



MVP Southgate Amendment Project

Docket No. CP25-XX-000

Resource Report 10 – Alternatives

November 2018 (Docket No. CP19-14-000)

Amended February 2025

MVP Southgate Amendment Project Resource Report 10 – Alternatives

Resource Report 10 – Filing Requirements	
Information	Location in Resource Report
Minimum Filing Requirements	
1. Address the “no action” alternative (Sec. 380.12(l)(1)).	Section 10.2
2. For large projects, address the effect of energy conservation or energy alternatives to the project (Sec. 380.12(l)(1)).	Section 10.3
3. Identify system alternatives considered during the identification of the project and provide the rationale for rejecting each alternative (Sec. 380.12(l)(1)).	Section 10.4
4. Identify major and minor route alternatives considered to avoid impact on sensitive environmental areas (e.g., wetlands, parks, or residences) and provide sufficient comparative data to justify the selection of the proposed route (Sec. 380.12(l)(2)(ii)).	Sections 10.5 and 10.6
5. Identify alternative sites considered for the location of major new aboveground facilities and provide sufficient comparative data to justify the selection of the proposed site (Sec. 380.12(l)(2)(ii)).	Section 10.8
Additional Information Often Missing and Resulting in Data Requests	
6. Ensure that project objectives that serve as the basis for evaluating alternatives are consistent with the purpose and need discussion in Resource Report 1.	Section 10.1.2
7. Identify and evaluate alternatives identified by stakeholders.	Section 10.5
8. Clearly identify and compare the corresponding segments of route alternatives and route variations to the segments of the proposed route that they would replace if adopted.	Section 10.6

RESOURCE REPORT 10 ALTERNATIVES

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LIST OF ACRONYMS AND ABBREVIATIONS

Amendment Project	MVP Southgate Amendment Project
Dth/d	dekatherms per day
Duke Energy	Duke Energy Carolinas, LLC
East Tennessee	East Tennessee Natural Gas, LLC
FERC or Commission	Federal Energy Regulatory Commission
FEIS	Final Environmental Impact Statement
HDD	Horizontal directional drill
LNG	liquefied natural gas
MP	milepost
Mountain Valley	Mountain Valley Pipeline, LLC
NCLD	National Land Cover Database
NHD	National Hydrography Dataset
NWI	National Wetlands Inventory
Original Certificated Project	MVP Southgate Project, as approved on June 18, 2020
PSNC	Public Service Company of North Carolina, Inc. (d/b/a Enbridge Gas North Carolina)
Transco	Transcontinental Gas Pipe Line Company, LLC
U.S.	United States
USGS	U.S. Geological Services
VADEQ	Virginia Department of Environmental Quality

RESOURCE REPORT 10 ALTERNATIVES

10.1 INTRODUCTION

On June 18, 2020, in Docket No. CP19-14-000, the Federal Energy Regulatory Commission (“FERC” or “Commission”) issued a Certificate of Public Convenience and Necessity pursuant to Section 7(c) of the Natural Gas Act to Mountain Valley Pipeline, LLC (“Mountain Valley”) authorizing Mountain Valley to construct and operate the MVP Southgate Project (or “Original Certificated Project”). A Final Environmental Impact Statement (“FEIS”) was issued by FERC on February 14, 2020.

In December 2023, Mountain Valley submitted an update on the status of the Original Certificated Project, indicating that it had entered into precedent agreements for a redesigned pipeline route. Mountain Valley is currently seeking to amend the MVP Southgate Project (“Amendment Project”) by truncating the Original Certificated Project to approximately 31.3 miles, incorporating certain route deviations, increasing the diameter of the pipeline, removing the Lambert Compressor Station, and modifying the proposed interconnects. The Amendment Project facilities will be located in Pittsylvania County, Virginia, and Rockingham County, North Carolina. See Resource Report 1 (General Project Description) for additional information on the Original Certificated Project and Amendment Project.

10.1.1 Environmental Resource Report Organization

Resource Report 10 describes updated information regarding the no-action alternative, other energy alternatives, system alternatives, route alternatives, route variations, and aboveground facility alternatives and is prepared and organized according to the FERC (2017) *Guidance Manual for Environmental Report Preparation*. The information presented in Resource Report 10 has not changed from the FEIS issued for the Original Certificated Project on February 14, 2020, except where noted.

10.1.2 Purpose and Need

See Resource Report 1 for additional information on the Amendment Project’s purpose and need.

10.2 NO-ACTION ALTERNATIVE

The No-Action Alternative for the Amendment Project would avoid the temporary and permanent environmental impacts associated with the construction and operation of the Amendment Project. However, the No-Action Alternative would not achieve the Amendment Project’s purpose and need, as stated in Resource Report 1. Under the No-Action Alternative, Mountain Valley would not be able to meet the specific requests for natural gas transportation service of Foundation Shippers, Public Service Company of North Carolina Inc. (d/b/a Enbridge Gas North Carolina) (“PSNC”), a local natural gas distribution company serving customers in North Carolina, and Duke Energy Carolinas, LLC (“Duke Energy”), an electric utility in North Carolina. On a broader scale, implementing the No-Action Alternative would not support the goal of increasing consumer access to stable and reliable natural gas supplies in the southeastern United States (“U.S.”).

The Amendment Project will bring lower-emission, domestically produced natural gas supplies to support the demand for natural gas, provide increased supply diversity, and improve supply reliability in the region.

Mountain Valley has signed 20-year firm transportation precedent agreements to provide 550,000 dekatherms per day (“Dth/d”) to its Foundation Shippers. The North Carolina Public Utility Commission is supportive of PSNC’s need to acquire incremental transportation to meet growing demand and a diversified gas supply. The Amendment Project will also support Duke Energy’s growing electric demand and coal retirements, as stated in its Integrated Resource Plans (Duke Energy 2023; North Carolina Utilities Commission 2024). As a result, the Amendment Project will contribute to Duke Energy’s carbon dioxide emission reductions.

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

10.3 ENERGY ALTERNATIVES

The use of certain alternative fuels to supply the needs of the market served by the Amendment Project is not an alternative to the Amendment Project. Energy conservation and efficiency programs help to reduce energy demand, and renewable energy is playing an increasing role in meeting the region’s energy needs. However, as concluded in the FEIS, because the purpose of the Amendment Project is to transport natural gas, and the generation of electricity from renewable energy sources or the gains realized from increased energy efficiency and conservation are not transportation alternatives, they cannot function as a substitute for the Amendment Project. Duke Energy provides electric service to Rockingham County and requires a supply of natural gas for its power plant. This natural gas supply cannot be replaced by renewable sources or coal. Renewable energy, energy conservation, alternative fossil fuels, nuclear, and fuel cells do not meet the Amendment Project’s purpose to provide new natural gas transmission pipeline capacity that will increase competition and enhance the reliability and resiliency of the existing pipeline infrastructure in North Carolina and southern Virginia.

10.4 SYSTEM ALTERNATIVES

System alternatives are alternatives to the proposed action that would make use of other existing, modified, or proposed pipeline systems or other surface transportation systems to meet the purpose and need of the Amendment Project. If available as a viable alternative, a system alternative could make it unnecessary to construct all or part of the Amendment Project, though some modifications or additions to the alternative systems would be required to increase their capacity or provide receipt and delivery capability consistent with that of the Amendment Project. These modifications or additions would result in environmental impacts that may be less than, comparable to, or greater than those associated with construction of the Amendment Project. System alternatives that would result in significantly less environmental impact might be preferable to the Amendment Project. However, a viable system alternative must also be technically and economically feasible and practicable and must satisfy necessary contractual commitments (including timing) made with shippers supporting the development of the Amendment Project. The systems evaluated as potential alternatives to the Amendment Project are discussed below.

The FEIS for the Amendment Project found no existing or proposed natural gas pipeline systems could meet the Amendment Project's objective. Therefore, this section documents existing and proposed projects identified after the FEIS was issued.

10.4.1 Surface Transportation System Alternatives

A surface transportation system alternative would involve the liquefaction of natural gas at the receipt points along the pipeline and transportation of the liquefied natural gas ("LNG") volumes to the delivery points where regasification facilities would be installed. To liquefy and transport natural gas, the temperature and pressure design points are -260 degrees Fahrenheit and 4 pounds per square inch gauge. Converting the 550 million cubic feet per day of natural gas volumes that the Amendment Project will deliver to PSNC in North Carolina to LNG would require production and transportation of approximately 4,114 million gallons per day. Transportation of the LNG would involve trucking on local and interstate highways to a centralized delivery point and transporting to regasification facilities at the delivery points along the pipeline. Given a truck tanker capacity of 10,850 gallons, it would take approximately 379,196 trucks per day to transport this volume with a truck-limiting load rate of approximately 300 gallons per minute. To transport the LNG volumes, a 24-hour per day, simultaneous loading operations of approximately nine trucks would be required. Any additional natural gas volume increase would result in an incremental increase in the number of trucks per day.

Installation of processing facilities to liquefy and subsequently re-gasify natural gas would require extensive permitting, require large tracts of land for a regasification facility, and result in associated air emissions from the liquefaction/regasification process and the truck or rail traffic. In addition, the development or improvement of the transportation network necessary to transport LNG gas would be required. Transporting LNG by rail is also not a viable option. Currently, there are no approved LNG rail tankers, and shipment of LNG in the International Organization for Standardization containers by rail is very limited due to regulatory constraints. Furthermore, the Pipeline and Hazardous Materials Safety Administration suspended its prior rule authorizing the transportation of LNG by rail, and it is not known if or when the authorization will be reinstated. Therefore, new regulatory processes and approvals would be required before LNG rail shipments would be possible. Since the LNG by rail alternative would not be available to meet the timeframe required for energy demands by the market, the use of this alternative is not a viable alternative to the Amendment Project. Therefore, transporting the Amendment Project's natural gas volumes as LNG by trucks and/or rail is not considered a viable alternative to the Amendment Project pipeline facilities and was eliminated from further consideration.

10.4.2 Transco Pipeline System

The Transcontinental Gas Pipe Line Company, LLC ("Transco") system encompasses approximately 10,200 miles from South Texas to New York City with a system peak design capacity of approximately 15 million dekatherms per day. The Transco pipeline currently transports nearly all of the natural gas supply entering North Carolina.

On October 29, 2024, Transco filed an application with FERC for its proposed Southeast Supply Enhancement Project ("SSE") (Docket No. CP25-10-000). According to Transco, its SSE Project would provide 1,596,900 Dth/d of incremental firm transportation to serve markets in the Mid-Atlantic and Southeastern states by November 2027. Customers served by the SSE Project include Duke Energy (1,000,000 Dth/d), Southern Company Services, Inc. (400,000 Dth/d), South Carolina Public Service

Authority (80,000 Dth/d), Atlanta Gas Light Company (75,000 Dth/d), Patriots Energy Group (14,000 Dth/d), Greer Commission of Public Works (10,000 Dth/d), the City of Fountain Inn (2,400 Dth/d), Municipal Gas Authority of Georgia (2,000 Dth/d), the City of Wilson (2,000 Dth/d), the City of Danville (1,500 Dth/d), Fort Hill Natural Gas Authority (5,000 Dth/d), and Southwestern Virginia Gas Company (5,000 Dth/d). Transco states that the project would provide shippers with firm access to competitive gas supplies and support overall reliability and diversification of energy infrastructure in the southeast, including Virginia, North Carolina, South Carolina, and Georgia.

The SSE Project would involve the construction and operation of approximately 50.4 miles of new, 42-inch-diameter natural gas pipeline (Eden Loop and Salem Loop) located along the existing Transco Mainline in Pittsylvania County, Virginia, and Rockingham, Guilford, Forsyth, and Davidson counties, North Carolina; expansion of one existing compressor station in Virginia (Stations 165); expansion of three existing compressor stations in North Carolina (Stations 145, 150, and 155); and modification of four existing facilities in South Carolina, Georgia, and Alabama. The Eden Loop portion of the SSE Project originates at Transco's Station 165 pool and generally runs parallel to the Amendment Project pipeline route in both Virginia and North Carolina, terminating at the Dan River Interconnect.

Transco states that it has executed long-term binding precedent agreements with multiple shippers for the full proposed project capacity. Therefore, it does not have the excess capacity to carry the 550,000 Dth/d that the Amendment Project would require. Supplying the additional capacity that the Amendment Project is contracted for would require either a larger-diameter pipeline than the already-proposed 42-inch-diameter pipeline of the SSE Project, additional compression, or both. Combining the Amendment Project and the SSE Project would not meet the purpose and need of the Amendment Project of diversifying the natural gas supply in the region or the requests of Mountain Valley and Transco to provide separate pipelines to each serve their customer requirements. The goals and objectives of the SSE Project focus on a broader geographic reach, designed to meet a widespread demand with larger-scale energy infrastructure, a broader region, and across multiple states, including Virginia, the Carolinas, Georgia, and Alabama. This broad geography far exceeds the footprint of the Amendment Project. Likewise, meeting the combined capacity of both projects (2,146,900 Dth/d) with the single 30-inch pipeline of the Amendment Project is not hydraulically viable. Additionally, the SSE Project includes additional compression at Station 165 to meet the pressure requirements for its larger volume, which is not currently planned on the Amendment Project. Upgrades of this nature would require significant modifications and additional infrastructure and would result in greater environmental impacts.

Overall, the Amendment Project cannot use the SSE Project as a system alternative due to differences in scope, capacity, and tariff specifications and the need for significant infrastructure modifications. Additionally, Transco's SSE Project would not meet several of the Amendment Project objectives that Foundation Shippers considered prior to contracting for capacity on the Amendment Project, specifically regarding increased resiliency, hourly flexibility, operational considerations, risk diversification, and the addition of competitive gas supplies to the region. Although the SSE Project provides access to the Appalachian gas region, it would still increase the reliance on a single pipeline to provide gas to customers in North Carolina and would not meet the goal of the Amendment Project of diversifying supply and enhancing the reliability and resiliency of the State's existing pipeline infrastructure.

10.4.3 East Tennessee Natural Gas System

The East Tennessee Natural Gas, LLC (“East Tennessee”) pipeline system consists of approximately 1,536 miles of pipeline in the Southeast and Mid-Atlantic. The system begins in Tennessee and extends to an area just south of Roanoke, Virginia. A segment of the system extends into southwest Virginia and northern North Carolina through a 95-mile natural gas pipeline that interconnects with the Transco system near Eden, North Carolina. This segment of the East Tennessee system also exclusively services Saltville Gas Storage Company L.L.C., the only underground natural gas storage in Virginia and the Carolinas. Both Amendment Project shippers utilize this storage facility, and access to it plays an important role in both operational balancing and fuel supply security during peak periods.

While East Tennessee interconnects with the Amendment Project at the LN 3600 Interconnect (at MP 28.95), the FEIS for the Original Certificated Project concluded that it could not be considered a viable system alternative as it would need to build similar facilities as proposed by Mountain Valley to meet the Amendment Project objectives. Significant modifications to the East Tennessee system (and the existing pipelines interconnected to East Tennessee), including the construction of new pipeline facilities, would be needed to provide the necessary design pressure and capacity to serve the Amendment Project’s larger natural gas commitment to its Foundation Shippers. Therefore, Mountain Valley does not consider this pipeline system to be a reasonable alternative to the Amendment Project.

10.5 ROUTE ALTERNATIVES

10.5.1 Pipeline Routing

During the route development of the Amendment Project, Mountain Valley conducted an extensive screening process relying on desktop and field review of potential pipeline routes to identify viable pipeline corridors and then refined the review to determine the most feasible route within the most favorable corridor. The goal of selecting the Original Certificated Project route was the identification of a pipeline alignment that minimizes environmental impact to the greatest practicable extent, coupled with the achievement of the Project goals. One of Mountain Valley’s primary objectives with respect to pipeline routing was to avoid or minimize, to the extent practicable, impacts to major population centers and significant environmental resources, including special aquatic sites and other aquatic resources, as required by Section 404 of the Clean Water Act. Mountain Valley also attempted to route its pipeline adjacent to existing rights-of-way, where feasible. Mountain Valley used field reconnaissance, aerial photography, topographic maps from the U.S. Geological Survey (“USGS”), National Land Cover Database (“NCLD”), National Wetlands Inventory (“NWI”) maps, and the National Hydrography (“NHD”) dataset during the route identification and evaluation processes. The Original Certificated Project route was reviewed by FERC and regulatory agencies during its origination and was ultimately selected as the Preferred Route to meet the objectives of the project. The Amendment Project route is consistent with that of the Original Certificated Project route but represents a shortened pipeline route that still meets Mountain Valley’s primary objective to minimize environmental impacts.

The Amendment Project includes the installation of approximately 31.3 miles of natural gas pipeline and appurtenant facilities (e.g., meter stations, valve settings, and launcher/receiver equipment), of which 64 percent is collocated. Approximately 1.86 miles of the Amendment Project route are collocated along a proposed segment of the Transco proposed SSE Project (Eden Loop). As discussed further below, the

Amendment Project has evaluated major and minor route alternatives to maximize constructability, minimize impacts to sensitive resources, and avoid encroachments.

10.5.2 Major Pipeline Route Alternatives

The FEIS for the Original Certificated Project evaluated three major pipeline route alternatives: the Berry Hill Alternative, Lake Cammack East Alternative, and the North-South Alternative. Each of these routes extended to a termination point in Alamance County, North Carolina, aligning with the Original Certificated Project route. They also included comparisons of laterals extending east to west, terminating at the Dan River Interconnects, the same location as the Amendment Project's termination point.

When considering all affected resources, the FEIS concluded that these major route alternatives do not offer a significant environmental advantage over the Original Certificated Route. The FEIS concluded that the Berry Hill Alternative would be 0.2 mile longer, require a 5.4-mile lateral, and affect seven more residences within 50 feet of the workspace. The FEIS concluded that the Lake Cammack East Alternative would require an 8.8-mile lateral, affect one more residence within 25 feet and five more residences within 50 feet of workspace, and impact an additional 2.5 acres of total wetlands, 3.5 additional acres of forested wetlands, and 28.7 additional acres of forested land during construction. The FEIS concluded that the North-South Alternative would be 2.3 miles longer, require a 16.6-mile lateral, cross 53 more parcels, affect 11 more residences within 50 feet of workspace, cross three more streams, and impact 2.3 acres more acres of wetlands (1.4 more acres of forested wetlands), and 131.6 more acres of forested land during construction. When analyzing these major route alternatives for the Amendment Project, Mountain Valley truncated each at the Dan River Interconnect. Since the Amendment Project generally follows the Original Certificated Route, the overall conclusions reached in the FEIS (that the major pipeline route alternatives would result in greater environmental impacts) also apply to the Amendment Project. As such, no other major route alternatives were considered for the Amendment Project.

10.6 AMENDMENT PROJECT VARIATIONS

Route variations differ from route alternatives as they consist of alignment adjustments that enhance constructability; reduce impacts on localized features, sensitive resources, or terrain; and/or provide appropriate space to allow for the safe operation and maintenance of the pipeline. They are typically shorter than route alternatives and may not always display a clear environmental advantage other than avoiding or reducing the impact to site-specific features or resources. Potential route variations to evaluate were identified through the systematic screening process described above in Section 10.5.1.

The Original Certificated Project route was issued a FERC Certificate in June 2020. However, due to project modifications associated with the Amendment Project and regulatory consultations after the FERC Certificate was issued, Mountain Valley incorporated certain route variations into the Amendment Project (Preferred Alternative) route as described below. Mountain Valley evaluated these potential route variations using both desktop and field survey data (where applicable) to address construction constraints and to reduce impacts to landowners and sensitive environmental resources. The variations presented below utilize this information to compare the proposed variation to the corresponding segment of the Original Certificated Route.

The Robert Pollok-Hill View Farms route variation at approximately MP 15.0 in Pittsylvania County, Virginia, described in the FEIS, has been implemented. A total of six minor route variations from the Original Certificated Project are proposed. These variations are described below.

10.6.1 Lambert Interconnect Variation (Preferred Alternative)

Due to the elimination of the Lambert Compressor Station, the Amendment Project no longer requires a specific inlet and outlet pipeline; therefore, the H-605 pipeline has been eliminated entirely. The Lambert Interconnect Variation reduces the overall length of pipeline, permanent right-of-way, air and noise emissions, and workspace (see Figure 10.6-1).

With the removal of the Lambert Compressor Station, the Amendment Project pipeline now initiates at the proposed Lambert Interconnect. The permanent footprint of this facility was previously included as part of the permanent, temporary, and additional temporary workspace identified as part of the Original Certificated Project. Construction of this new facility is proposed within permanent easement owned by Mountain Valley at MP 0.05. It will require new additional temporary workspace outside of the workspaces previously certificated and is requested as a variation that has been incorporated as part of the Amendment Project. The new Lambert Interconnect Variation is shown in Figure 10.6-1 in Appendix 10-A.

As shown in Table 10.6-1, the primary advantages of incorporating this variation are:

- reduces environmental impacts and air and noise emissions by the removal of the Lambert Compressor Station;
- reduces pipeline length by the removal of the Lambert Compressor Station; and
- reduces the amount of overall required workspace.

The primary disadvantages of the Lambert Interconnect Variation are:

- none identified based on initial review.

Potential constructability concerns of the Lambert Interconnect Variation are:

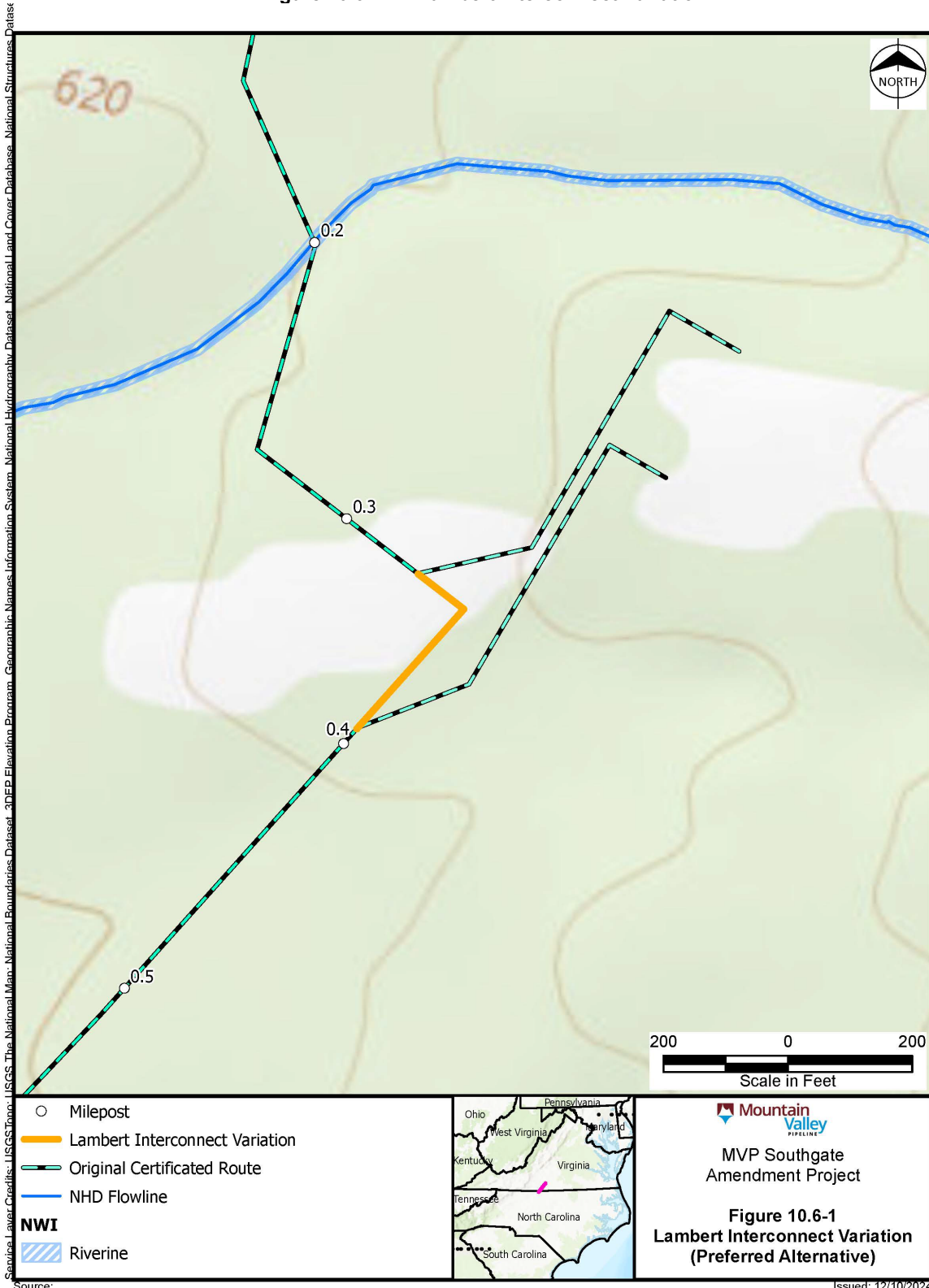
- none identified based on initial review.

Table 10.6-1

Comparison of the Original Certificated Project and Lambert Interconnect Variation

Feature	Lambert Interconnect Variation (Preferred Alternative)	Original Certificated Project	Difference
Total length (miles)	0.07	0.28	-0.22
Construction right-of-way (acres) <u>a/</u>	0.97	3.24	-2.27
Permanent right-of-way (acres) <u>a/</u>	1.00	1.66	-0.66
Total number of parcels crossed	1	2	-1
Number of residences within 25 and 50 feet of the edge of the construction right-of-way (and associated additional temporary workspace)	0	0	0
Number of waterbodies crossed	0	0	0
Number of wetlands crossed	0	0	0
Total wetland crossing length (feet)	0	0	0
Wetlands within construction right-of-way (acres) <u>b/</u>	0	0	0
Agricultural land within construction right-of-way (acres) <u>c/</u>	0.01	0.88	-0.87
Forested land within construction right-of-way (acres)	0.05	0.11	-0.06
Length parallel or adjacent to existing right-of-way (miles)	0.28	0.28	0.0
Source: North Carolina Parcel Boundaries and Standard Fields 2024; NLCD 2021; NWI 2024; USGS 2024; ESRI 2024. <u>a/</u> Assuming 100-foot-wide construction right-of-way and 50-foot-wide permanent right-of-way. Information is based on publicly available data only. <u>b/</u> Assuming 75-foot-wide construction right-of-way. <u>c/</u> Includes pasture/hay and cultivated crops.			

Figure 10.6-1: Lambert Interconnect Variation



10.6.2 MP 9.9 to MP 10.3 Variation (Preferred Alternative)

Mountain Valley evaluated a route variation between MP 9.9 and MP 10.3 based on coordination with the Virginia Department of Environmental Quality (“VADEQ”) to avoid a forested wetland (see Figure 10.6-2). The route variation is approximately 0.33 mile in length. Environmental impacts associated with this variation are provided in Table 10.6-2. This variation moves the Original Certificated Project route approximately 100 to 175 feet west for approximately 0.3 mile and crosses forested and agricultural land.

As shown in Table 10.6-2, the primary advantages of the MP 9.9 and MP 10.3 Variation are:

- avoids a forested wetland per a request and coordination with VADEQ; and
- allows for better design of erosion and sediment control features.

The primary disadvantages of the MP 9.9 and MP 10.3 Variation are:

- greater length and associated land disturbance; and
- additional effects to forested area and agricultural land.

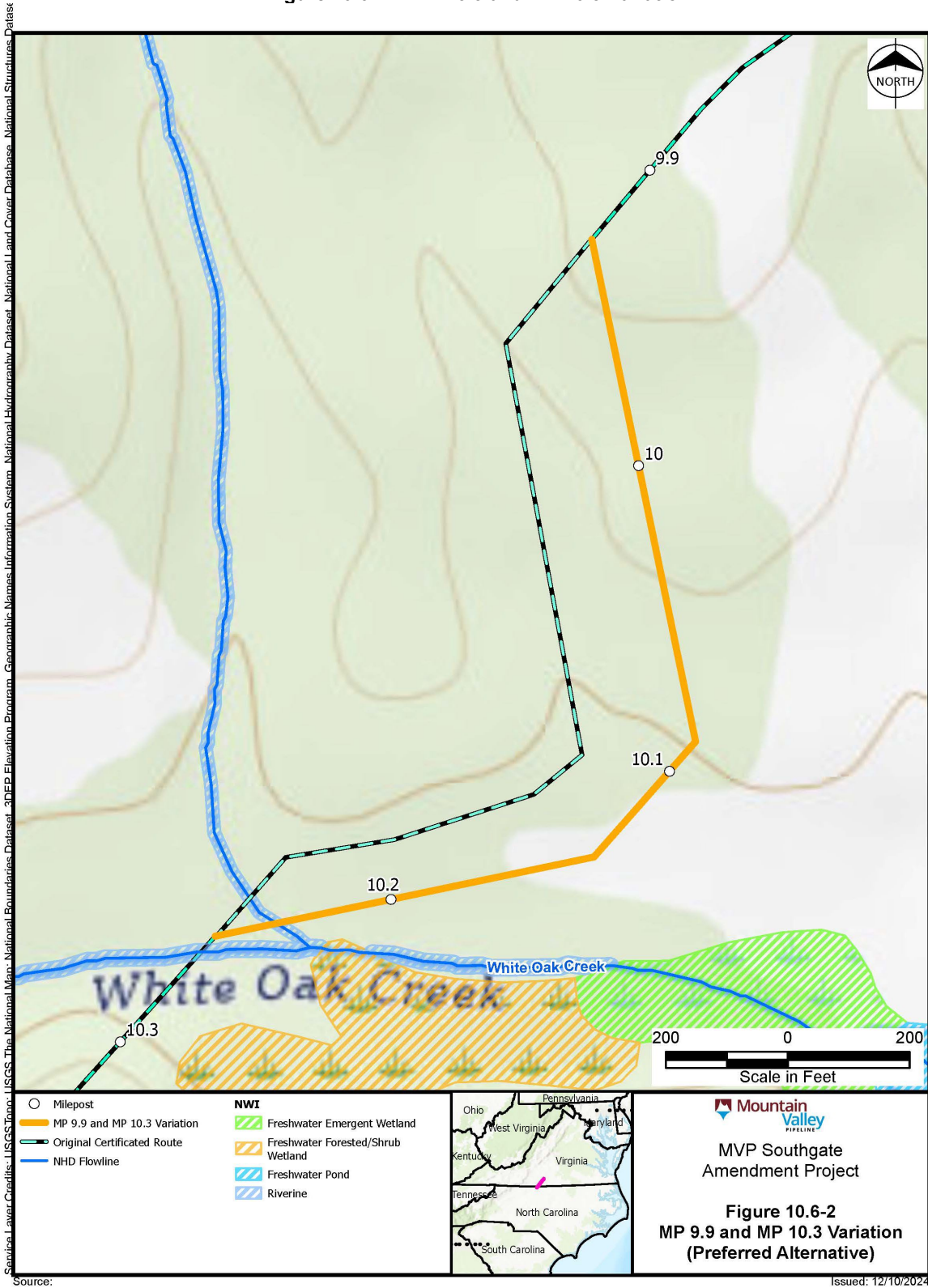
Potential constructability concerns of the MP 9.9 and MP 10.3 Variation are:

- no additional concerns compared to Original Certificated Project.

As this variation was requested by a regulatory agency and avoids a sensitive environmental resource, it was incorporated into the Amendment Project’s preferred pipeline route.

Comparison of the Original Certificated Project and MP 9.9 to MP 10.3 Variation			
Feature	MP 9.9 and MP 10.3 Variation (Preferred Alternative)	Original Certificated Project	Difference
Total length (miles)	0.33	0.30	+0.03
Construction right-of-way (acres) <u>a/</u>	4.15	3.86	+0.29
Permanent right-of-way (acres) <u>a/</u>	2.03	1.89	+0.14
Total number of parcels crossed	3	3	0
Number of residences within 25 and 50 feet of the edge of the construction right-of-way (and associated additional temporary workspace)	0	0	0
Number of waterbodies crossed	1	1	0
Number of wetlands crossed	1	1	0
Wetland crossing length (feet)	28.24	20.46	-7.78
Wetlands within construction right-of-way (acres) <u>b/</u>	0	0	0
Agricultural land within construction right-of-way (acres) <u>c/</u>	1.60	1.38	+0.52
Forested land within construction right-of-way (acres)	2.53	2.39	+0.14
Length parallel or adjacent to existing right-of-way (miles)	0.00	0.00	0.00
Source: North Carolina Parcel Boundaries and Standard Fields 2024; NLCD 2021; NWI 2024; USGS 2024; ESRI 2024. <u>a/</u> Assuming 100-foot-wide construction right-of-way and 50-foot-wide permanent right-of-way. Information is based on publicly available data only. <u>b/</u> Assuming 75-foot-wide construction right-of-way. <u>c/</u> Includes pasture/hay and cultivated crops.			

Figure 10.6-2: MP 9.9 and MP 10.3 Variation



10.6.3 Sandy River Variation (Preferred Alternative)

Mountain Valley evaluated a route variation at MP 17.9 to MP 18.36 for approximately 0.44 mile in connection with the Amendment Project's crossing of the Sandy River. For the Original Certificated Project, Mountain Valley proposed to cross this river utilizing dry ditch crossing methods. However, based on coordination with the Virginia Department of Historic Resources and the requirement to avoid known cultural resources and to address the challenging topography at the banks of the Sandy River combined with heavy flow and frequent flooding in that area, for the Amendment Project, Mountain Valley proposes to cross the Sandy River utilizing a horizontal direction drill ("HDD"). Due to the change in crossing method, a minor realignment was made to better accommodate the HDD and avoid additional sensitive environmental resources. This variation avoids adverse effects to cultural resources and potential instream construction-related impacts to protected species (see Figure 10.6-3).

As shown in Table 10.6-3, the primary advantages of the Sandy River Variation are:

- avoids potential impact/adverse effect to two pre-contact archeological sites, one of which has been determined eligible for the National Register of Historic Places;
- avoids potential instream construction-related impacts to protected species that may be present at the crossing location; and
- avoids a large wetland that was on the Original Certificated Project route.

The primary disadvantages of the Sandy River Variation are:

- potential for inadvertent return of drilling fluids during the HDD.

Potential constructability concerns of the Sandy River Variation are:

- potential subsurface conditions that may affect technical feasibility of HDD installations.

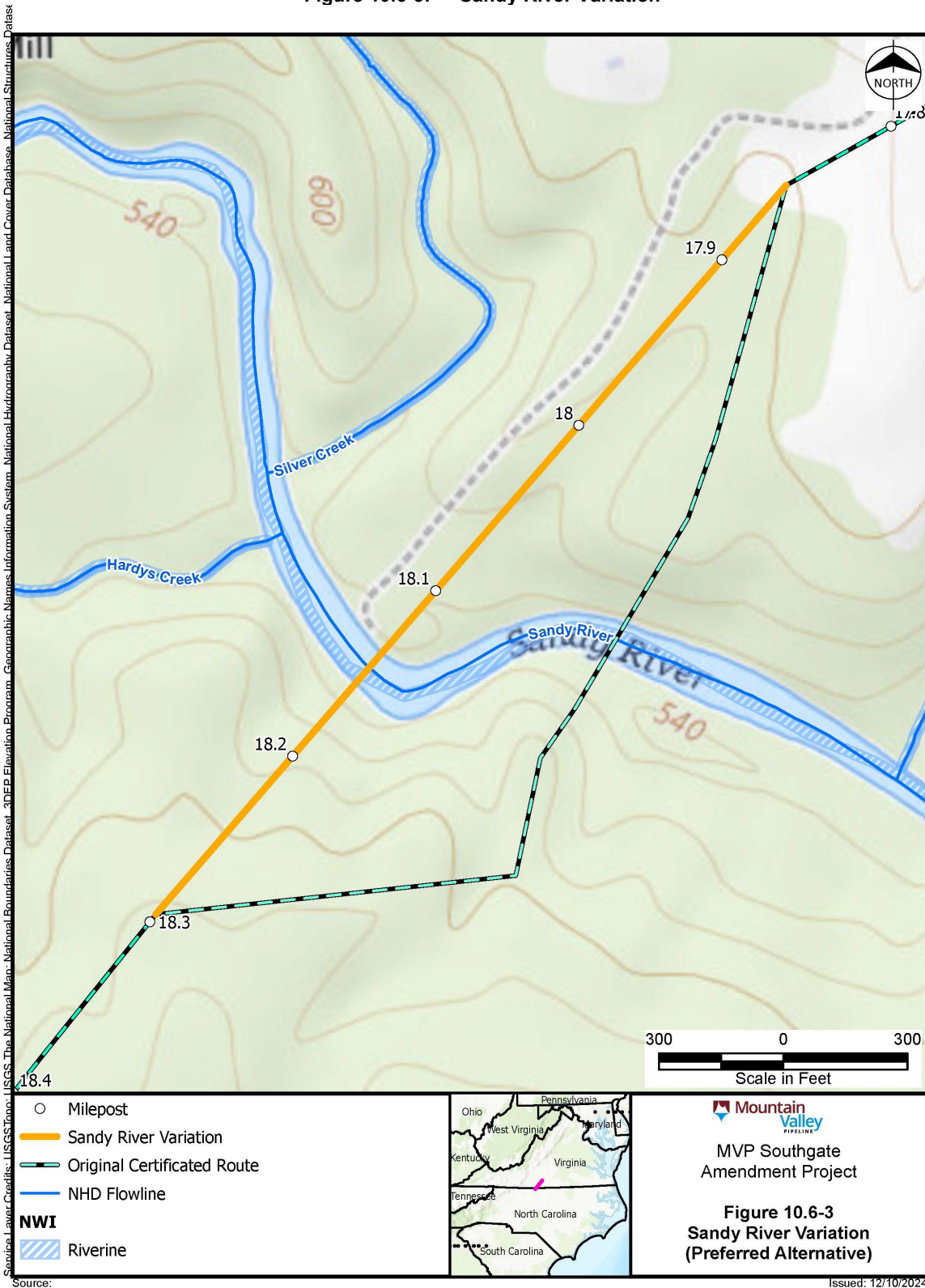
The Sandy River Variation will result in similar environmental impacts as the Original Certificated Project; however, it will avoid impacts to known cultural resources and direct impacts to the Sandy River and any protected species that may occur there. Accordingly, it was incorporated into the Amendment Project's preferred pipeline route.

Table 10.6-3

Comparison of the Original Certificated Project and Sandy River Variation

Feature	Sandy River Variation (Preferred Alternative)	Original Certificated Project	Difference
Total length (miles)	0.44	0.51	-0.07
Construction right-of-way (acres) <u>a/</u>	1.61	6.34	-4.73
Permanent right-of-way (acres) <u>a/</u>	1.46	3.12	-1.66
Total number of parcels crossed	4	3	+1
Number of residences within 25 and 50 feet of the edge of the construction right-of-way (and associated additional temporary workspace)	0	0	0
Number of waterbodies crossed	1	1	0
Number wetlands crossed	1	1	0
Total wetland crossing length (feet)	0	0	0
Wetlands within construction right-of-way (acres) <u>b/</u>	0.00	0.00	0.00
Agricultural land within construction right-of-way (acres) <u>c/</u>	1.12	0.83	+0.29
Forested land within construction right-of-way (acres)	0.35	3.15	-2.8
Length parallel or adjacent to existing right-of-way (miles)	0.44	0.00	+0.44
Source: North Carolina Parcel Boundaries and Standard Fields 2024; NLCD 2021; NWI 2024; USGS 2024; ESRI 2024. <u>a/</u> Assuming 100-foot-wide construction right-of-way and 50-foot-wide permanent right-of-way, which incorporates a 3-foot-wide area between HDD entry and exits for construction purposes. Information is based on publicly available data only. <u>b/</u> Assuming 75-foot-wide construction right-of-way. <u>c/</u> Includes pasture/hay and cultivated crops.			

Figure 10.6-3: Sandy River Variation



10.6.4 MP 19.9 Variation (Preferred Alternative)

Mountain Valley evaluated a route variation for approximately 400 feet from MP 19.9 to MP 19.9 to satisfy a request from Transco for additional separation from Transco’s pipeline. Inaccurate survey data inadvertently placed the Amendment Project’s pipeline within 25 feet of Transco’s existing pipeline; therefore, this variation corrects that issue. The MP 19.9 Variation is offset from the Original Certificated Project route by approximately 25 feet and connects to the Original Certificated Project route at both ends, crossing forested and agricultural land (see Figure 10.6-4).

The primary advantage of the MP 19.9 Variation is:

- satisfies spacing request from Transco by providing additional separation from Transco’s pipeline.

As shown in Table 10.6-4, the primary disadvantage of the MP 19.9 Variation is:

- additional tree removal.

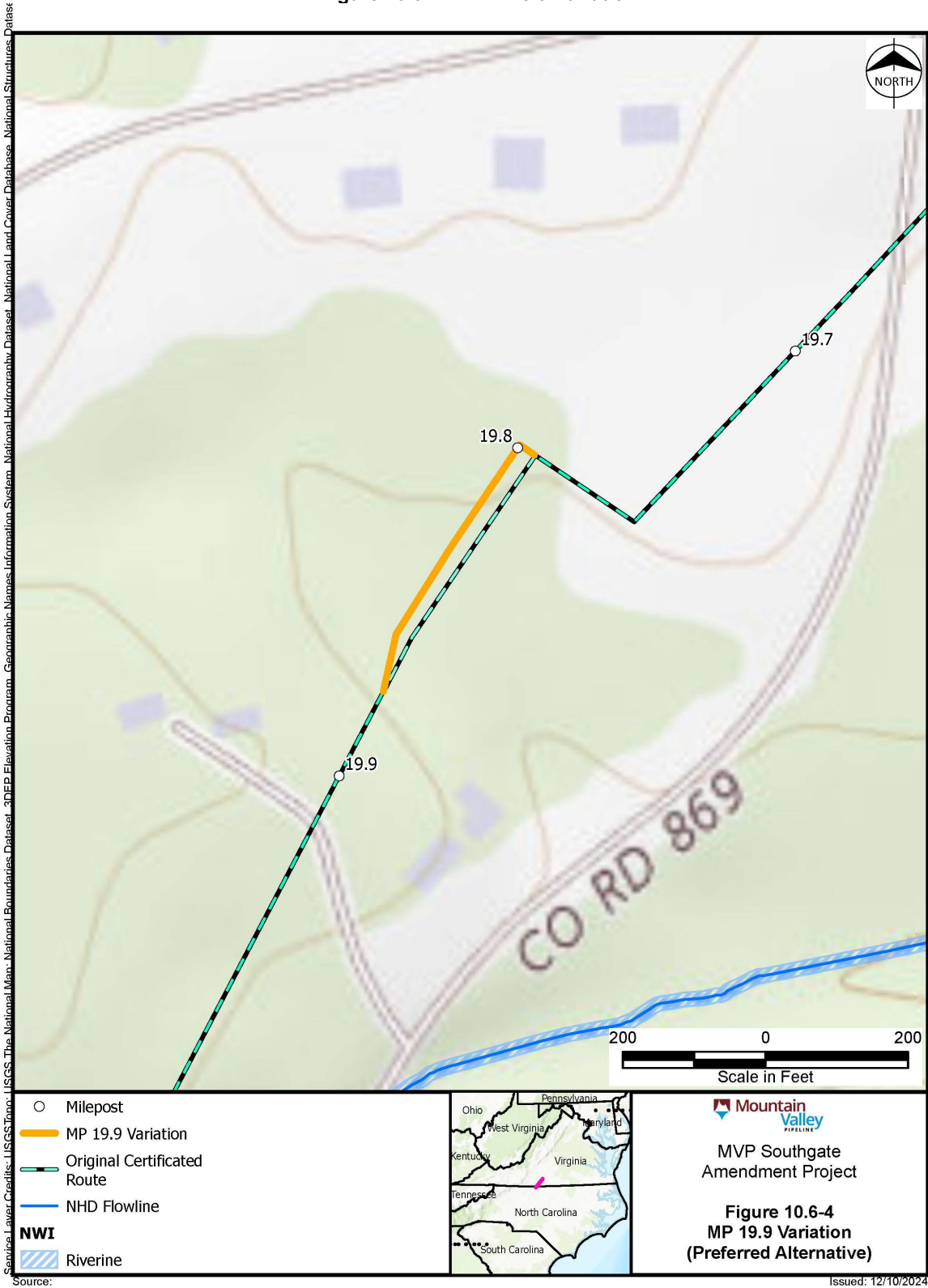
Potential constructability concerns of the MP 19.9 Variation are:

- none.

While the MP 19.9 Variation results in similar environmental impacts as the Original Certificated Project route, it provides additional separation from the existing Transco pipeline. Therefore, it was incorporated into the Amendment Project’s preferred pipeline route.

Feature	MP 19.9 Variation (Preferred Alternative)	Original Certificated Project	Difference
Total length (miles)	0.08	0.07	+0.01
Construction right-of-way (acres) <u>a/</u>	1.14	1.09	+0.06
Permanent right-of-way (acres) <u>a/</u>	0.53	0.50	+0.03
Total number of parcels crossed	5	6	-1
Number of residences within 25 and 50 feet of the edge of the construction right-of-way (and associated additional temporary workspace)	0	0	0
Number of waterbodies crossed	0	0	0
Number wetlands crossed	0	0	0
Total wetland crossing length (feet)	0	0	0
Wetlands within construction right-of-way (acres) <u>b/</u>	0.00	0.00	0.00
Agricultural land within construction right-of-way (acres) <u>c/</u>	0.32	0.38	-0.06
Forested land within construction right-of-way (acres)	0.82	0.71	+0.11
Length parallel or adjacent to existing right-of-way (miles)	0.08	0.07	+0.01
Source: North Carolina Parcel Boundaries and Standard Fields 2024; NLCD 2021; NWI 2024; USGS 2024; ESRI 2024.			
<u>a/</u> Assuming 100-foot-wide construction right-of-way and 50-foot-wide permanent right-of-way. Information is based on publicly available data only.			
<u>b/</u> Assuming 75-foot-wide construction right-of-way.			
<u>c/</u> Includes pasture/hay and cultivated crops.			

Figure 10.6-4: MP 19.9 Variation



10.6.5 MP 23.9 to MP 25.4 Variation (Preferred Alternative)

Mountain Valley evaluated a route variation for approximately 1.5 miles from MP 23.9 to MP 25.4 to satisfy a request from the Danville Industrial Development Authority in connection with its development plans. The Original Certificated Project route was collocated with an existing pipeline right-of-way in this location. To avoid conflicts with planned future development, the MP 23.9 to MP 25.4 Variation deviates from the Original Certificated Project route at various distances between approximately 225 and 1,225 feet. It connects to the Original Certificated Project route at both ends, crossing forested area, utility right-of-way, and undeveloped land (see Figure 10.6-5). The parcels appear to be a historically forested area that has recently been cleared in preparation for future development. The land is owned by the Danville-Pittsylvania Regional Industrial Facility Authority.

The primary advantage of the MP 23.9 to MP 25.4 Variation is:

- satisfy development plans of the Danville Industrial Development Authority.

As shown in Table 10.6-5, the primary disadvantages of the MP 23.9 to MP 25.4 Variation are:

- longer pipeline length;
- increased distance between the Amendment Project and an existing pipeline corridor; and
- additional tree removal.

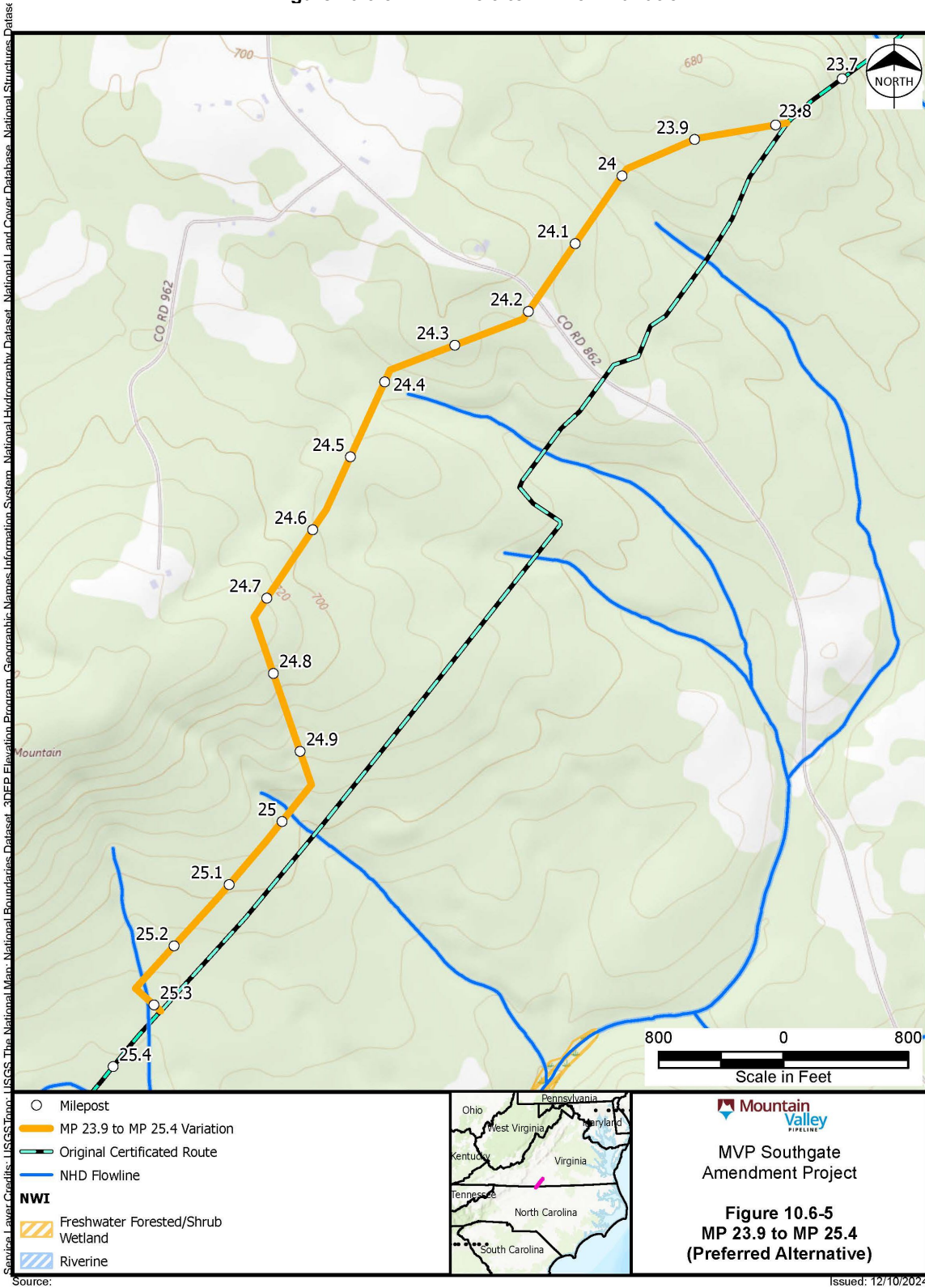
While the MP 23.9 to MP 25.4 Variation results in similar environmental impacts as the Original Certificated Project route, it moves the pipeline to satisfy a request from the Danville Industrial Development Authority to meet its development plans for the parcel. Therefore, it was incorporated into the Amendment Project's preferred pipeline route.

Table 10.6-5

Comparison of the Original Certificated Project and MP 23.9 to MP 25.4 Variation

Feature	MP 23.9 to MP 25.4 Variation (Preferred Route)	Original Certificated Project	Difference
Total length (miles)	1.53	1.39	+0.14
Construction right-of-way (acres) <u>a/</u>	18.66	17.06	+1.60
Permanent right-of-way (acres) <u>a/</u>	9.28	8.49	+0.79
Total number of parcels crossed	9	5	+4
Number of residences within 25 and 50 feet of the edge of the construction right-of-way (and associated additional temporary workspace)	0	0	0
Number of waterbodies crossed	2	4	-2
Number wetlands crossed	0	0	0
Total wetland crossing length (feet)	0.00	0.00	0.00
Wetlands within construction right-of-way (acres) <u>b/</u>	0.00	0.00	0.00
Agricultural land within construction right-of-way (acres) <u>c/</u>	0.00	3.46	-3.46
Forested land within construction right-of-way (acres)	17.89	12.58	+5.31
Length parallel or adjacent to existing right-of-way (miles)	0.37	0.77	-0.40
Source: North Carolina Parcel Boundaries and Standard Fields 2024; NLCD 2021; NWI 2024; USGS 2024; ESRI 2024. <u>a/</u> Assuming 100-foot-wide construction right-of-way and 50-foot-wide permanent right-of-way. Information is based on publicly available data only. <u>b/</u> Assuming 75-foot-wide construction right-of-way. <u>c/</u> Includes pasture/hay and cultivated crops.			

Figure 10.6-5: MP 23.9 to MP 25.4 Variation



10.6.6 Dan River Variation (Preferred Alternative)

Mountain Valley evaluated the Dan River route variation, an approximate 0.6-mile variation from MP 30.7 to MP 31.3, to satisfy a request for additional separation from Transco’s existing pipeline. The Dan River Variation moves the Dan River crossing approximately 150 feet to the southeast as well as providing a new entry route to the Dan River Interconnect #1. The Dan River Variation crosses forested areas, existing pipelines, the Dan River, a waterbody, and agricultural land (see Figure 10.6-6).

The primary advantage of the Dan River Variation is:

- satisfies a request for additional separation from Transco’s existing pipelines.

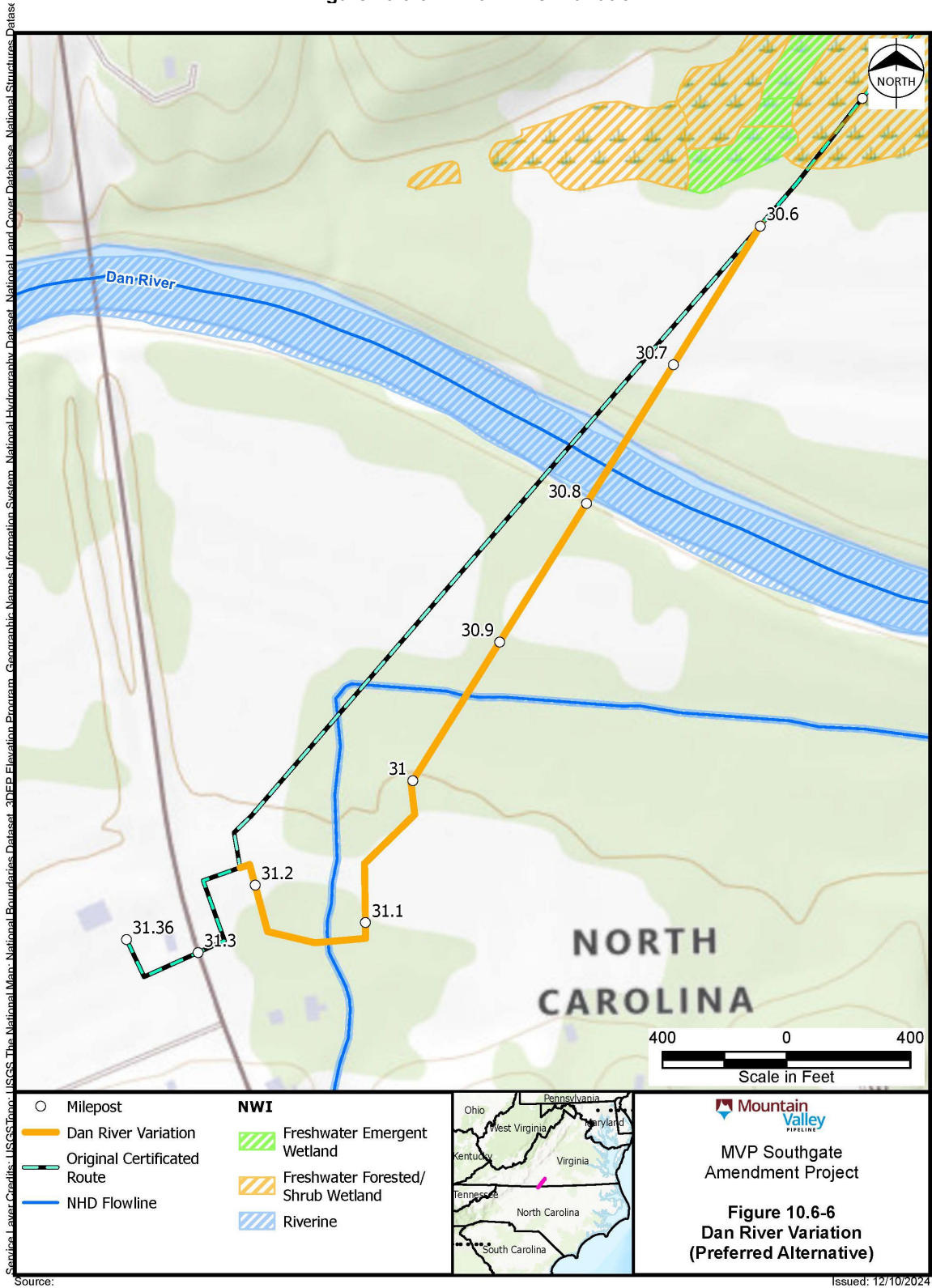
As shown in Table 10.6-6, the primary disadvantages of the Dan River Variation are:

- longer pipeline length; and
- additional tree clearing.

While the Dan River Variation results in similar environmental impacts as the Original Certificated Project route, it satisfies a request for additional separation from Transco’s existing pipelines. Therefore, it was incorporated into the Amendment Project’s preferred pipeline route.

Comparison of the Original Certificated Project and Dan River Variation			
Feature	Dan River Variation (Preferred Alternative)	Original Certificated Project	Difference
Total length (miles)	0.62	0.51	+0.11
Construction right-of-way (acres) <u>a/</u>	7.68	6.40	+1.28
Permanent right-of-way (acres) <u>a/</u>	3.80	3.16	+0.64
Total number of parcels crossed	16	8	+8
Number of residences within 25 and 50 feet of the edge of the construction right-of-way (and associated additional temporary workspace)	5	5	0
Number of waterbodies crossed	3	3	0
Number wetlands crossed	1	1	0
Total wetland crossing length (feet)	0.00	0.00	0.00
Wetlands within construction right-of-way (acres) <u>b/</u>	0.00	0.00	0.00
Agricultural land within construction right-of-way (acres) <u>c/</u>	3.58	3.52	+0.06
Forested land within construction right-of-way (acres)	1.08	0.67	+0.41
Length parallel or adjacent to existing right-of-way (miles)	0.00	0.00	0.00
Source: North Carolina Parcel Boundaries and Standard Fields 2024; NLCD 2021; NWI 2024; USGS 2024; ESRI 2024. <u>a/</u> Assuming 100-foot-wide construction right-of-way and 50-foot-wide permanent right-of-way. Information is based on publicly available data only. <u>b/</u> Assuming 75-foot-wide construction right-of-way. <u>c/</u> Includes pasture/hay and cultivated crops.			

Figure 10.6-6: Dan River Variation



10.7 ABOVEGROUND FACILITY ALTERNATIVES

10.7.1 Compressor Station Alternatives

The Lambert Compressor Station included in the Original Certificated Project has been removed. Therefore, no compressor station alternatives are included.

10.7.2 Meter Station Alternatives

The locations of the LN 3600 Interconnect and Dan River Interconnect #1 (formally referred to as the T-15 Dan River Interconnect) included in the Original Certificated Project have not changed. For the Amendment Project, Mountain Valley has removed the T-21 Haw River Interconnect and added the Lambert Interconnect and Dan River Interconnect #2. The locations of these facilities reflect customer and system requirements. In addition, these facilities are proposed to be constructed on Mountain Valley-owned parcels. There are no alternatives that would satisfy all of these requirements; therefore, no alternatives were considered.

10.8 REFERENCES

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