PFO	8.2	1	0.0	0.0	0.0	0.0
AW-E18-17	PEM	8.6	28	0.1	0.0	0.0	0.0
W-E18-17	PEM	8.6	68	0.1	0.0	0.0	0.0
AW-E18-13	PFO	8.7	110	0.1	0.1	0.1	0.1
W-E18-13	PFO	8.7	0	0.1	0.1	0.0	0.0
AW-E18-13	PFO	8.7	77	0.1	0.1	0.0	0.0
W-E18-13	PFO	8.7	0	0.1	0.1	0.0	0.0
AW-E18-13	PFO	8.8	62	0.1	0.1	0.0	0.0
W-E18-13	PFO	8.8	0	0.1	0.1	0.0	0.0
W-E18-24	PFO	9.2	0	0.0	0.0	0.0	0.0
AW-E18-24	PFO	9.2	9	0.0	0.0	0.0	0.0
W-F18-16	PFO	10	0	0.0	0.0	0.0	0.0
W-F18-16	PFO	10	10	0.0	0.0	0.0	0.0
W-F18-16	PFO	10	0	0.0	0.0	0.0	0.0
W-F18-18	PFO	10.1	0	0.0	0.0	0.0	0.0
W-F18-18	PFO	10.1	0	0.0	0.0	0.0	0.0
AW-E18-23	PFO	10.2	0	0.0	0.0	0.0	0.0
W-E18-23	PFO	10.2	12	0.0	0.0	0.0	0.0
W-F18-21	PFO	11.2	4	0.0	0.0	0.0	0.0
W-F18-29	PFO, PSS	11.5	64	0.1	0.1	0.0	0.0

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-F18-21	PFO	11.5	2	0.0	0.0	0.0	0.0
W-F18-21	PFO	11.5	15	0.0	0.0	0.0	0.0
W-D18-23	PFO	14.3	56	0.1	0.1	0.0	0.0
AW-D18-23	PFO	14.4	0	0.0	0.0	0.0	0.0
AW-E18-43	PFO	18.1	0	0.0	0.0	0.0	0.0
W-E18-43	PFO	18.1	17	0.0	0.0	0.0	0.0
AW-D18-35	PFO	21.1	118	0.1	0.1	0.1	0.1
W-D18-35	PFO	21.1	0	0.1	0.1	0.0	0.0
W-F18-36	PFO	23.9	0	0.0	0.0	0.0	0.0
AW-E18-33	PFO	24.1	0	0.0	0.0	0.0	0.0
W-E18-33	PFO	24.1	0	0.0	0.0	0.0	0.0
Virginia Subtotal			2,837	6.3	5.6	1.8	1.7
North Carolina							
Rockingham							
W-B18-98	PFO	26.7	15	0.0	0.0	0.0	0.0
W-A18-22	PEM	26.9	68	0.1	0.0	0.0	0.0
W-A18-44	PEM	27.2	0	0.0	0.0	0.0	0.0
W-A18-44	PEM	27.3	222	0.3	0.0	0.1	0.0
W-A18-44	PEM	27.3	0	0.0	0.0	0.0	0.0
W-A18-44	PEM	27.4	338	0.4	0.0	0.1	0.0
W-A18-41	PEM	27.6	154	0.2	0.0	0.0	0.0
W-A18-41	PEM, PFO	27.6	0	0.0	0.0	0.0	0.0
W-A18-39	PEM	28.1	19	0.1	0.0	0.0	0.0
W-A18-39	PEM	28.2	39	0.1	0.0	0.0	0.0
W-A18-26	PEM	28.2	9	0.0	0.0	0.0	0.0
W-A18-26	PEM	28.2	0	0.0	0.0	0.0	0.0

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-A18-26	PEM	28.3	43	0.1	0.0	0.0	0.0
W-A18-25	PFO	28.3	41	0.1	0.1	0.0	0.0
W-A18-30	PEM	28.5	0	0.0	0.0	0.0	0.0
W-A18-30	PFO	28.5	5	0.0	0.0	0.0	0.0
W-A18-33	PEM	28.5	0	0.0	0.0	0.0	0.0
W-A18-38	PEM, PFO	28.8	29	0.1	0.0	0.0	0.0
W-B18-48	PEM, PFO	29.2	33	0.1	0.1	0.0	0.0
W-A18-18	PEM, PFO	29.9	1,983	1.7	1.6	0.7	0.6
W-B18-39	PEM	30.3	30	0.0	0.0	0.0	0.0
W-B18-36	PFO	30.4	290	0.5	0.5	0.2	0.2
W-B18-36	PEM, PFO	30.4	36	0.1	0.0	0.0	0.0
W-B18-36	PEM	30.5	30	0.0	0.0	0.0	0.0
W-B18-34	PFO	30.6	125	0.2	0.2	0.1	0.1
W-A18-54	PEM	30.8	10	0.0	0.0	0.0	0.0
W-B18-103	PEM	31.2	0	0.0	0.0	0.0	0.0
W-A18-141	PFO	32	0	0.0	0.0	0.0	0.0
W-A18-141	PEM, PFO	32.1	186	0.3	0.3	0.1	0.1
W-A18-149	PEM, PSS	32.3	87	0.3	0.0	0.0	0.0
W-A18-152	PEM, PFO	32.7	62	0.1	0.0	0.0	0.0
W-A18-155	PEM, PSS	33.2	0	0.1	0.0	0.0	0.0
W-A18-155	PSS	33.2	68	0.1	0.0	0.0	0.0
W-C18-40	PEM	34.6	0	0.0	0.0	0.0	0.0
W-A18-95	PEM	37.1	8	0.0	0.0	0.0	0.0
W-A18-98	PFO	37.2	0	0.0	0.0	0.0	0.0
W-A18-6	PFO	38.5	129	0.2	0.2	0.1	0.1
W-A18-6	PEM, PFO	38.6	138	0.2	0.1	0.1	0.1

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-A18-7	PEM, PFO, PSS	38.7	110	0.3	0.0	0.0	0.0
W-A18-7	PEM	38.7	16	0.0	0.0	0.0	0.0
W-A18-7	PEM	38.8	29	0.1	0.0	0.0	0.0
W-A18-7	PEM	38.8	16	0.0	0.0	0.0	0.0
W-B18-78	PFO	39.5	0	0.0	0.0	0.0	0.0
W-B18-78	PFO	39.7	56	0.1	0.1	0.0	0.0
W-B18-112	PEM	40.2	0	0.0	0.0	0.0	0.0
W-B18-110	PFO	40.3	0	0.0	0.0	0.0	0.0
W-B18-55	PEM, PFO	41.2	21	0.1	0.1	0.0	0.0
W-A18-175	PEM	43.4	19	0.0	0.0	0.0	0.0
AW-NWI-543	PSS	47	92	0.4	0.0	0.0	0.0
W-C18-77	PFO	47.1	47	0.1	0.1	0.0	0.0
W-A18-62	PSS	48.7	40	0.1	0.0	0.0	0.0
W-A18-62	PSS	48.7	0	0.0	0.0	0.0	0.0
W-A18-61	PEM	48.7	0	0.0	0.0	0.0	0.0
W-A18-57	PEM	49.3	0	0.0	0.0	0.0	0.0
W-A18-184	PEM	50	0	0.0	0.0	0.0	0.0
W-A18-184	PEM, PFO	50	42	0.1	0.0	0.0	0.0
W-C18-20	PEM, PFO	51.4	153	0.2	0.2	0.1	0.1
	Rockingham County Subtotal		4,838	7.0	3.6	1.9	1.5
Alamance							
W-A18-83	PEM	53.4	10	0.0	0.0	0.0	0.0
W-A18-85	PEM, PSS	53.7	71	0.1	0.0	0.0	0.0
W-C18-67	PFO	54.4	86	0.1	0.1	0.0	0.0
W-C18-59	PFO	55	0	0.0	0.0	0.0	0.0
W-C18-59	PFO	55	0	0.0	0.0	0.0	0.0

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-C18-69	PFO	55.3	37	0.1	0.1	0.0	0.0
W-B18-61	PEM	55.6	39	0.1	0.0	0.0	0.0
W-A18-119	PEM, PFO	56.5	92	0.2	0.1	0.0	0.0
W-A18-119	PEM, PFO	56.6	115	0.2	0.1	0.1	0.1
W-A18-119	PFO	56.6	201	0.3	0.3	0.1	0.1
W-A18-127	PEM	56.7	0	0.0	0.0	0.0	0.0
W-A18-127	PFO	56.7	0	0.0	0.0	0.0	0.0
W-A18-127	PEM, PFO	56.7	61	0.1	0.1	0.0	0.0
W-A18-130	PEM, PFO	56.9	132	0.2	0.2	0.1	0.1
W-A18-130	PEM	57	0	0.0	0.0	0.0	0.0
W-A18-133	PFO	57.1	0	0.0	0.0	0.0	0.0
W-A18-133	PFO	57.1	41	0.1	0.1	0.0	0.0
W-A18-135	PEM, PFO	57.2	140	0.2	0.2	0.1	0.1
W-A18-139	PSS	57.5	0	0.0	0.0	0.0	0.0
W-A18-139	PSS	57.6	0	0.0	0.0	0.0	0.0
W-C18-3	PEM, PFO	57.9	20	0.0	0.0	0.0	0.0
W-C18-5	PEM, PSS	58	52	0.1	0.0	0.0	0.0
W-C18-29	PFO	60.8	317	0.5	0.5	0.2	0.2
W-A18-79	PFO	61.8	0	0.0	0.0	0.0	0.0
W-A18-74	PFO	62.5	8	0.0	0.0	0.0	0.0
W-A18-80	PEM	62.7	64	0.1	0.0	0.0	0.0
W-B18-32	PEM	62.9	0	0.0	0.0	0.0	0.0
W-B18-28	PFO	63.1	313	0.7	0.7	0.2	0.2
AW-B18-19	PFO	63.9	47	0.1	0.1	0.0	0.0
W-B18-81	PEM, PFO	65	240	0.3	0.3	0.2	0.1
W-B18-82	PFO	65.1	25	0.0	0.0	0.0	0.0

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-B18-82	PFO	65.1	25	0.0	0.0	0.0	0.0
W-B18-84	PFO	65.8	268	0.5	0.5	0.2	0.2
W-B18-5	PFO	67.9	0	0.0	0.0	0.0	0.0
W-A18-67	PFO	71.4	44	0.0	0.0	0.0	0.0
W-A18-67	PFO	71.4	0	0.0	0.0	0.0	0.0
W-A18-111	PEM	72.59	33	0.2	0.0	0.0	0.0
Alamance County Subtotal			2,481	4.5	3.7	1.6	1.5
North Carolina Subtotal			**7,319**	**11.4**	**7.3**	**3.4**	**2.9**
Mainline Subtotal			**10,156**	**17.7**	**12.9**	**5.2**	**4.7**
Aboveground Facilities							
North Carolina							
Rockingham							
AW-NWI-540 CY-05	PEM	30.8	0	0.2	0.0	0.0	0.0
AW-NWI-541 - CY-05	PEM	30.8	0	0.1	0.0	0.0	0.0
W-B18-36 - T-15 Dan River Interconnect	PEM, PFO	30.4	148	0.6	0.5	0.6	0.5
Alamance							
W-A18-83 - MLV 6	PEM	53.4	15	0.0	0.0	0.0	0.0
W-A18-111 - T-21 Haw River Interconnect	PEM	72.59	12	0.1	0.0	0.1	0.0
Aboveground Facilities Subtotal			**175**	**1.0**	**0.5**	**0.7**	**0.5**
Temporary Access Roads							
Virginia							
Pittsylvania							
W-F18-11 - TA-PI-002	PFO	0.4	0	0.0	0.0	0.0	0.0
W-F18-11/ AW-F18-11 - TA-PI-002	PEM, PFO	0.4	34	0.0	0.0	0.0	0.0
W-F18-11 - TA-PI-002	PFO	0.4	0	0.0	0.0	0.0	0.0
AW-NWI-1341 - TA-PI-004	PEM	1.8	0	0.0	0.0	0.0	0.0

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-D18-1 - TA-PI-010	PFO	5.2	20	0.0	0.0	0.0	0.0
W-D18-1 - TA-PI-010	PEM	5.2	140	0.1	0.0	0.0	0.0
W-F18-1 - TA-PI-011	PSS	5.5	110	0.1	0.0	0.0	0.0
W-D18-14 - TA-PI-020	PFO	7.8	0	0.0	0.0	0.0	0.0
W-D18-14 - TA-PI-020	PFO	7.8	0	0.0	00.0	0.0	0.0
W-D18-29 - TA-PI-034	PFO	13.8	10	0.0	0.0	0.0	0.0
W-D18-29 - TA-PI-034	PFO	13.8	3	0.0	0.0	0.0	0.0
W-D18-27 - TA-PI-034	PFO	13.8	100	0.1	0.1	0.0	0.0
W-E18-37 - TA-PI-061	PFO	22.7	0	0.0	0.0	0.0	0.0
W-E18-37 - TA-PI-061	PFO	22.7	0	0.0	0.0	0.0	0.0
W-E18-37 - TA-PI-061	PFO	22.9	0	0.0	0.0	0.0	0.0
W-F18-37 - TA-PI-062	PFO	23.8	0	0.0	0.0	0.0	0.0
W-F18-37 - TA-PI-062	PFO	23.8	0	0.0	0.0	0.0	0.0
W-F18-37 - TA-PI-062	PFO	23.8	0	0.0	0.0	0.0	0.0
W-E18-31 - TA-PI-063	PFO	24.1	0	0.0	0.0	0.0	0.0
Virginia Temporary Access Road Subtotal			417	0.3	0.1	0.0	0.0
North Carolina							
Rockingham							
W-B18-97 - TA-PI-068	PEM	26.3	20	0.0	0.0	0.0	0.0
W-A18-44 - TA-RO-073	PEM	27.2	0	0.0	0.0	0.0	0.0
W-A18-44 - TA-RO-073	PEM	27.2	0	0.0	0.0	0.0	0.0
W-A18-26 - TA-RO-075	PEM	28.2	0	0.0	0.0	0.0	0.0
W-A18-28 - TA-RO-076	PEM	28.5	11	0.0	0.0	0.0	0.0
W-A18-20 - TA-RO-080	PEM	29.8	0	0.0	0.0	0.0	0.0
W-A18-20 - TA-RO-080	PEM	29.8	0	0.0	0.0	0.0	0.0
W-A18-20 - TA-RO-080	PEM	29.8	0	0.0	0.0	0.0	0.0

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/
W-A18-18 - TA-RO-080	PEM	30.1	0	0.0	0.0	0.0	0.0
W-B18-39 - TA-RO-081	PEM	30.3	23	0.0	0.0	0.0	0.0
W-B18-39 - TA-RO-081	PEM	30.3	38	0.0	0.0	0.0	0.0
W-B18-36 - TA-RO-081	PEM	30.4	44	0.0	0.0	0.0	0.0
W-B18-36/AW-B18-36 - TA-RO-081	PEM	30.4	78	0.1	0.0	0.0	0.0
W-A18-7 - TA-RO-104	PEM	38.7	0	0.0	0.0	0.0	0.0
W-B18-43 - TA-RO-113	PEM	41.9	65	0.0	0.0	0.0	0.0
W-C18-17 - TA-RO-140	PSS	51.6	0	0.0	0.0	0.0	0.0
Alamance							
W-A18-130 - TA-AL-160	PEM	57	202	0.1	0.0	0.0	0.0
W-A18-130 - TA-AL-160	PEM	57	0	0.0	0.0	0.0	0.0
W-A18-75 - TA-AL-169	PEM	62.5	0	0.0	0.0	0.0	0.0
W-A18-75 - TA-AL-169	PEM	62.5	13	0.0	0.0	0.0	0.0
North Carolina Temporary Access Road Subtotal			494	0.3	0.0	0.0	0.0
Temporary Access Road Subtotal			**911**	**0.6**	**0.1**	**0.0**	**0.0**
Permanent Access Road North Carolina Rockingham							
W-B18-34 - PA-RO-082	PFO	30.5	0	0.0	0.0	0.0	0.0
Permanent Access Road Subtotal			**0**	**0.0**	**0.0**	**0.0**	**0.0**
Project Total			**11,242**	**19.3**	**13.5**	**5.9**	**5.2**

Appendix 2-B

Wetlands Crossed by the MVP Southgate Project

Facility/ State/ County/ Wetland ID a/	Wetland Type b/	Approx. MP	Crossing Length (Feet) c/	Total Construction Impacts (acres) d/	Forested Construction Impacts (acres) d/	Total Operation Vegetation Impacts (acres) e/	Forested Operation Vegetation Impacts (acres) e/

a/ Data is based on wetland field delineations completed through July 29, 2018 where access has been obtained, National Wetland Inventory (NWI) data, and desktop analysis of approximated resources. Wetland IDs starting with "W" have been field delineated and wetland ID starting with "AW" are approximated based on NWI data and desktop analysis.

b/ Wetland Classifications PEM = palustrine emergent wetland, PSS = palustrine scrub shrub wetland, PFO = palustrine forested wetland

c/ Crossing length is measured at the intersection of the wetland and proposed centerline of the pipeline or center of the access road. Crossing length of “0” indicates the wetland is not crossed by the centerline of the pipeline, but is located within the construction workspace.

d/ Total construction impacts include all wetland impacts (PEM, PFO, PSS) associated with the construction workspace. Forested construction impacts are only the PFO impacts within the construction workspace. Wetland impacts of “0.0” indicates the impact is less than 0.001 acre, but the impact is included in the project totals.

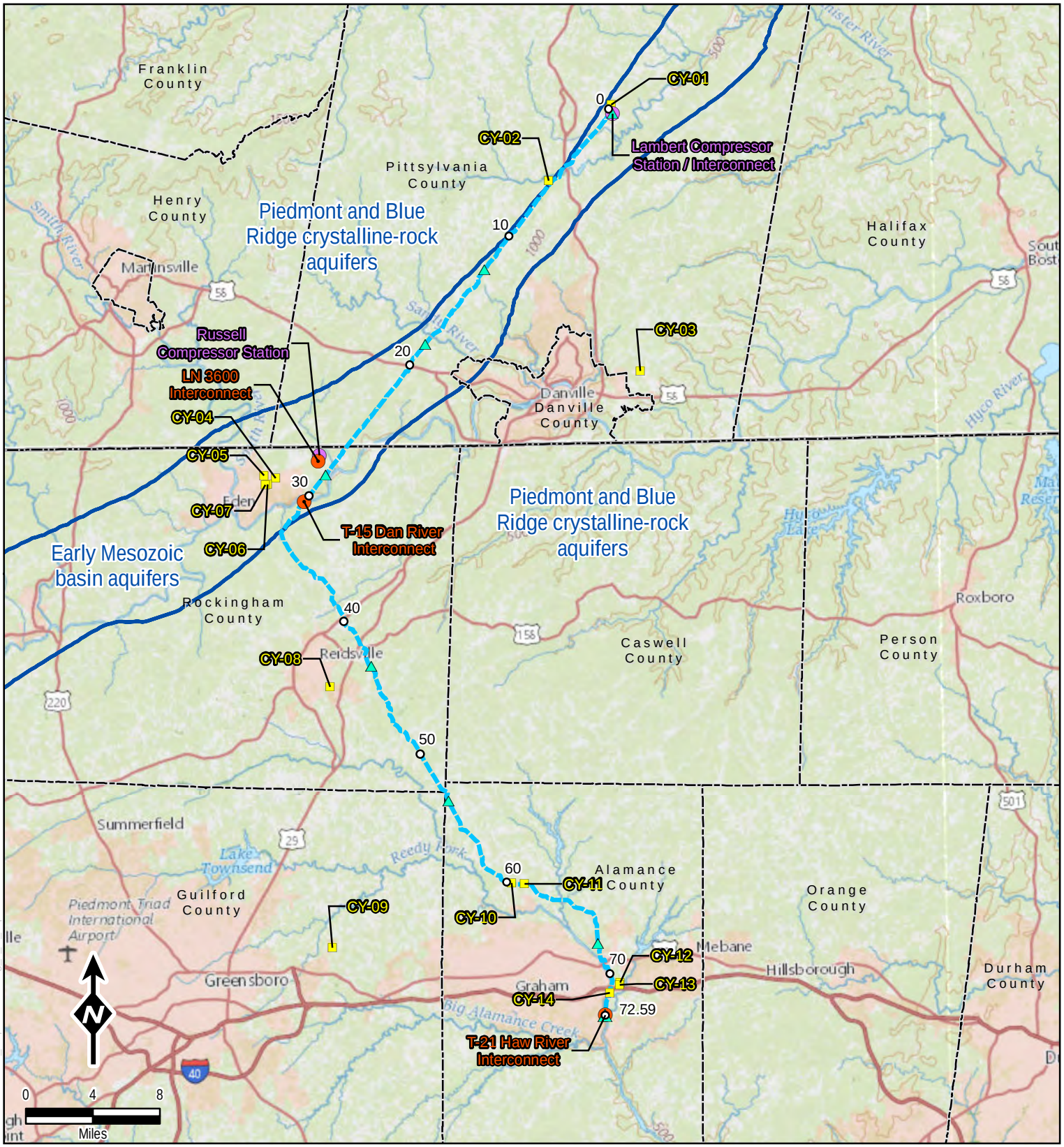
e/ Total operation vegetation impacts include PEM, PSS and PFO impacts for vegetation maintenance. Operational vegetation impacts for PEM and PSS wetlands include a 10-foot-wide vegetation maintenance corridor; operational vegetation maintenance impacts for PFO wetlands include a 30-foot-wide vegetation maintenance corridor (i.e., 10-foot-wide cleared corridor and selective removal of trees within 15 feet of the pipeline). Wetland impacts of “0.0” indicates the impact is less than 0.001 acre, but the impact is included in the project totals.

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-C
Figures



Legend

- Aquifer Boundary
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, USGS, TRC, EQT

1 inch = 8 miles
When Printed 8.5x11

Mountain Valley PIPELINE, LLC

Figure 2-C-1

Regional Aquifers Along the MVP Southgate Project

TRC
600 Willowbrook Ln
West Chester, PA 19382

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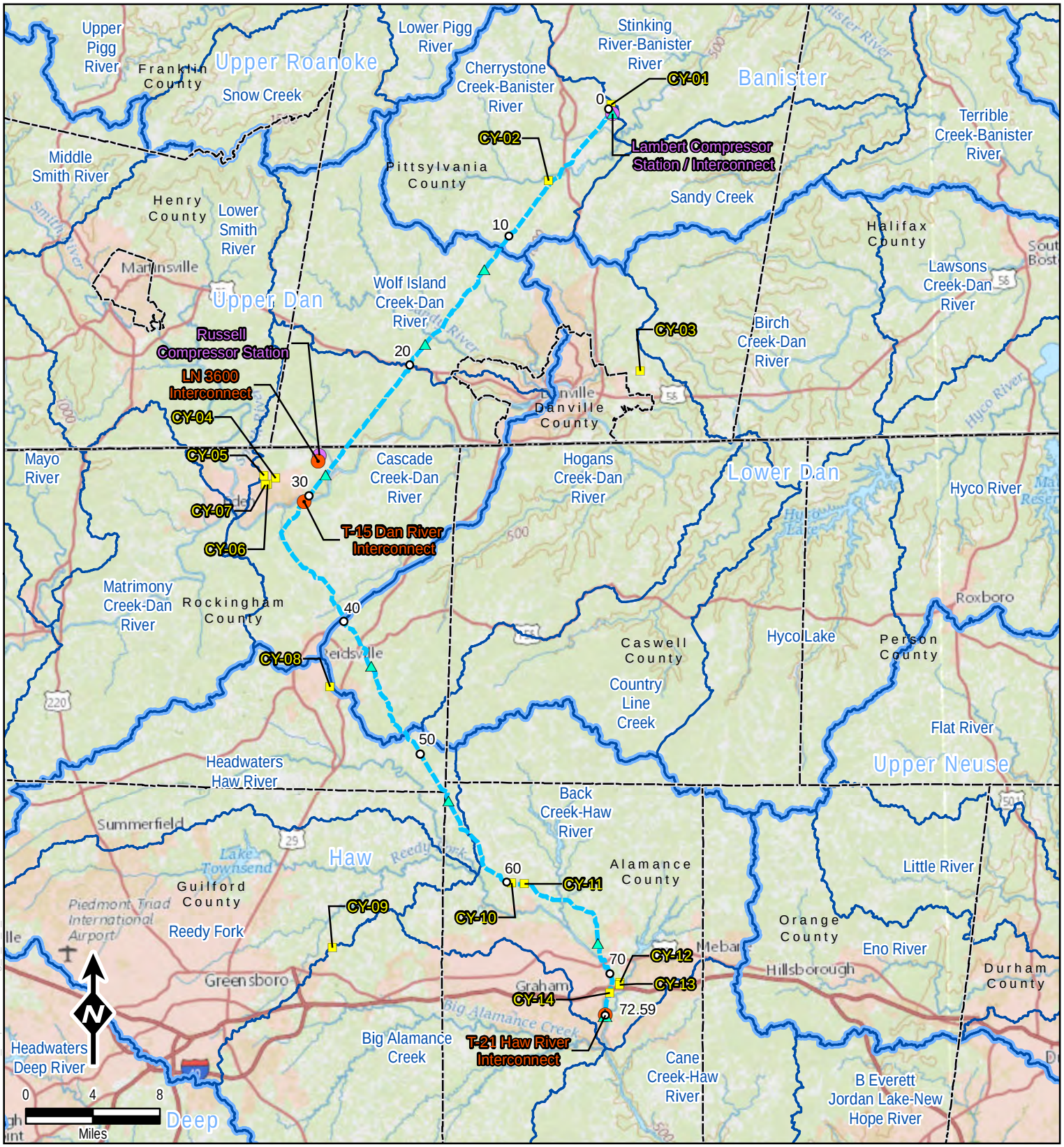
Upper Pigg River
Franklin County
Upper Roanoke
Snow Creek
Lower Pigg River
Cherrystone Creek-Banister River
Stinking River-Banister River
CY-01
Banister
Terrible Creek-Banister River
CY-02
Lambert Compressor Station / Interconnect
Middle Smith River
Pittsylvania County
Sandy Creek
Henry County
Lower Smith River
Martinsville
Upper Dan
Wolf Island Creek-Dan River
Halifax County
Lawsons Creek-Dan River
Russell Compressor Station
LN 3600 Interconnect
CY-03
Birch Creek-Dan River
CY-04
Danville
Danville County
CY-05
Mayo River
Cascade Creek-Dan River
Hogans Creek-Dan River
Lower Dan
Hyco River
CY-07
T-15 Dan River Interconnect
CY-06
Matrimony Creek-Dan River
Rockingham County
Roxboro
Hyco Lake
Caswell County
Person County
CY-08
Reidsville
Country Line Creek
Flat River
Headwaters Haw River
Upper Neuse
Back Creek-Haw River
Summerfield
Haw
Lake Townsend
Alamance County
Little River
Guilford County
CY-11
CY-09
CY-10
Piedmont Triad International Airport
Reedy Fork
Orange County
Eno River
Mebane
CY-12
CY-13
Hillsborough
Durham County
Greensboro
Graham
CY-14
72.59
Big Alamance Creek
Headwaters Deep River
T-21 Haw River Interconnect
Cane Creek-Haw River
B Everett Jordan Lake-New Hope River
Deep
0
4
8
Miles
West Virginia
Virginia
North Carolina
South Carolina
Legend
8 Digit Watershed Boundary
10 Digit Watershed Boundary
Proposed Pipeline Route
Mileposts
Compressor Station
Contract Yard
Meter Station
Valve Site
State Boundary
County Boundary
8 Digit HUC Name
10 Digit HUC Name
Note: All 8 and 10 digit boundaries shown fall within the 2 digit South Atlantic-Gulf Region watershed boundary.
1 inch = 8 miles
When Printed 8.5x11
Data Sources: ESRI, USGS, TRC, EQT
Mountain Valley PIPELINE LLC
Figure 2-C-2
Watersheds in Virginia and North Carolina
TRC
600 Willowbrook Ln
West Chester, PA 19382
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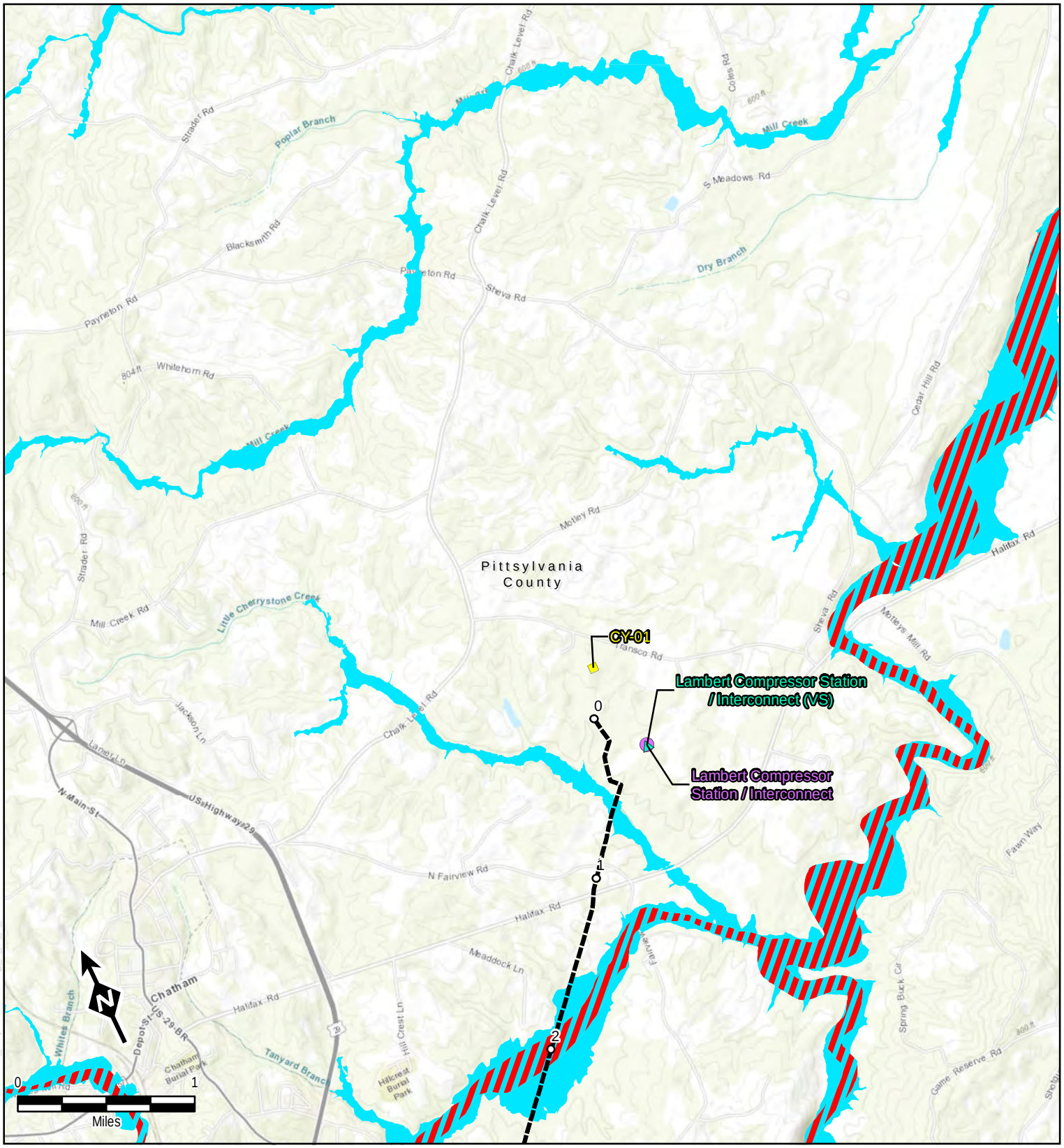

Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE

Figure 2-C-3
Sheet 1 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC
600 Willowbrook Ln
West Chester, PA 19382

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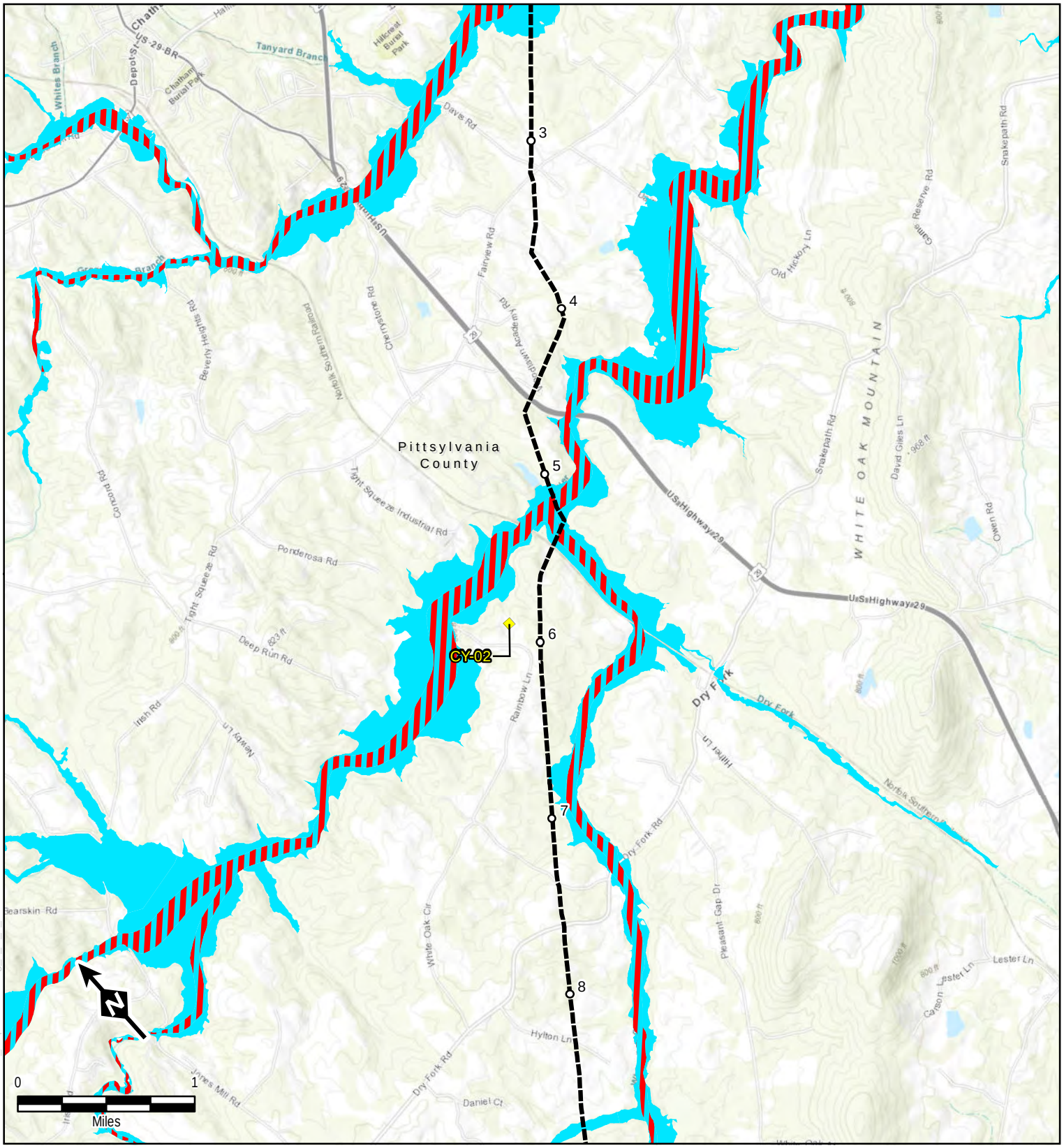

Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- Valve Site
- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 2 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

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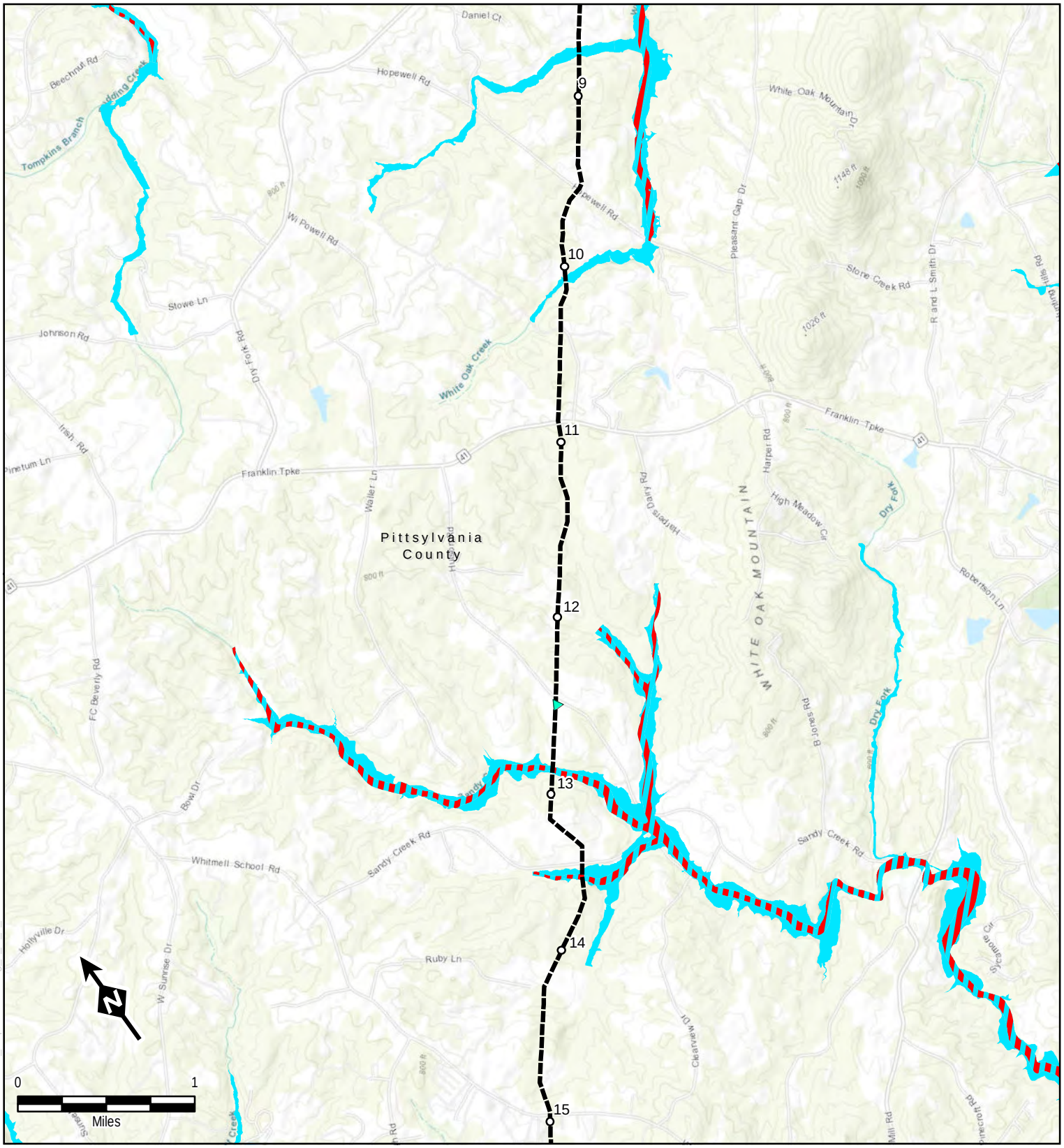

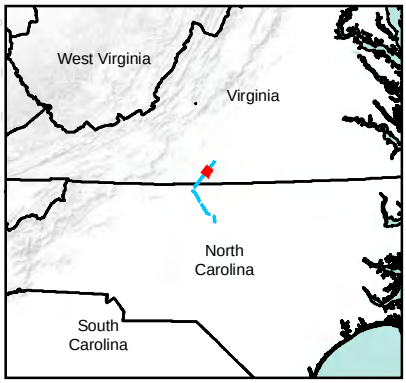

Legend

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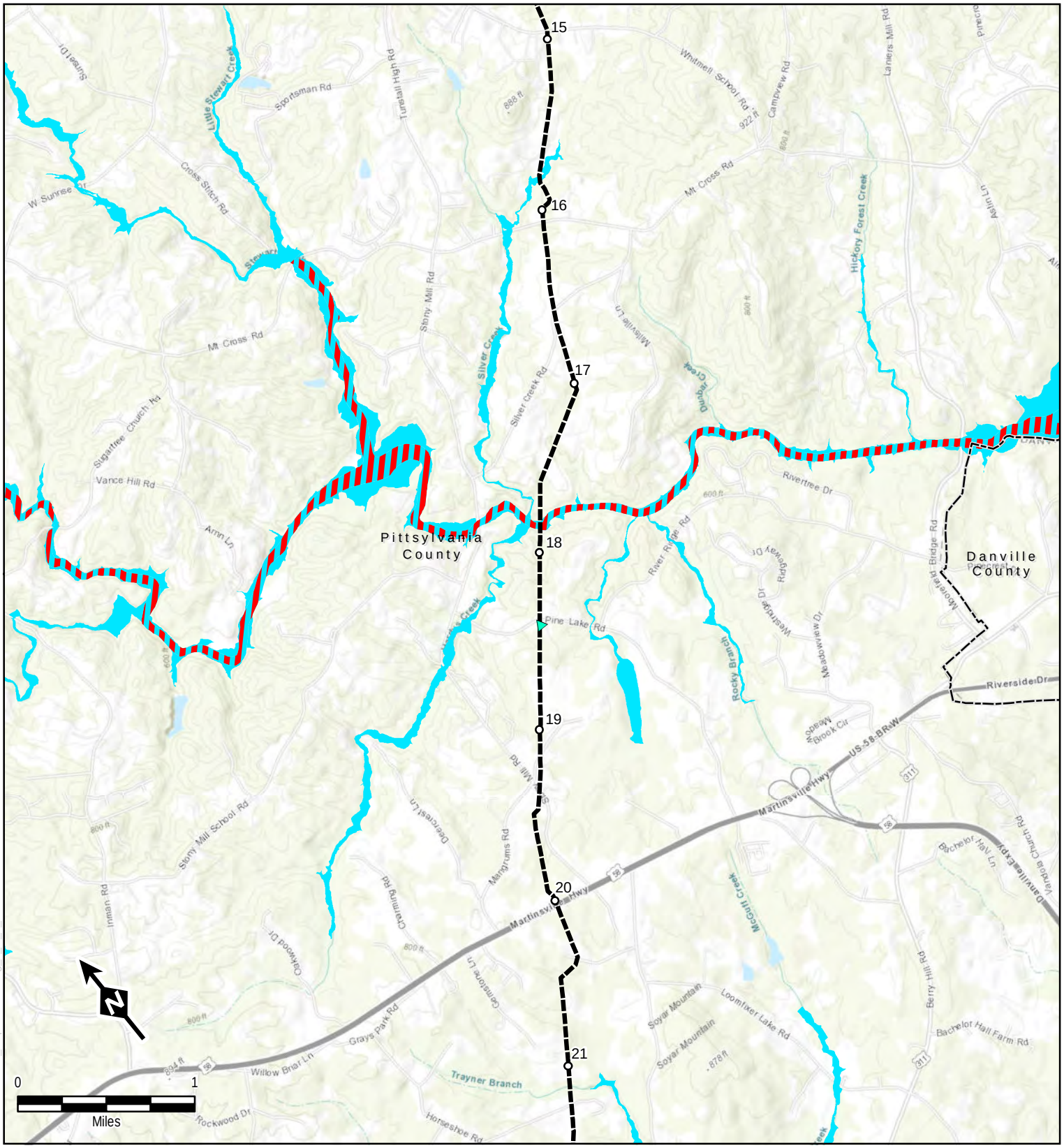
Mountain Valley PIPELINE LLC

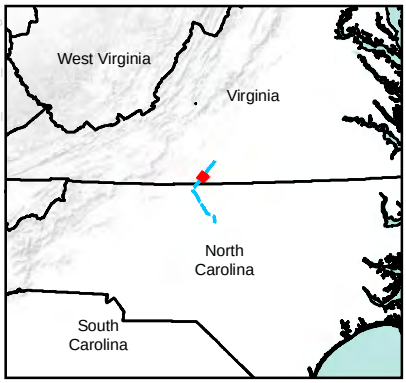
Figure 2-C-3
Sheet 3 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Fig_2_C_3_FEMA.mxd





Legend

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Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 4 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

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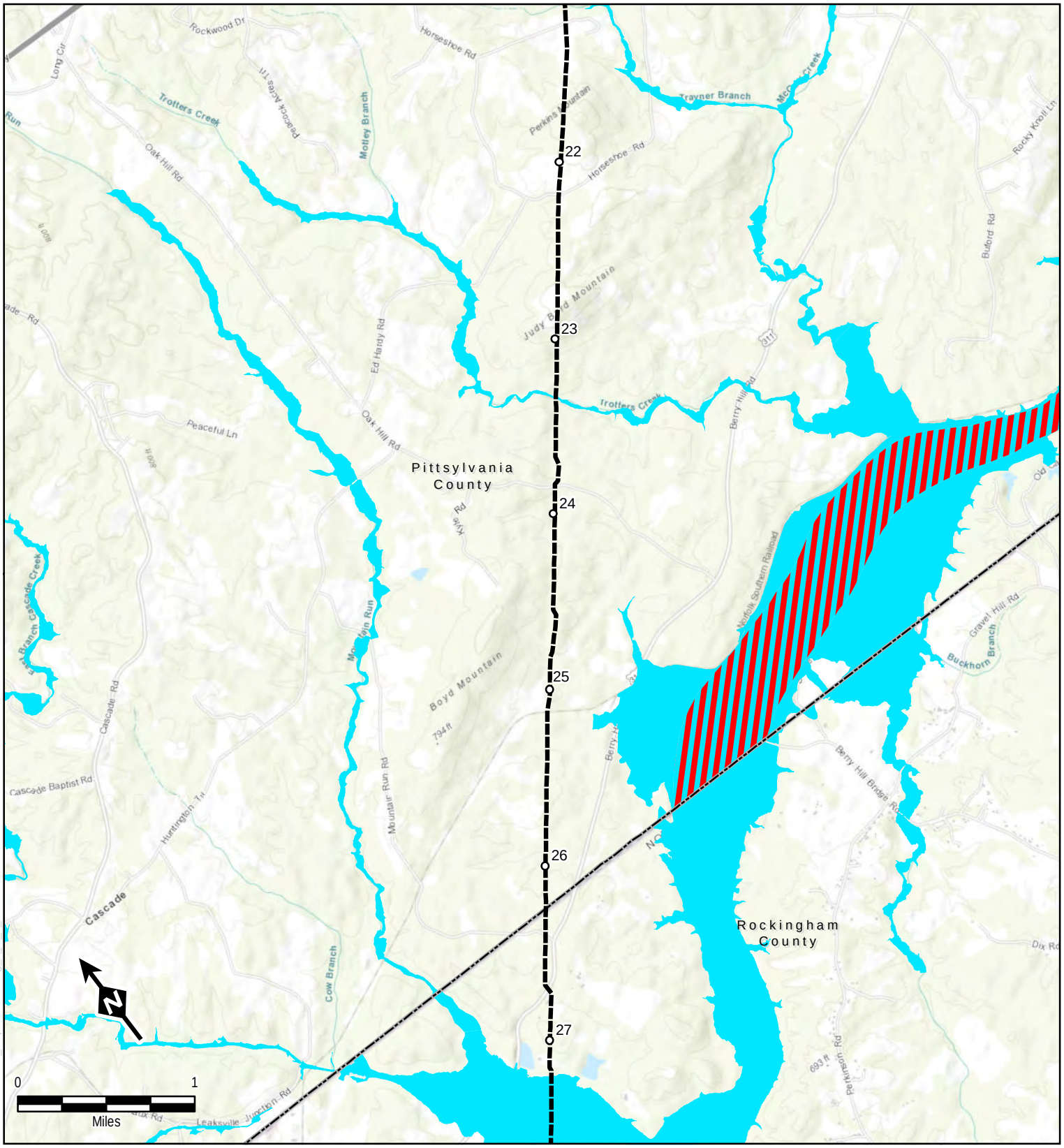

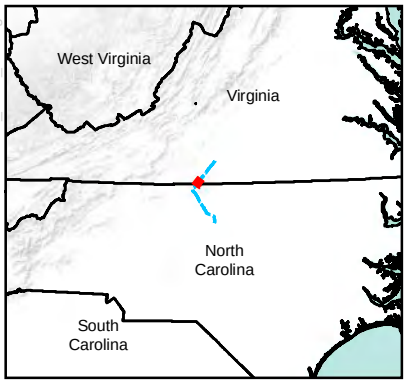

Legend

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Proposed Pipeline Route
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- Meter Station
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- State Boundary
- County Boundary

Data Sources: ESRI, FEMA, TRC, EQT

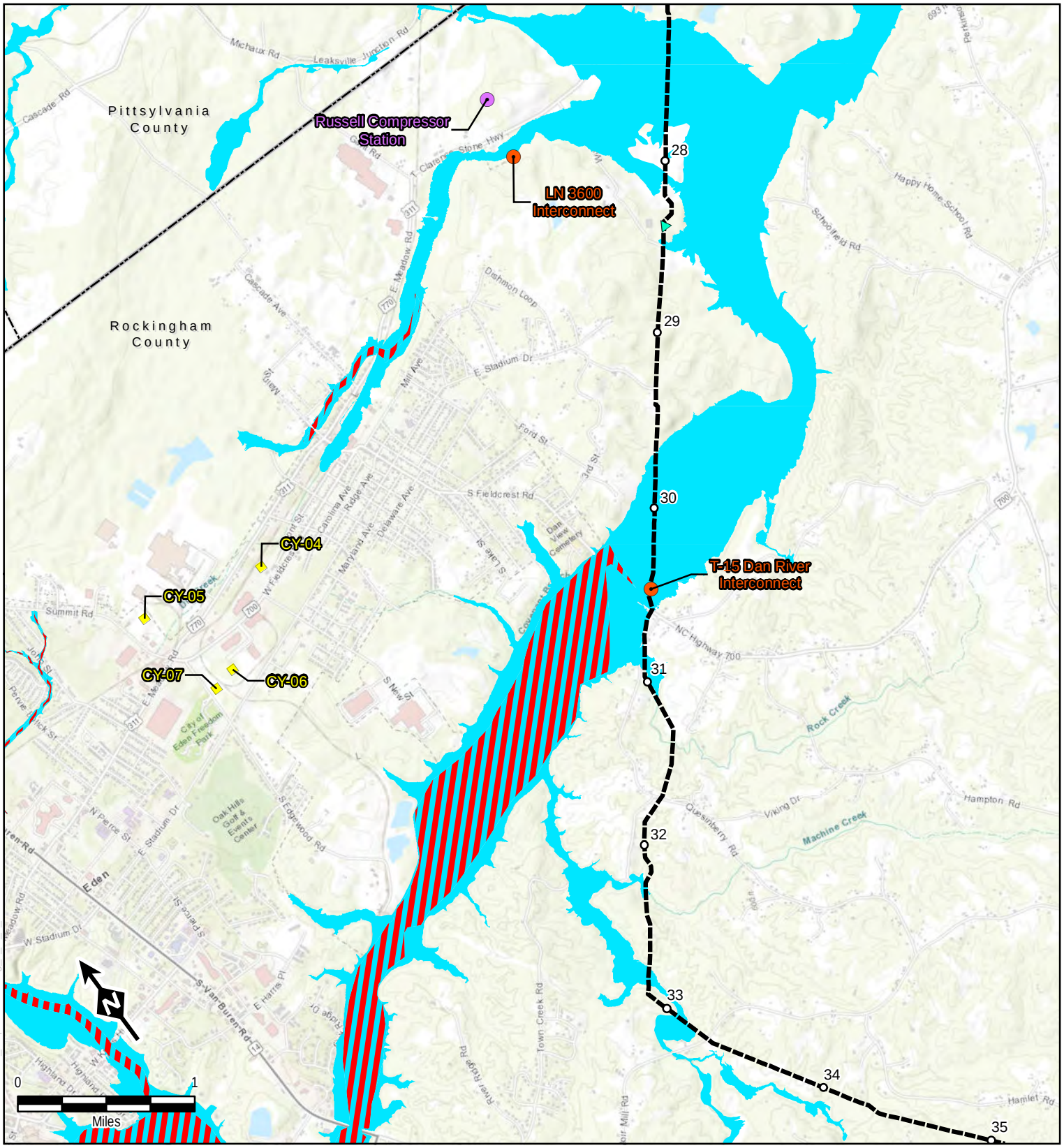
1 inch = 0.76 miles
When Printed 8.5x11

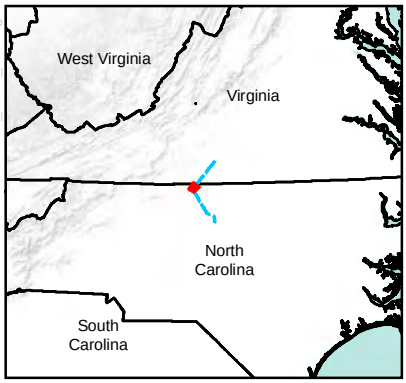
Mountain Valley PIPELINE, LLC

Figure 2-C-3
Sheet 5 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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





Legend

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Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE, LLC

Figure 2-C-3
Sheet 6 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

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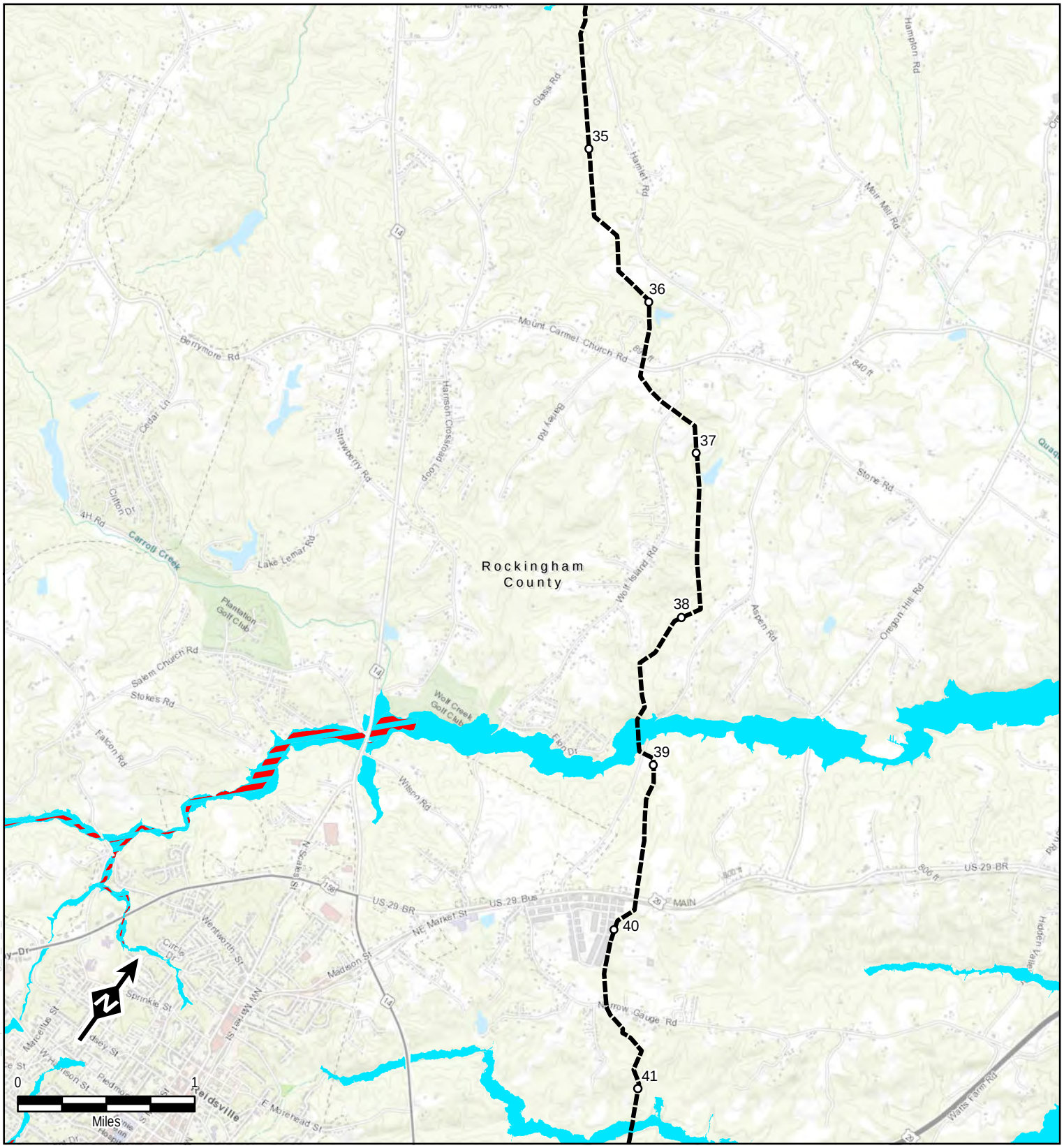

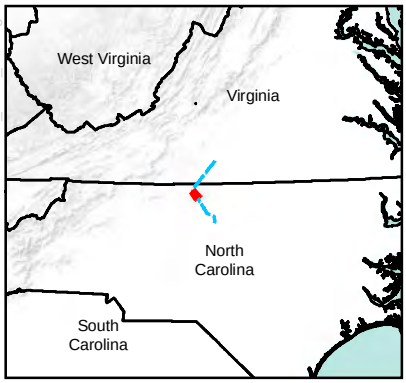

Legend

- 1% Annual Chance Flood Hazard
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Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE, LLC

Figure 2-C-3
Sheet 7 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

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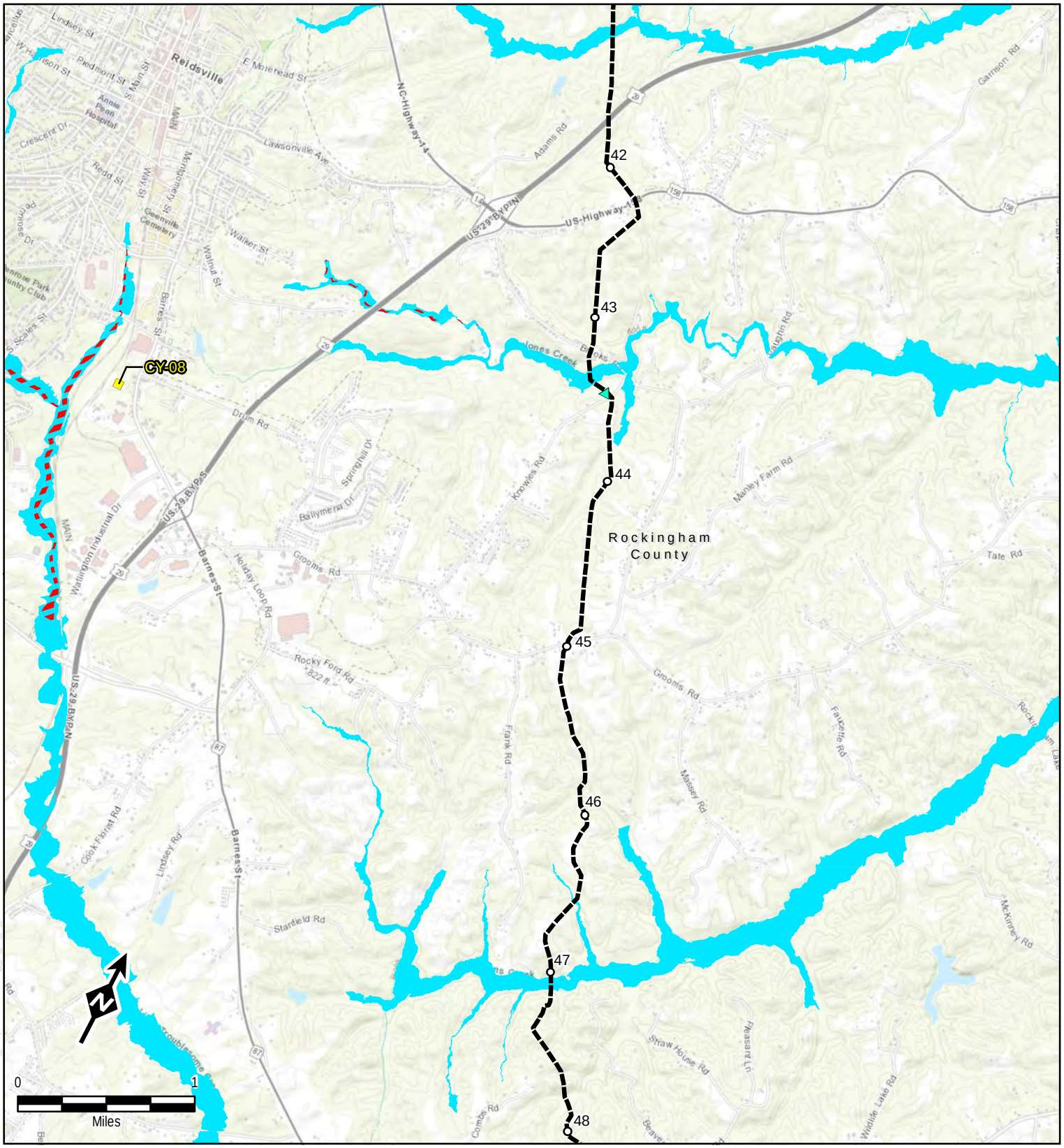

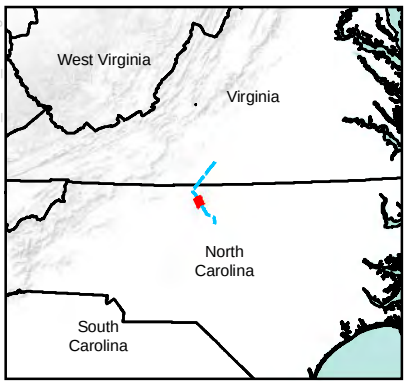

Legend

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Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE

Figure 2-C-3
Sheet 8 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC
600 Willowbrook Ln
West Chester, PA 19382

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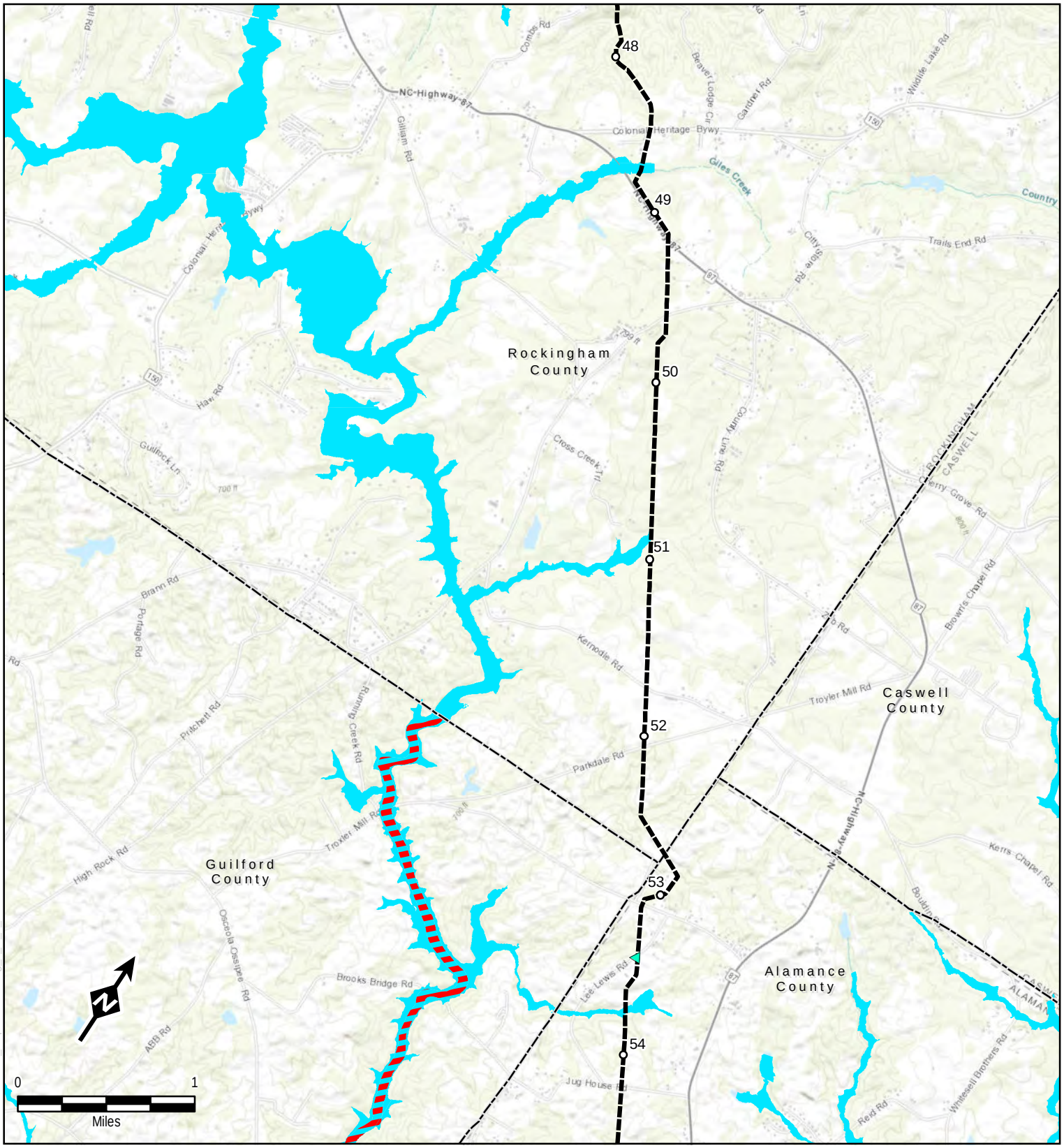

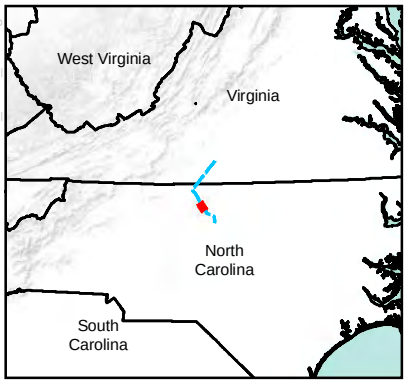

Legend

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Data Sources: ESRI, FEMA, TRC, EQT

1 inch = 0.76 miles
When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 9 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

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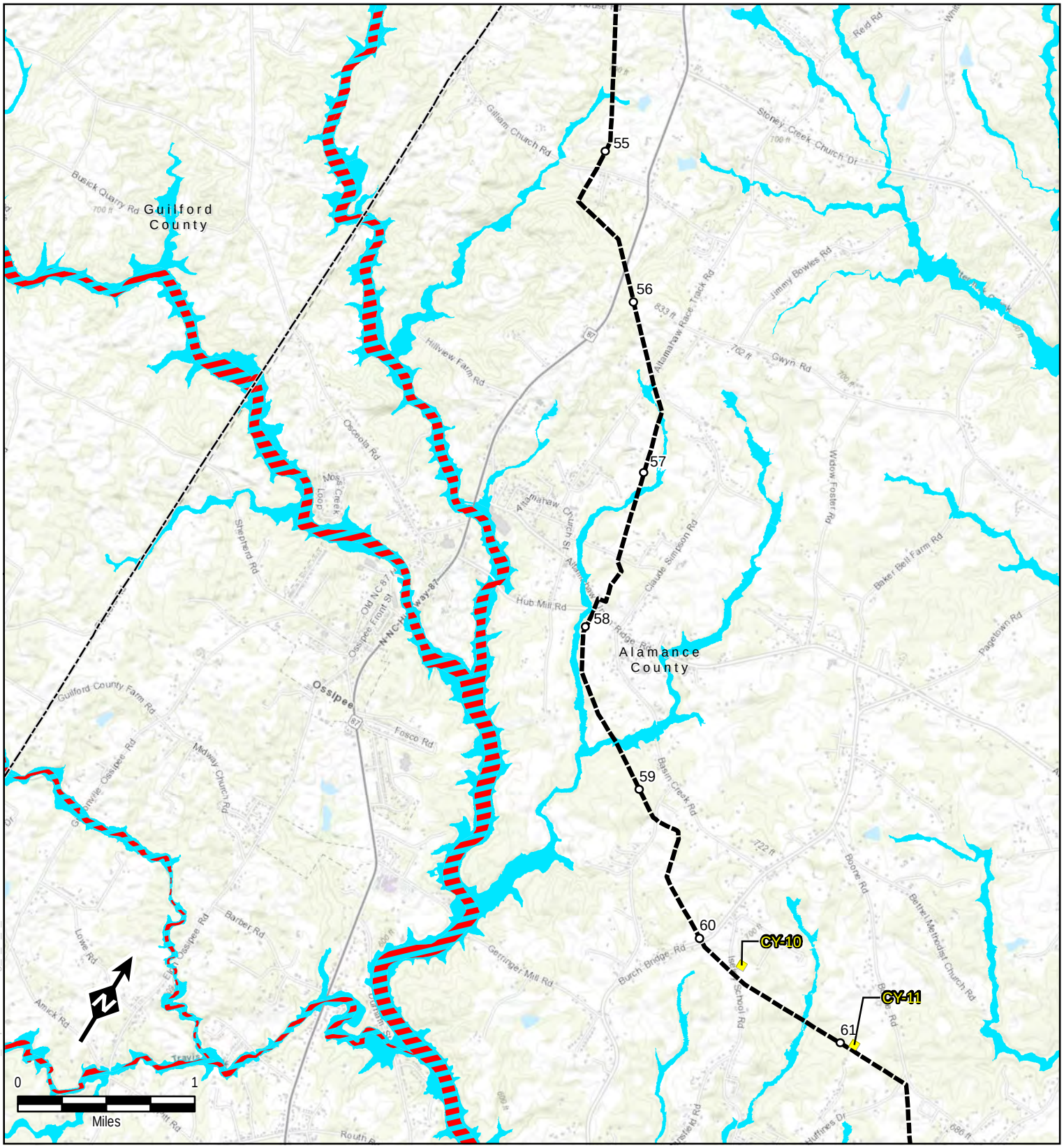

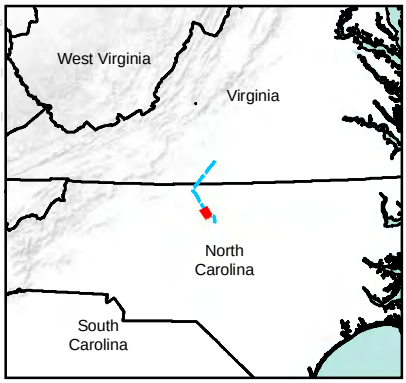

Legend

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Data Sources: ESRI, FEMA, TRC, EQT

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When Printed 8.5x11

Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 10 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

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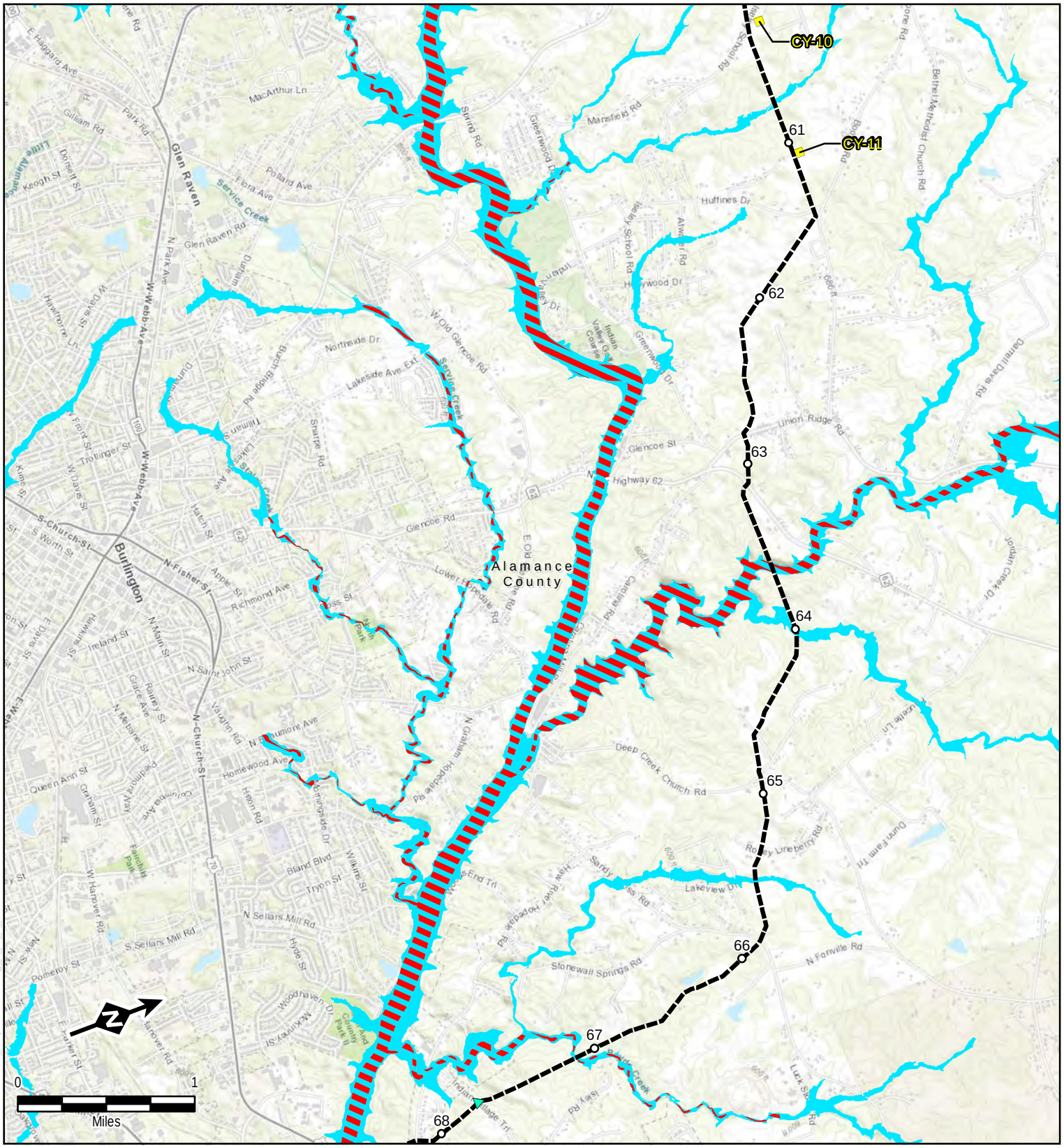

Legend

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Data Sources: ESRI, FEMA, TRC, EQT

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When Printed 8.5x11

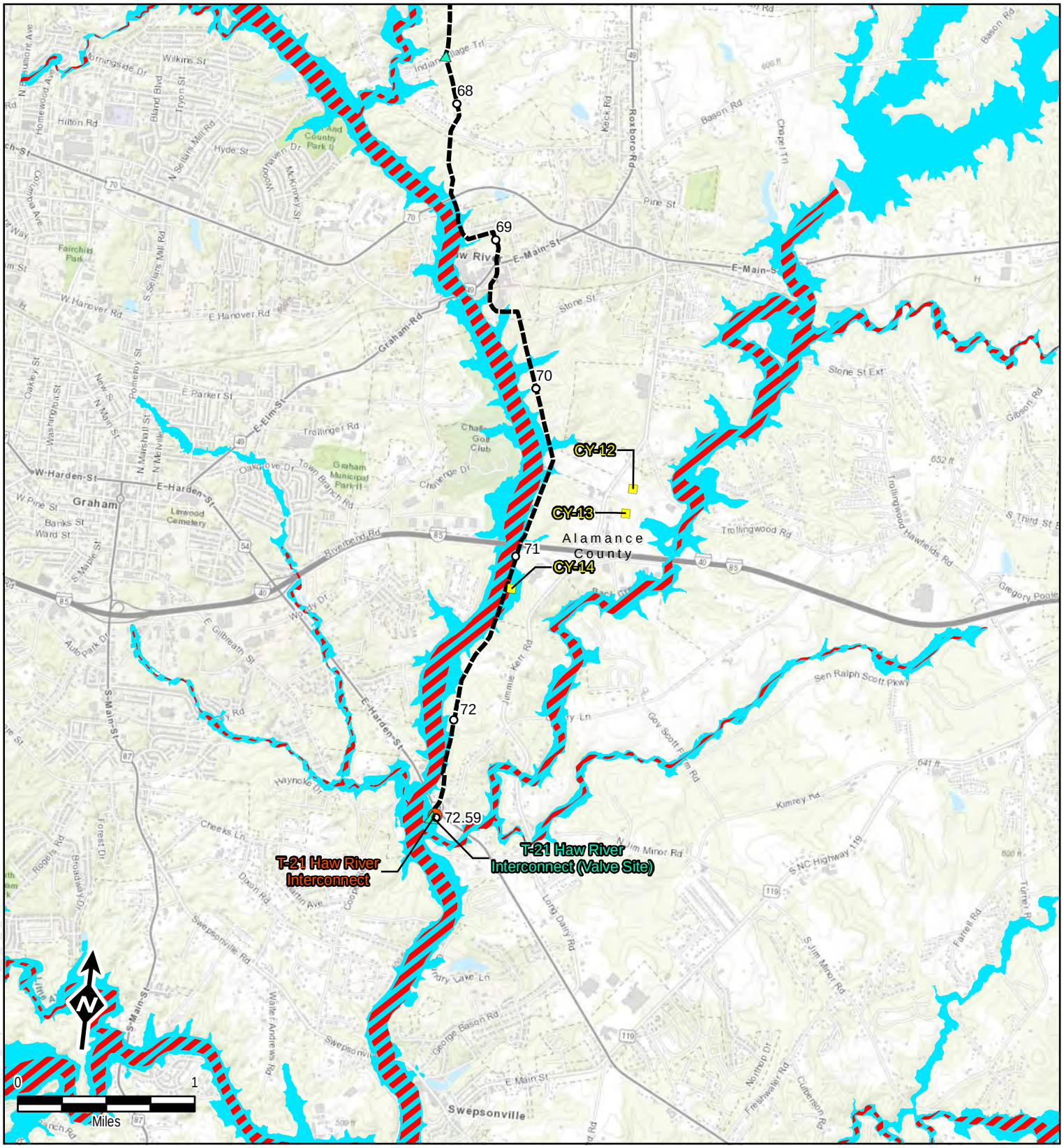
Mountain Valley PIPELINE, LLC

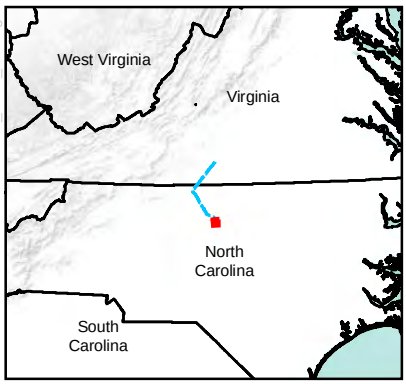
Figure 2-C-3
Sheet 11 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Fig_2_C_3_FEMA.mxd





Legend

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Data Sources: ESRI, FEMA, TRC, EQT

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When Printed 8.5x11

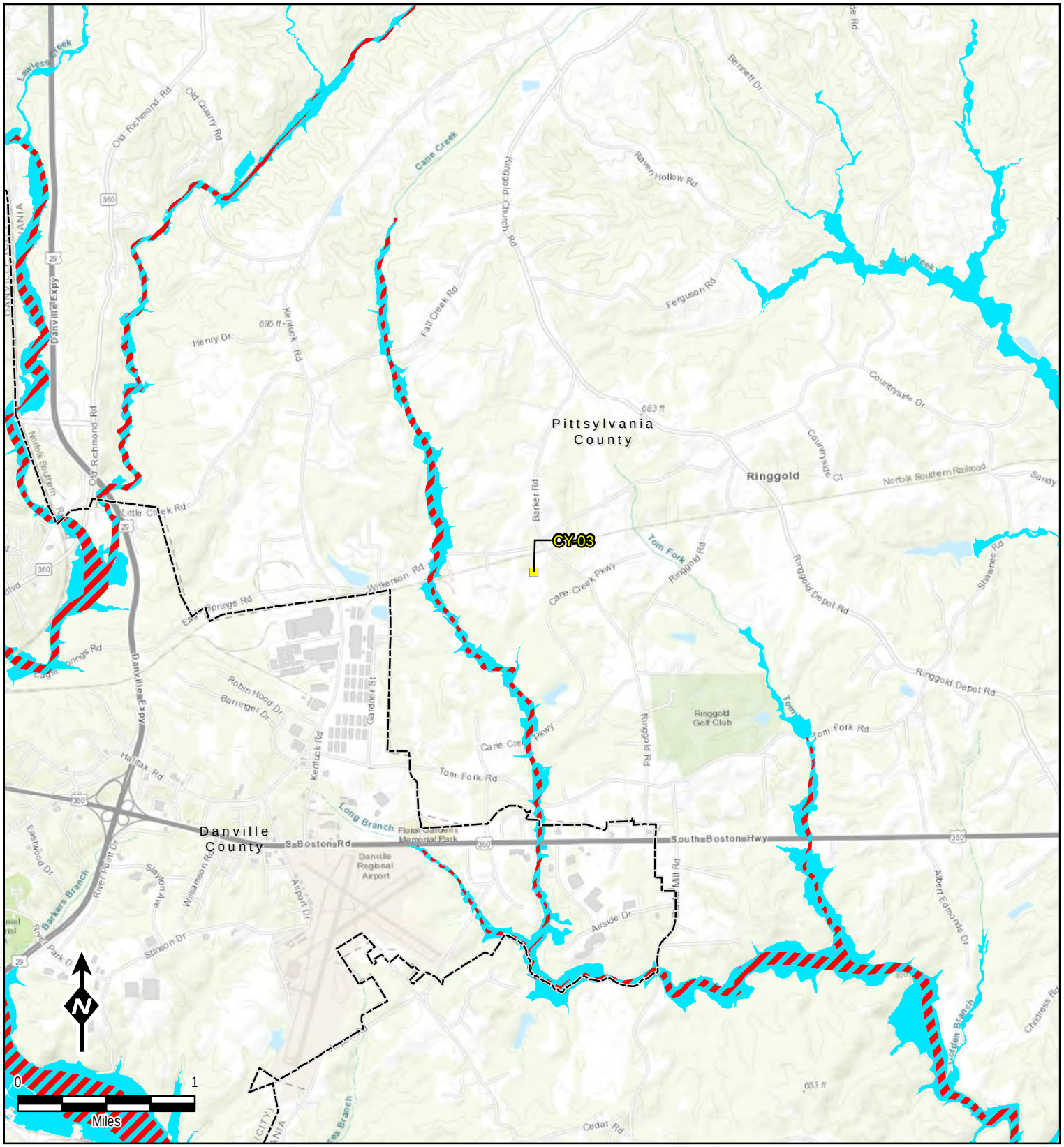
Mountain Valley PIPELINE, LLC

Figure 2-C-3
Sheet 12 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Fig_2_C_3_FEMA.mxd



Legend

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Mountain Valley PIPELINE LLC

Figure 2-C-3
Sheet 13 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

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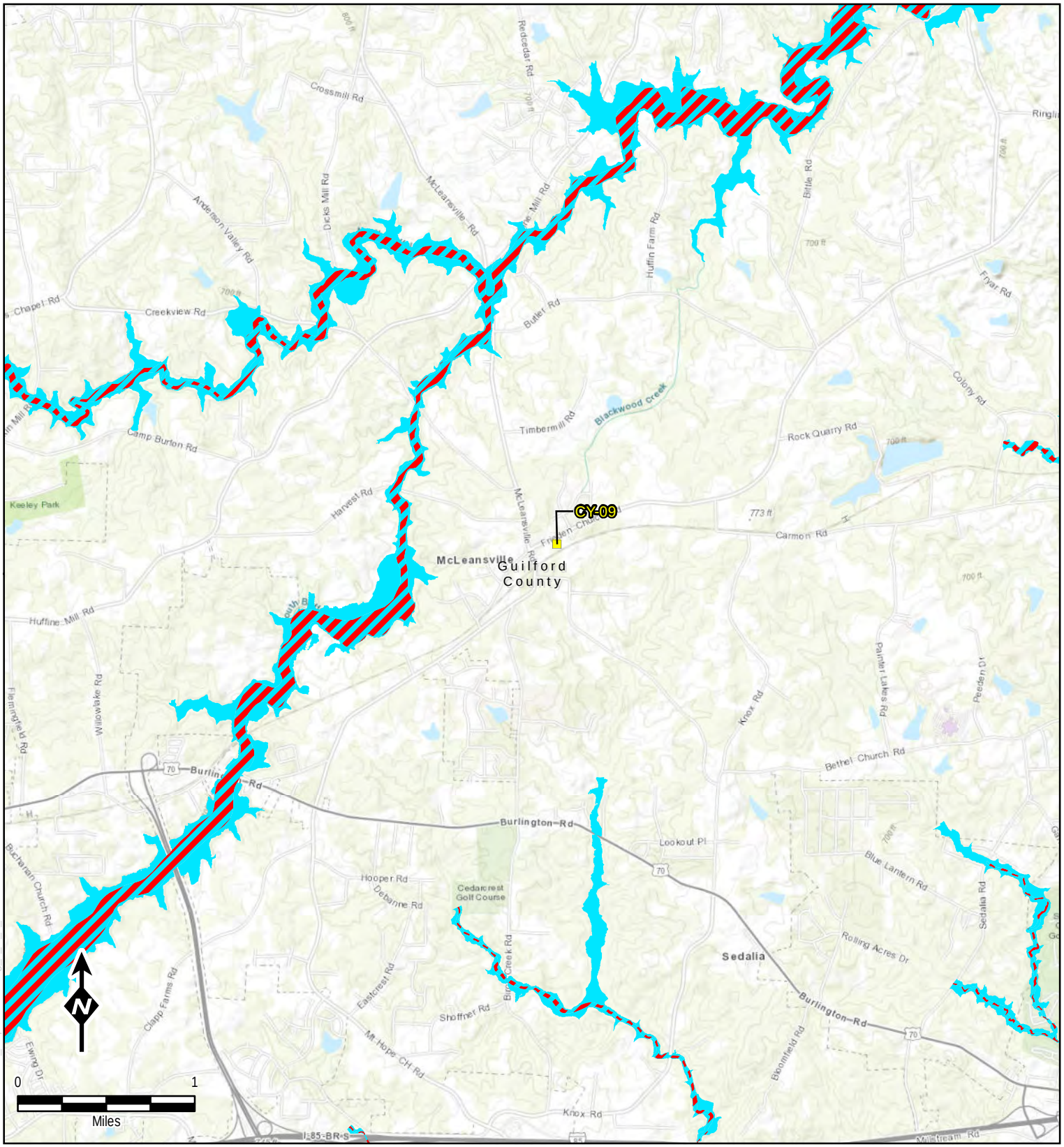

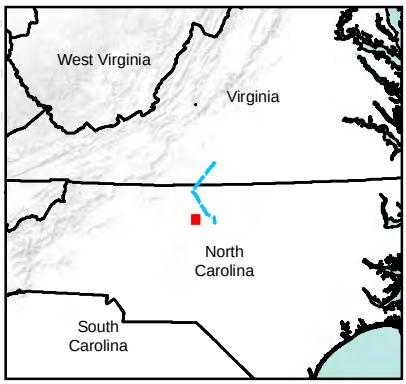

Legend

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Mountain Valley PIPELINE, LLC

Figure 2-C-3
Sheet 14 of 14

FEMA Flood Zones Crossed by the MVP Southgate Project

TRC
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600 Willowbrook Ln
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S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Fig_2_C_3_FEMA.mxd

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-D
Identified Sites of Potential Contamination Concern within 0.5 Mile of the Proposed MVP Southgate Project Work Space

[*Not Included in the Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-E
Water Resources Identification and Testing Plan

[*Not Included in the Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-F
ATWS within 50 feet of Wetlands and Waterbodies

Appendix 2-F

ATWS within 50 feet of Wetlands and Waterbodies

State, County, ATWS ID	Approx. MP	Within 50ft of a Wetland	Within 50ft of a Waterbody	Feature ID	Distance from Resource Area (feet) b/	Justification	Alternative Measure Required (Y/N)
Virginia							
Pittsylvania							
1008	0.4		X	S-F18-10/AS-F18-10	20	Equipment	Y
1009	0.6	X		AW-NWI-1345	0	Pumps	Y
1010	0.6		X	AS-NHD-2317	45	Mats	Y
1010	0.8		X	AS-NHD-2384	48	Mats	Y
1020	1.6		X	AS-NHD-2349	19	Pumps	Y
1020	1.6	X		AW-NWI-1344	0	Pumps	Y
1021	1.7	X		AW-NWI-1344	0	Pumps	Y
1024	1.9		X	AS-NHD-2311	35	Pumps	Y
1040	4.3		X	S-D18-9	49	Pumps	N
1052	5.4	X		W-D18-1	0	Boring Equipment	Y
1081	8.8	X		W-E18-13	39	Mats	Y
1109	12.9		X	AS-NHD-2320	3	Pumps	Y
1114	13.6		X	AS-NHD-2355	35	Pumps	Y
1132	16.9		X	AS-NHD-2359	0	Mats	N
1170	22.2		X	AS-NHD-2405	0	Boring Equipment	N
North Carolina							
Rockingham							
1249	30.4	X	X	W-B18-36/AW-B18-36/S-B18-38	0	Boring Equipment	N
1251	30.6	X		W-B18-34	41	Mats	N
1254	30.9		X	S-A18-52	31	Materials	N
1256	31.1		X	S-A18-52/AS-A18-52	47	Materials	Y

Appendix 2-F

ATWS within 50 feet of Wetlands and Waterbodies

State, County, ATWS ID	Approx. MP	Within 50ft of a Wetland	Within 50ft of a Waterbody	Feature ID	Distance from Resource Area (feet) b/	Justification	Alternative Measure Required (Y/N)
1257	31.2		X	S-A18-52/AS-A18-52	40	Materials	Y
1260	31.4		X	S-B18-95/AS-B18-95	41	Mats	Y
1262	31.9		X	AS-A18-140	0	Equipment	Y
1285	34.0		X	S-C18-49	49	Materials	Y
1304	36.1		X	S-C18-35/AS-C18-35	38	Mats	Y
1321	37.4		X	S-A18-101	45	Mats	Y
1325	37.8		X	S-B18-117/AS-B18-117	4	Mats	Y
1332	38.5		X	S-A18-9	49	Mats	Y
N/A	38.5			S-A18-4	3	Terrain	Y
1335	38.8		X	AS-A18-8	49	Boring Equipment	Y
N/A	39.5			W-B18-78/S-B18-74	0	Terrain	Y
1360	40.8		X	S-B18-52	40	Mats	Y
1368	41.7		X	S-B18-44	18	Boring Equipment	Y
1378	42.3		X	AS-B18-89/S-B18-89	1	Equipment	Y
1395	43.8		X	AS-A18-105/S-A18-105	43	Materials	Y
1417	45.8		X	AS-B18-71	39	Materials	N
1427	47.1	X	X	AS-C18-76/S-C18-76 /AW-NWI-543	34/0	Pumps	Y
1428	47.1	X	X	AS-C18-76/S-C18-76 /AW-NWI-543	37/0	Mats	Y
1473	52.2		X	AS-C18-15	33	Pumps	Y
1476	52.5		X	AS-NHD-1557	0	Materials	Y
1526	57.0	X		W-A18-130	0	Materials	N
1578	63.1	X	X	S-B18-29, S-B18-30, W-B18-28	0, 13/0	Boring Equipment	Y
1579	63.1		X	S-B18-12	7	Materials	Y

Appendix 2-F ATWS within 50 feet of Wetlands and Waterbodies							
State, County, ATWS ID	**Approx. MP**	**Within 50ft of a Wetland**	**Within 50ft of a Waterbody**	**Feature ID**	**Distance from Resource Area (feet) b/**	**Justification**	**Alternative Measure Required (Y/N)**
1619	67.1		X	AS-NHD-1558	46	Mats	Y
1620	67.1		X	AS-NHD-1558	4	Pumps	Y
1635	68.1		X	AS-NHD-1552	0	Materials	Y
1651	68.9		X	AS-NHD-1559	38	Materials	Y
1653	69.0		X	AS-NHD-1559	24	Pumps	Y
1678	71.1		X	S-B18-58	49	Boring Equipment	N
1692	72.6	X		W-A18-111	0	Boring Equipment	N
Construction Workspace within 15 feet of Waterbodies and/or Associated Wetlands							
North Carolina							
Rockingham							
N/A	38.5			S-A18-4	3	Terrain	Y
N/A	39.5			W-B18-78/S-B18-74	0	Terrain/Additional Resource Impact	Y
Alamance							
N/A	62.5			S-A18-71	8	Terrain	Y

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-G
Areas along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/
Virginia			
Pittsylvania			
VA-PI-002.000	0.1	0.5	X
VA-PI-003.000	0.5	0.9	
VA-PI-003.000.RC	0.9	0.9	
VA-PI-005.000	0.9	1.1	
VA-PI-005.000.RC	1.1	1.1	
VA-PI-006.000	1.1	1.2	X
VA-PI-008.000	1.2	1.4	X
VA-PI-009.000	1.4	1.7	
VA-PI-010.000	1.7	2.2	
VA-PI-012.000	2.2	2.5	
VA-PI-014.000	2.5	3.1	X
VA-PI-014.000.RC	3.1	3.1	
VA-PI-016.000.RC	3.2	3.2	
VA-PI-024.000	3.9	4.1	
VA-PI-026.000.RC	4.4	4.5	
VA-PI-026.000.RC	4.5	4.5	
VA-PI-031.000.RC	4.5	4.6	
VA-PI-032.000	4.6	5.2	X
VA-PI-034.000	5.2	5.4	X
VA-PI-034.000.RR	5.4	5.5	
VA-PI-035.000	5.5	5.7	
VA-PI-036.000	5.7	6.4	
VA-PI-037.000	6.4	6.8	X
VA-PI-038.000	6.8	7.1	X
VA-PI-040.000.RC	7.4	7.4	
VA-PI-041.000	7.4	7.5	X
VA-PI-042.000	7.5	7.6	X
VA-PI-042.000.RC	7.6	7.6	
VA-PI-044.000	7.6	8.0	X
VA-PI-045.000	8.0	8.3	X
VA-PI-045.000.RC	8.3	8.3	
VA-PI-046.000	8.3	8.3	
VA-PI-047.000	8.3	8.6	
VA-PI-048.000	8.6	9.0	X
VA-PI-049.000	9.0	9.0	
VA-PI-050.000	9.0	9.1	X
VA-PI-051.000	9.1	9.2	X
VA-PI-052.000	9.2	9.5	X
VA-PI-052.000.RC	9.5	9.5	

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/
VA-PI-053.000	9.5	10.1	X
VA-PI-055.000	10.1	10.3	X
VA-PI-054.000	10.3	10.4	
VA-PI-059.000	10.4	10.4	
VA-PI-054.000	10.4	10.4	
VA-PI-061.000	10.4	10.5	
VA-PI-064.000	10.5	10.6	
VA-PI-063.000	10.6	10.6	
VA-PI-065.000	10.6	10.9	
VA-PI-065.000.RC	10.9	10.9	
VA-PI-075.000	10.9	11.7	X
VA-PI-076.000	11.7	11.7	
VA-PI-077.000	11.7	12.1	
VA-PI-078.000	12.1	12.2	
VA-PI-079.000	12.2	12.4	
VA-PI-079.000.RC	12.4	12.5	
VA-PI-082.000	12.5	12.9	
VA-PI-084.000	12.9	13.3	
VA-PI-087.000.RC	13.5	13.5	
VA-PI-089.000	13.5	13.5	
VA-PI-090.000	13.5	13.7	
VA-PI-095.000	14.8	14.8	
VA-PI-096.000	14.8	14.9	
VA-PI-096.000.RC	14.9	15.0	
VA-PI-099.000	15.3	15.5	
VA-PI-101.000	15.5	15.8	
VA-PI-103.000	15.8	15.9	
VA-PI-102.000	15.9	15.9	
VA-PI-103.000	15.9	16.1	
VA-PI-103.000.RC	16.1	16.1	
VA-PI-106.000	16.1	16.1	
VA-PI-105.000	16.1	16.1	
VA-PI-106.000	16.1	16.3	
VA-PI-107.000	16.3	16.5	X
VA-PI-111.000.RC	16.6	16.6	
VA-PI-115.000	16.6	17.2	
VA-PI-118.000	17.2	17.6	
VA-PI-119.000	17.6	17.9	
VA-PI-121.000	17.9	18.3	X
VA-PI-122.000.ABU	18.3	18.4	
VA-PI-121.000.RC	18.4	18.4	

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/
VA-PI-123.000	18.4	18.5	
VA-PI-124.000	18.5	18.6	
VA-PI-125.000	18.6	18.8	
VA-PI-126.000	18.8	19.1	
VA-PI-128.000	19.1	19.1	
VA-PI-129.000	19.1	19.1	
VA-PI-129.000.RC	19.1	19.2	
VA-PI-131.000	19.2	19.3	
VA-PI-132.000	19.3	19.3	
VA-PI-143.000.RC	19.3	19.4	
VA-PI-134.000	19.4	19.4	
VA-PI-134.000.ABU	19.4	19.4	
VA-PI-135.000.ABU	19.4	19.4	
VA-PI-136.000.ABU	19.4	19.5	
VA-PI-137.000.ABU	19.5	19.5	
VA-PI-137.000	19.5	19.5	
VA-PI-137.100	19.5	19.5	
VA-PI-141.100	19.5	19.6	
VA-PI-140.000	19.6	19.7	
VA-PI-144.000	19.7	19.8	
VA-PI-149.000	19.8	19.9	
VA-PI-150.000	19.9	20.0	
VA-PI-151.000	20.0	20.0	
VA-PI-151.000.RC	20.0	20.0	
VA-PI-152.000	20.0	20.3	
VA-PI-156.000	20.3	20.3	
VA-PI-156.000.RC	20.3	20.4	
VA-PI-158.000	20.4	20.4	
VA-PI-157.000	20.4	20.4	
VA-PI-160.000	20.4	20.8	
VA-PI-161.000	20.8	21.0	X
VA-PI-162.000	21.0	21.2	
VA-PI-163.000	21.2	21.7	
VA-PI-165.000	21.7	21.9	
VA-PI-166.000	21.9	21.9	
VA-PI-167.000	21.9	21.9	
VA-PI-168.000	21.9	22.0	
VA-PI-169.000	22.0	22.2	
VA-PI-169.000.RC	22.2	22.2	
VA-PI-171.000	22.2	22.4	
VA-PI-174.000	23.0	23.4	X

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/
VA-PI-175.000.RC	23.8	23.8	
VA-PI-178.000	23.8	24.9	X
VA-PI-179.000	24.9	25.1	
VA-PI-179.000.RR	25.1	25.1	
VA-PI-180.000	25.1	26.2	
North Carolina			
Rockingham			
NC-RO-030.000.RC	31.7	31.7	
NC-RO-033.000	31.7	31.9	
NC-RO-034.000	31.9	32.0	X
NC-RO-042.000	33.3	34.0	
NC-RO-074.000	37.5	37.5	
NC-RO-075.000	37.5	37.6	
NC-RO-076.000	37.6	37.6	
NC-RO-077.000	37.6	37.8	
NC-RO-079.000	37.8	37.8	
NC-RO-080.000	37.8	37.9	
NC-RO-081.000	38.0	38.0	
NC-RO-090.000	38.8	38.9	
NC-RO-090.000.RC	38.9	38.9	
NC-RO-095.000.RC	39.8	39.8	
NC-RO-098.000	39.8	39.8	
NC-RO-097.000.RR	39.8	39.8	
NC-RO-105.000	40.4	40.5	
NC-RO-111.000.RC	41.7	41.7	
NC-RO-112.000.RC	42.2	42.2	
NC-RO-112.200	42.2	42.3	
NC-RO-117.000.RC	43.2	43.2	
NC-RO-136.000	44.4	44.6	
NC-RO-140.000	45.4	45.8	X
NC-RO-142.000	45.8	46.1	X
NC-RO-143.000	46.1	46.5	
NC-RO-146.100	46.5	46.8	
NC-RO-148.500	46.8	47.1	
NC-RO-149.000	47.1	47.2	X
NC-RO-155.000	47.8	48.0	
NC-RO-157.000	48.4	48.5	
NC-RO-157.000.RC	48.5	48.5	
NC-RO-160.000	48.5	48.6	
NC-RO-166.000	49.4	49.4	
NC-RO-168.000	49.5	49.6	

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/
NC-RO-168.000.RC	49.6	49.6	
NC-RO-169.000	49.6	49.7	
NC-RO-173.000	50.0	50.2	
NC-RO-174.000	50.2	50.3	
NC-RO-175.000	50.3	50.4	
NC-RO-176.000	50.4	50.4	
NC-RO-177.000	50.4	50.5	
NC-RO-178.000	50.5	50.7	
NC-RO-179.000	50.7	50.9	
NC-GU-001.000	52.1	52.5	
Alamance			
NC-AL-000.010	52.8	52.8	
NC-AL-000.015	52.8	52.8	
NC-AL-000.020	52.8	53.0	
NC-AL-000.045	53.0	53.1	
NC-AL-000.045.RC	53.1	53.1	
NC-AL-004.000	54.0	54.0	
NC-AL-005.000.RC	54.2	54.2	
NC-AL-016.000	55.3	55.4	
NC-AL-043.000	57.5	57.8	
NC-AL-043.000.RC	57.8	57.8	
NC-AL-044.000	57.8	57.9	
NC-AL-044.000.RC	57.9	57.9	
NC-AL-050.000	58.2	58.6	
NC-AL-052.000	58.7	58.9	
NC-AL-053.000	58.9	59.1	
NC-AL-054.000	59.1	59.2	
NC-AL-054.000.RC	59.2	59.2	
NC-AL-058.000	59.2	59.3	
NC-AL-057.000	59.3	59.4	
NC-AL-059.000	59.4	59.5	
NC-AL-062.000	59.5	59.6	
NC-AL-064.000	59.6	59.7	
NC-AL-065.000	59.7	59.9	
NC-AL-070.000	60.3	60.5	
NC-AL-077.000	61.2	61.4	
NC-AL-077.000.RC	61.4	61.4	
NC-AL-080.000	61.4	61.4	
NC-AL-097.000.WBC	63.6	63.7	
NC-AL-104.000	63.7	64.0	
NC-AL-104.000	64.0	64.0	

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/
NC-AL-104.000	64.0	64.1	
NC-AL-106.000	64.1	64.2	
NC-AL-104.000	64.2	64.5	
NC-AL-107.000	64.5	64.6	
NC-AL-108.000	64.6	64.9	
NC-AL-105.000	64.9	64.9	
NC-AL-108.000.RC	64.9	64.9	
NC-AL-117.000	65.1	65.2	
NC-AL-118.000	65.2	65.3	
NC-AL-118.100	65.3	65.3	
NC-AL-119.000	65.3	65.7	
NC-AL-122.000.RC	65.8	65.9	
NC-AL-126.000	65.9	65.9	
NC-AL-125.000	65.9	66.0	
NC-AL-124.000	66.0	66.0	
NC-AL-126.000	66.0	66.2	
NC-AL-130.000	66.2	66.4	
NC-AL-129.000	66.4	66.5	
NC-AL-131.000	66.5	66.6	
NC-AL-134.000	66.9	67.0	
NC-AL-135.000	67.0	67.1	
NC-AL-137.000	67.1	67.2	
NC-AL-138.000	67.2	67.4	
NC-AL-139.000	67.4	67.5	
NC-AL-140.000	67.5	67.6	
NC-AL-141.000	67.6	67.6	
NC-AL-142.000	67.6	67.7	
NC-AL-145.000	68.0	68.1	
NC-AL-144.000	68.1	68.1	
NC-AL-144.000.RC	68.1	68.2	
NC-AL-149.000.RC	68.5	68.6	
NC-AL-150.000	68.6	68.6	X
NC-AL-160.000	68.9	68.9	
NC-AL-161.000	68.9	68.9	
NC-AL-166.000	69.0	69.1	
NC-AL-168.000	69.1	69.1	
NC-AL-167.000	69.1	69.1	
NC-AL-166.000.RC	69.1	69.1	
NC-AL-166.000.RR	69.3	69.3	
NC-AL-186.000	69.8	70.0	
NC-AL-191.000.RC	70.9	71.0	

Appendix 2-G

Areas Along the MVP Southgate Project Pipeline not Surveyed for Wetlands and Waterbodies a/

State, County, Line List Number	Milepost Start	Milepost End	Property Partially Surveyed b/
NC-AL-194.000	71.5	71.7	
NC-AL-195.000	71.7	71.7	
NC-AL-196.000	71.7	71.8	
NC-AL-197.000	71.8	71.9	
NC-AL-198.000	71.9	72.0	
NC-AL-199.000	72.0	72.2	
NC-AL-200.000	72.2	72.3	
NC-AL-204.000	72.4	72.4	
NC-AL-206.000	72.4	72.4	
NC-AL-207.000	72.4	72.5	
NC-AL-207.000.RC	72.5	72.5	
NC-AL-210.000	72.5	72.6	
NC-AL-211.000	72.6	72.6	

a/ Properties surveyed as of 6/29/2018

b/ Biological survey field crews had partial access to the property during field visit

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-H
Unanticipated Discovery of Contaminated Soils Plan

[*Not Included in the Draft*]

MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-I
MVP Southgate Project Wetland Delineation Report

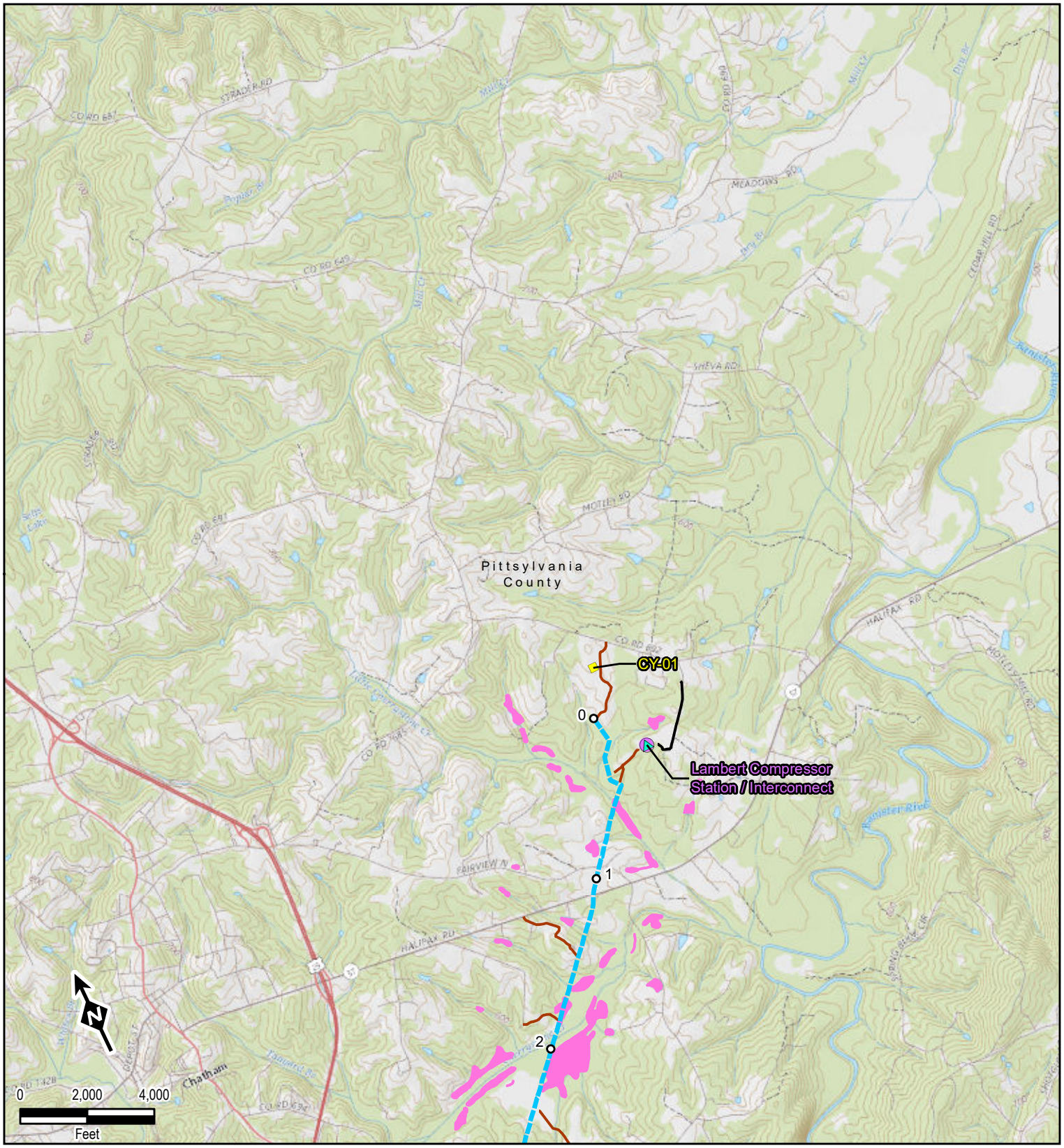
[*Not Included in the Draft*]

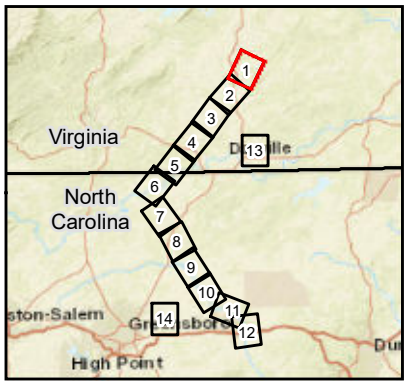
MVP Southgate Project

Docket No. PF18-4-000

Draft Resource Report 2

Appendix 2-J
National Wetlands Inventory Mapping along the MVP Southgate Project





Legend

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

1 inch = 4,000 feet
When Printed 8.5x11

Data Sources: ESRI, USGS, EQT, USFWS

Mountain Valley Pipeline, LLC

Appendix 2-J

NWI Wetlands

Sheet 1 of 14

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

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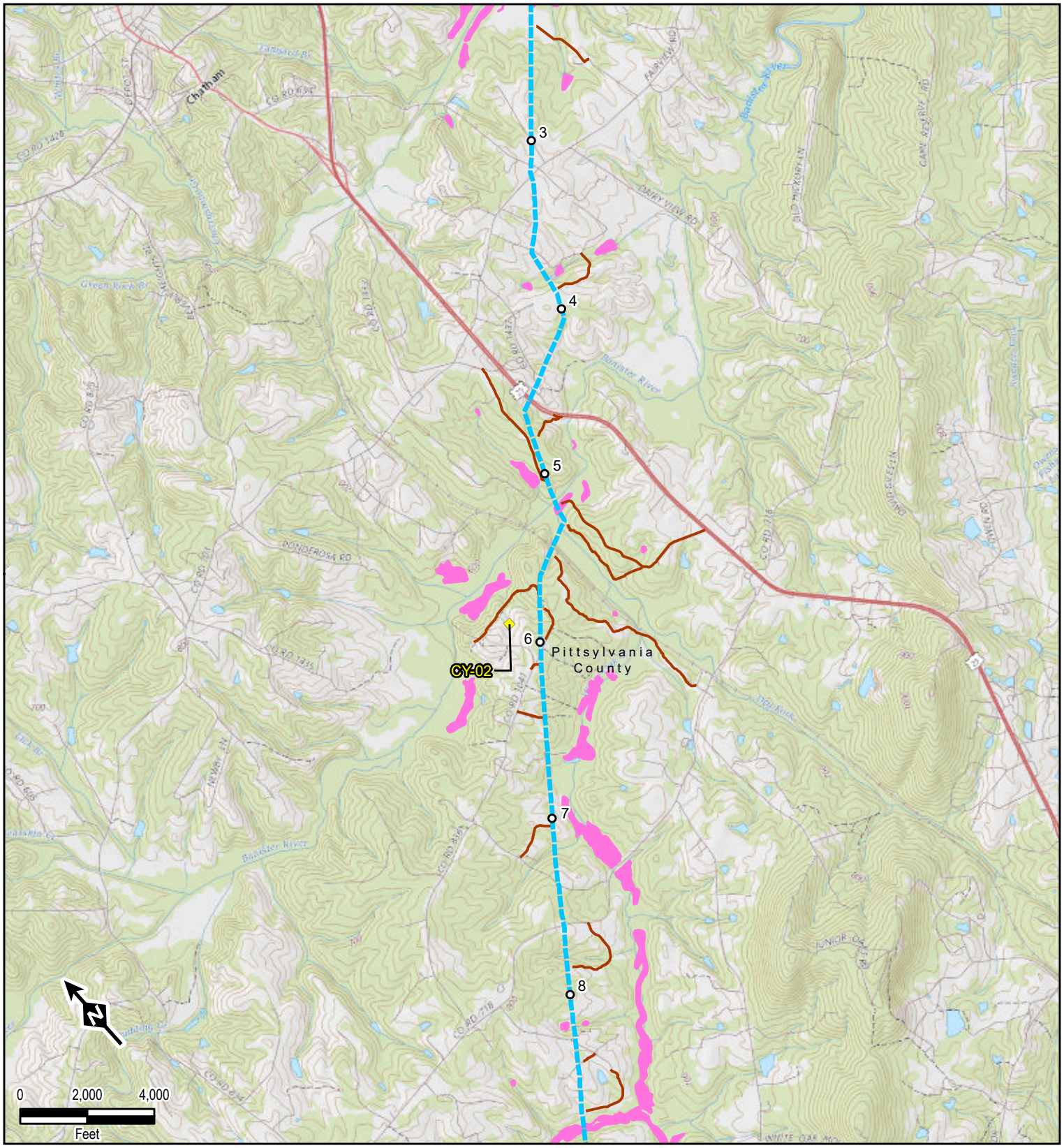

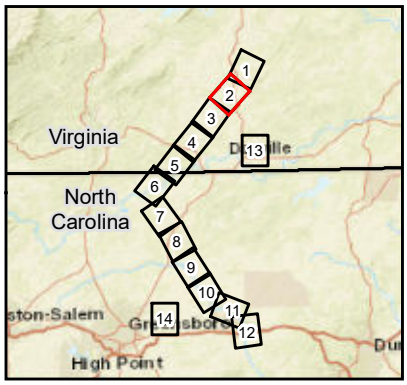

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Mountain Valley PIPELINE LLC

Appendix 2-J

NWI Wetlands

Sheet 2 of 14

TRC
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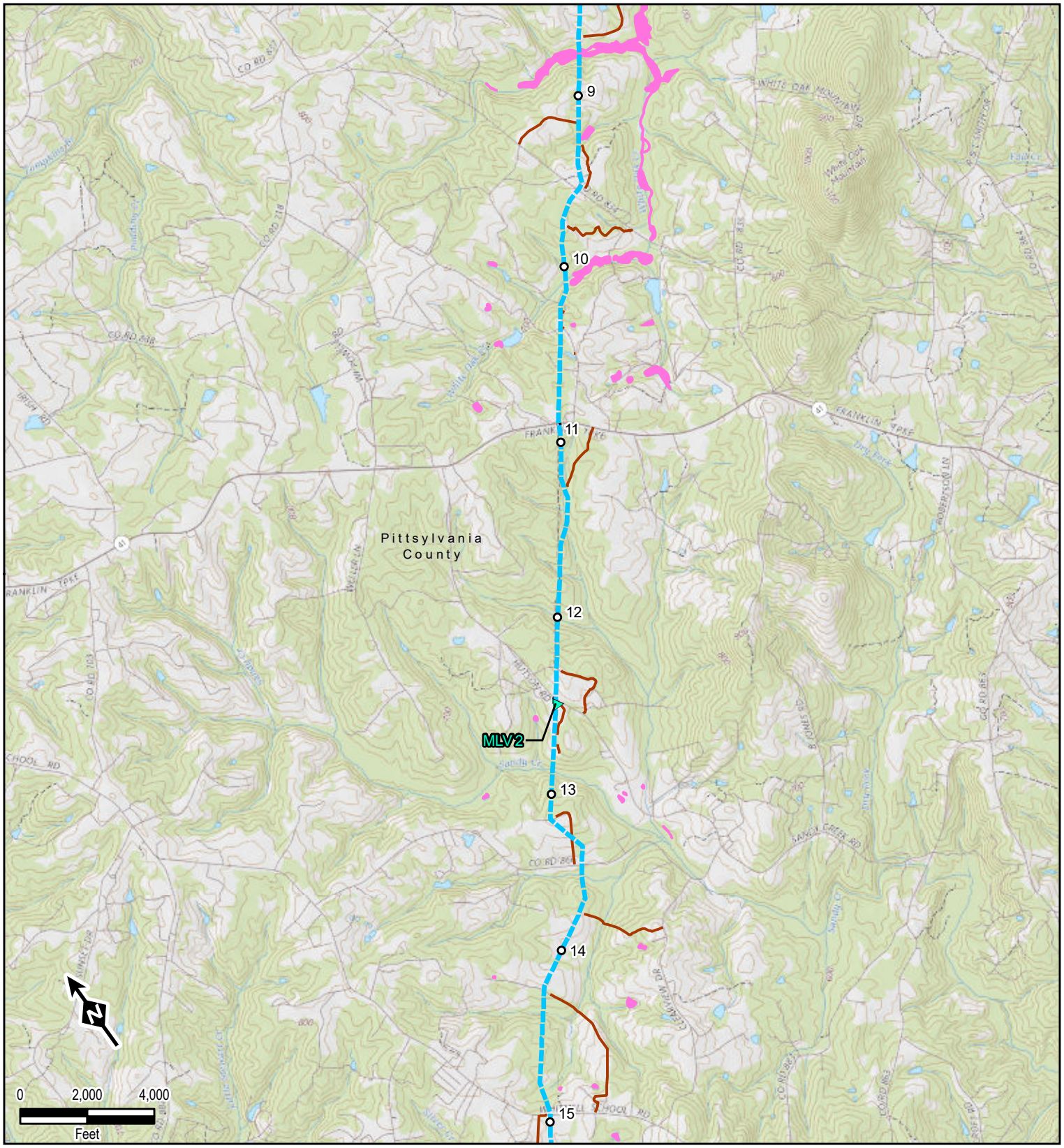

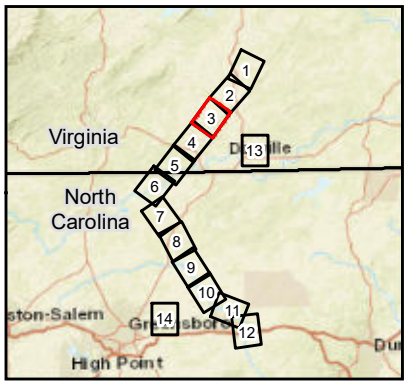

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Data Sources: ESRI, USGS, EQT, USFWS

Mountain Valley Pipeline, LLC

Appendix 2-J

NWI Wetlands

Sheet 3 of 14

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

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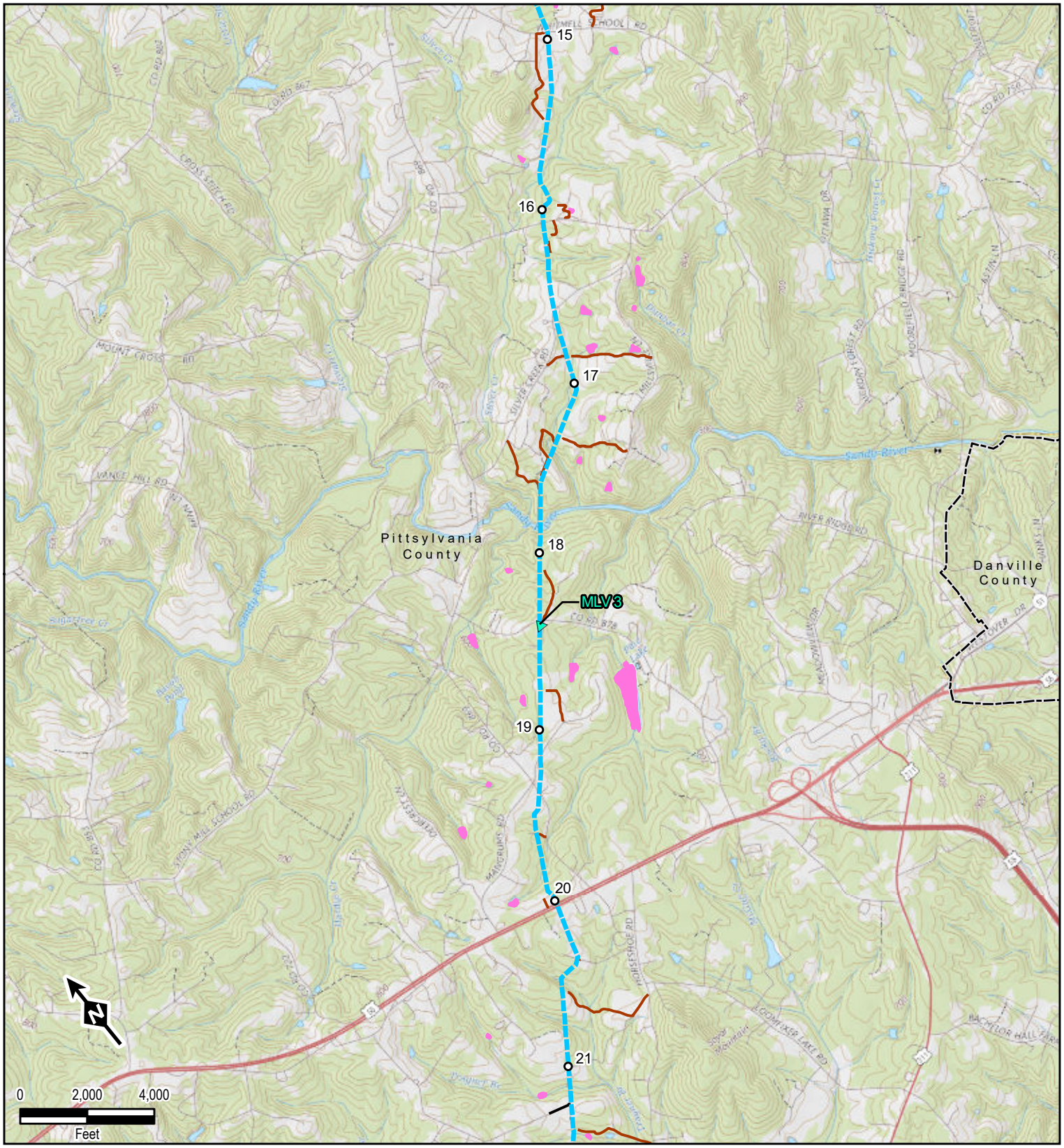

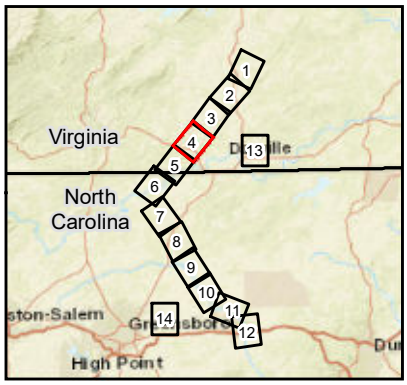

Legend

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Mountain Valley PIPELINE LLC

Appendix 2-J

NWI Wetlands

Sheet 4 of 14

TRC Results you can rely on
600 Willowbrook Ln
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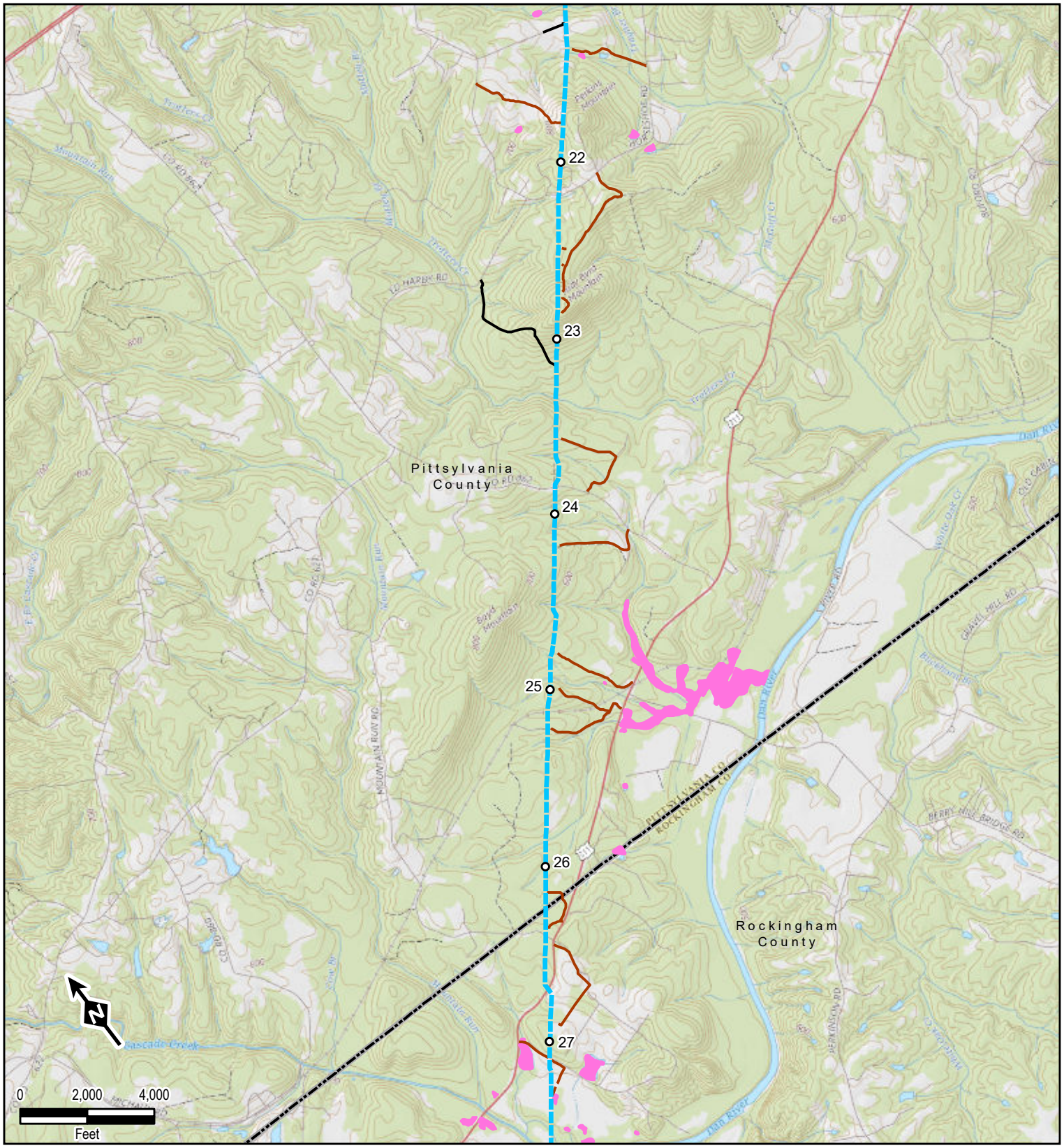

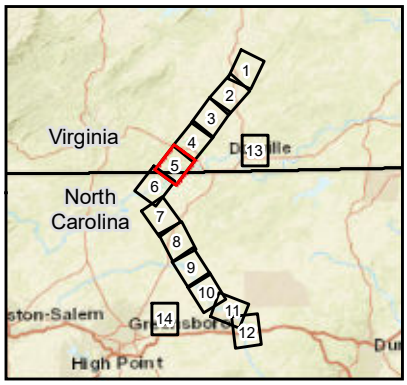

Legend

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1 inch = 4,000 feet
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Data Sources: ESRI, USGS, EQT, USFWS

Mountain Valley Pipeline, LLC

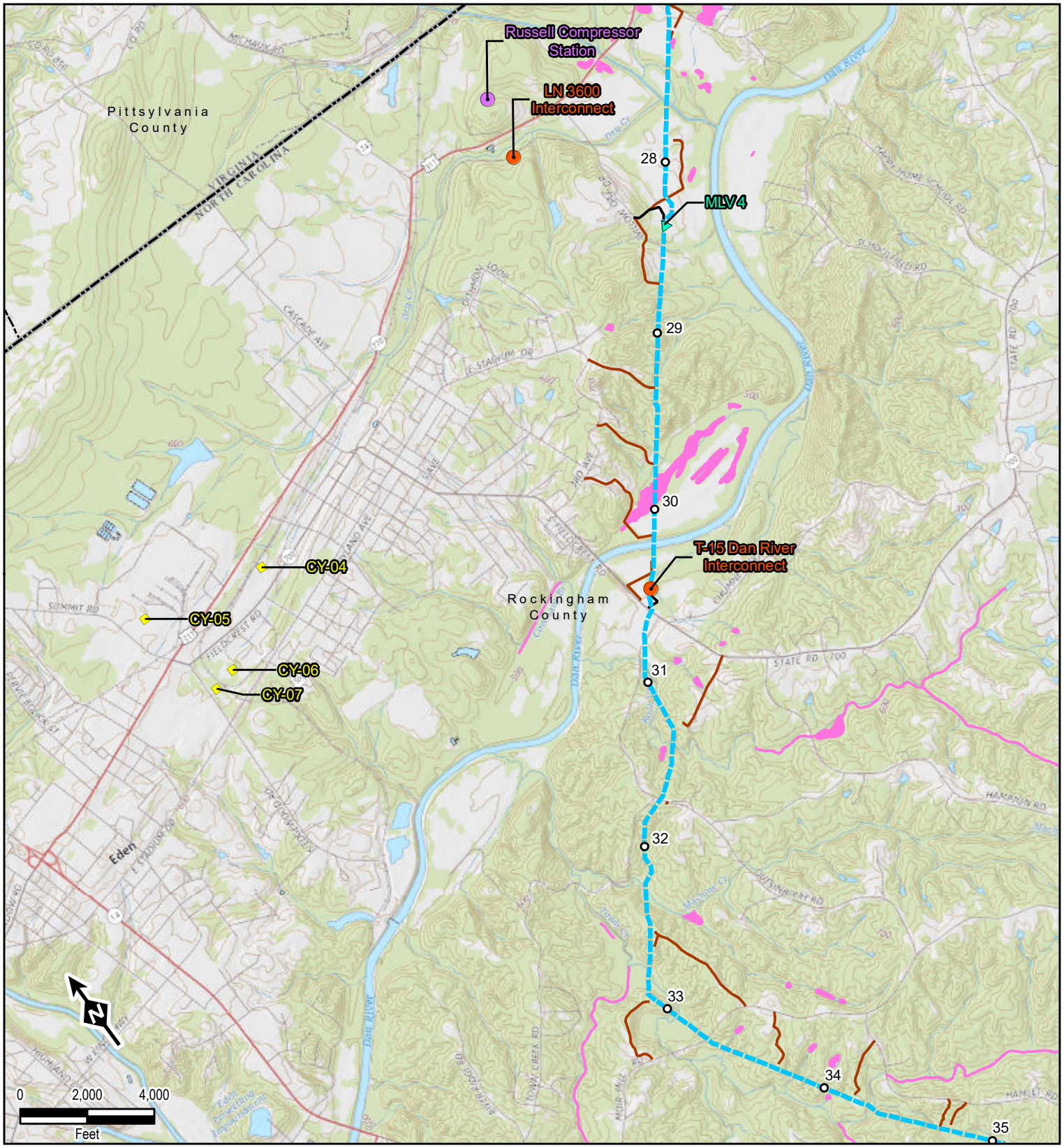
Appendix 2-J

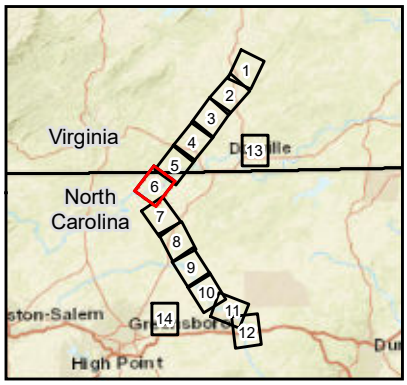
NWI Wetlands

Sheet 5 of 14

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

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI.mxd





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Mountain Valley PIPELINE LLC

Appendix 2-J

NWI Wetlands

Sheet 6 of 14

TRC
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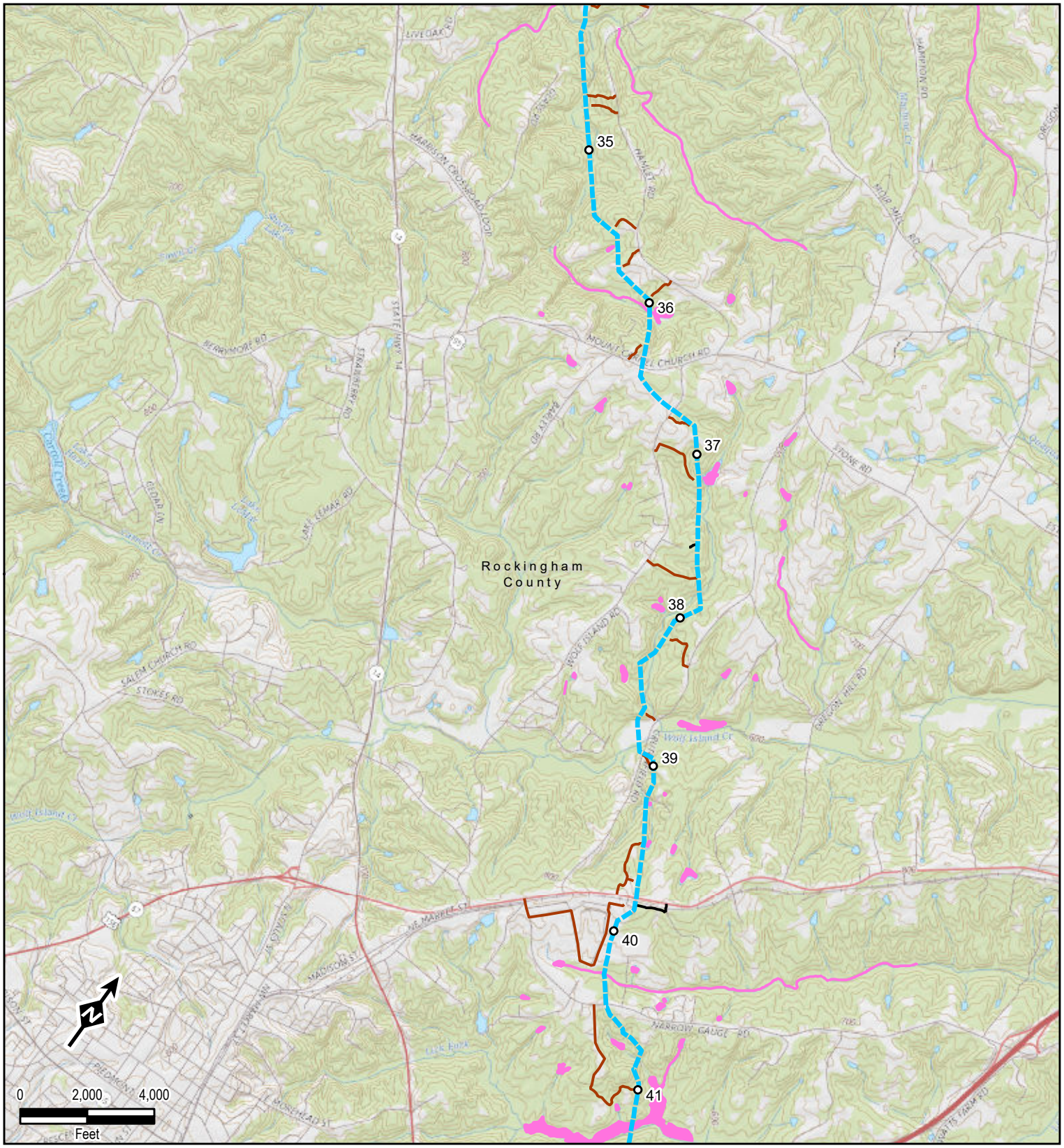
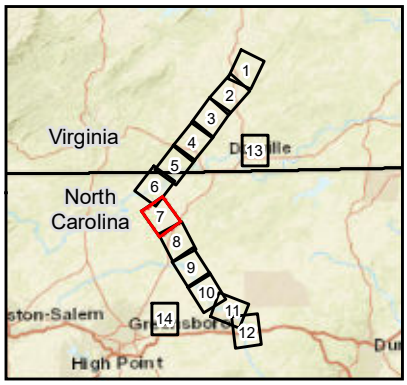
S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI.mxd





Legend

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- Proposed Pipeline Route
- NWI Wetlands
- State Boundary
- County Boundary

1 inch = 4,000 feet
When Printed 8.5x11

Data Sources: ESRI, USGS, EQT, USFWS

Mountain Valley PIPELINE LLC

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NWI Wetlands

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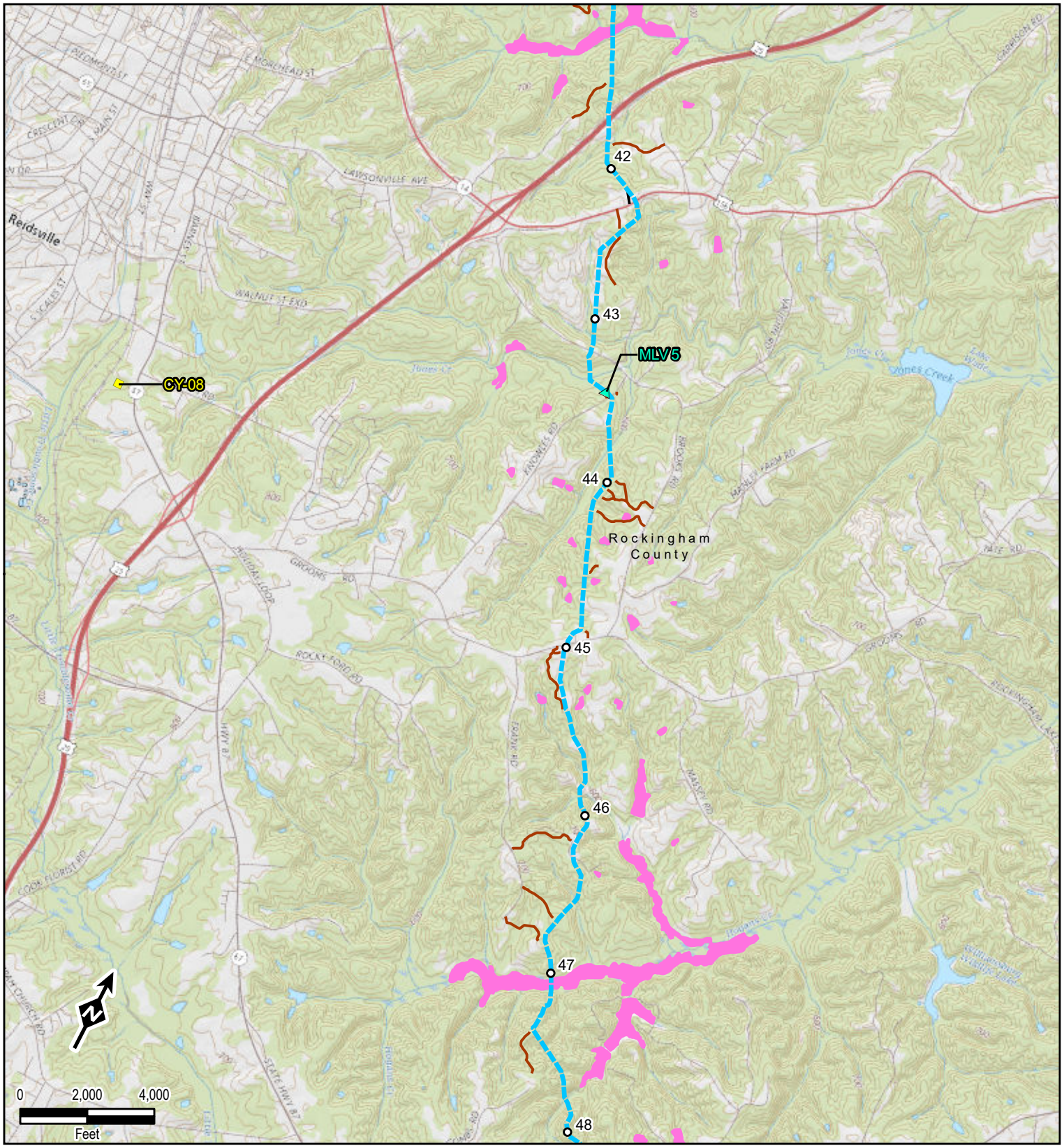
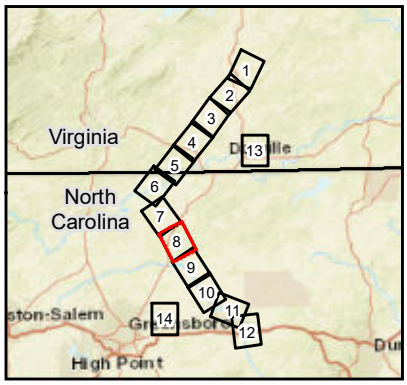
TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI.mxd





Legend

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

1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

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NWI Wetlands

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

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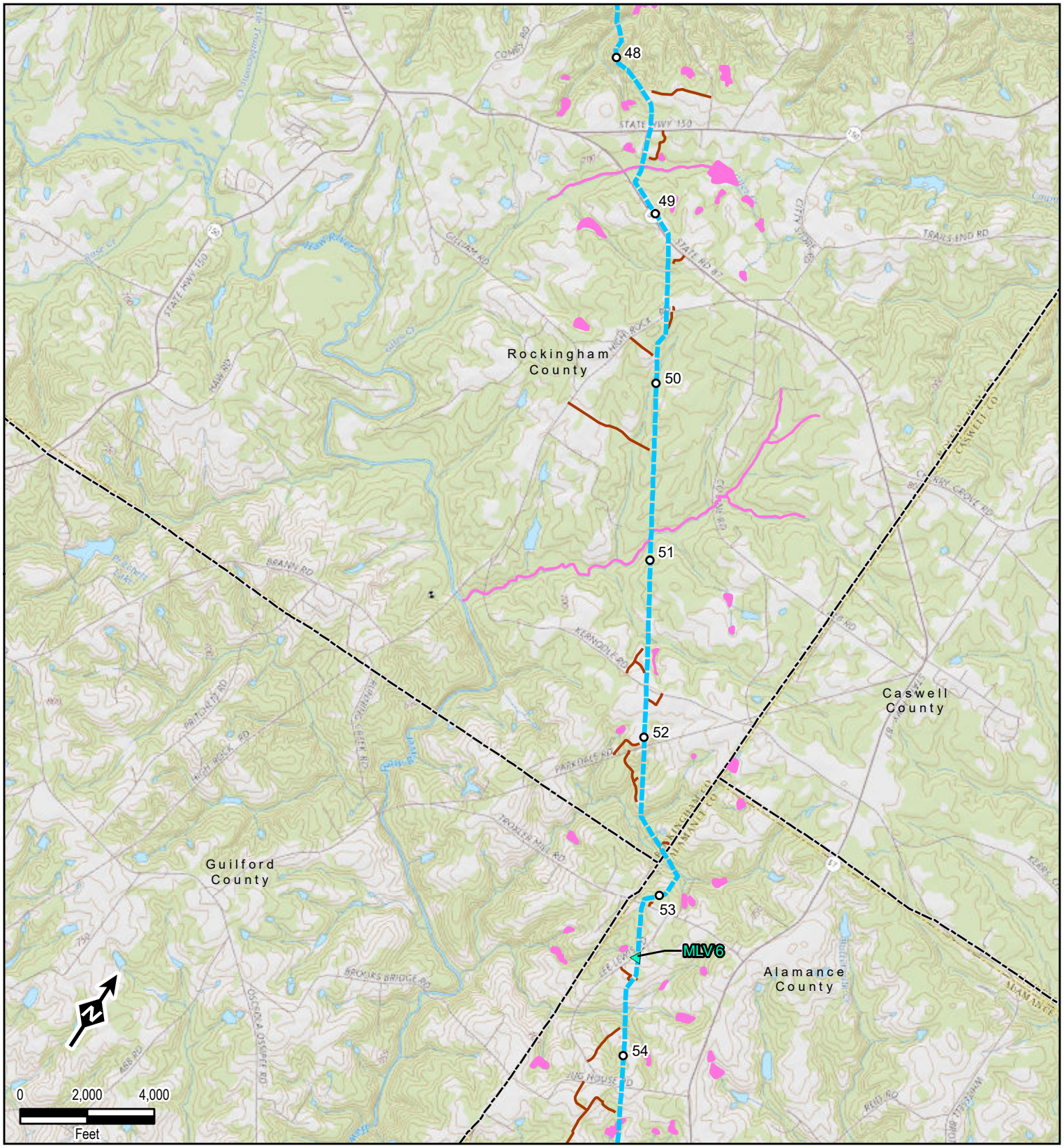

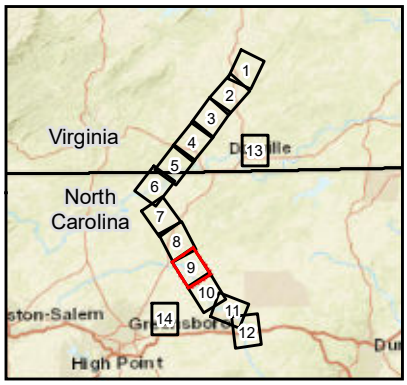

Legend

- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
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- NWI Wetlands
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1 inch = 4,000 feet
When Printed 8.5x11

Data Sources: ESRI, USGS, EQT, USFWS

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NWI Wetlands

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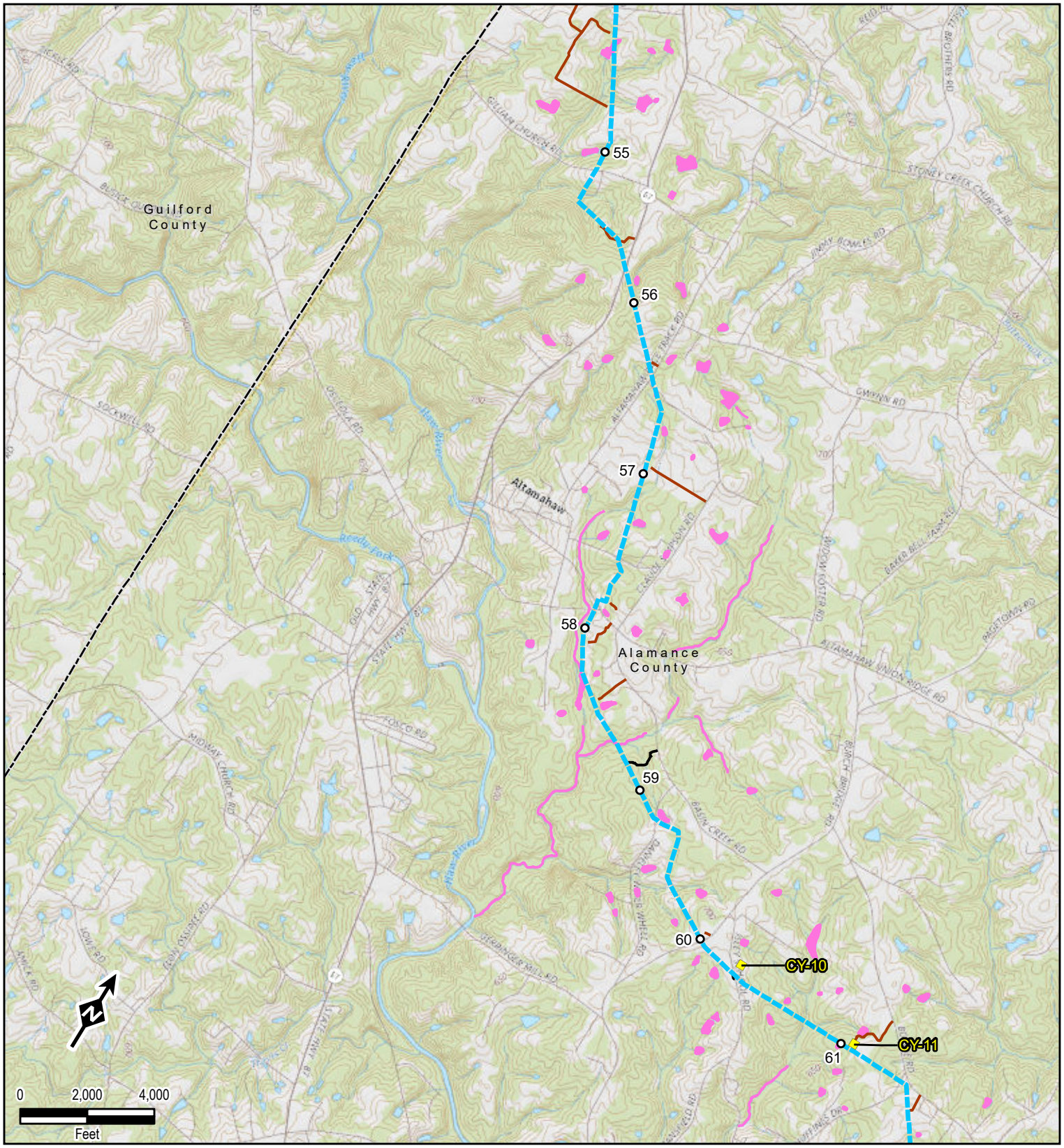
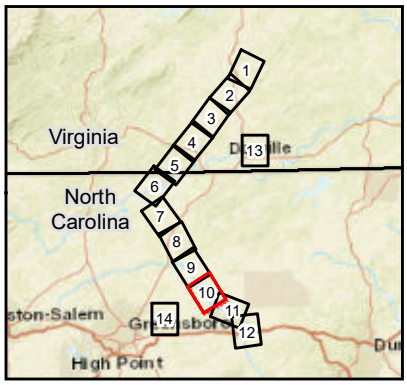
TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI.mxd





Legend

- Mileposts
- Compressor Station
- Contract Yard
- Meter Station
- Valve Site
- Permanent Access Road
- Temporary Access Road
- Proposed Pipeline Route
- NWI Wetlands
- State Boundary
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1 inch = 4,000 feet
When Printed 8.5x11

Data Sources: ESRI, USGS, EQT, USFWS

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NWI Wetlands

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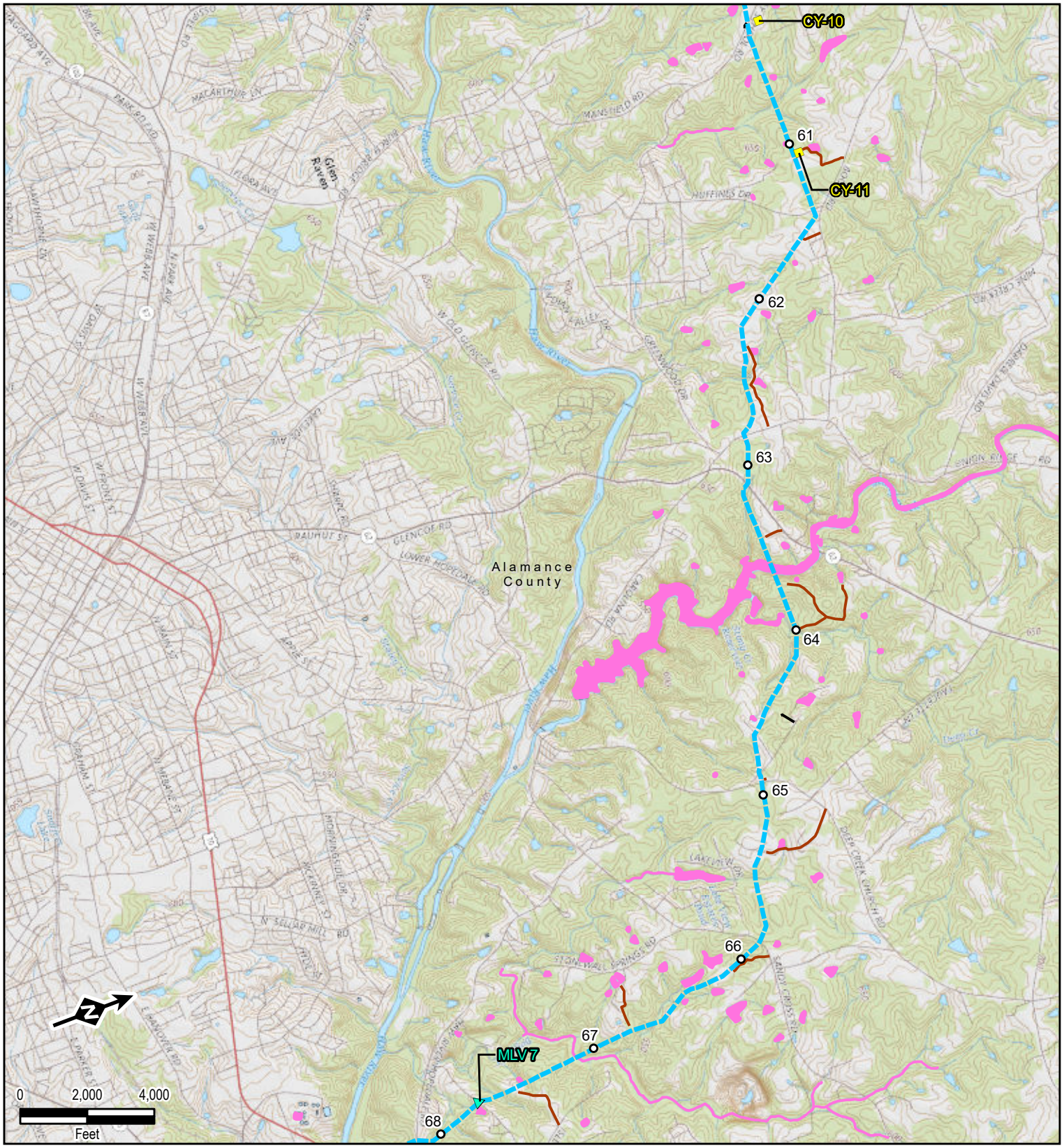
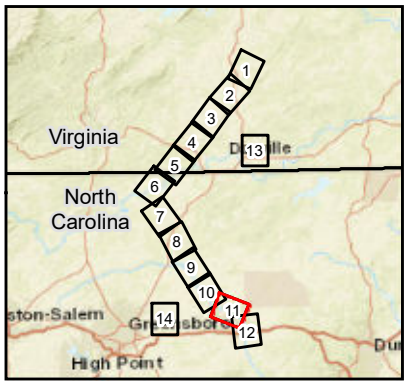
TRC
Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI.mxd





Legend

- Mileposts
- Compressor Station
- Contract Yard
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- Valve Site
- Permanent Access Road
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1 inch = 4,000 feet
When Printed 8.5x11

Data Sources: ESRI, USGS, EQT, USFWS

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NWI Wetlands

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

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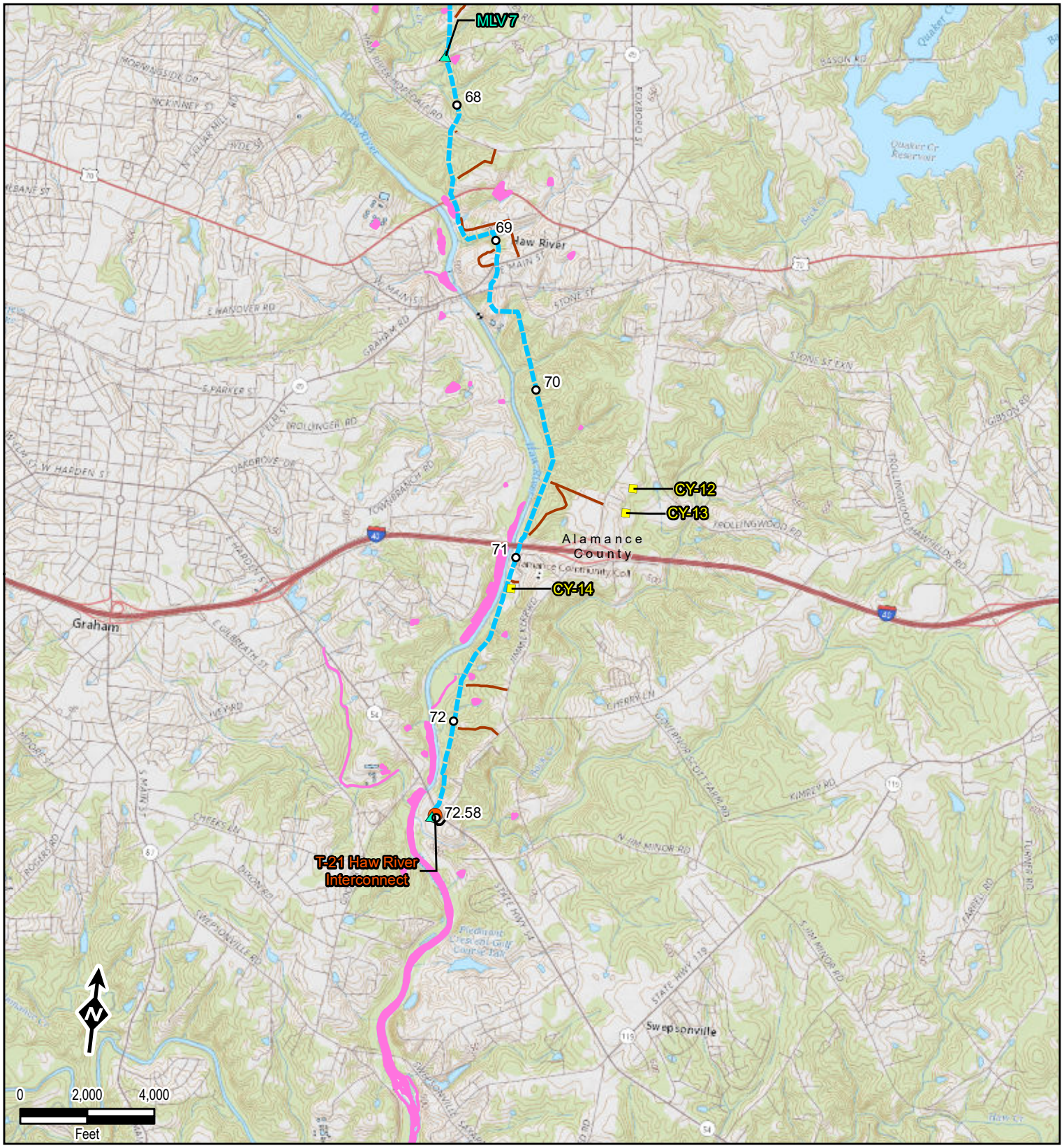

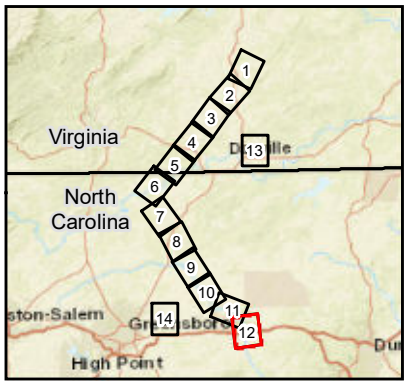

Legend

- Mileposts
- Compressor Station
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- Valve Site
- Permanent Access Road
- Temporary Access Road
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- NWI Wetlands
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1 inch = 4,000 feet
When Printed 8.5x11

Data Sources: ESRI, USGS, EQT, USFWS

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NWI Wetlands

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

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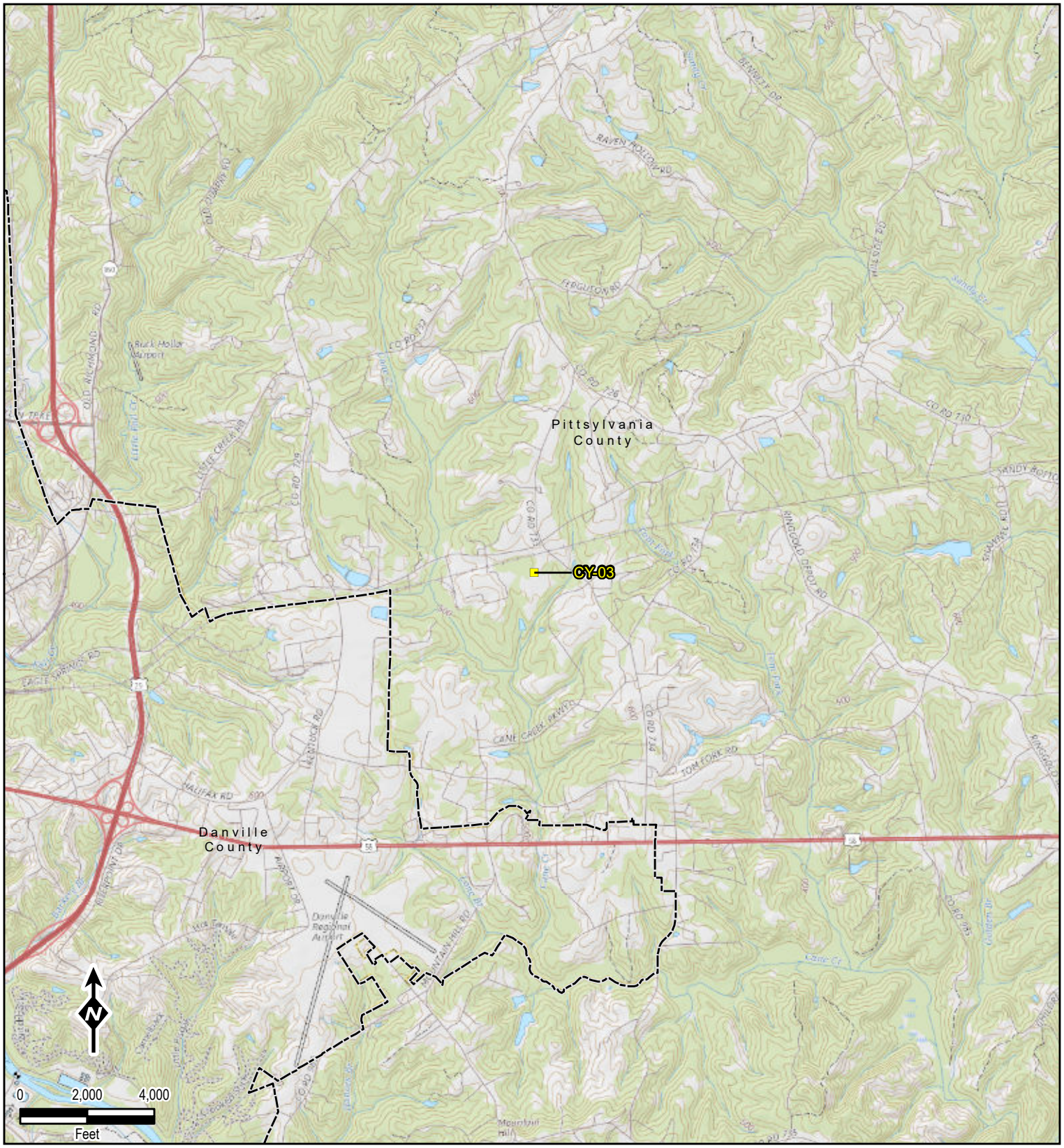

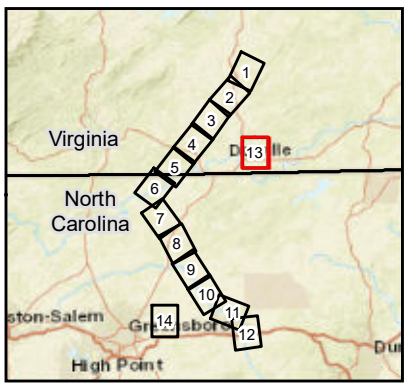

Legend

- Mileposts
- Compressor Station
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1 inch = 4,000 feet

Data Sources: ESRI, USGS, EQT, USFWS When Printed 8.5x11

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NWI Wetlands

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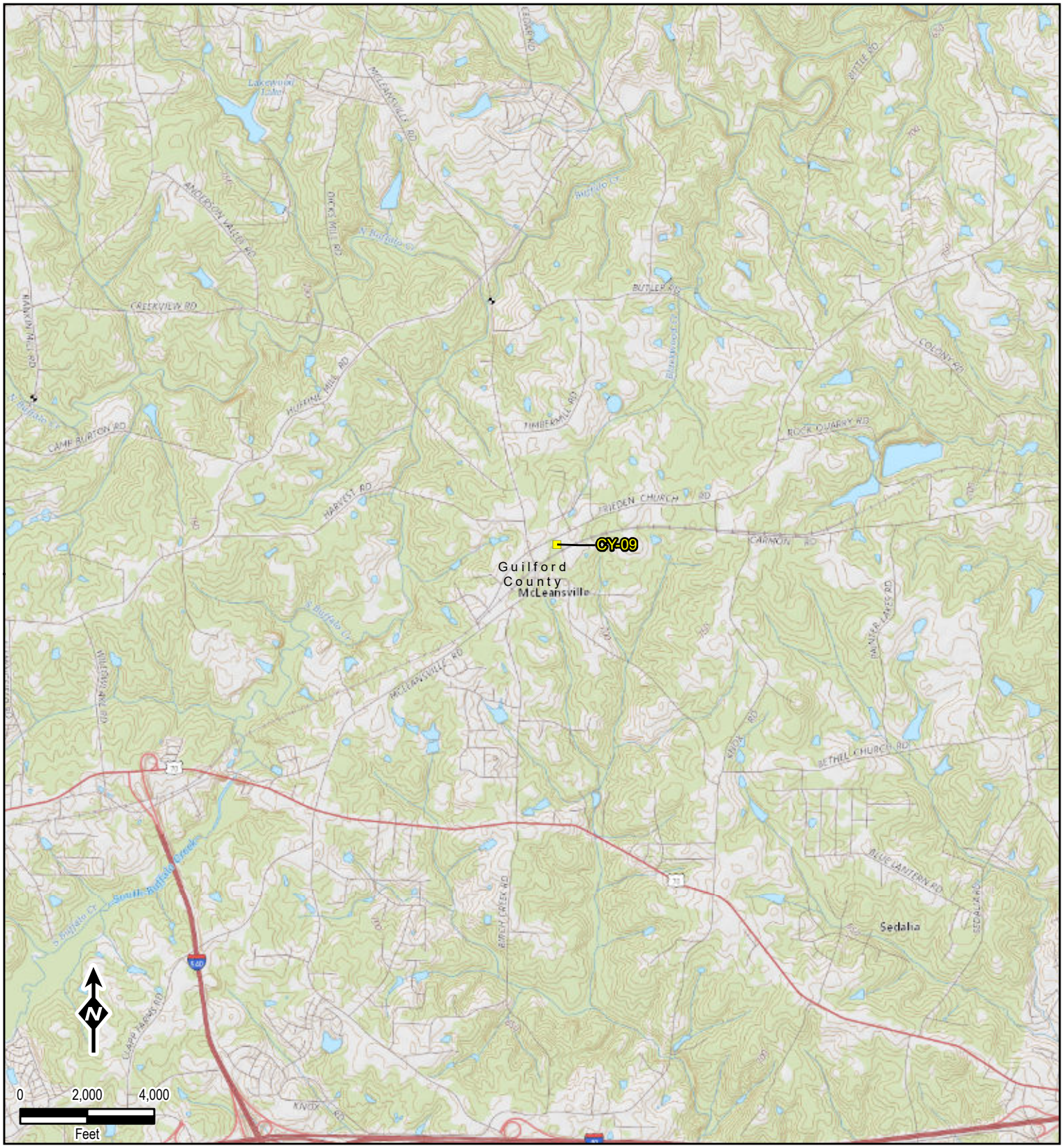
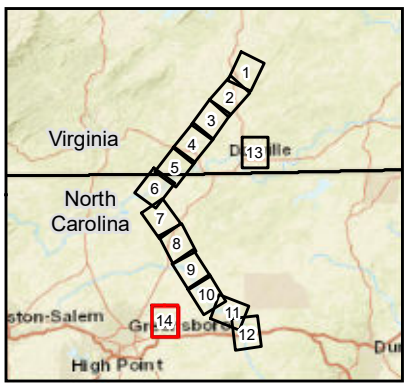
TRC Results you can rely on
600 Willowbrook Ln
West Chester, PA 19382

S:\1-PROJECTS\NEXTERA\300423_MVP_Southgate\6-MXD\Resource_Reports\RR2\Appendix_2J_NWI.mxd





Legend

- Mileposts
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NWI Wetlands

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TRC
Results you can rely on

600 Willowbrook Ln
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