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December 12, 2024

BY ELECTRONIC FILING

Mr. Bernard Logan, Clerk
c/o Document Control Center
State Corporation Commission
1300 East Main Street
Tyler Building – 1st Floor
Richmond, Virginia 23219

Application of Virginia Electric and Power Company
For approval and certification of electric transmission facilities:
Carmel Church and Ruther Glen 230 kV Transmission Line Projects
Case No. PUR-2024-00221

Dear Mr. Logan:

Please find enclosed for electronic filing in the above-captioned proceeding the application for approval of electric transmission facilities on behalf of Virginia Electric and Power Company (the "Company"). This filing contains the Application, Appendix, Direct Testimony, DEQ Supplement, and Routing Studies, including attachments.

As indicated in Section II.A.12.b of the Appendix, an electronic copy of the map of the Virginia Department of Transportation "General Highway Map" for Caroline County, as well as the digital geographic information system ("GIS") map required by § 56-46.1 of the Code of Virginia, which is Attachment II.A.2 to the Appendix, were provided via an e-room to the Commission's Division of Public Utility Regulation on December 11, 2024.

Please do not hesitate to call if you have any questions regarding the enclosed.

Highest regards,

Vishwa B. Link

Vishwa B. Link

Enclosures

cc: William H. Chambliss, Esq.
Mr. David Essah (without enclosures)

Mr. Neil Joshipura (without enclosures)
Mr. Michael A. Cizenski (without enclosures)
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Application, Appendix, DEQ Supplement, Routing Study, Direct Testimony and Exhibits of Virginia Electric and Power Company

Before the State Corporation Commission of Virginia

Carmel Church and Ruther Glen 230 kV Transmission Line Projects

Application No. 344

Case No. PUR-2024-00221

Filed: December 12, 2024

Volume 1 of 4

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY

FOR APPROVAL AND CERTIFICATION
OF ELECTRIC TRANSMISSION FACILITIES

Carmel Church and Ruther Glen 230 kV Transmission Line Projects

Application No. 344

Case No. PUR-2024-00221

Filed: December 12, 2024

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2024-00221
	)	
For approval and certification of electric transmission facilities: Carmel Church and Ruther Glen 230 kV Transmission Line Projects	)))	

APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY FOR APPROVAL AND CERTIFICATION OF ELECTRIC TRANSMISSION FACILITIES: CARMEL CHURCH AND RUTHER GLEN 230 kV TRANSMISSION LINE PROJECTS

Pursuant to § 56-46.1 of the Code of Virginia ("Va. Code") and the Utility Facilities Act, Va. Code § 56-265.1 *et seq.*, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), by counsel, files with the State Corporation Commission of Virginia (the "Commission") this application for approval and certification of electric transmission facilities (the "Application"). In support of its Application, Dominion Energy Virginia respectfully states as follows:

1. Dominion Energy Virginia is a public service corporation organized under the laws of the Commonwealth of Virginia furnishing electric service to the public within its Virginia service territory. The Company also furnishes electric service to the public in portions of North Carolina. Dominion Energy Virginia's electric system—consisting of facilities for the generation, transmission, and distribution of electric energy—is interconnected with the electric systems of neighboring utilities and is a part of the interconnected network of electric systems serving the continental United States. By reason of its operation in two states and its interconnections with other utilities, the Company is engaged in interstate commerce.

2. In order to perform its legal duty to furnish adequate and reliable electric service, Dominion Energy Virginia must, from time to time, replace existing transmission facilities or construct new transmission facilities in its system. The electric facilities proposed in this Application are necessary so that Dominion Energy Virginia can continue to provide reliable electric service to its customers, consistent with applicable reliability standards.

3. In order to provide service requested by Rappahannock Electric Cooperative ("REC") for REC to provide service to its two new load additions in Caroline County, Virginia, to maintain reliable service for the overall load growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Caroline County, Virginia, to:

(i) **Ruther Glen Loop**: Cut the Company's existing 230 kilovolt ("kV") Line #256 (Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410 (the "Ruther Glen Loop"). From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[1]

(ii) **Ruther Glen Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Ruther Glen Switching Station").

(iii) **Carmel Church Loop**: From the proposed Ruther Glen Switching Station, extend a new double circuit overhead 230 kV transmission line approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church - Four Rivers Line #2422 (the "Carmel Church Loop"). As proposed, existing 230 kV

[1] Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power (megavolt ampere reactive or "MVAR").

Ladysmith CT – Four Rivers Line #256 will be cut at Structure #256/227, and to effectuate the cut-in location, the Company will remove one single circuit H-frame tangent structure and install one two-pole double dead-end structure within the existing right-of-way. From the proposed cut-in location within existing right-of-way, Lines #2410 and #2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) **Carmel Church Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Carmel Church Switching Station").

The Ruther Glen Loop and the Ruther Glen Switching Station are referred to as the "Ruther Glen Project." The Carmel Church Loop and the Carmel Church Switching Station are referred to as the "Carmel Church Project." The Ruther Glen Project and the Carmel Church Project are referred to together as the "Projects."

4. The Projects are necessary to assure that Dominion Energy Virginia can provide requested service to REC for REC to provide service to two new data center developments in Caroline County, Virginia, to maintain reliable service for the overall growth in the Project area, and to comply with mandatory NERC Reliability Standards for transmission facilities and the Company's mandatory planning criteria ("Planning Criteria"). Currently, there is only one 230 kV transmission line – Line #256 – in the load growth area to serve several DP requests including Ruther Glen (300 MW), Carmel Church (300 MW), and Slayden Creek (120 MW). To reliably serve these new DP requests, as well as to maintain service for the overall load growth area, and to comply with mandatory NERC Reliability Standards, an additional 230 kV circuit will need to be constructed to Ruther Glen in the future. This additional source is also needed to address the Company's 300 MW load drop reliability criteria during N-1-1 contingency scenarios. For this reason, a new 160-foot-wide right-of-way will be needed for double circuit structures from Line

#256 to Ruther Glen Switching Station. The Company proposes to construct the proposed Carmel Church Line entirely within new rights-of-way, measuring approximately 100 feet wide.

5. The Company identified an approximately 4.0-mile overhead proposed route for the Ruther Glen Loop ("Ruther Glen Proposed Route" or "Ruther Glen Route 5"), as well as an approximately 3.7-mile overhead alternative route ("Ruther Glen Alternative Route 4" or "Ruther Glen Route 4"), and an approximately 3.9-mile overhead alternative route ("Ruther Glen Alternative Route 6" or "Ruther Glen Route 6"). The Company identified an approximately 2.5-mile overhead proposed route for the Carmel Church Loop ("Carmel Church Proposed Route" or "Carmel Church Route 1") and an approximately 2.8-mile overhead alternative route ("Carmel Church Alternative Route 2" or "Carmel Church Route 2"). The Company is proposing all the Proposed and Alternative Routes identified above for notice and Commission consideration. Discussion of the Proposed Routes and Alternative Routes is provided in Section II of the Appendix and in the Environmental Routing Study included with the Application.

6. The Company selected Route 5 as the Ruther Glen Proposed Route as it avoids or reasonably minimizes adverse impact to the greatest extent reasonably practicable on the scenic assets, historic and cultural resources, and environment of the area concerned. The Ruther Glen Proposed Route (Route 5) would be collocated for a total of 1.3 miles, all of which is collocated with the 115 kV REC line. The Ruther Glen Proposed Route will avoid or minimize impacts to the maximum extent practicable on national historic places listed in the National Register of Historic Places ("NRHP"), thereby minimizing conflict between current and planned land uses where practicable, consistent with Guideline #2 in Attachment 1 to the *Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia*.

7. The Company selected Route 1 as the Carmel Church Proposed Route as it avoids or reasonably minimizes adverse impact to the greatest extent reasonably practicable on the scenic assets, historic and cultural resources, and environment of the area concerned. The Carmel Church Proposed Route (Route 1) does not collocate with any existing utility easements or roadways. The Carmel Church Proposed Route will avoid or minimize impacts to the maximum extent practicable on national historic places listed in the National Register of Historic Places ("NRHP"), thereby minimizing conflict between current and planned land uses where practicable, consistent with Guideline #2 in Attachment 1 to the *Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia*.

8. In accordance with the Company's Facility Interconnection Requirements ("FIR")[2] document, the proposed 230 kV Ruther Glen Switching Station will be constructed with four 230 kV 4000 ampere ("A") breakers with an ultimate design of six breakers arranged in a breaker-and-a-half configuration. The total area of the Ruther Glen Switching Station is approximately 7.5 acres. The proposed 230 kV Carmel Church Switching Station will be constructed with four 230 kV 4000 A breakers with an ultimate design of nine breakers arranged in a breaker-and-a-half configuration. The total area of the Carmel Church Switching Station is approximately 10.0 acres.

9. The desired in-service target date for the proposed Projects is April 1, 2027. The Company estimates it will take approximately 20 months for detailed engineering, materials procurement, permitting, real estate, and construction after a final order from the Commission. Accordingly, to support this estimated construction timeline and construction plan, the Company

[2] The Company's mandatory electric transmission planning criteria ("Planning Criteria") can be found in Attachment 1 of the Company's FIR document (effective January 1, 2024), pursuant to Facility Connection ("FAC") Standard FAC-001 (R1, R3), which is available online at https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/virginia/parallel-generation/facility-connection-requirements.pdf?la=en&rev=f280781e90cf47f69ea526c944c9c347&hash=82DD2567D0B033C47536134B8C4D5C5E.

respectfully requests a final order by August 1, 2025. Should the Commission issue a final order by August 1, 2025, to accommodate long-lead materials procurement, the Company estimates that construction should begin around March 2026, and be completed by April 1, 2027. This schedule is contingent upon obtaining the necessary permits and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to labor shortages or materials/supply issues. This schedule also is contingent upon the Company's ability to negotiate for easements with property owners along the approved route and to obtain property rights for substation use without the need for additional litigation.

10. In addition, the Company is actively monitoring regulatory changes and requirements associated with the Northern long-eared bat ("NLEB") and how they could potentially impact construction timing associated with time of year restrictions ("TOYRs"). On October 15, 2024, USFWS issued the NLEB Final Guidance for development projects. The USFWS Interim Guidance for the NLEB expired on November 30, 2024, and the Final Guidance took effect.

11. The Company is also monitoring regulatory changes associated with the potential up-listing of the Tricolored bat ("TCB"). The Company is anticipating the TCB will be listed; therefore, the Company assumes any regulatory changes associated with the potential listing of the TCB will affect these Projects. On September 14, 2022, the TCB was proposed to be listed as Endangered by the USFWS. USFWS extended its Final Rule issuance target from September 2023 to the end of 2024. At this time, the TCB Final Rule has not been issued. In October 2024

USFWS issued a final NLEB and TCB Range-wide Determination Key ("Dkey") to allow project proponents to assess project impacts, practicable avoidance and minimization measures, and consultation requirements under the final NLEB guidance and the eventual TCB listing ahead of the final decision. The Company will utilize the DKey to further assess project impacts and determine appropriate avoidance and minimization measures to ensure compliance with state and federal regulations when the Projects enter permitting.

12. Any adjustments to this Project schedule resulting from these or similar challenges could necessitate a minimum of a six- to twelve-month delay in the targeted in-service date. Accordingly, for purposes of judicial economy, the Company requests that the Commission issue a final order approving both a desired in-service target date (*i.e.*, April 1, 2027) and an authorization sunset date (*i.e.*, April 1, 2028) for energization of the Project.

13. The total estimated conceptual cost of the Ruther Glen Project as proposed is approximately \$44.7 million, which includes approximately \$31.4 million for transmission-related work and approximately \$13.3 million for substation-related work (2024 dollars). The total estimated conceptual cost of the Carmel Church Project as proposed is approximately \$35.9 million, which includes approximately \$22.9 million for transmission-related work and approximately \$13.0 million for substation-related work (2024 dollars).[3]

14. Based on consultations with the Virginia Department of Environmental Quality ("DEQ"), the Company has developed a supplement ("DEQ Supplement") containing information designed to facilitate review and analysis of the proposed facilities by the DEQ and other relevant agencies. The DEQ Supplement is attached to this Application.

[3] These total Project costs are inclusive of projected real estate costs that the Company anticipates will be required to acquire the property rights for the Project. The total Project costs exclude minor substation-related work (see Section II.C of the Appendix).

15. Based on the Company's experience, the advice of consultants, and a review of published studies by experts in the field, the Company believes that there is no causal link to harmful health or safety effects from electric and magnetic fields generated by the Company's existing or proposed facilities. Section IV of the Appendix provides further details on Dominion Energy Virginia's consideration of the health aspects of electric and magnetic fields.

16. Section V of the Appendix provides a proposed route description for public notice purposes and a list of federal, state, and local agencies and officials that the Company has or will notify about the Application.

17. In addition to the information provided in the Appendix, the DEQ Supplement, and the Environmental Routing Study, this Application is supported by the pre-filed direct testimony of Company Witnesses Jason S. Whitlow, Sergio E. De Hoyos Irizarry, George C. Brimmer, Blair Parks, and Rachel Tippett filed with this Application.

18. Finally, Dominion Energy Virginia requests that, to the extent the Commission modifies the deadline for responses to interrogatories and requests for production of documents in 5 VAC 5-20-260, the Commission grant the parties seven calendar days in order to afford the Company adequate time to provide comprehensive responses to discovery.

WHEREFORE, Dominion Energy Virginia respectfully requests that the Commission:

(a) direct that notice of this Application be given as required by § 56-46.1 of the Code of Virginia;

(b) approve pursuant to § 56-46.1 of the Code of Virginia the construction of the Projects; and,

(c) grant a certificate of public convenience and necessity for the Projects under the Utility Facilities Act, § 56-265.1 *et seq.* of the Code of Virginia.

VIRGINIA ELECTRIC AND POWER COMPANY

By: ___*[s] Vishwa B. Link*___________
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Counsel for Applicant Virginia Electric and Power Company

December 12, 2024

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY

FOR APPROVAL AND CERTIFICATION
OF ELECTRIC TRANSMISSION FACILITIES

Carmel Church and Ruther Glen 230 kV Transmission Line Projects

Application No. 344

Appendix

Containing Information in Response to
"Guidelines for Transmission Line Applications Filed Under title 56 of the Code of Virginia"

Case No. PUR-2024-00221

Filed: December 12, 2024

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In order to provide service requested by Rappahannock Electric Cooperative ("REC") for REC to provide service to its two new load additions in Caroline County, Virginia, to maintain reliable service for the overall load growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Caroline County, Virginia, to:

(i) **Ruther Glen Loop**: Cut the Company's existing 230 kilovolt ("kV") Line # 256 (Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410 (the "Ruther Glen Loop"). From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[1]

(ii) **Ruther Glen Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Ruther Glen Switching Station").

(iii) **Carmel Church Loop**: From the proposed Ruther Glen Switching Station, extend a new double circuit overhead 230 kV transmission line approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church - Four Rivers Line #2422 (the "Carmel Church Loop"). As proposed, existing 230 kV Ladysmith CT – Four Rivers Line #256 will be cut at Structure #256/227, and to effectuate the cut-in location, the Company will remove one single circuit H-frame tangent structure and install one two-pole double dead-end structure within the existing right-of-way. From the proposed cut-in location within existing right-of-way, Lines #2410 and #2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) **Carmel Church Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Carmel Church Switching Station").

The Ruther Glen Loop and the Ruther Glen Switching Station are referred to as the "Ruther Glen

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[1] Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power (megavolt ampere reactive or "MVAR").

Project." The Carmel Church Loop and the Carmel Church Switching Station are referred to as the "Carmel Church Project." The Ruther Glen Project and the Carmel Church Project are referred to together as the "Projects." While the Projects have separate need drivers, the project areas are geographically in close proximity to each other. For this reason, the Projects are combined for this Application and Appendix.

The Projects are necessary to assure that Dominion Energy Virginia can provide requested service to the Customer for the Customer to provide service to two new data center developments in Caroline County, Virginia, to maintain reliable service for the overall growth in the Project area, and to comply with mandatory NERC Reliability Standards for transmission facilities and the Company's mandatory planning criteria ("Planning Criteria").[2]

REC's Ruther Glen DP request projects a summer peak of 170 MW in 2027 and in 2028, and 300 MW in 2029, which is full build out of REC's customer's data center campus. REC's Carmel Church DP request projects a summer peak of 18 MW in 2027, 80 MW in 2028, and 125 MW in 2029, with 300 MW at full build out of REC's customer's data center campus. Both developments are in a rural area where additional load cannot be added without constructing additional transmission and distribution infrastructure.

Ruther Glen Loop Route: The Company identified an approximately 4.0-mile overhead proposed route for the Ruther Glen Loop ("Ruther Glen Proposed Route" or "Ruther Glen Route 5"), as well as an approximately 3.7-mile overhead alternative route ("Ruther Glen Alternative Route 4" or "Ruther Glen Route 4"), and an approximately 3.9-mile overhead alternative route ("Ruther Glen Alternative Route 6" or "Ruther Glen Route 6").

Carmel Church Loop Route: The Company identified an approximately 2.5-mile overhead proposed route for the Carmel Church Loop ("Carmel Church Proposed Route" or "Carmel Church Route 1") and an approximately 2.8-mile overhead alternative route ("Carmel Church Alternative Route 2" or "Carmel Church Route 2").

The Company is proposing all the Proposed and Alternative Routes identified above for notice and Commission consideration. Discussion of the routes that the Company studied but ultimately rejected, is provided in Section II of the Appendix and in the Environmental Routing Studies (or "Routing Studies") included with the Application.

The proposed 230 kV Ruther Glen Switching Station will be constructed with four 230 kV 4000 ampere ("A") breakers with an ultimate design of six breakers arranged in a breaker-and-a-half configuration. The total area of the Ruther Glen Switching Station is approximately 7.5 acres.

The proposed 230 kV Carmel Church Switching Station will be constructed with four 230 kV 4000 A breakers with an ultimate design of nine breakers arranged in a breaker-and-a-half configuration. The total area of the Carmel Church Switching Station is approximately 10.0 acres.

The total estimated conceptual cost of the Ruther Glen Project as proposed is approximately $44.7

[2] The Company's Planning Criteria can be found in Attachment 1 of the Company's FIR document (effective September 1, 2024), pursuant to FAC-001 (R1, R3), which is available online at https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/virginia/parallel-generation/sig-on-file--devet-facility-interconnection-requirements-rev23-eff-date-09012024.pdf?rev=116db3b1c4ce4d239843c601616b18e9&hash=64AB2F5B22CE90BE545783726485AE4C.

million, which includes approximately $31.4 million for transmission-related work and approximately $13.3 million for substation-related work (2024 dollars).

The total estimated conceptual cost of the Carmel Church Project as proposed is approximately $35.9 million, which includes approximately $22.9 million for transmission-related work and approximately $13.0 million for substation-related work (2024 dollars).[3]

The desired in-service target date for the proposed Projects is April 1, 2027. The Company estimates it will take approximately 20 months for detailed engineering, materials procurement, permitting, real estate, and construction after a final order from the Commission. Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by August 1, 2025. Should the Commission issue a final order by August 1, 2025, to accommodate long-lead materials procurement, the Company estimates that construction should begin around March 2026, and be completed by April 1, 2027. This schedule is contingent upon obtaining the necessary permits and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to labor shortages, or materials/supply issues. This schedule is also contingent upon the Company's ability to negotiate for easements with property owners along the approved routes without the need for additional litigation.

In addition, the Company is actively monitoring regulatory changes and requirements associated with the Northern long-eared bat ("NLEB") and how they could potentially impact construction timing associated with time of year restrictions ("TOYRs"). On October 15, 2024, the U.S. Fish and Wildlife Service ("USFWS") issued the NLEB Final Guidance for development projects. The USFWS Interim Guidance for the NLEB expired on November 30, 2024, and the Final Guidance took effect.

The Company is also monitoring regulatory changes associated with the potential up-listing of the Tricolored bat ("TCB"). The Company is anticipating the TCB will be listed; therefore, the Company assumes any regulatory changes associated with the potential listing of the TCB will affect these Projects. On September 14, 2022, the TCB was proposed to be listed as Endangered by the USFWS. USFWS extended its Final Rule issuance target from September 2023 to the end of 2024. At this time, the TCB Final Rule has not been issued.

In October 2024 USFWS issued a final NLEB and TCB Range-wide Determination Key ("Dkey") to allow project proponents to assess project impacts, practicable avoidance and minimization measures, and consultation requirements under the final NLEB guidance and the eventual TCB listing ahead of the final decision. The Company will utilize the DKey to further assess project impacts and determine appropriate avoidance and minimization measures to ensure compliance

[3] These total Project costs are inclusive of projected real estate costs that the Company anticipates will be required to acquire the property rights for the Project. The total Project costs exclude minor substation-related work (see Section II.C).

with state and federal regulations when the Projects enter permitting.

Any adjustments to this Project schedule resulting from these or similar challenges could necessitate a minimum of a six- to twelve-month delay in the targeted in-service date. Accordingly, for purposes of judicial economy, the Company requests that the Commission issue a final order approving both a desired in-service target date (*i.e.*, April 1, 2027) and an authorization sunset date (*i.e.*, April 1, 2028) for energization of the Project.

I. NECESSITY FOR THE PROPOSED PROJECT

A. State the primary justification for the proposed project (for example, the most critical contingency violation including the first year and season in which the violation occurs). In addition, identify each transmission planning standard(s) (of the Applicant, regional transmission organization ("RTO"), or North American Electric Reliability Corporation) projected to be violated absent construction of the facility.

Response: The Projects are necessary to provide requested transmission service to the REC for REC to provide service to two new data center developments in Caroline County, Virginia, to maintain reliable service for the overall growth in the Project area, and to comply with mandatory NERC Reliability Standards. See Attachment I.A.1.a-b for overview maps of the proposed Projects.

Dominion Energy Virginia's transmission system is responsible for providing transmission service: (i) for redelivery to the Company's retail customers; (ii) to Appalachian Power Company, ODEC, Northern Virginia Electric Cooperative, Central Virginia Electric Cooperative, and Virginia Municipal Electric Association for redelivery to their retail customers in Virginia; and (iii) to North Carolina Electric Membership Corporation and North Carolina Eastern Municipal Power Agency for redelivery to their customers in North Carolina (collectively, the "DOM Zone"). The Company needs to be able to maintain the overall, long-term reliability of its transmission system to meet its customers' evolving power needs in the future.

Dominion Energy Virginia is part of the PJM Interconnection, L.L.C. ("PJM") regional transmission organization ("RTO"), which provides service to a large portion of the eastern United States. PJM currently is responsible for ensuring the reliability of and coordinating the movement of electricity through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. This service area has a population of approximately 65 million and on August 2, 2006, set a record high of 165,563 MW for summer peak demand, of which Dominion Energy Virginia's load portion was approximately 19,256 MW. On August 2, 2024, the Company set a record high of 22,654 MW for summer peak demand. On December 24, 2022, the Company set a winter and all-time record demand of 22,189 MW. Based on the 2024 PJM Load Forecast, the DOM Zone is expected to grow with average growth rates of 5.6% summer and 5.1% winter over the next 10 years compared to the PJM average of 1.7% and 2.0% over the same period for the summer and winter, respectively.[4]

[4] A copy of the 2024 PJM Load Report is available at the following: https://www.pjm.com/-/media/library/reports-notices/load-forecast/2024-load-report.ashx. *See, in particular,* page 3 (PJM) and 28, 35, 39 (DOM Zone).

Dominion Energy Virginia is also part of the Eastern Interconnection transmission grid, meaning its transmission system is interconnected, directly or indirectly, with all of the other transmission systems in the United States and Canada between the Rocky Mountains and the Atlantic coast, except for Quebec and most of Texas. All of the transmission systems in the Eastern Interconnection are dependent on each other for moving bulk power through the transmission system and for reliability support. Dominion Energy Virginia's service to its customers is extremely reliant on a robust and reliable regional transmission system.

North American Electric Reliability Corporation ("NERC") has been designated by the Federal Energy Regulatory Commission ("FERC") as the electric reliability organization for the United States. Accordingly, NERC requires that the planning authority and transmission planner develop planning criteria to ensure compliance with NERC Reliability Standards. Mandatory NERC Reliability Standards require that a transmission owner ("TO") develop facility interconnection requirements that identify load and generation interconnection minimum requirements for a TO's transmission system, as well as the TO's reliability criteria.[5]

Federally mandated NERC Reliability Standards constitute minimum criteria with which all public utilities must comply as components of the interstate electric transmission system. Moreover, the Energy Policy Act of 2005 mandates that electric utilities follow these NERC Reliability Standards and imposes fines on utilities found to be in noncompliance up to $1.3 million per day per violation.

PJM's Regional Transmission Expansion Plan ("RTEP") is the culmination of a FERC-approved annual transmission planning process that includes extensive analysis of the electric transmission system to determine any needed improvements.[6] PJM's annual RTEP is based on the effective criteria in place at the time of the analyses, including applicable standards and criteria of NERC, PJM, and local reliability planning criteria, among others.[7] Projects identified through the RTEP process are developed by the TO in coordination with PJM, and are presented at the Transmission Expansion Advisory Committee ("TEAC") meetings prior to inclusion in the RTEP that is then presented for approval by the PJM Board of Managers (the "PJM Board").

Outcomes of the RTEP process include three types of transmission system upgrades or projects: (i) baseline upgrades are those that resolve a system reliability criteria violation, which can include planning criteria from NERC, ReliabilityFirst, SERC Reliability Corporation, PJM, and TOs; (ii) network upgrades are new or upgraded facilities required primarily to eliminate reliability

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[5] *See* n. 2 *supra*.

[6] PJM Manual 14B (effective June 27, 2024) focuses on the RTEP process and can be found at https://www.pjm.com/-/media/documents/manuals/m14b.ashx.

[7] See PJM Manual 14B, Attachment D: PJM Reliability Planning Criteria. *See supra*, n. 7 for a link to the PJM Manual 14B.

criteria violations caused by proposed generation, merchant transmission, or long-term firm transmission service requests; and (iii) supplemental projects are projects initiated by the TO in order to interconnect new customer load, address degraded equipment performance, improve operational flexibility and efficiency, and increase infrastructure resilience. The Projects are classified as supplemental projects initiated by the TO in order to interconnect new customer load. While supplemental projects are included in the RTEP, the PJM Board does not actually approve such projects. See Section I.J for a discussion of the PJM process as it relates to this Project.

As discussed in more detail below, the Projects are needed to provide service requested by the Customer in the Richmond Load Area, as well as serve emerging load in the area.

NEED FOR THE PROJECT

The combination of competitive collocation/cloud environment, fiber connectivity, strategic geographic location, low risk of business disruptions, affordable and reliable power, and the business climate in Virginia has created the largest market for data center capacity in the United States. The proposed Projects are needed to meet the load requirements of the planned new data center projects, maintain reliable service for the overall load growth in the area, and comply with mandatory NERC Reliability Standards.

The two new data center developments in Caroline County, Virginia are driving the need for these Projects and development in the area. Both developments are in a rural area where additional load cannot be added without constructing additional transmission and distribution infrastructure.

New 230 kV Carmel Church Loop and Switching Station

On October 23, 2023, REC submitted a delivery point ("DP") request for a new 230 kV DP, the proposed Carmel Church Switching Station, to serve load associated with its customer's new data center campus in Caroline County (the "Carmel Church DP"). See Attachment I.A.4. The Carmel Church DP is located at the southwest quadrant of the intersection of Interstate 95 and State Route 207. The Carmel Church DP request projects an initial campus load of 18 MW by 2027, 80 MW by 2028, 125 MW by 2029, and 300 MW upon full build-out by 2030.

New 230 kV Ruther Glen Loop and Switching Station

On November 21, 2023, REC submitted a DP request for a new 230 kV DP, proposed Ruther Glen Switching Station, to serve a separate new load addition for a customer's new data center campus also located in Caroline County (the "Ruther Glen DP"). See Attachment I.A.5. REC's radial 115 kV St. Johns DP - Ladysmith Line crosses the Ruther Glen DP site, but this line is insufficient to serve the campus's projected load. More specifically, the Ruther Glen DP request projects an initial campus load of 170 MW by 2027, 300 MW by 2028, and a campus load of 548 MW upon full build-out by 2031.

THE PROPOSED PROJECT

Ruther Glen Loop and Switching Station

The Ruther Glen DP request is the load driver for the Ruther Glen Project. REC's customer has proposed a separate data center development in Caroline County, Virginia, with a projected ultimate load of approximately 300 MW. To meet this demand, the Company proposes to cut the Company's existing 230 kV Line # 256 (Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410.

From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA. The Ruther Glen Loop will be constructed to source the new switching station, as there is no existing transmission infrastructure source that can feed the proposed switching station.

The Company identified an approximately 4.0-mile overhead route for this portion of the Project ("Ruther Glen Proposed Route" or Ruther Glen Route 5"), an approximately 3.7-mile alternative route ("Ruther Glen Alternative Route 4"), and an approximately 3.9-mile alternative route ("Ruther Glen Alternative Route 6"). Discussion of the Ruther Glen Proposed and Alternative Routes, as well as other overhead routes that the Company studied but ultimately rejected, is provided in Section II.A.9 of the Appendix and in the Environmental Routing Study included with the Application.

<u>Ruther Glen Switching Station</u>

The Ruther Glen Project also includes construction of the proposed Ruther Glen Switching Station to serve the Ruther Glen DP. The proposed Ruther Glen Switching Station will be constructed with four 230 kV 4000 A breakers with an ultimate design of six breakers arranged in a breaker-and-a-half configuration.

Carmel Church Loop and Switching Station

The Carmel Church DP request is the load driver for the Carmel Church Project. REC's customer has proposed a data center development in Caroline County, Virginia, with a projected load at full build-out of approximately 300 MW. To meet this demand, the Company proposes to extend a new double circuit overhead 230 kilovolt ("kV") transmission line from the proposed Ruther Glen Switching Station approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church - Four Rivers Line #2422.

From the proposed cut-in location within existing right-of-way, Lines #2410 and 2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA. The Carmel Church Loop will be constructed to source the new switching station, as there is no existing transmission infrastructure source that can feed the proposed switching station.

The Company identified an approximately 2.5-mile overhead route for this portion of the Project ("Carmel Church Proposed Route" or "Carmel Church Route 1") and an approximately 2.8-mile overhead alternative route ("Carmel Church Alternative Route 2" or "Carmel Church Route 2"). Discussion of the Carmel Church Proposed and Alternative Routes, as well as other overhead routes that the Company studied but ultimately rejected, is provided in Section II.A.9 of the Appendix and in the Environmental Routing Study included with the Application.

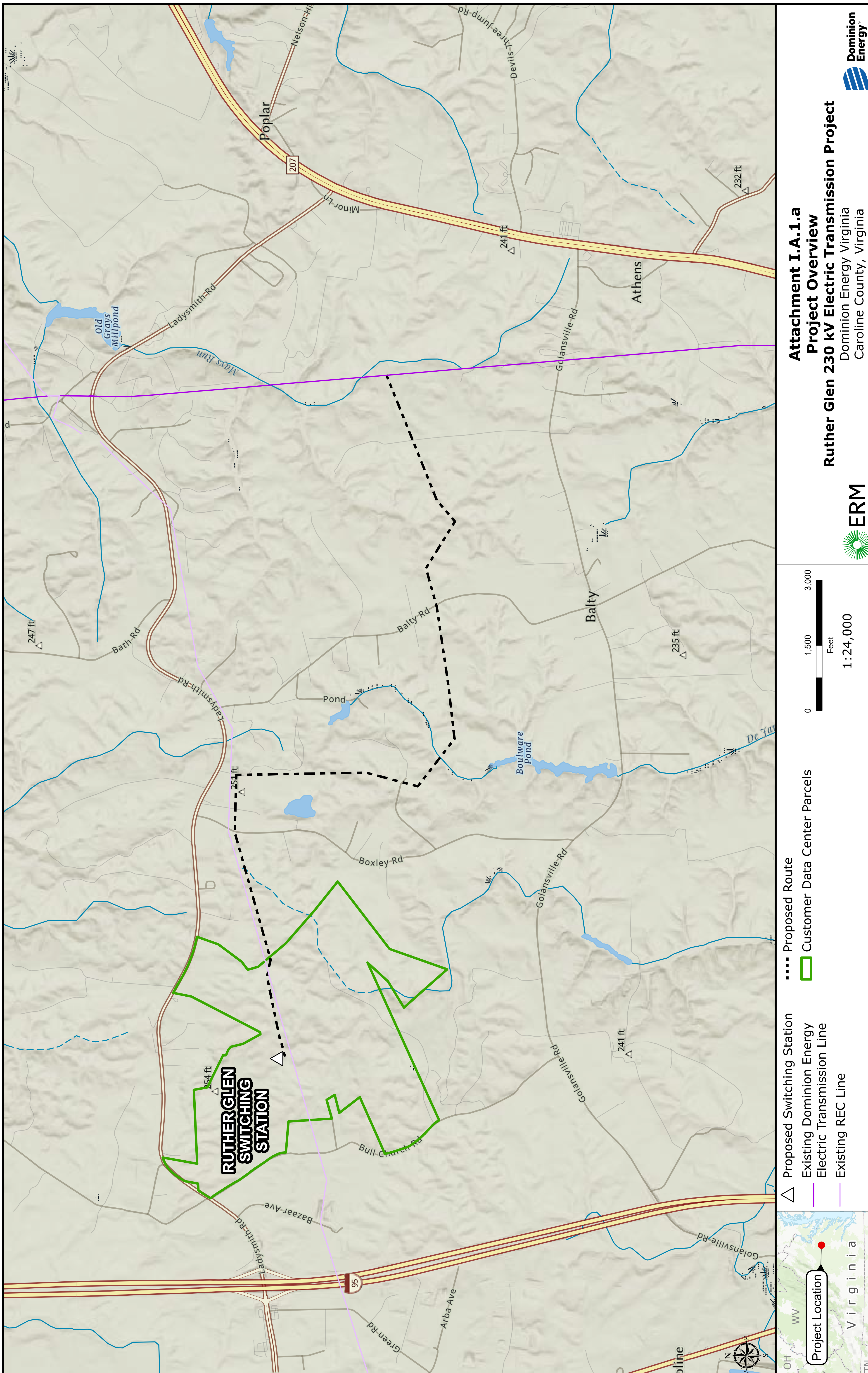
Carmel Church Switching Station

The Carmel Church Project also includes construction of the proposed Carmel Church Switching Station to serve the Carmel Church DP. The proposed Carmel Church Switching Station will be constructed with four 230 kV 4000 A breakers with an ultimate design of nine breakers arranged in a breaker-and-a-half configuration.

***

See Attachment I.A.2 for a one-line diagram of the existing area transmission system in the Richmond Load Area, and Attachment I.A.3 for a one-line diagram of the transmission system in the Richmond Load Area after the proposed Projects are energized on April 1, 2027, which includes all baseline and supplemental projects in the Project area that have been submitted to PJM as of December 1, 2024. See Attachment II.A.2 for a map depicting the Projects, including the Proposed and Alternative Routes for the Projects.

In summary, the proposed Projects will provide service requested by REC for REC to provide service to its two new load additions, maintain reliable service for the overall growth in the Project area, and comply with mandatory NERC Reliability Standards.


Attachment I.A.1.a
Project Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Customer Data Center Parcels
0
1,500
3,000
Feet
1:24,000
ERM
Dominion Energy
Project Location
Virginia
WV
OH
KY
TN
RUTHER GLEN SWITCHING STATION
Poplar
Athens
Balty
Old Grays Millpond
Mays Run
Boulware Pond
Pond
Ladysmith-Rd
Nelson-Hill
Minor-Ln
Devils-Three-Jump-Rd
Golansville-Rd
Balty-Rd
Bath-Rd
Boxley-Rd
Bull-Church-Rd
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Green-Rd
Arba-Ave
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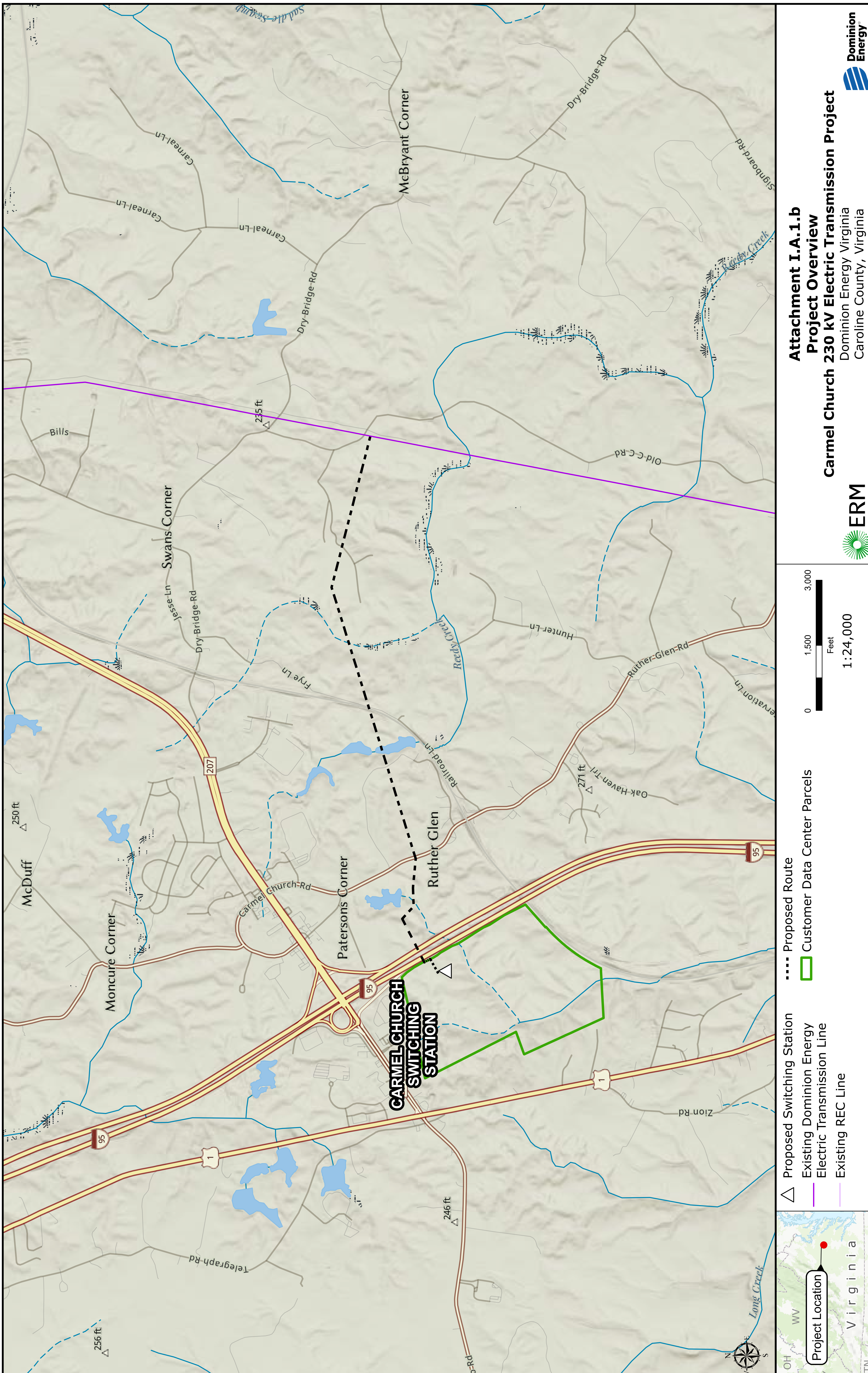
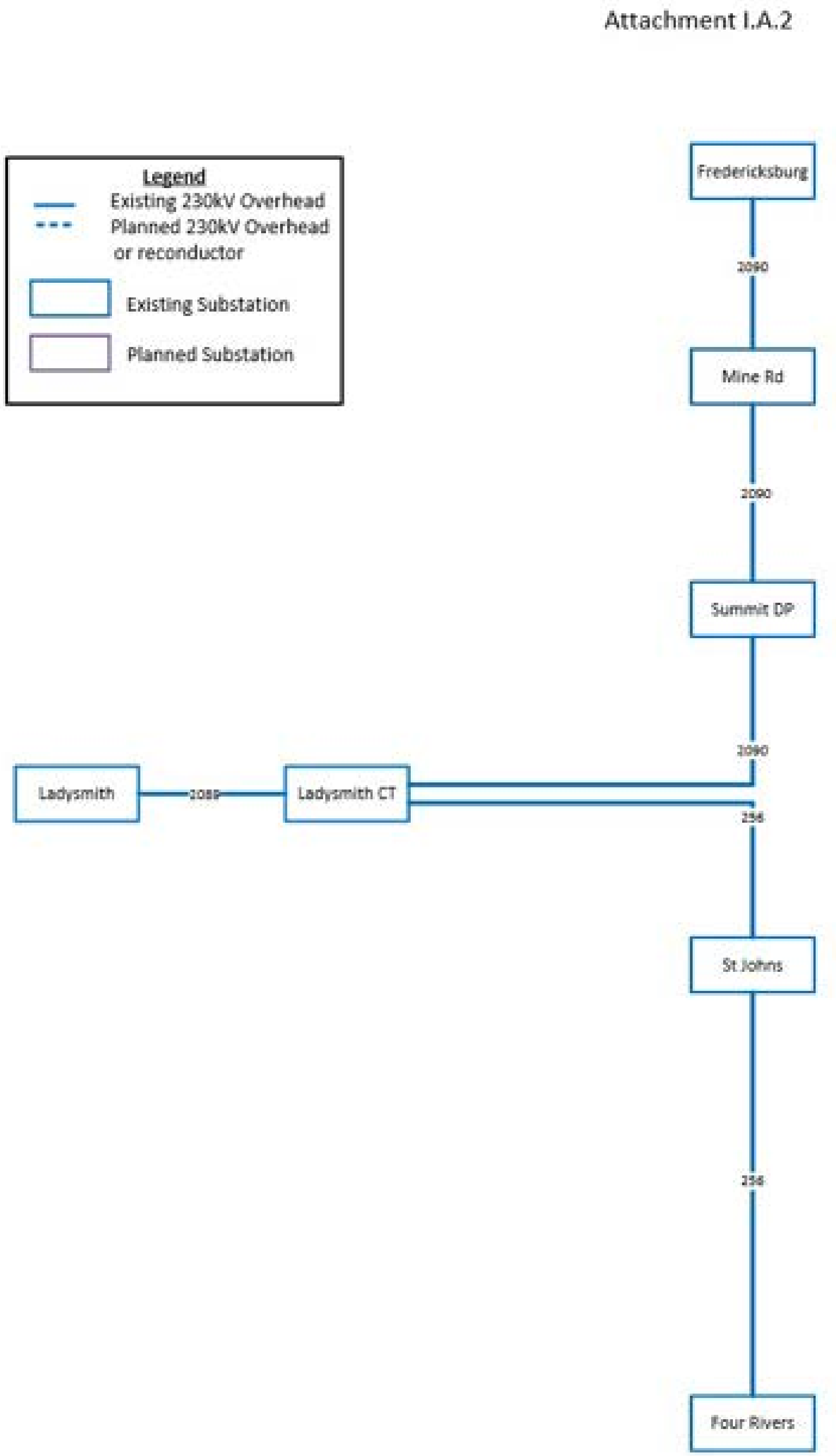
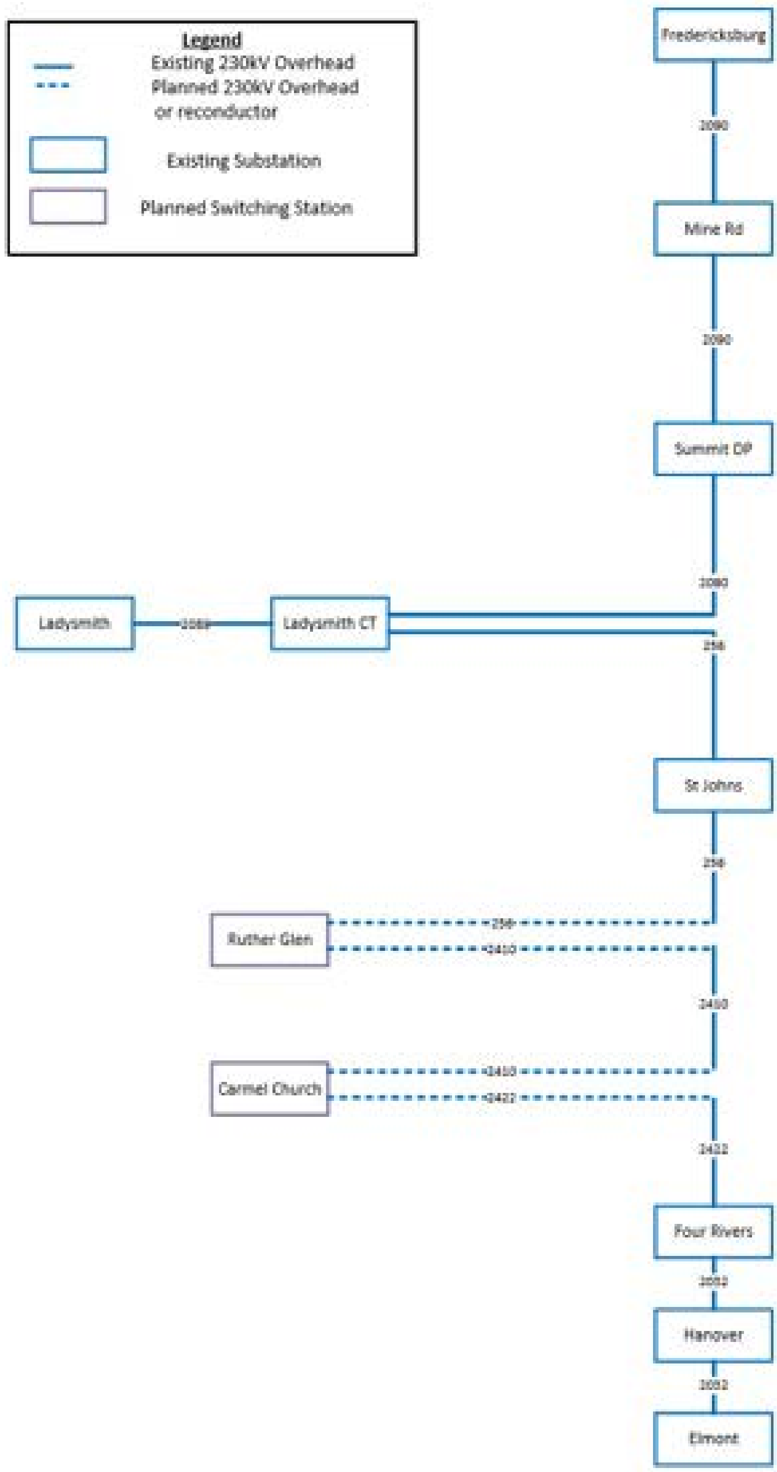
95
241 ft
232 ft
247 ft
235 ft
251 ft
254 ft


Attachment I.A.1.b
Project Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Customer Data Center Parcels
0
1,500
3,000
Feet
1:24,000
Project Location
Virginia
CARMEL CHURCH SWITCHING STATION
McDuff
Moncure Corner
Patersons Corner
Ruther Glen
Swans Corner
McBryant Corner
Carmel Church Rd
Dry Bridge Rd
Carneal Ln
Jesse Ln
Frye Ln
Railroad Ln
Hunter Ln
Old C C Rd
Ruther Glen Rd
Oak Haven Trl
Zion Rd
Telegraph Rd
Signboard Rd
Reedy Creek
Long Creek
Bills
235 ft
250 ft
271 ft
246 ft
256 ft
95
207
1
ERM
Dominion Energy


Attachment I.A.2
Legend
Existing 230kV Overhead
Planned 230kV Overhead
or reconductor
Existing Substation
Planned Substation
Fredericksburg
2090
Mine Rd
2090
Summit DP
2090
Ladysmith
2089
Ladysmith CT
256
St Johns
256
Four Rivers

Attachment I.A.3



I. NECESSITY FOR THE PROPOSED PROJECT

B. Detail the engineering justifications for the proposed project (for example, provide narrative to support whether the proposed project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Applicant's system, etc.). Describe any known future project(s), including but not limited to generation, transmission, delivery point or retail customer projects, that require the proposed project to be constructed. Verify that the planning studies used to justify the need for the proposed project considered all other generation and transmission facilities impacting the affected load area, including generation and transmission facilities that have not yet been placed into service. Provide a list of those facilities that are not yet in service.

Response: **(1) Engineering Justification for Project**

Requirement: Detail the engineering justifications for the proposed project (for example, provide narrative to support whether the proposed project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Applicant's system, etc.).

There are no existing transmission sources near the two proposed Projects; therefore, new transmission sources must be designed and constructed from the nearest source to the Project sites.

See Section I.A of the Appendix.

(2) Known Future Projects

Describe any known future project(s), including but not limited to generation, transmission, delivery point or retail customer projects, that require the proposed project to be constructed.

The proposed Projects are needed to serve REC's Carmel Church and Ruther Glen DPs so that REC can serve its two new load additions, as discussed in Section I.A. See Attachment I.A.1a.-b. for existing and future distribution facilities in the affected load area, including the proposed Projects, which will work together to continue to serve existing and future customers in the area. Any additional DP request from REC would require a third source.

Currently, there is only one 230 kV transmission line – Line #256 – in the load growth area to serve several DP requests including Ruther Glen (300 MW), Carmel Church (300 MW), and Slayden Creek (120 MW). To reliably serve these new DP requests, as well as to maintain service for the overall load growth area, and to comply with mandatory NERC Reliability Standards, an additional 230 kV circuit will need to be constructed to Ruther Glen in the future. This additional source is also needed to address the Company's 300 MW load drop reliability criteria during N-1-1 contingency scenarios. For this reason, a 160-foot-wide right-of-way will be needed for double circuit structures from Line #256 to Ruther Glen Switching Station.

(3) Planning Studies

Verify that the planning studies used to justify the need for the proposed project considered all other generation and transmission facilities impacting the affected load area, including generation and transmission facilities that have not yet been placed into service.

In order to maintain reliable service to the Company's customers and to comply with mandatory NERC Reliability Standards, specifically FAC-001,[8] the Company's FIR document addresses the interconnection requirements of generation, transmission, and electricity end-user facilities. The purpose of the NERC FAC standards is to avoid adverse impacts on reliability by requiring that each TO establish facility connection and performance requirements in accordance with FAC-001, and the TOs and end-users meet and adhere to the established facility connection and performance requirements in accordance with FAC-002.[9]

NERC Reliability Standards TPL-001 requirements R2, R5, and R6 require PJM, the Planning Coordinator ("PC") and the TO have criteria. PJM's planning criteria outlined in Attachment D of Manual 14B requires the Company, as a TO, to follow NERC and Regional Planning Standards and criteria as well as the TO Standards filed in Dominion Energy Virginia's FERC 715 filings. The Company's FERC 715 filing contains the Dominion Energy Virginia Transmission Planning Criteria in Exhibit A of the FIR document.

The two major criteria considered as part of this Project were:

1) Ring bus arrangement is required for load interconnections in excess of 100 MW (Company's FIR, Section 4.3); and

2) The minimum load levels within a 10-year planning horizon for the direct interconnection to existing transmission lines is 30 MW for a 230 kV delivery (Company's FAC-001 Section 4.3, Load Criteria – End User).

[8] *See supra*, n. 2.

[9] *See* https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-002-2.pdf.

The Projects are being constructed as two single 230 kV circuits to comply with Section 4.3 of the Company's FIR, which requires a ring bus arrangement for load interconnections in excess of 100 MW.

(4) Facilities List

Provide a list of those facilities that are not yet in service.

See Attachment I.A.2-3 for existing and future transmission infrastructure planned for the Richmond Load Area, which includes all baseline and supplemental projects in the Project area that have been submitted to PJM as of December 1, 2024. See Attachment I.G.1 for existing transmission lines and for existing and proposed transmission facilities.

I. NECESSITY FOR THE PROPOSED PROJECT

C. Describe the present system and detail how the proposed project will effectively satisfy present and projected future electrical load demand requirements. Provide pertinent load growth data (at least five years of historical summer and winter peak demands and ten years of projected summer and winter peak loads where applicable). Provide all assumptions inherent within the projected data and describe why the existing system cannot adequately serve the needs of the Applicant (if that is the case). Indicate the date by which the existing system is projected to be inadequate.

Response: See Attachment I.G.1 for the portion of the Company's existing transmission facilities in the area of these Projects. The Ruther Glen and Carmel Church DPs are in rural area where additional load cannot be added without constructing additional transmission and distribution infrastructure, as there are not existing transmission and distribution facilities in close enough proximity to the Project areas.

The Ruther Glen DP request projects loading of 170 MW by 2027, with 300 MW at full build-out of the REC customer's development by 2031.

The Carmel Church DP request projects loading of 18 MW by 2027, 80 MW by 2028, and 300 MW at full build-out of the REC customer's development by 2030.

Attachment I.C.1 shows historical and projected peak loads for summer and winter in the Richmond Load Area.

Loads taken from 2023-2038 MW / MVAR Load Projection Spreadsheet

Forecast Load MW

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	MAX	MIN
Richmond Area Summer	2280	2368	2403	2474	2553	2687	2828	2969	3103	3255	**3255**	**2280**
Richmond Area Winter	2467	2531	2641	2680	2748	2833	2964	3116	3268	3397	**3397**	**2467**

Historic Load MW

	2019	2020	2021	2022	2023						MAX	MIN
Richmond Area Summer	1878	2006	1980	2056	2204						**2204**	**1878**
Richmond Area Winter	2087	1816	1819	2131	2400						**2400**	**1816**

I. NECESSITY FOR THE PROPOSED PROJECT

D. If power flow modeling indicates that the existing system is, or will at some future time be, inadequate under certain contingency situations, provide a list of all these contingencies and the associated violations. Describe the critical contingencies including the affected elements and the year and season when the violation(s) is first noted in the planning studies. Provide the applicable computer screenshots of single-line diagrams from power flow simulations depicting the circuits and substations experiencing thermal overloads and voltage violations during the critical contingencies described above.

Response: See Section I.B.2.

I. NECESSITY FOR THE PROPOSED PROJECT

E. Describe the feasible project alternatives, if any, considered for meeting the identified need including any associated studies conducted by the Applicant or analysis provided to the RTO. Explain why each alternative was rejected.

Response: No transmission or distribution alternatives other than the proposed Projects were considered, given that both developments are in a rural area where additional load cannot be added without constructing additional transmission and distribution infrastructure as described in Sections I.A and I.C.

Analysis of Demand-Side Resources:

Pursuant to the Commission's November 26, 2013, Order entered in Case No. PUE-2012-00029, and its November 1, 2018, Final Order entered in Case No. PUR-2018-00075 ("2018 Final Order"), the Company is required to provide analysis of demand-side resources ("DSM") incorporated into the Company's planning studies. DSM is the broad term that includes both energy efficiency ("EE") and demand response ("DR"). In this case, PJM and the Company have identified a need for the proposed Project in order to provide requested service and comply with mandatory NERC Reliability Standards, while maintaining the overall long-term reliability of its transmission system.[10] Notwithstanding, when performing an analysis based on PJM's 50/50 load forecast, there is no adjustment in load for DR programs because PJM only dispatches DR when the system is under stress (*i.e.*, a system emergency). Accordingly, while existing DSM is considered to the extent the load forecast accounts for it, DR that has been bid previously into PJM's capacity market is not a factor in this particular application because of the identified need for the Project. Based on these considerations, the evaluation of the Projects demonstrated that despite accounting for DSM consistent with PJM's methods, the Projects are necessary.

Incremental DSM also will not eliminate the need for the Projects. As reflected in Attachments I.A.4 and I.A.5, the highest annual projected peak load over the next 10 years at REC's DPs exceed 245 MW. By way of comparison, the Company achieved demand savings 276.5 MW (net) / 350 MW (gross) from its DSM Programs in 2023.

[10] While the PJM load forecast does not directly incorporate DR, its load forecast incorporates variables derived from Itron that reflect EE by modeling the stock of end-use equipment and its usages. Further, because P JM's load forecast considers the historical non-coincident peak ("NCP") for each load serving entity ("LSE") within PJM, it reflects the actual load reductions achieved by DSM programs to the extent an LSE has used DSM to reduce its NCPs.

I. NECESSITY FOR THE PROPOSED PROJECT

F. Describe any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project, including the number of circuits and normal and emergency ratings of the facilities.

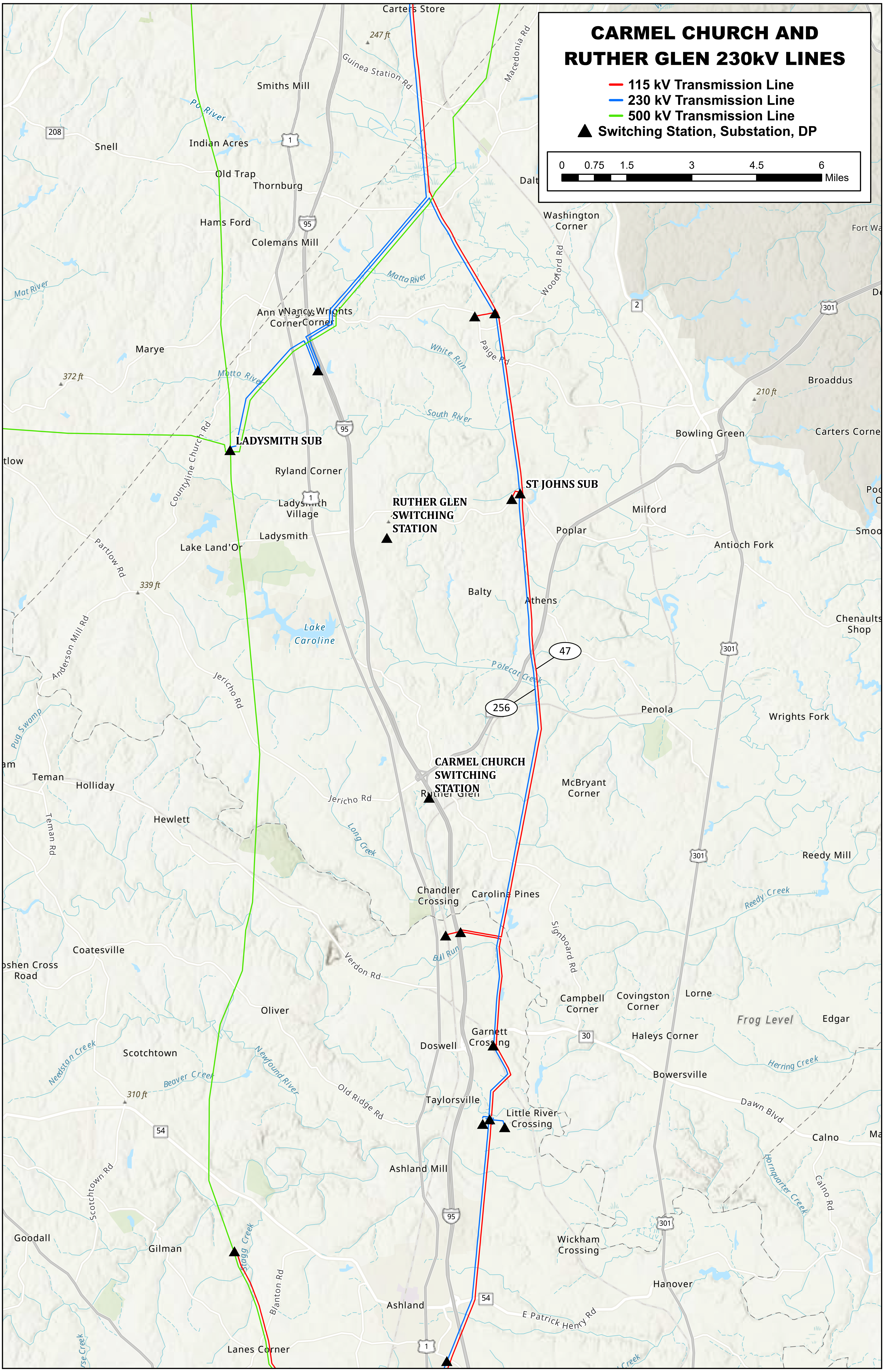
Response: For Ruther Glen, no lines or facilities will be removed.

For the Carmel Church Proposed and Alternative Routes, the Company would remove one 70-foot-tall wood H-frame tangent structure supporting Line #256 and replace it with one two-pole double dead-end structure to effectuate the cut-in location.

I. NECESSITY FOR THE PROPOSED PROJECT

G. Provide a system map, in color and of suitable scale, showing the location and voltage of the Applicant's transmission lines, substations, generating facilities, etc., that would affect or be affected by the new transmission line and are relevant to the necessity for the proposed line. Clearly label on this map all points referenced in the necessity statement.

Response: See Attachment I.G.1.


CARMEL CHURCH AND
RUTHER GLEN 230kV LINES
115 kV Transmission Line
230 kV Transmission Line
500 kV Transmission Line
Switching Station, Substation, DP
0 0.75 1.5 3 4.5 6
Miles
LADYSMITH SUB
RUTHER GLEN
SWITCHING
STATION
ST JOHNS SUB
CARMEL CHURCH
SWITCHING
STATION
Carters Store
Smiths Mill
Snell
Indian Acres
Old Trap
Thornburg
Hams Ford
Colemans Mill
Marye
Ryland Corner
Ladysmith
Lake Land'Or
Lake Caroline
Balty
Athens
Bowling Green
Milford
Poplar
Antioch Fork
Broaddus
Penola
Wrights Fork
McBryant Corner
Teman
Holliday
Hewlett
Chandler Crossing
Caroline Pines
Coatesville
Oliver
Doswell
Garnett Crossing
Campbell Corner
Covington Corner
Lorne
Haleys Corner
Bowersville
Scotchtown
Taylorsville
Little River Crossing
Ashland Mill
Goodall
Gilman
Ashland
Lanes Corner
Wickham Crossing
Hanover
Calno
Edgar
Reedy Mill
Frog Level
Washington Corner
Chenaults Shop

I. NECESSITY FOR THE PROPOSED PROJECT

H. Provide the desired in-service date of the proposed project and the estimated construction time.

Response: The desired in-service target date for the proposed Projects is April 1, 2027.

The Company estimates it will take approximately 20 months for detailed engineering, materials procurement, permitting, real estate, and construction after a final order from the Commission. Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by August 1, 2025. Should the Commission issue a final order by August 1, 2025, the Company estimates that construction should begin around March 2026 and be completed by April 2027. This schedule is contingent upon obtaining the necessary permits and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to labor shortages or materials/supply issues. This schedule is also contingent upon the Company's ability to negotiate for easements with property owners along the approved route and to purchase land for substation use without the need for additional litigation.

In addition, the Company is actively monitoring regulatory changes and requirements associated with the Northern long-eared bat ("NLEB") and how they could potentially impact construction timing associated with time of year restrictions ("TOYRs"). On October 15, 2024, USFWS issued the NLEB Final Guidance for development projects. The USFWS Interim Guidance for the NLEB expired on November 30, 2024, and the Final Guidance took effect.

The Company is also monitoring regulatory changes associated with the potential up-listing of the Tricolored bat ("TCB"). The Company is anticipating the TCB will be listed; therefore, the Company assumes any regulatory changes associated with the potential listing of the TCB will affect these Projects. On September 14, 2022, the TCB was proposed to be listed as Endangered by the USFWS. USFWS extended its Final Rule issuance target from September 2023 to the end of 2024. At this time, the TCB Final Rule has not been issued.

In October 2024 USFWS issued a final NLEB and TCB Range-wide Determination Key ("Dkey") to allow project proponents to assess project impacts, practicable avoidance and minimization measures, and consultation requirements under the final NLEB guidance and the eventual TCB listing ahead of the final decision. The Company will utilize the DKey to further assess project impacts and determine appropriate avoidance and minimization measures to ensure compliance with state and federal regulations when the project enters permitting.

Any adjustments to this Project schedule resulting from these or similar challenges could necessitate a minimum of a six- to twelve-month delay in the targeted in-service date. Accordingly, for purposes of judicial economy, the Company requests that the Commission issue a final order approving both a desired in-service target date (*i.e.*, April 1, 2027) and an authorization sunset date (*i.e.*, April 1, 2028) for energization of the Project.

I. NECESSITY FOR THE PROPOSED PROJECT

I. Provide the estimated total cost of the project as well as total transmission-related costs and total substation-related costs. Provide the total estimated cost for each feasible alternative considered. Identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.) for each cost provided.

Response: The total estimated conceptual cost of the Ruther Glen Project as proposed is approximately $44.7 million, which includes approximately $31.4 million for transmission-related work and approximately $13.3 million for substation-related work (2024 dollars).

The total estimated conceptual cost of the Carmel Church Project as proposed is approximately $35.9 million, which includes approximately $22.9 million for transmission-related work and approximately $13.0 million for substation-related work (2024 dollars).[11]

The estimated conceptual costs for the transmission-related work associated with the Alternative Routes for both Projects is provided in Section II.A.9.

[11] *See supra* n.4.

I. NECESSITY FOR THE PROPOSED PROJECT

J. If the proposed project has been approved by the RTO, provide the line number, regional transmission expansion plan number, cost responsibility assignments, and cost allocation methodology. State whether the proposed project is considered to be a baseline or supplemental project.

Response: The Projects are classified as two supplemental projects (Ruther Glen DOM-2024-0012 and Carmel Church DOM-2023-0055) initiated by the TO in order to interconnect new load. The need for Carmel Church DOM-2023-0055 was submitted to PJM on December 5, 2023, and the need for Ruther Glen DOM-2024-0012 was submitted to PJM on February 6, 2024. See Attachments I.J.1 and I.J.2, respectively. Both project solutions are anticipated to be submitted to PJM in January 2025. See Attachments I.J.3 and I.J.4. Once the project solutions are presented and PJM performs their Do-No-Harm ("DNH") analysis they will assign Supplemental ID numbers to each project and include them in the Local Plan.

The Projects are presently 100% cost allocated to DOM Zone.

Dominion Supplemental Projects

Transmission Expansion Advisory Committee
December 5, 2023

Dominion Transmission Zone: Supplemental

Need Number: DOM-2023-0055 Carmel Church
Process Stage: Need Meeting 12/05/2023
Project Driver: Customer Service

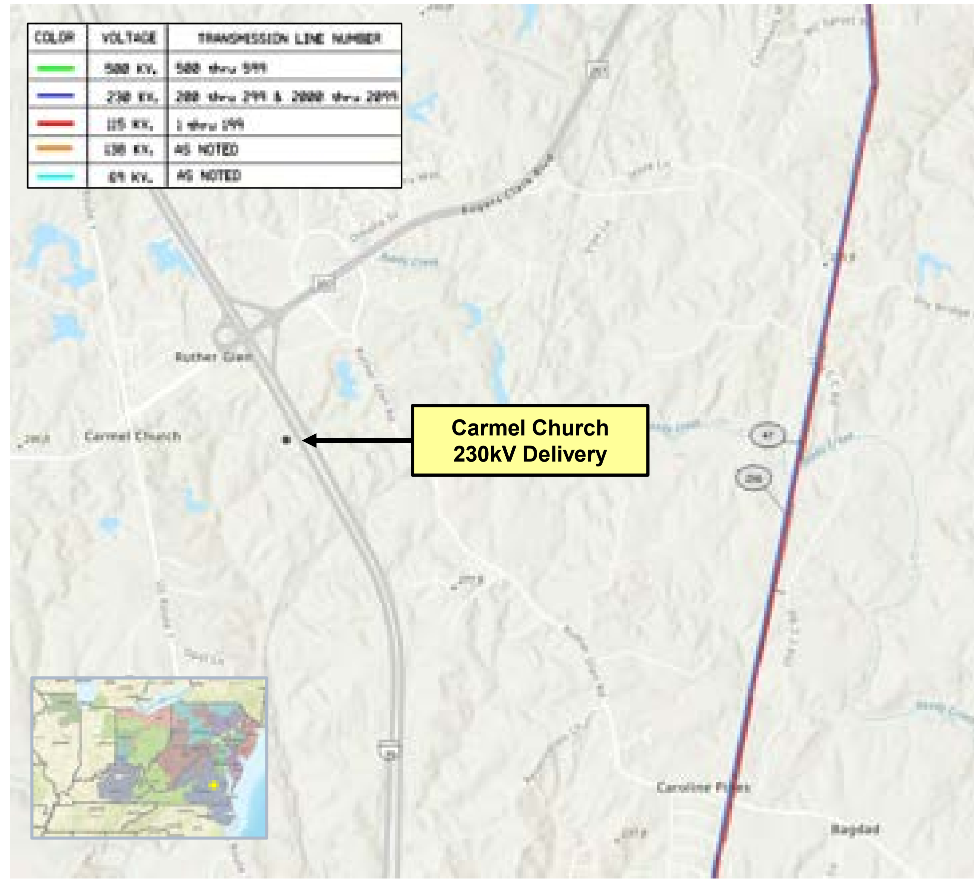
Specific Assumption References:

Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:

ODEC has submitted a DP request for a new 230 kV delivery point (Carmel Church Sub) to serve a data center customer in Caroline County with a total load in excess of 100 MW. Requested in-service date is 12/31/2026.

Initial In-Service Load	Projected 2028 Load
Summer: 0 MW Winter: 18 MW	Summer: 125 MW Winter: 125 MW



Dominion Energy

Dominion Supplemental Projects

Transmission Expansion Advisory Committee
February 6, 2024

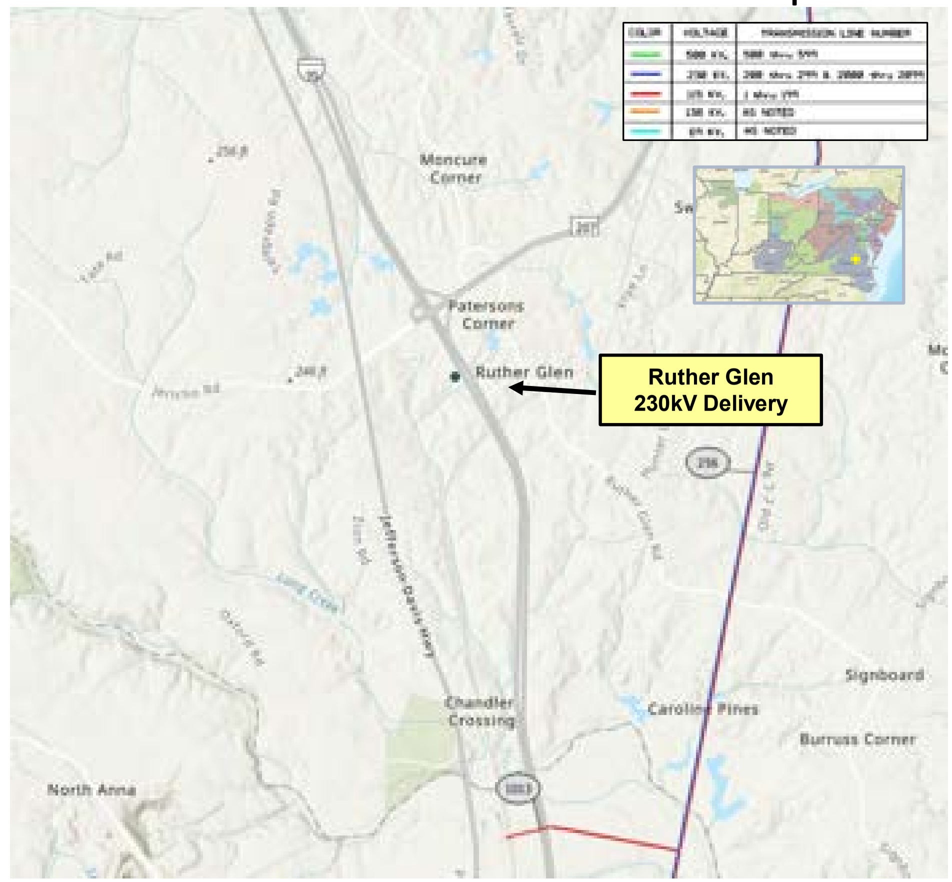
Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2024-0012
Process Stage: Need Meeting 02/06/2024
Project Driver: Customer Service

Specific Assumption References:
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:
ODEC has submitted a DP request for a new 230 kV delivery point (Ruther Glen) to serve a data center customer in Caroline County VA with a total load in excess of 100 MW. Requested in-service date is 3/02/2026.

Initial In-Service Load	Projected 2028 Load
Summer: 170 MW Winter: 170 MW	Summer: 300 MW Winter: 300 MW



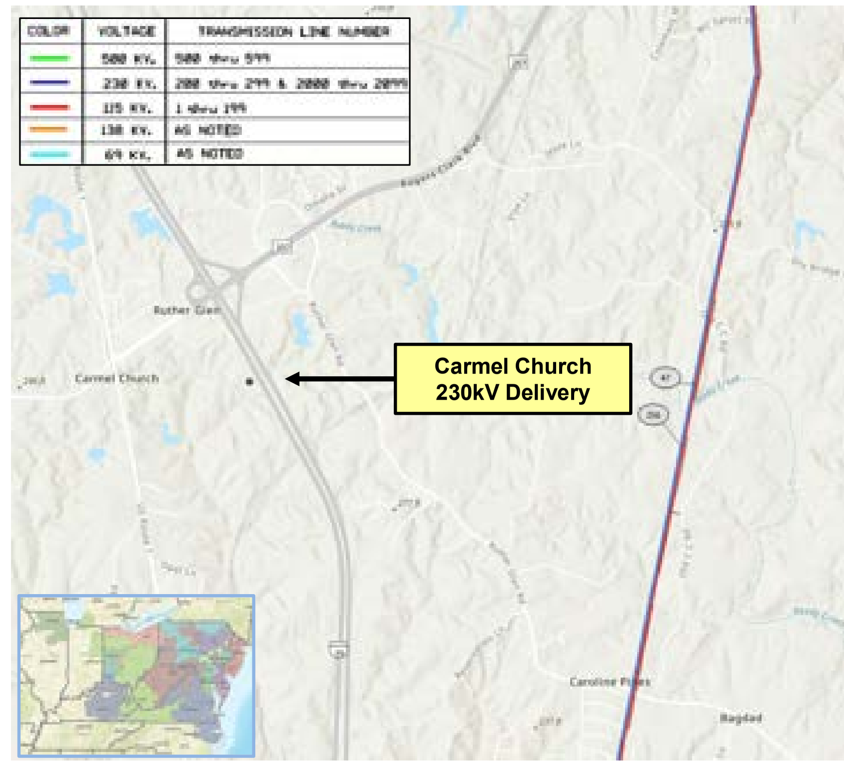
Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2023-0055
Process Stage: Solution Meeting 1/07/2025
Previously Presented: Need Meeting 12/05/2023
Project Driver: Customer Service

Specific Assumption References:
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:
ODEC has submitted a DP request for a new 230 kV delivery point (Carmel Church Sub) to serve a data center customer in Caroline County with a total load in excess of 100 MW. Requested in-service date is 7/1/2027.

Initial In-Service Load	Projected 2029 Load
Summer: 18.0 MW Winter: 18.0 MW	Summer: 125.0 MW Winter: 125.0 MW



Dominion Energy

Attachment I.J.3

Dominion Transmission Zone: Supplemental Carmel Church 230kV Delivery - DEV

Need Number: DOM-2023-0055

Process Stage: Solution Meeting 1/07/2025

Project Driver: Customer Service

Proposed Solution:

- Construct new Carmel Church 230kV substation with 4 breaker ring bus configuration.
- Cut existing 230kV Line 256 (Ladysmith CT to Four Rivers) and extend double circuit 230kV transmission lines for approximately two miles to proposed Carmel Church substation.

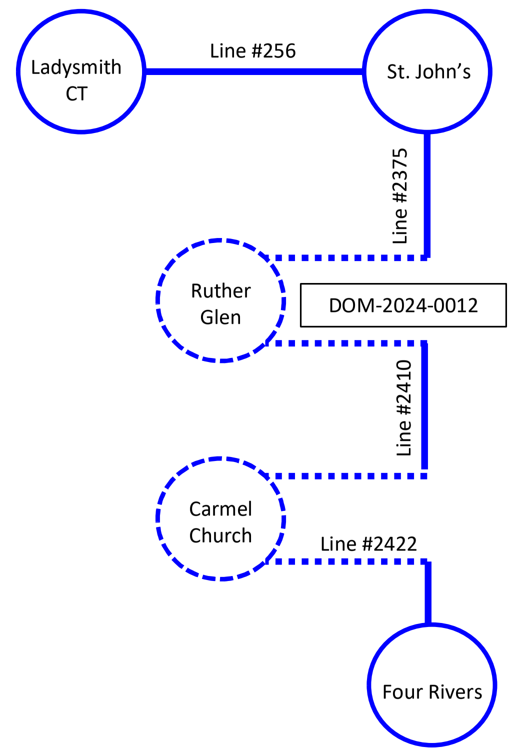
Estimated Project Cost: Transmission Lines: $25M; Substation: $15M

Alternatives Considered: None, Line 256 is the closest source to proposed site

Projected In-service Date: 7/1/2027

Project Status: Engineering

Model: 2029 RTEP



Attachment I.J.3

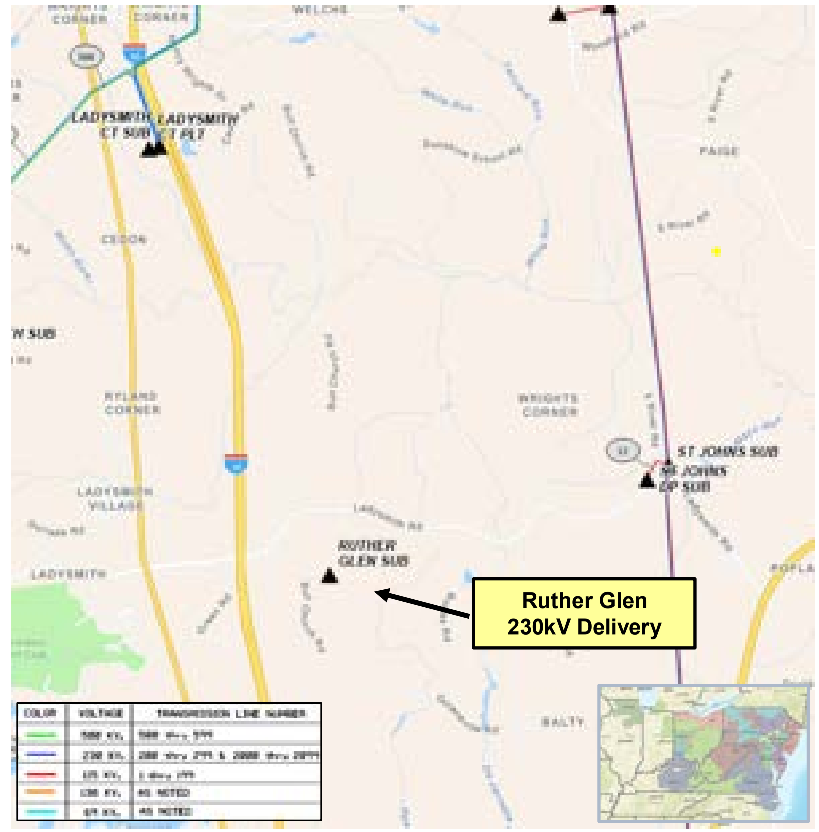
Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2024-0012
Process Stage: Solution Meeting 1/07/2025
Previously Presented: Need Meeting 02/06/2024
Project Driver: Customer Service

Specific Assumption References:
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

Problem Statement:
ODEC has submitted a DP request for a new 230 kV delivery point (Ruther Glen) to serve a data center customer in Caroline County VA with a total load in excess of 100 MW. Requested in-service date is 7/1/2027.

Initial In-Service Load	Projected 2029 Load
Summer: 170 MW Winter: 170 MW	Summer: 300 MW Winter: 300 MW



Attachment I.J.4

Dominion Transmission Zone: Supplemental
Ruther Glen 230kV Delivery - DEV

Need Number: DOM-2024-0012

Process Stage: Solution Meeting 1/07/2025

Project Driver: Customer Service

Proposed Solution:

- Construct new Ruther Glen 230kV substation with 6 breaker ring bus configuration.
- Cut existing 230kV Line 256 (Ladysmith CT to Four Rivers) and extend double circuit 230kV lines approximately three miles to proposed Ruther Glen substation.

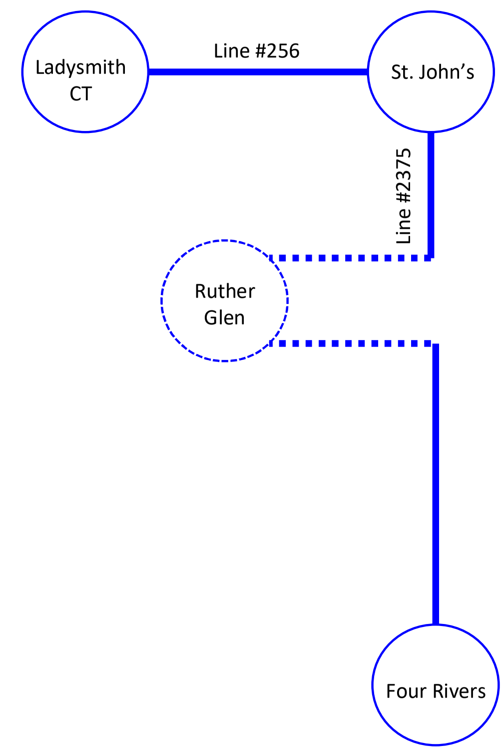
Estimated Project Cost: Transmission Lines: $32M; Substation: $15M

Alternatives Considered: None, Line 256 is the closest source to proposed site

Projected In-service Date: 7/1/2027

Project Status: Engineering

Model: 2029 RTEP



I. NECESSITY FOR THE PROPOSED PROJECT

K. If the need for the proposed project is due in part to reliability issues and the proposed project is a rebuild of an existing transmission line(s), provide five years of outage history for the line(s), including for each outage the cause, duration and number of customers affected. Include a summary of the average annual number and duration of outages. Provide the average annual number and duration of outages on all Applicant circuits of the same voltage, as well as the total number of such circuits. In addition to outage history, provide five years of maintenance history on the line(s) to be rebuilt including a description of the work performed as well as the cost to complete the maintenance. Describe any system work already undertaken to address this outage history.

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

L. If the need for the proposed project is due in part to deterioration of structures and associated equipment, provide representative photographs and inspection records detailing their condition.

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

M. In addition to the other information required by these guidelines, applications for approval to construct facilities and transmission lines interconnecting a Non-Utility Generator ("NUG") and a utility shall include the following information:

1. The full name of the NUG as it appears in its contract with the utility and the dates of initial contract and any amendments;

2. A description of the arrangements for financing the facilities, including information on the allocation of costs between the utility and the NUG;

3. a. For Qualifying Facilities ("QFs") certificated by Federal Energy Regulatory Commission ("FERC") order, provide the QF or docket number, the dates of all certification or recertification orders, and the citation to FERC Reports, if available;

b. For self-certificated QFs, provide a copy of the notice filed with FERC;

4. Provide the project number and project name used by FERC in licensing hydroelectric projects; also provide the dates of all orders and citations to FERC Reports, if available; and

5. If the name provided in 1 above differs from the name provided in 3 above, give a full explanation.

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

N. Describe the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations and other ground facilities associated with the proposed project.

Response: The Ruther Glen and Carmel Church Switching Stations will serve REC's customers' new load additions in Caroline County. See also Attachment I.A.1. The Projects may also be used to support future load growth in the area.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

1. Provide the length of the proposed corridor and viable alternatives.

Response: The approximate lengths of the Proposed and Alternative Routes for the Ruther Glen Loop are as follows:

Proposed Route (Route 5): 4.0 miles

Alternative Route 4: 3.7 miles

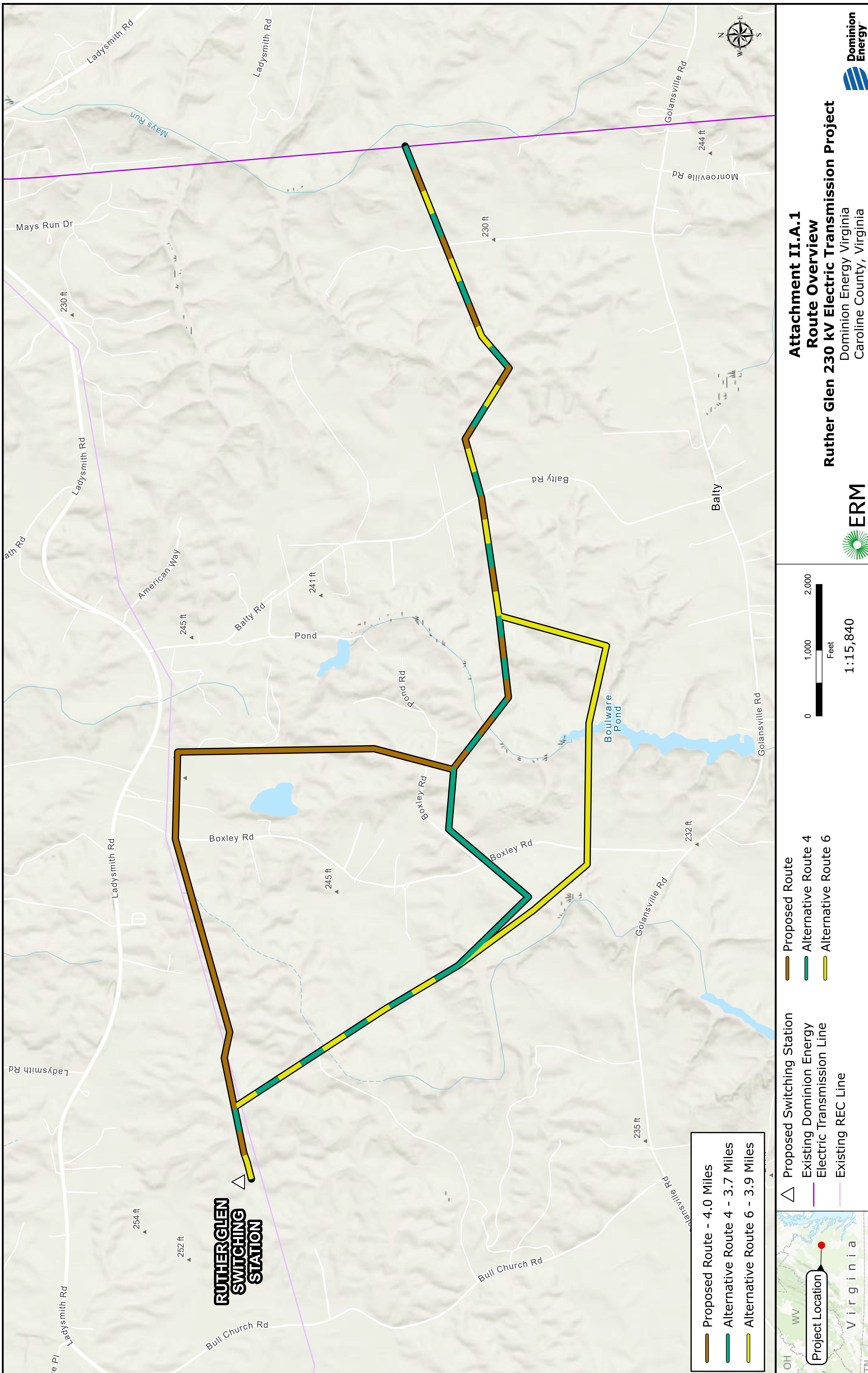
Alternative Route 6: 3.9 miles

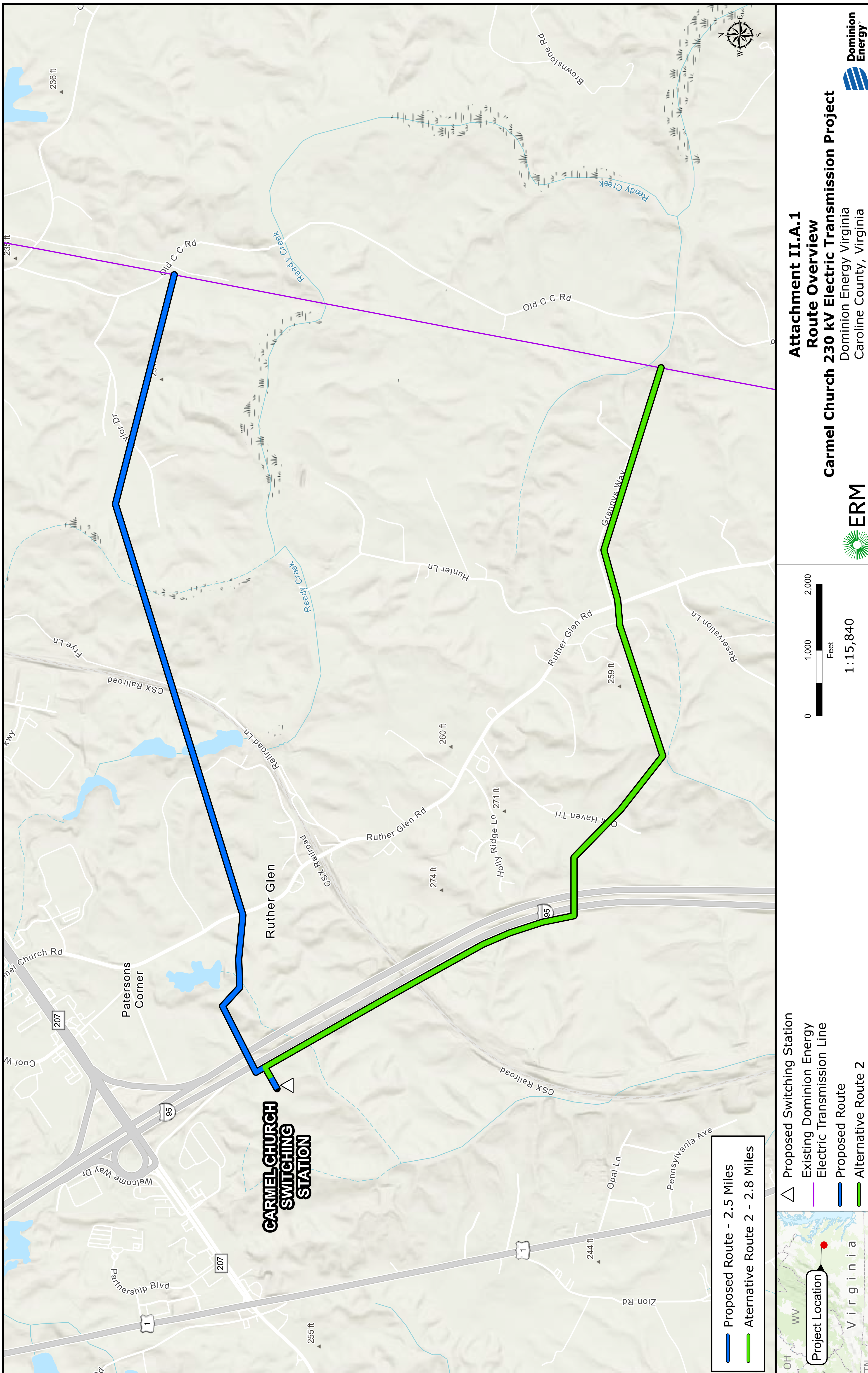
The approximate lengths of the Proposed and Alternative Routes for the Carmel Church Loop are as follows:

Proposed Route (Route 1): 2.5 miles

Alternative Route 2: 2.8 miles

See Section II.A.9 for an explanation of the Company’s route selection process, as well as the Environmental Routing Study referenced therein.


Attachment II.A.1
Route Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Proposed Route - 4.0 Miles
Alternative Route 4 - 3.7 Miles
Alternative Route 6 - 3.9 Miles
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Alternative Route 4
Alternative Route 6
0
1,000
2,000
Feet
1:15,840
Project Location
Virginia
RUTHER GLEN SWITCHING STATION
Ladysmith Rd
Mays Run
Mays Run Dr
Golansville Rd
Monroeville Rd
Balty Rd
Balty
American Way
Pond
Pond Rd
Boulware Pond
Boxley Rd
Bull Church Rd
ERM
Dominion Energy


Attachment II.A.1
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Proposed Route
Alternative Route 2
Proposed Route - 2.5 Miles
Aternative Route 2 - 2.8 Miles
0
1,000
2,000
Feet
1:15,840
CARMEL CHURCH SWITCHING STATION
Project Location
Virginia
Ruther Glen
Patersons Corner
Old C C Rd
Ruther Glen Rd
Hunter Ln
Grannys Way
Reedy Creek
CSX Railroad
Railroad Ln
Holly Ridge Ln
Reservation Ln
Brownstone Rd
Partnership Blvd
Welcome Way Dr
Pennsylvania Ave
Opal Ln
Zion Rd
Frye Ln
Dominion Energy
ERM

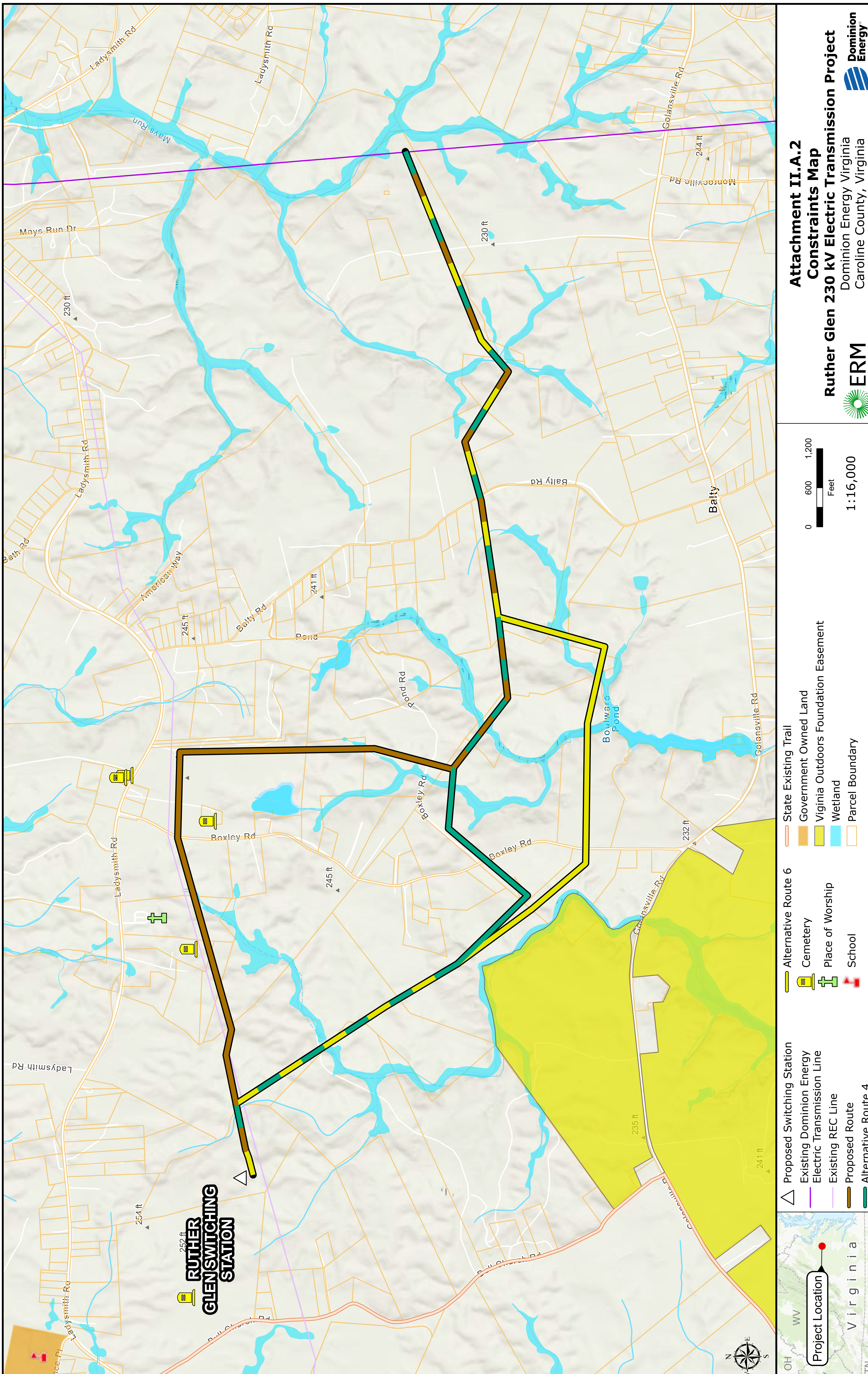
II. DESCRIPTION OF THE PROPOSED PROJECT

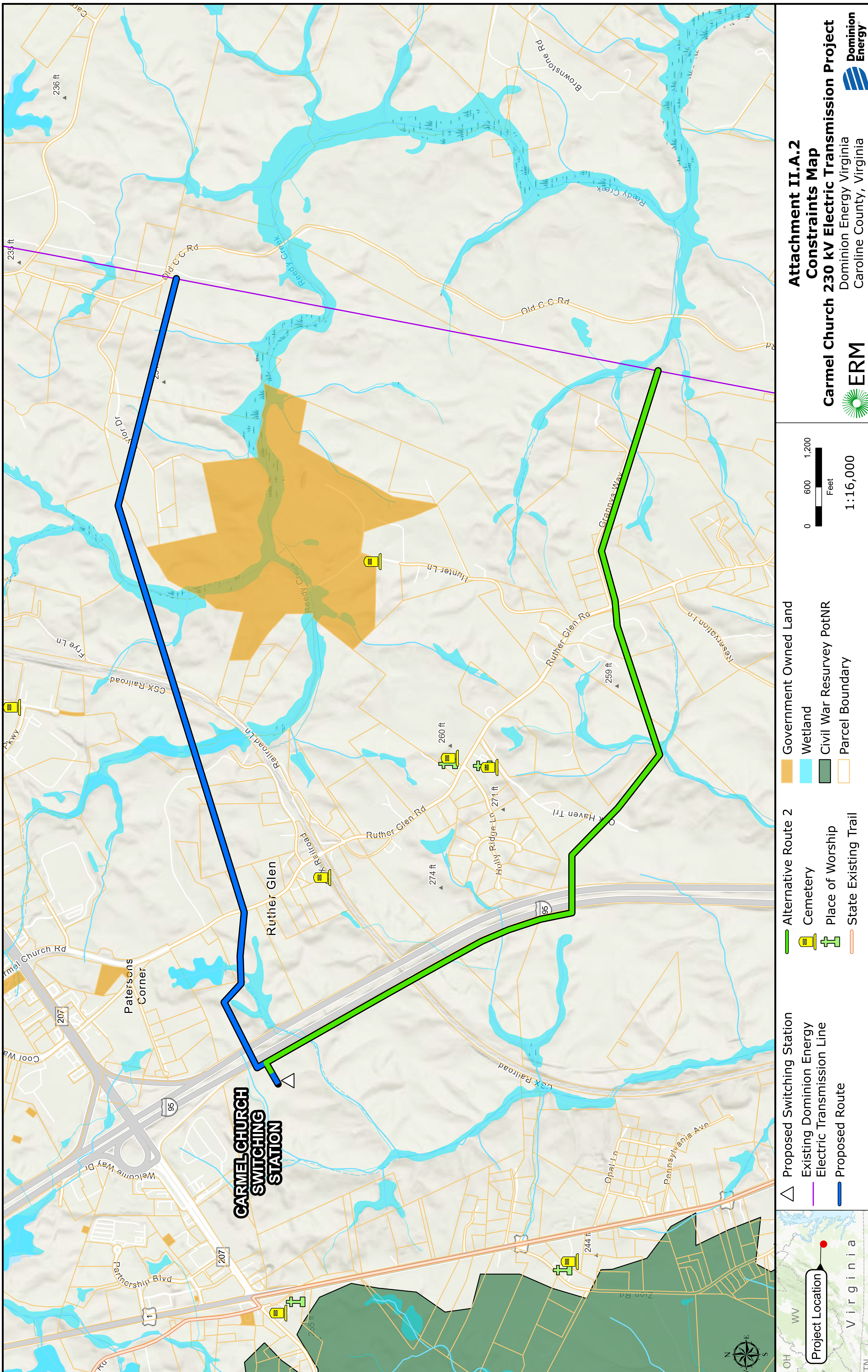
A. Right-of-way ("ROW")

2. Provide color maps of suitable scale (including both general location mapping and more detailed GIS-based constraints mapping) showing the route of the proposed line and its relation to: the facilities of other public utilities that could influence the route selection, highways, streets, parks and recreational areas, scenic and historic areas, open space and conservation easements, schools, convalescent centers, churches, hospitals, burial grounds/cemeteries, airports and other notable structures close to the proposed project. Indicate the existing linear utility facilities that the line is proposed to parallel, such as electric transmission lines, natural gas transmission lines, pipelines, highways, and railroads. Indicate any existing transmission ROW sections that are to be quitclaimed or otherwise relinquished. Additionally, identify the manner in which the Applicant will make available to interested persons, including state and local governmental entities, the digital GIS shape file for the route of the proposed line.

Response: See Attachment II.A.2. No portion of the right-of-way is proposed to be quitclaimed or relinquished as part of the Projects.

Dominion Energy Virginia will make the digital Geographic Information Systems ("GIS") shape file available to interested persons upon request to the Company's legal counsel as listed in the Project Application.


Attachment II.A.2
Constraints Map
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
0 600 1,200
Feet
1:16,000
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Alternative Route 4
Alternative Route 6
Cemetery
Place of Worship
School
State Existing Trail
Government Owned Land
Vigrinia Outdoors Foundation Easement
Wetland
Parcel Boundary
Project Location
Virginia
WV
OH
KY
TN
RUTHER GLEN SWITCHING STATION
Ladysmith Rd
Mays Run
Mays Run Dr
Bath Rd
American Way
Balty Rd
Balty
Pond Rd
Boxley Rd
Boulware Pond
Golansville Rd
Monroeville Rd
Bull Church Rd
230 ft
241 ft
245 ft
244 ft
232 ft
235 ft
252 ft
254 ft



Attachment II.A.2
Constraints Map
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Proposed Route
Alternative Route 2
Cemetery
Place of Worship
State Existing Trail
Government Owned Land
Wetland
Civil War Resurvey PotNR
Parcel Boundary
0
600
1,200
Feet
1:16,000
Project Location
Virginia
OH
WV
KY
TN
CARMEL CHURCH SWITCHING STATION
Ruther Glen
Patersons Corner
Reedy Creek
Old C C Rd
Brownstone Rd
Grannys Way
Ruther Glen Rd
Hunter Ln
Reservation Ln
Oak Haven Trl
Holly Ridge Ln
Railroad Ln
CSX Railroad
Frye Ln
Carmel Church Rd
Cool Water
Welcome Way Dr
Partnership Blvd
Pennsylvania Ave
Opal Ln
Zion Rd
95
207
1
236 ft
235 ft
260 ft
259 ft
271 ft
274 ft
244 ft

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

3. Provide a separate color map of a suitable scale showing all the Applicant's transmission line ROWs, either existing or proposed, in the vicinity of the proposed project.

Response: See Attachment I.G.1.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

4. To the extent the proposed route is not entirely within existing ROW, explain why existing ROW cannot adequately service the needs of the Applicant.

Response: There is no existing Company right-of-way that serves the REC customers' proposed data center developments and the proposed Ruther Glen and Carmel Church Switching Stations.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

5. Provide drawings of the ROW cross section showing typical transmission line structure placements referenced to the edge of the ROW. These drawings should include:

a. ROW width for each cross section drawing;

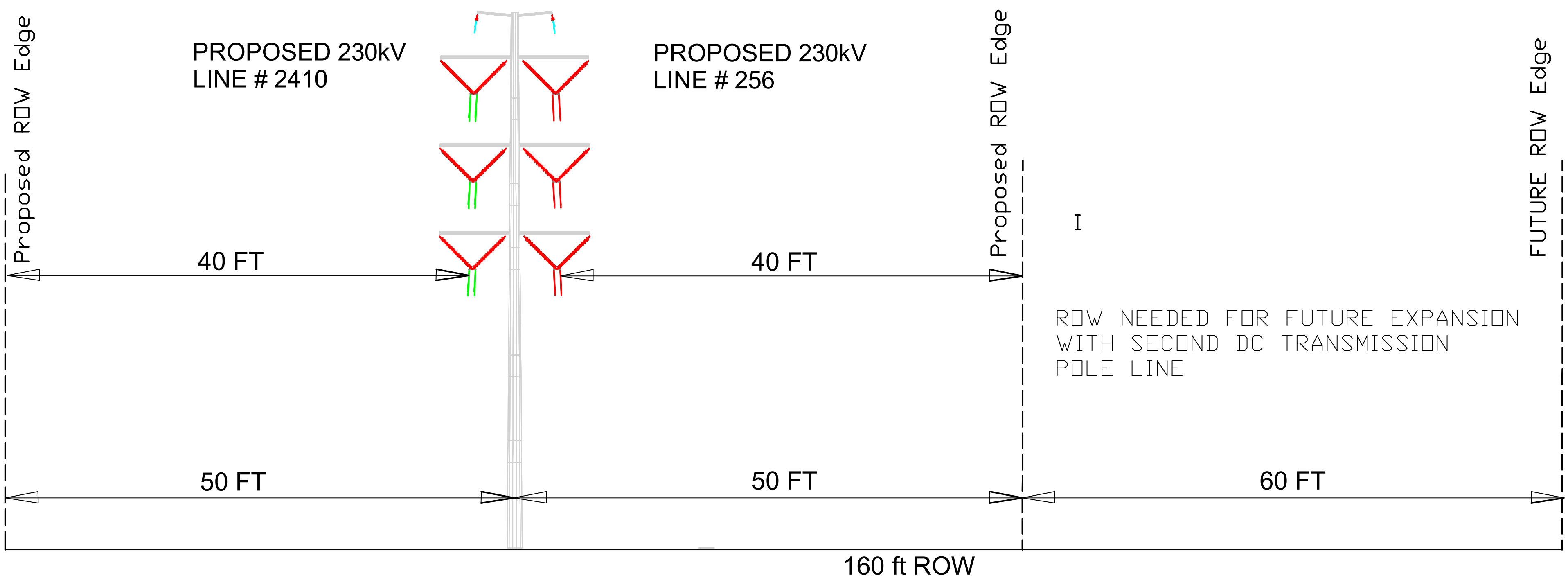
b. Lateral distance between the conductors and edge of ROW;

c. Existing utility facilities on the ROW; and

d. For lines being rebuilt in existing ROW, provide all of the above (i) as it currently exists, and (ii) as it will exist at the conclusion of the proposed project.

Response: See Attachment II.A.5.a and II.A.5.b.

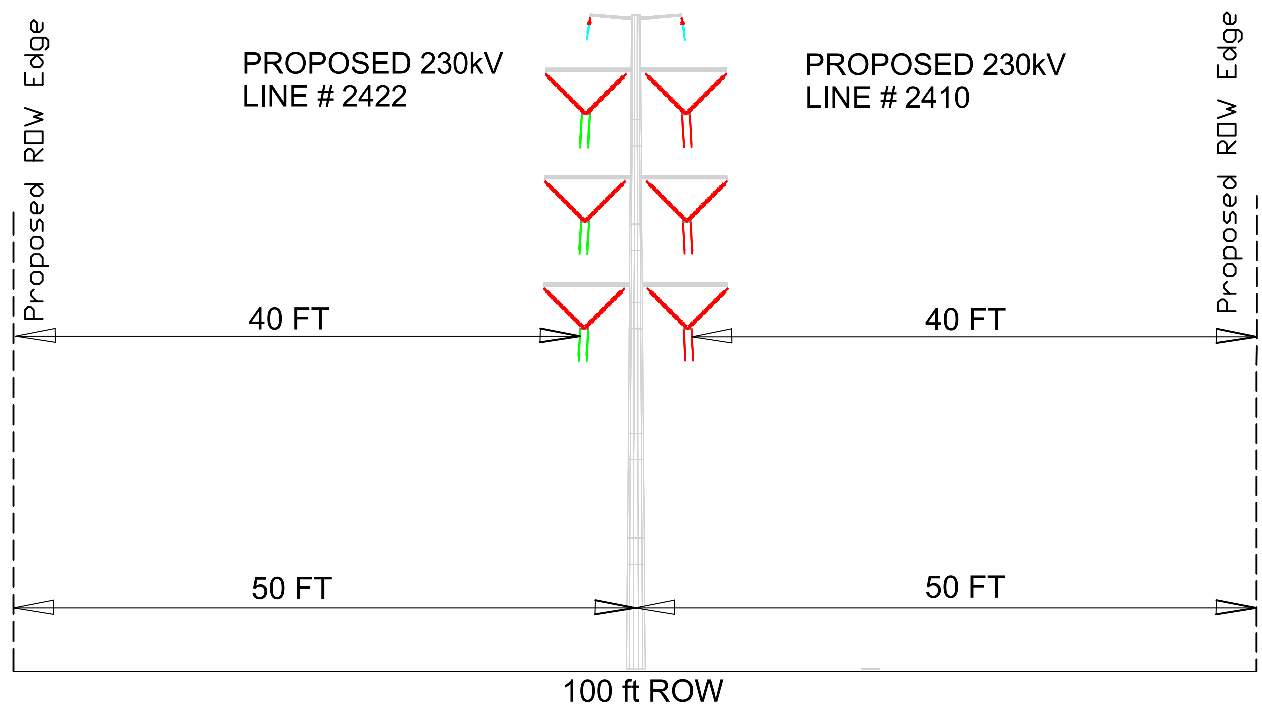
For additional information on the structures, see Section II.B.3.



PROPOSED ROW CONFIGURATION

DISCLAIMER		DESCRIPTION & VIEW	ATTACHMENT NO.
THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN	Dominion Energy Dominion Energy 5000 Dominion Blvd. Glen Allen, VA 23060	STR. 256/300-256/334 (2410/300-2410/334) TYPICAL RIGHT OF WAY LOOKING TOWARDS RUTHER GLEN SWITCHING STATION	II.A.5.a DRAWN BY SDH

Attachment II.A.5.b



PROPOSED ROW CONFIGURATION

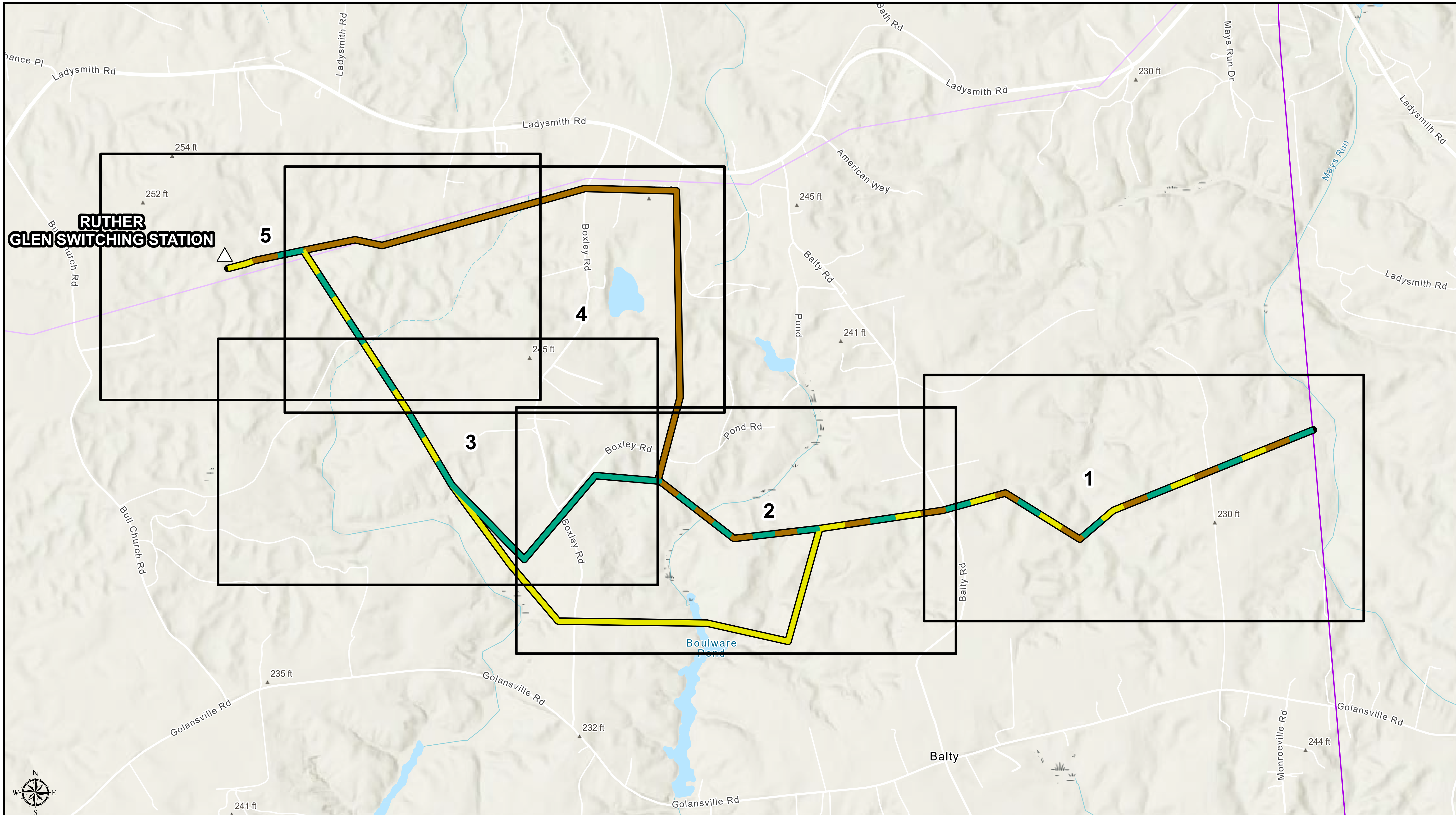
DISCLAIMER		DESCRIPTION & VIEW	ATTACHMENT NO.
THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN	Dominion Energy Dominion Energy 5000 Dominion Blvd. Glen Allen, VA 23060	STR. 2410/300-2410/322 (2422/300-2422/322) TYPICAL RIGHT OF WAY LOOKING TOWARDS CARMEL CHURCH SWITCHING STATION	II.A.5.b DRAWN BY SDH

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

6. Detail what portions of the ROW are subject to existing easements and over what portions new easements will be needed.

Response: As discussed in Section II.A.4, there is no existing Company-owned permanent right-of-way that serves the REC customers' new load additions and the proposed Ruther Glen and Carmel Church Switching Stations. Therefore, the right-of-way will require easements for a new-build transmission line. No overlap between existing easements and the proposed easements for the Project will occur. See Attachment II.A.6.



- △ Proposed Switching Station
- Existing Dominion Energy Electric Transmission Line
- Existing REC Line
- Proposed Route
- Alternative Route 4
- Alternate Route 6

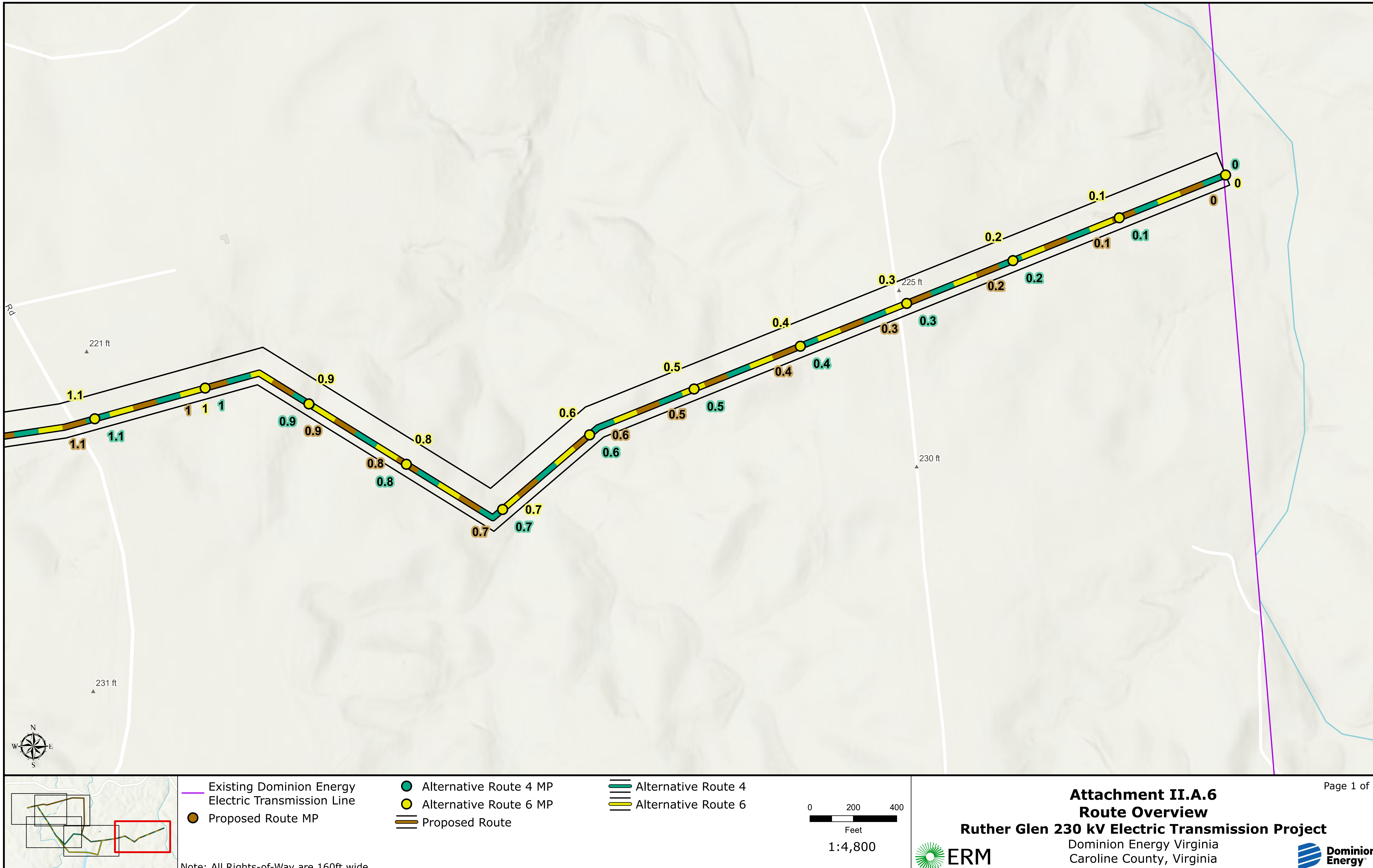
0 660 1,320
Feet
1:16,000

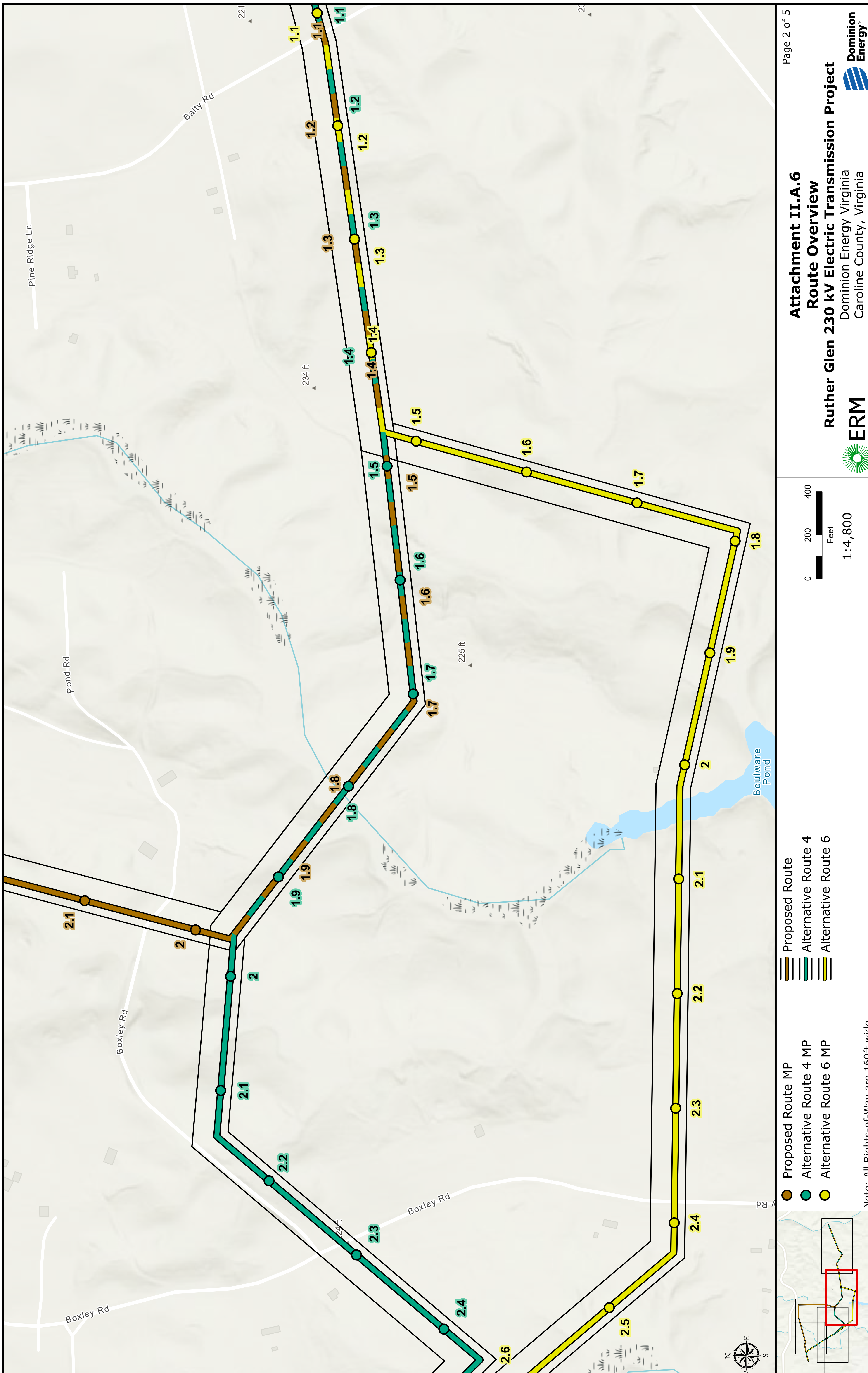
ERM

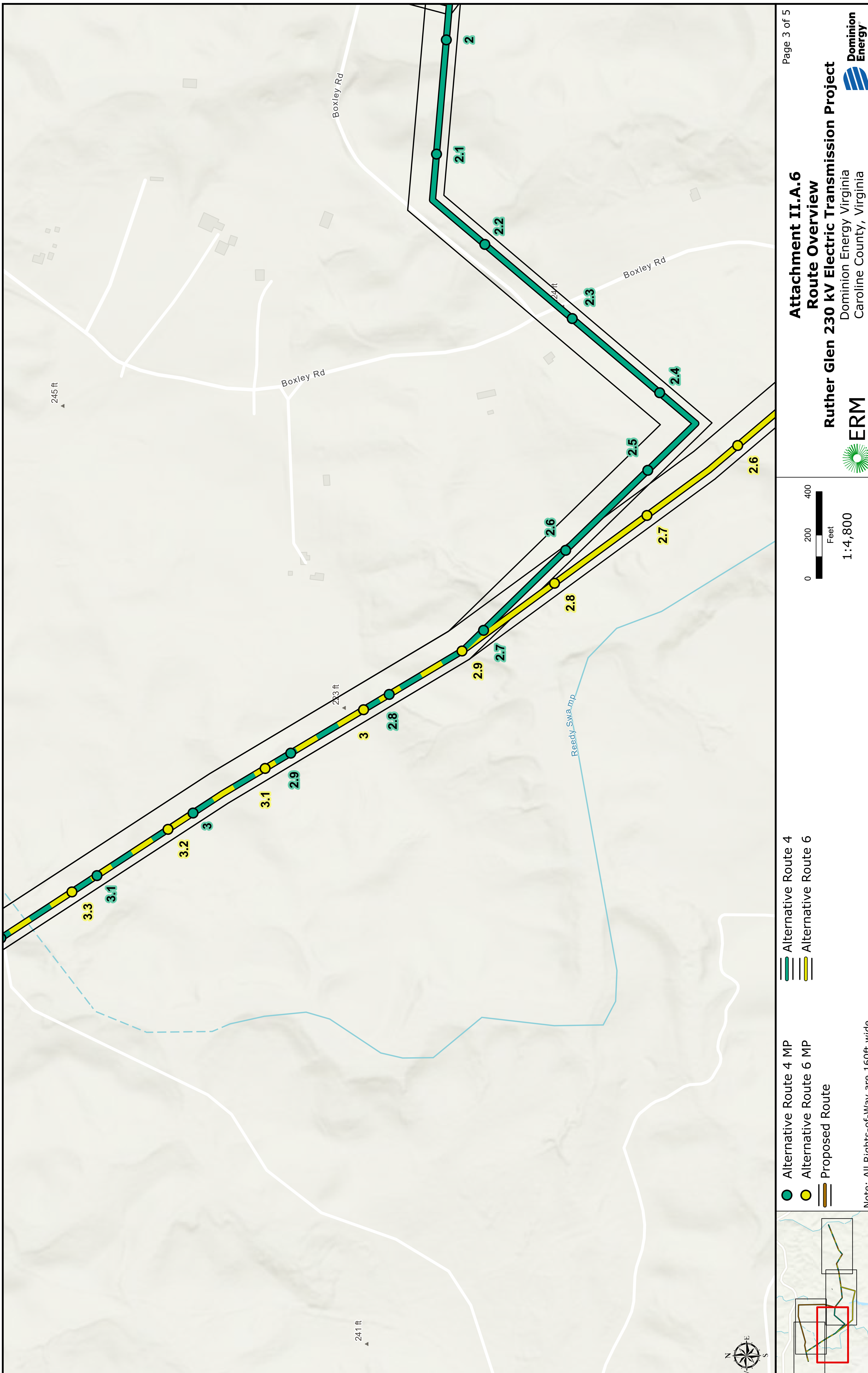
Page 0

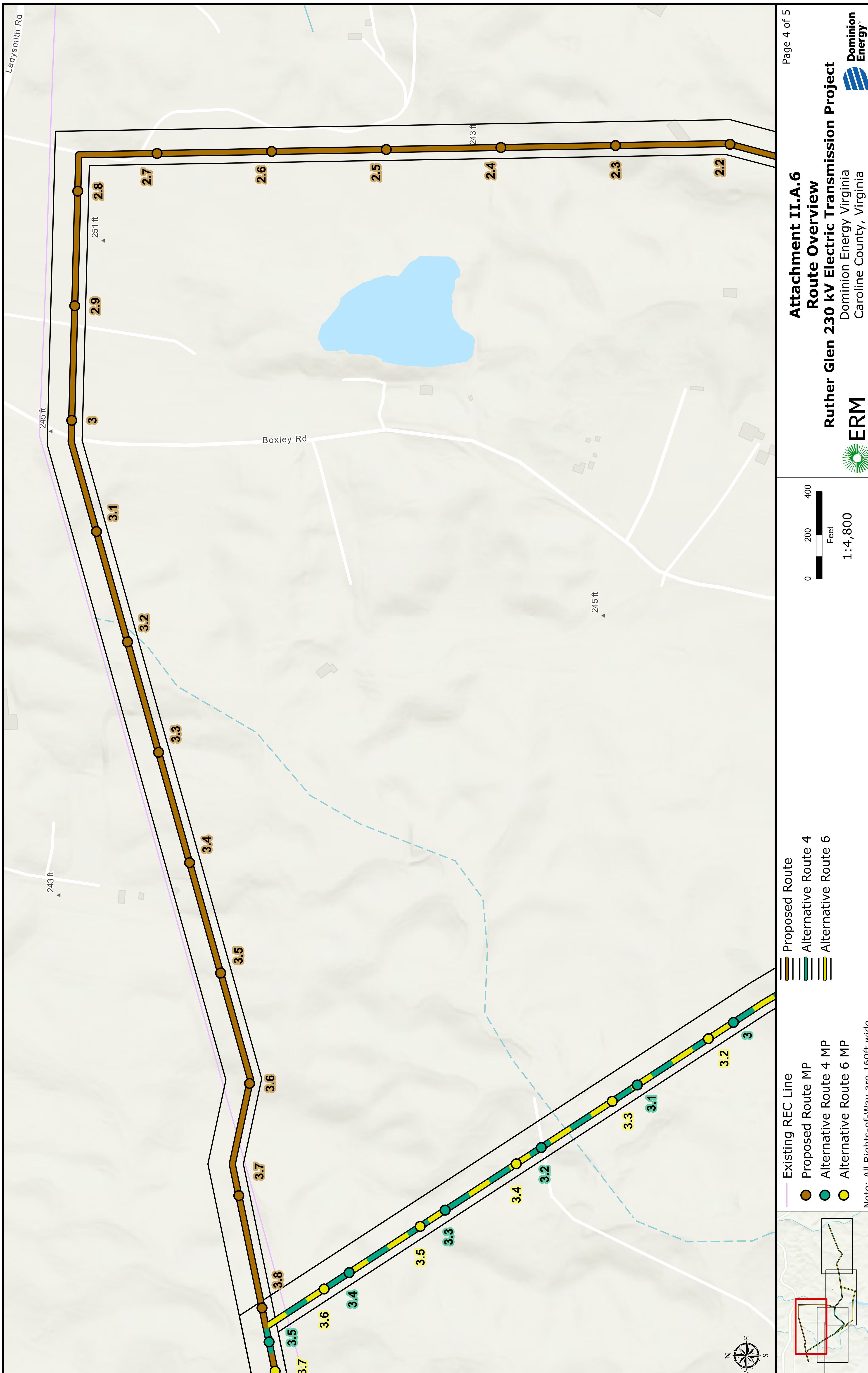
Attachment II.A.6
Route Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

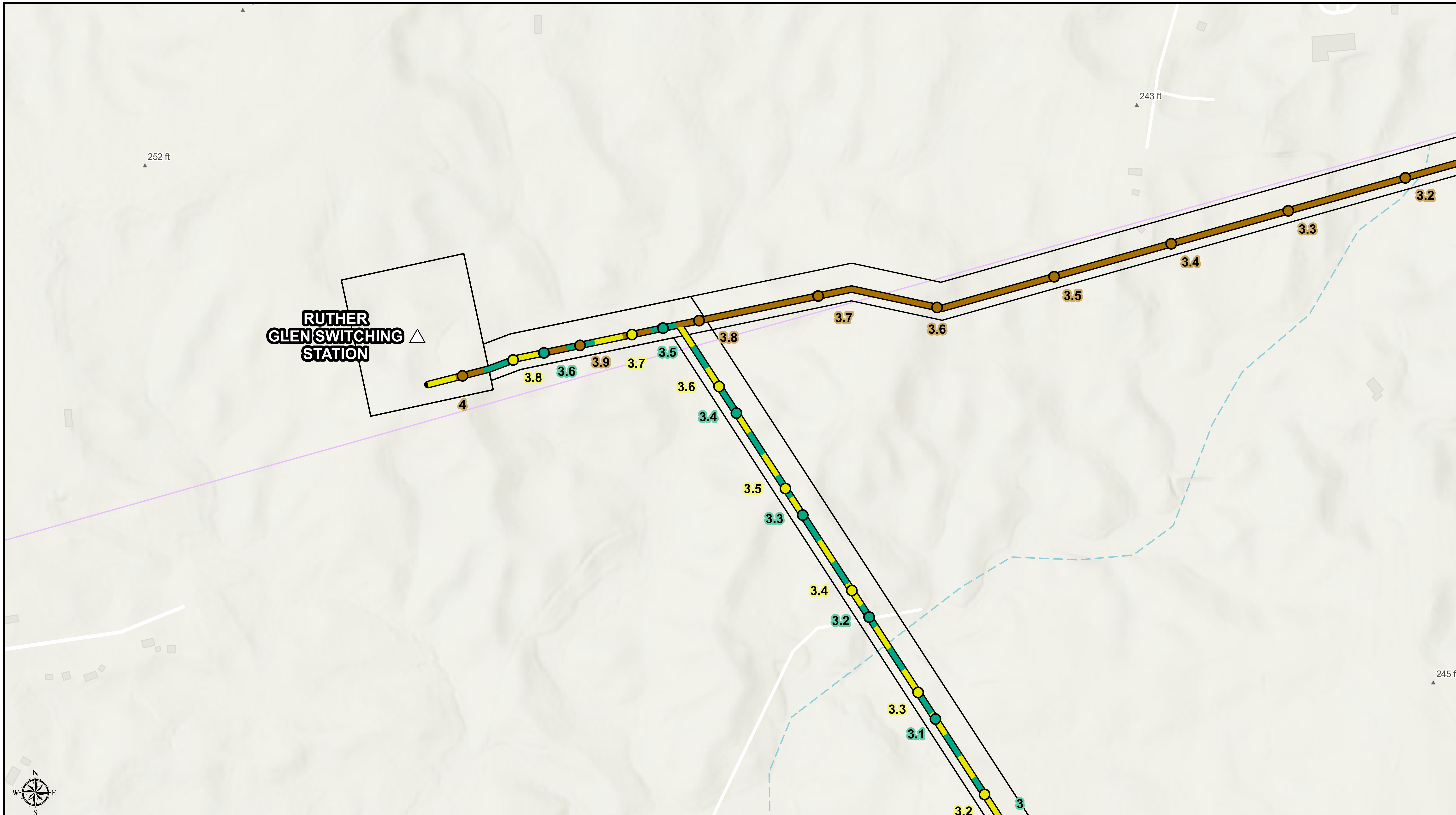

Attachment II.A.6
Route Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 1 of 5
Existing Dominion Energy Electric Transmission Line
Proposed Route MP
Alternative Route 4 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Note: All Rights-of-Way are 160ft wide.
0 200 400
Feet
1:4,800
ERM
Dominion Energy


Attachment II.A.6
Route Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 2 of 5
ERM
Dominion Energy
Proposed Route MP
Alternative Route 4 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Note: All Rights-of-Way are 160ft wide.
0 200 400
Feet
1:4,800
Balty Rd
Pine Ridge Ln
Pond Rd
Boxley Rd
Boulware Pond
234 ft
225 ft


Attachment II.A.6
Route Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 3 of 5
Alternative Route 4 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Note: All Rights-of-Way are 160ft wide.
0
200
400
Feet
1:4,800
ERM
Dominion Energy
Boxley Rd
Boxley Rd
Boxley Rd
Reedy Swamp
245 ft
223 ft
241 ft
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
3.1
2.6
2.7
2.8
2.9
3
3.1
3.2
3.3



Attachment II.A.6
Route Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 4 of 5
ERM
Dominion Energy
Existing REC Line
Proposed Route MP
Alternative Route 4 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Note: All Rights-of-Way are 160ft wide.
0
200
400
Feet
1:4,800
Ladysmith Rd
Boxley Rd
251 ft
245 ft
243 ft



Proposed Switching Station
Existing REC Line
Proposed Route MP
Alternative Route 4 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6

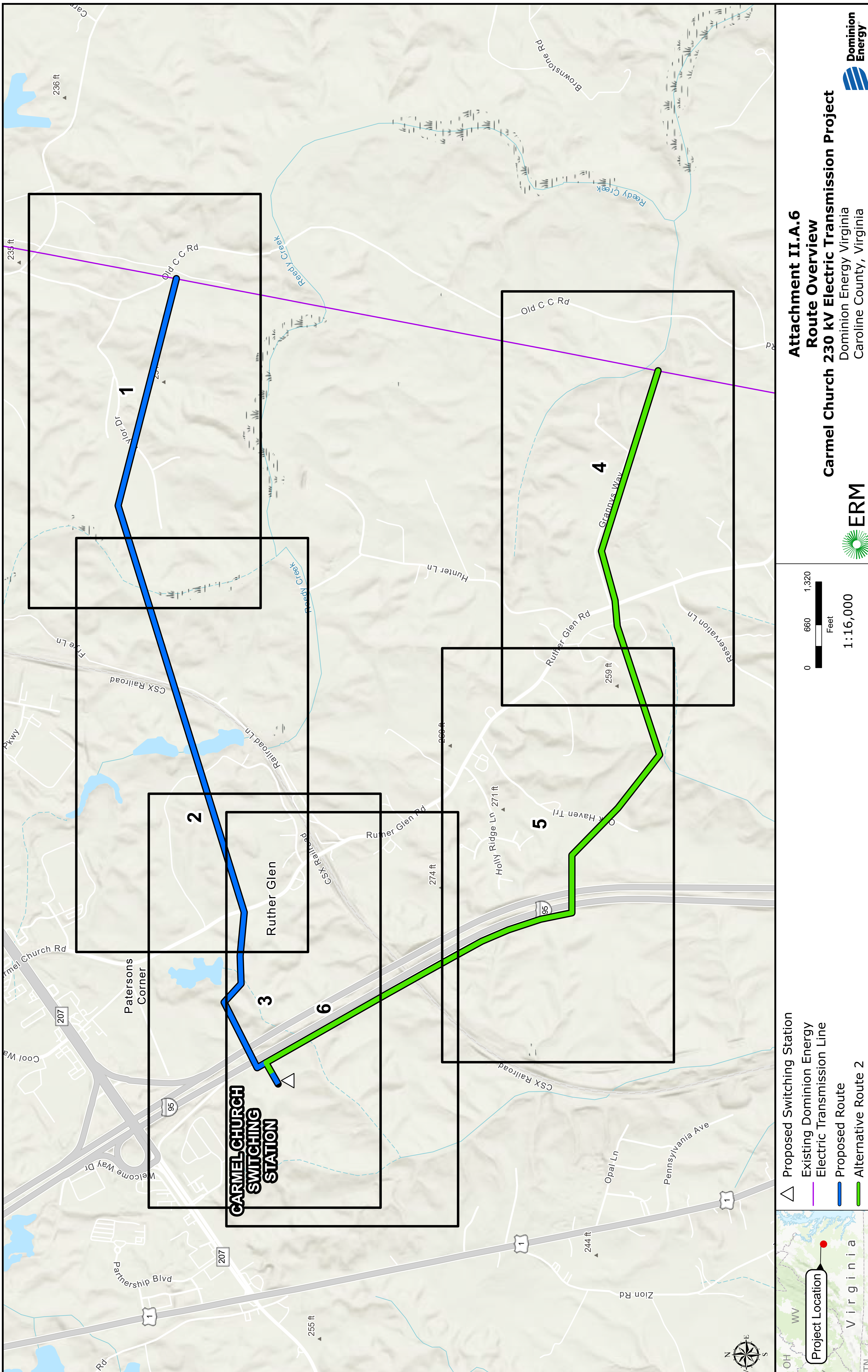
Note: All Rights-of-Way are 160ft wide.

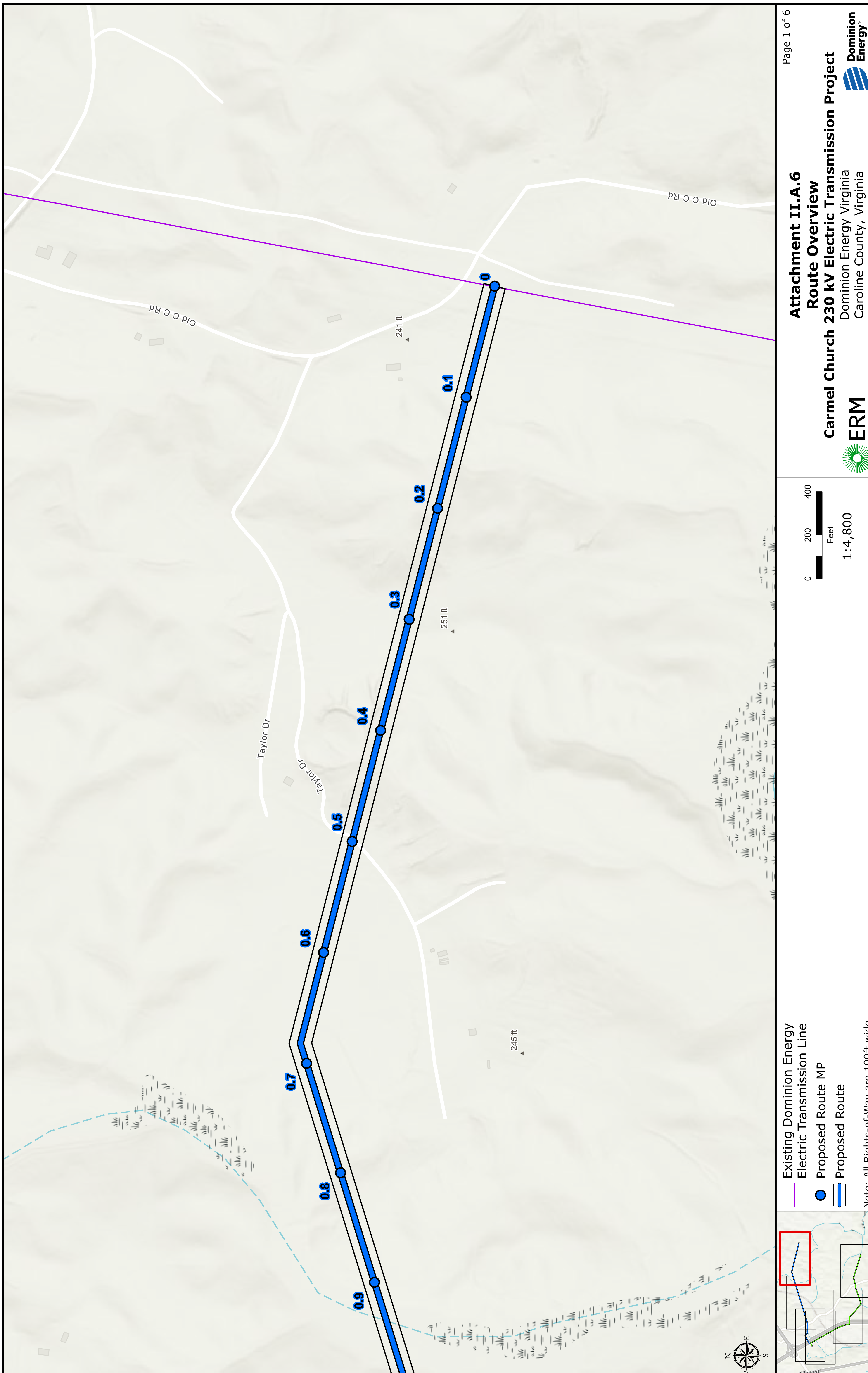
0 200 400
Feet
1:4,800

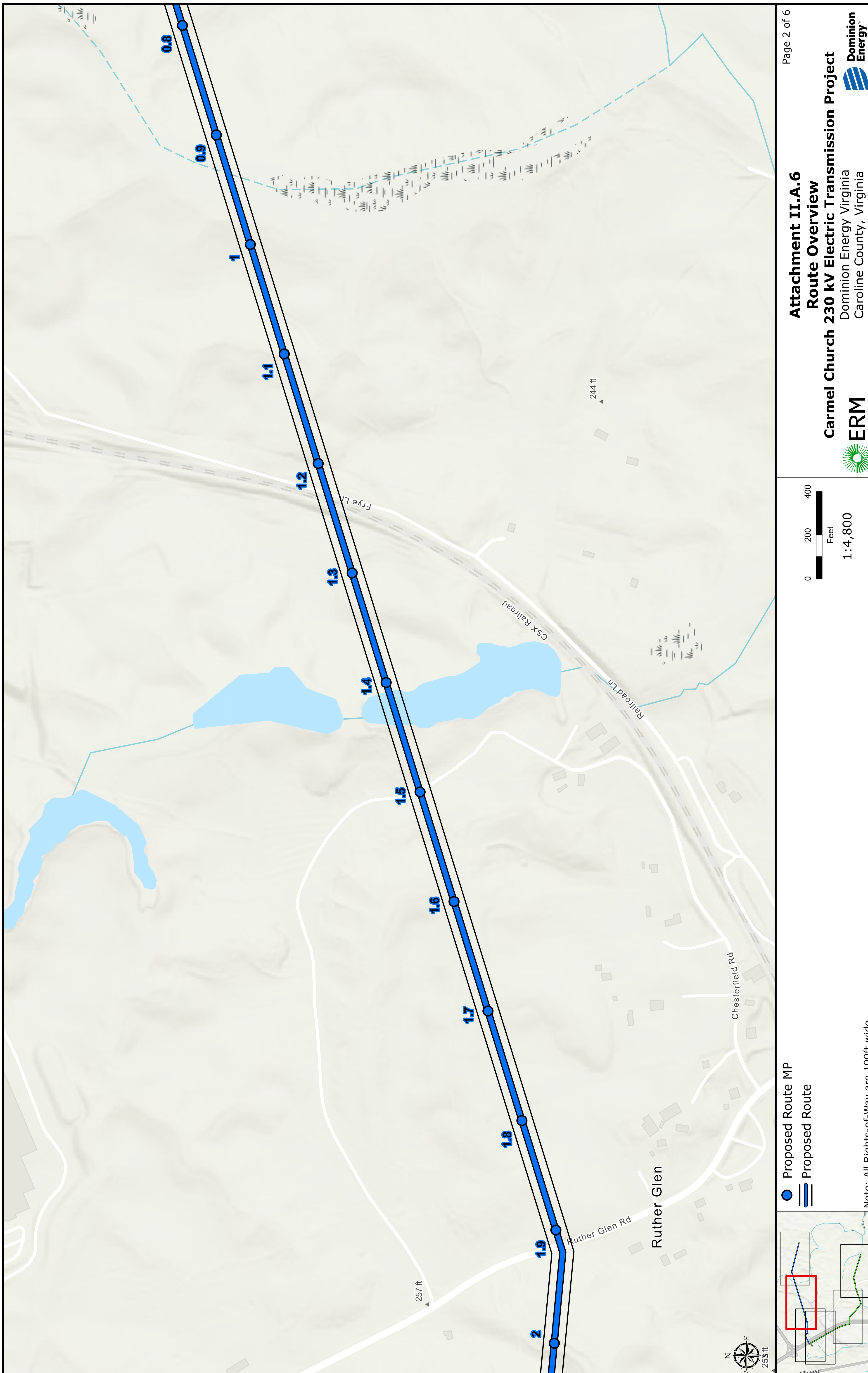
Page 5 of 5

Attachment II.A.6
Route Overview
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

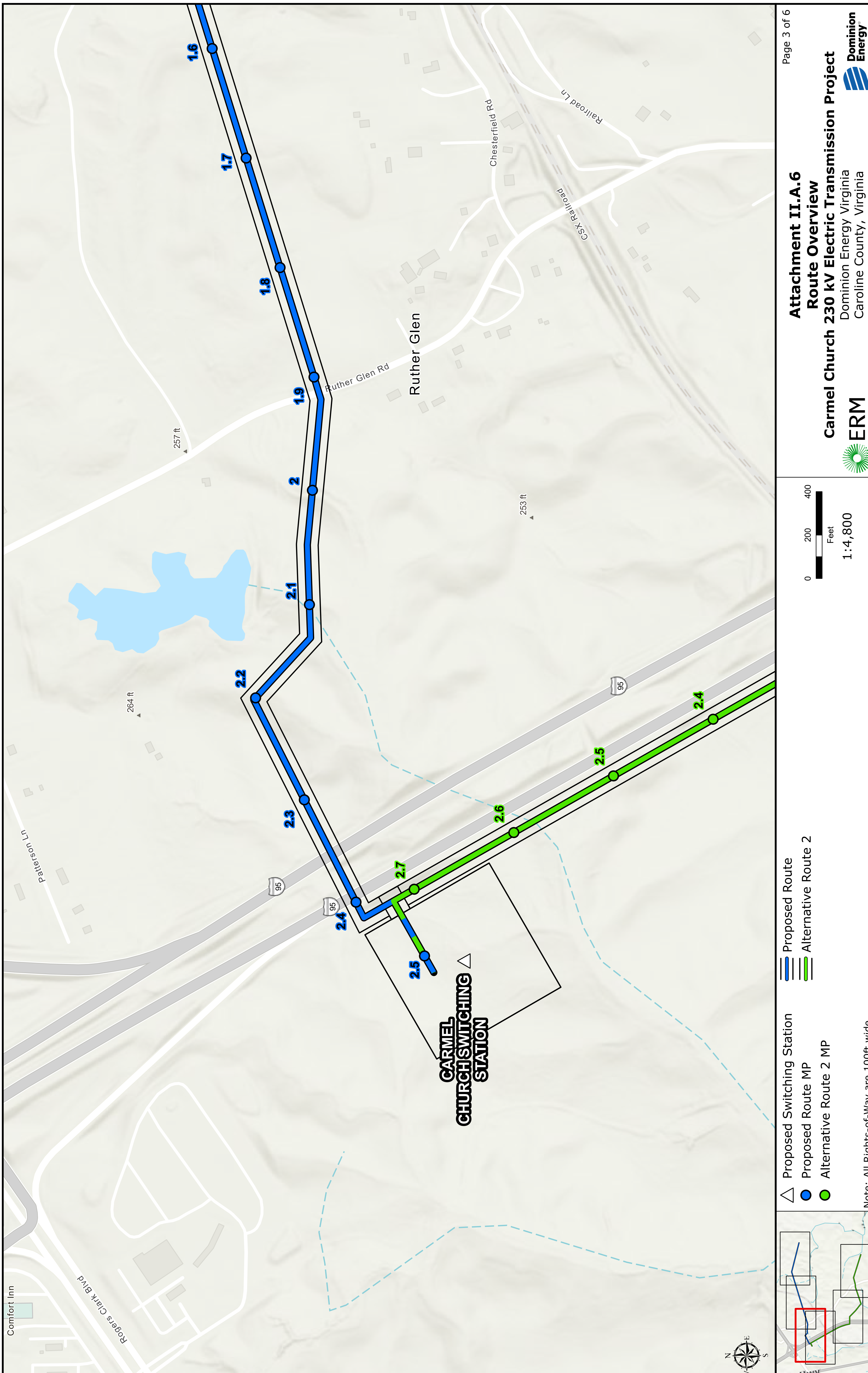
ERM
Dominion Energy

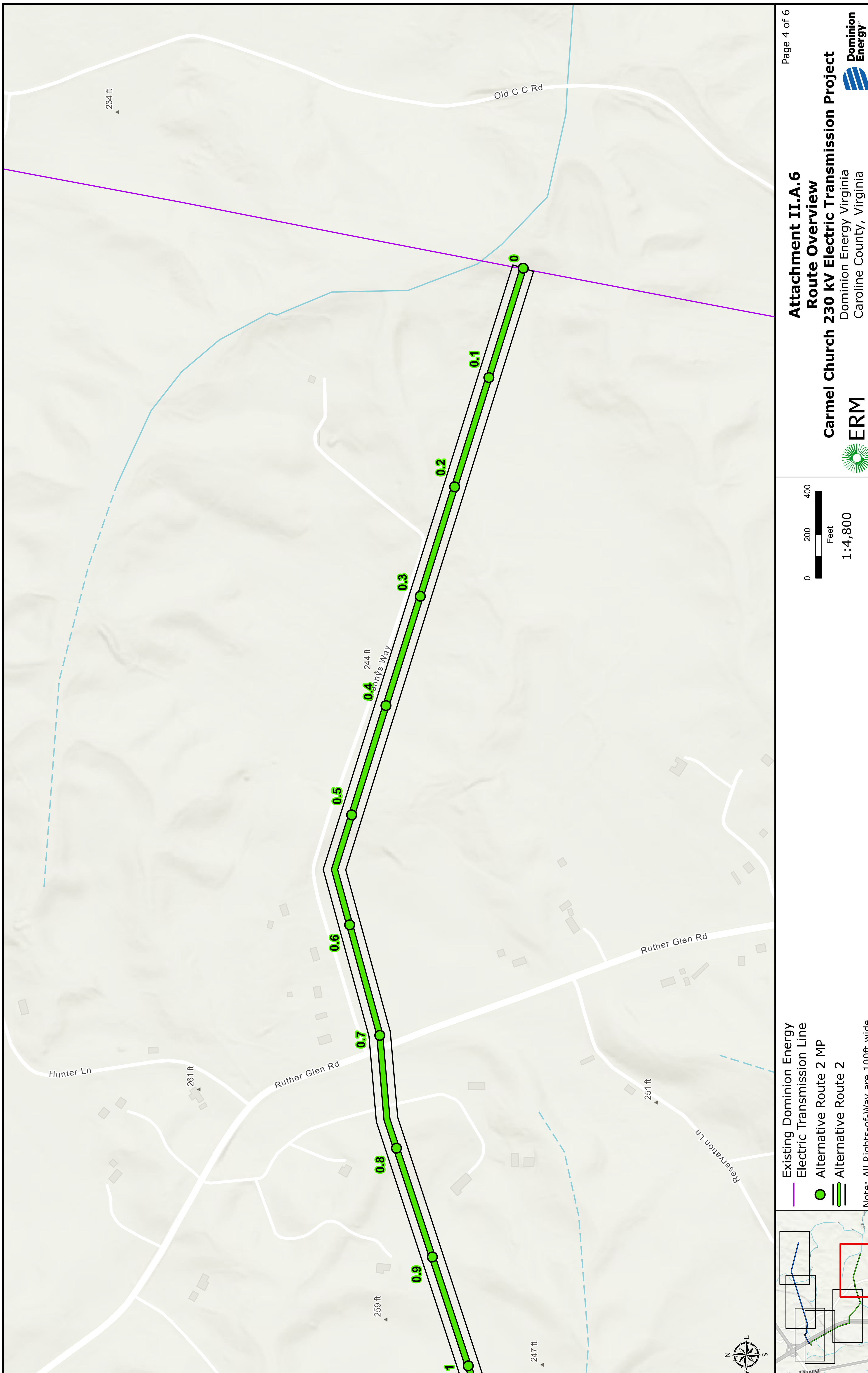

Attachment II.A.6
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Proposed Route
Alternative Route 2
0 660 1,320
Feet
1:16,000
Project Location
Virginia
CARMEL CHURCH SWITCHING STATION
Ruther Glen
Patersons Corner
Old C C Rd
Reedy Creek
Hunter Ln
CSX Railroad
Railroad Ln
Ruther Glen Rd
Grannys Way
Reservation Ln
Holly Ridge Ln
Pennsylvania Ave
Opal Ln
Zion Rd
Partnership Blvd
Welcome Way Dr
Brownstone Rd
1
2
3
4
5
6

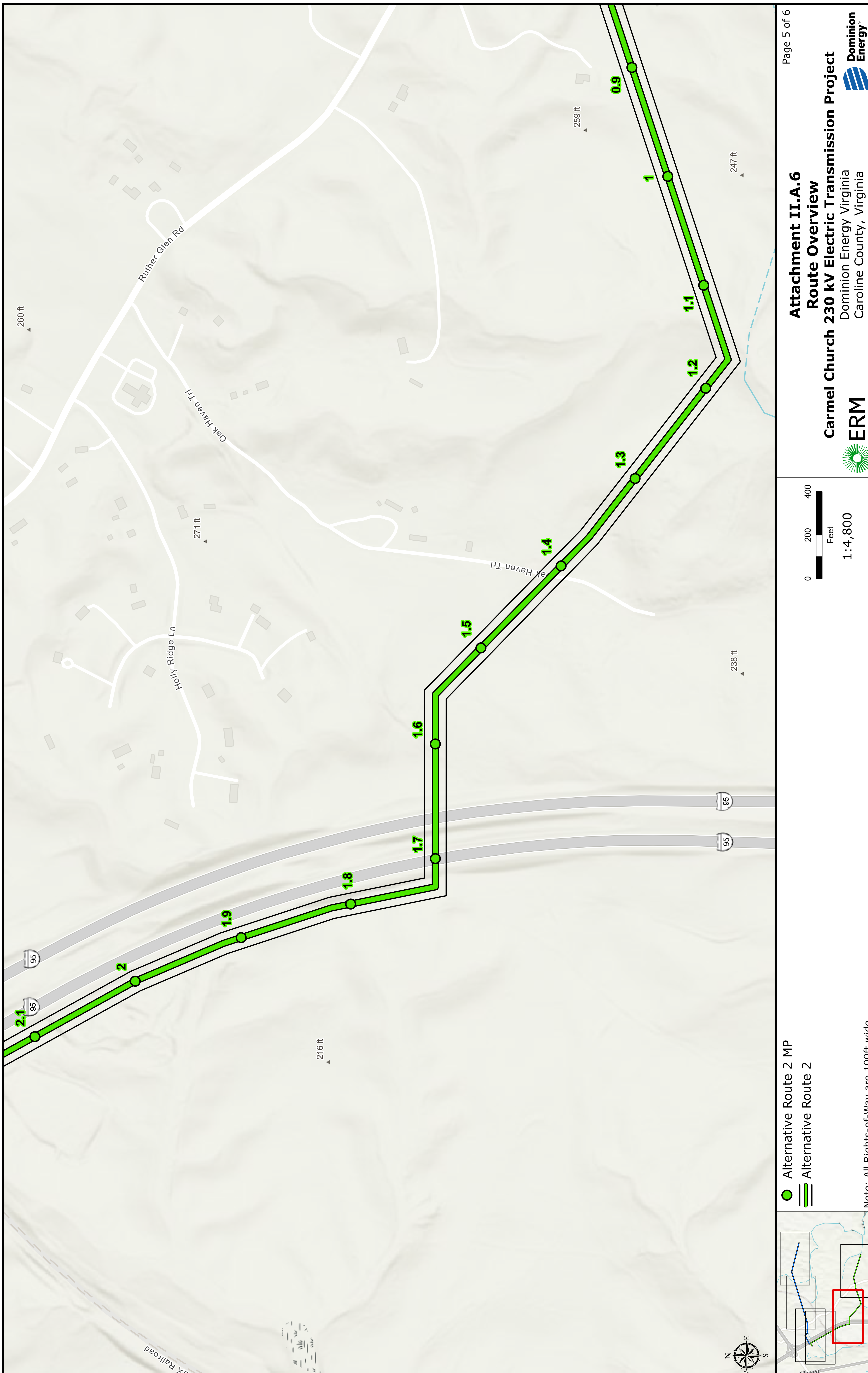

Attachment II.A.6
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 1 of 6
ERM
Dominion Energy
0 200 400
Feet
1:4,800
Existing Dominion Energy Electric Transmission Line
Proposed Route MP
Proposed Route
Note: All Rights-of-Way are 100ft wide.
Old C C Rd
Old C C Rd
Taylor Dr
Taylor Dr
241 ft
251 ft
245 ft
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
avis Hwy



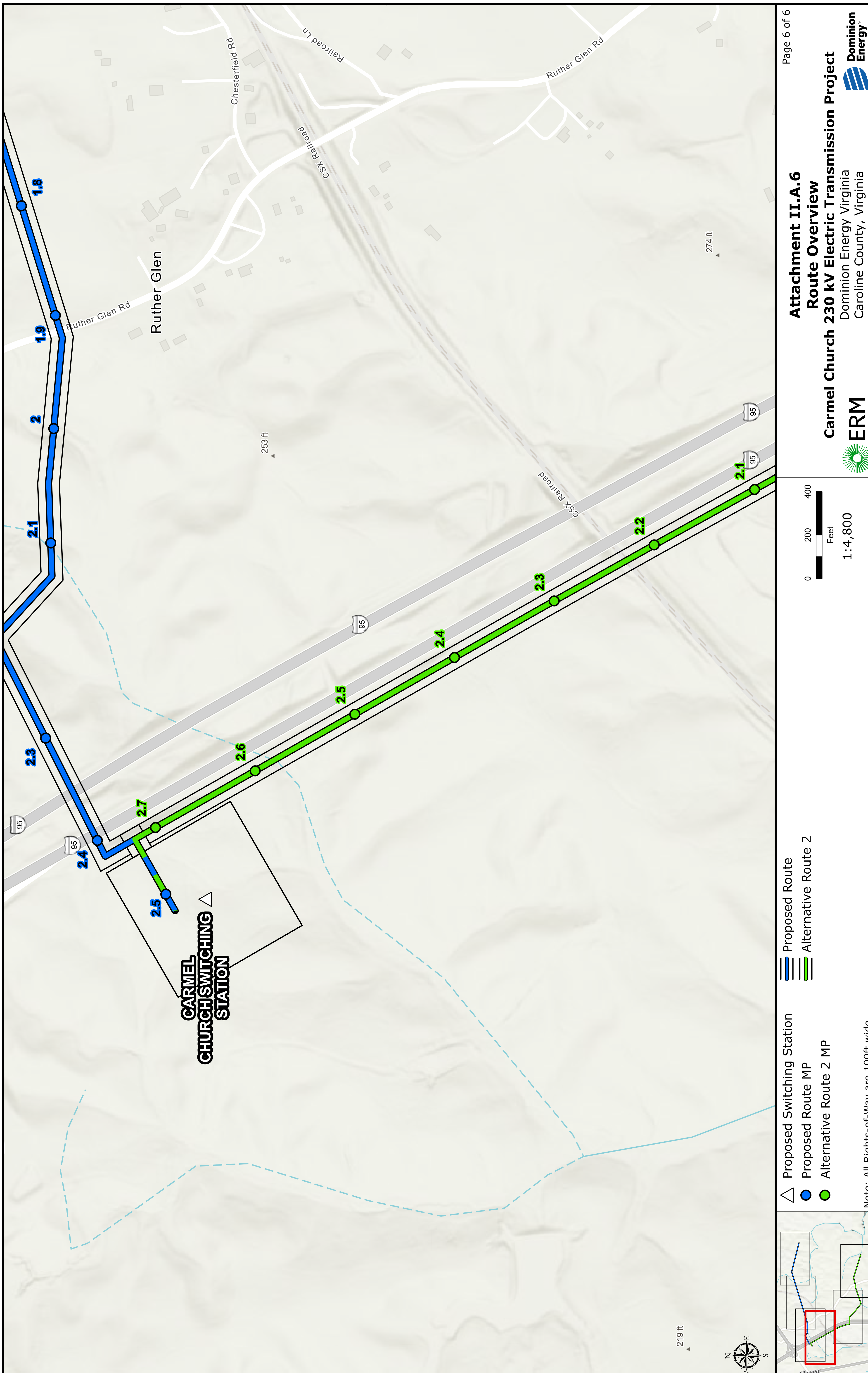
Attachment II.A.6
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 2 of 6
ERM
Dominion Energy
Proposed Route MP
Proposed Route
Note: All Rights-of-Way are 100ft wide.
0
200
400
Feet
1:4,800
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
Frye Ln
CSX Railroad
Railroad Ln
Chesterfield Rd
Ruther Glen Rd
Ruther Glen
244 ft
257 ft
253 ft


Attachment II.A.6
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 3 of 6
ERM
Dominion Energy
Proposed Switching Station
Proposed Route MP
Alternative Route 2 MP
Proposed Route
Alternative Route 2
Note: All Rights-of-Way are 100ft wide.
0
200
400
Feet
1:4,800
CARMEL CHURCH SWITCHING STATION
Ruther Glen
Ruther Glen Rd
Chesterfield Rd
Railroad Ln
CSX Railroad
Patterson Ln
Rogers Clark Blvd
Comfort Inn
257 ft
253 ft
264 ft
95
1.6
1.7
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7


Attachment II.A.6
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 4 of 6
ERM
Dominion Energy
0 200 400
Feet
1:4,800
Existing Dominion Energy Electric Transmission Line
Alternative Route 2 MP
Alternative Route 2
Note: All Rights-of-Way are 100ft wide.
Old C C Rd
Ruther Glen Rd
Hunter Ln
Reservation Ln
244 ft
234 ft
261 ft
251 ft
259 ft
247 ft
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1



Attachment II.A.6
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 5 of 6
Alternative Route 2 MP
Alternative Route 2
Note: All Rights-of-Way are 100ft wide.
0 200 400
Feet
1:4,800
ERM
Dominion Energy
Rutherglen Rd
Oak Haven Trl
Holly Ridge Ln
CSX Railroad
95
260 ft
271 ft
259 ft
247 ft
238 ft
216 ft
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.1


Attachment II.A.6
Route Overview
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 6 of 6
ERM
Dominion Energy
Proposed Switching Station
Proposed Route MP
Alternative Route 2 MP
Proposed Route
Alternative Route 2
Note: All Rights-of-Way are 100ft wide.
0
200
400
Feet
1:4,800
CARMEL CHURCH SWITCHING STATION
Ruther Glen
Ruther Glen Rd
Chesterfield Rd
Railroad Ln
CSX Railroad
95
253 ft
274 ft
219 ft
1.8
1.9
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

7. Detail the proposed ROW clearing methods to be used and the ROW restoration and maintenance practices planned for the proposed project.

Response: The right-of-way width for the Ruther Glen Proposed Route will be 160 feet wide. Based on anticipated conditions, tree clearing would be required along the majority of the Proposed Route. The right-of-way width for the Carmel Church Proposed Route will be 100 feet wide. Based on anticipated conditions, tree clearing would be required along the majority of the Proposed Routes.

Trimming of tree limbs along the edge of the right-of-way also may be conducted to support construction activities for the Projects. For any such minimal clearing within the right-of-way where development has already occurred, trees will be cut to no more than three inches above ground level. Trees located outside of the right-of-way that are tall enough to potentially impact the transmission facilities, commonly referred to as "danger trees," may also need to be cut. Danger trees will be cut to be no more than three inches above ground level, limbed, and will remain where felled. Debris that is adjacent to homes will be disposed of by chipping or removal. In other areas, debris may be mulched or chipped as practicable. Danger tree removal will be accomplished by hand in wetland areas and within 100 feet of streams, if applicable. Care will be taken not to leave debris in streams or wetland areas. Matting will be used for heavy equipment in these areas. Erosion control devices will be used where applicable on an ongoing basis during all clearing and construction activities accompanied by weekly Virginia Stormwater Management Program inspections.

Erosion control will be maintained and temporary stabilization for all soil disturbing activities will be used until the right-of-way has been restored. Upon completion of the Projects, the Company will restore the right-of-way utilizing site rehabilitation procedures outlined in the Company's *Standards & Specifications for Erosion & Sediment Control and Stormwater Management for Construction and Maintenance of Linear Electric Transmission Facilities* that was approved by the Virginia Department of Environmental Quality ("DEQ"). Time of year and weather conditions may affect when permanent stabilization takes place.

This right-of-way will continue to be maintained on a regular cycle to prevent interruptions to electric service and provide ready access to the right-of-way in order to patrol and make emergency repairs. Periodic maintenance to control woody growth will consist of hand cutting, machine mowing and/or herbicide application.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

8. Indicate the permitted uses of the proposed ROW by the easement landowner and the Applicant.

Response: Any non-transmission use will be permitted that:

- Is in accordance with the terms of the easement agreement for the right-of-way;
- Is consistent with the safe maintenance and operation of the transmission lines;
- Will not restrict future line design flexibility; and
- Will not permanently interfere with future construction.

Subject to the terms of the easement, examples of typical permitted uses include but are not limited to:

- Agriculture
- Hiking Trails
- Fences
- Perpendicular Road Crossings
- Perpendicular Utility Crossings
- Residential Driveways
- Wildlife / Pollinator Habitat

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

9. Describe the Applicant's route selection procedures. Detail the feasible alternative routes considered. For each such route, provide the estimated cost and identify and describe the cost classification (e.g. "conceptual cost," "detailed cost," etc.). Describe the Applicant's efforts in considering these feasible alternatives. Detail why the proposed route was selected and other feasible alternatives were rejected. In the event that the proposed route crosses, or one of the feasible routes was rejected in part due to the need to cross, land managed by federal, state, or local agencies or conservation easements or open space easements qualifying under §§ 10.1-1009 – 1016 or §§ 10.1-1700 – 1705 of the Code (or a comparable prior or subsequent provision of the Code), describe the Applicant's efforts to secure the necessary ROW.

Response: The Company's route selection for a new transmission line typically begins with identification of the project "origin" and "termination" points provided by the Company's Transmission Planning Department. This is followed by the development of a study area for the project. The study area represents a circumscribed geographic area from which potential routes suitable for a transmission line can be identified.

For the Projects, the Company retained the services of Environmental Resources Management ("ERM") to help collect information within the study areas, identify potential routes, perform a routing analysis, and document the routing efforts in a Routing Study. After reviewing the new build options, the Company identified one electrical option for each Project; both of which are located entirely within Caroline County, Virginia.

Ruther Glen

The Ruther Glen study area encompasses an area containing the Project origin (Line #256) and termination points (Ruther Glen Switching Station), and is bounded by the following features:

- The intersection of Cedon Road at Route 1 to the north;
- The Legacy Park sports complex and the Caroline County Agricultural Fairgrounds to the south;
- The Company's existing Line #256 transmission corridor to the east; and
- The Company's existing Line #574 transmission corridor to the west.

The Company considered the facilities required to construct and operate the new infrastructure, the length of new right-of-way that would be required for the Project, the amount of existing development in the area, the potential for environmental impacts and impacts on communities, and cost.

ERM identified and assessed a single route option for the proposed Ruther Glen Switching Station, that minimizes impacts to rural residential, road crossings, and environmental features.

As discussed in more detail below and in the Routing Study, nine potential overhead route variations were identified. These routes were rejected due to environmental justice constraints, environmental constraints, residential development, and overall route length.

Ruther Glen Proposed Route

The Company proposes to construct the Ruther Glen Proposed Route (Route 5) by cutting the Company's existing 230 kV Line #256 near the St. Johns Substation at #256/180A which is approximately 0.75 mile due north of Golansville Road. From the cut-in location, the Proposed Route extends west for approximately 1.10 miles across agricultural fields, forested land, a Columbia Gas Natural Gas easement and Balty Road. The Proposed Route turns north to cross Boxley Road/Pond Road and extends north for approximately 0.80 mile through forested parcels and along the eastern edge of an agricultural parcel. The route then turns west to run parallel to and south of the existing REC 115 kV easement for approximately 0.8 mile through agricultural and forested land. Proposed Route 5 then crosses and runs parallel to the north side of the REC easement for approximately 0.4 mile through forested land before entering the Ruther Glen Switching Station.

The Proposed Route is approximately 4.0 miles in length and would require 160-foot right-of-way width, affecting 77.1 acres of rights-of-way.

All 19 parcels crossed by the Proposed Route are privately owned. Land use along the Proposed Route right-of-way currently consists of 43.9 acres of forested land, 14.4 acres of open space, 14.4 acres of developed land, and 0.0 acres of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of the Proposed Route, will encompass approximately 6.3% (4.9 acres) of land with a medium/high or higher probability of containing wetlands and waterbodies. Of this, approximately 0.2 acre are riverine wetlands. The Proposed Route has six waterbody crossings, including one perennial waterbody (Reedy Swamp) and five unnamed intermittent streams. The Proposed Route will impact about 43.9 acres of forested land. The proposed Ruther Glen Switching Station will impact 7.5 acres of forested land.

The total estimated conceptual cost of the Ruther Glen Project as proposed is approximately $44.7 million, which includes approximately $31.4 million for transmission-related work and approximately $13.3 million for substation-related work (2024 dollars).

Ruther Glen Alternative Route 4

Alternative Route 4 cuts the Company's existing Line #256 approximately 0.8 mile due north of Golansville Road and extends west for approximately 1.1 miles across agricultural fields, forested land, a Columbia Gas Natural Gas easement and Balty Road. Following property lines west of Balty Road, Alternative Route 4 passes through forested parcels and crosses Dejarnette Mill Run twice before turning southwest to cross Boxley Road approximately 0.6 mile north of Golansville Road. West of Boxley Road, Alternative Route 4 turns northwest for approximately 1.1 miles through forested land east of Reedy Swamp and west of rural residential properties before turning west to enter the proposed Ruther Glen Switching Station.

Alternative Route 4 is approximately 3.7 miles in length and would require 160 feet in right-of-way, affecting 70.7 acres of rights-of-way.

All 14 parcels crossed by Alternative Route 4 are privately owned. Land use along this Alternative Route right-of-way currently consists of 45.7 acres of forested land, 14.9 acres of open space, 0.4 acre of developed land, and 0.0 acres of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Alternative Route 4, will encompass approximately 6.2% (4.4 acres) of land with a medium/high or higher probability of containing wetlands and waterbodies. Of this, approximately 0.2 acre are riverine wetlands. Alternative Route 4 has seven waterbody crossings, including two perennial waterbodies (DeJarnette Mill Run and Reedy Swamp), and five unnamed intermittent streams. This Alternative Route 4 will impact about 45.7 acres of forested land. The proposed Ruther Glen Switching Station will impact 7.5 acres of forested land.

The estimated conceptual cost of the transmission-related work for Ruther Glen Alternative Route 4 is $29.4 million (2024 dollars).

Ruther Glen Alternative Route 6

Alternative Route 6 cuts the Company's existing Line #256 in the same location as Alternative Route 4 and follows the same path as Route 4 for the first approximately 1.5 miles. At this point, Alternative Route 6 turns south for approximately 0.3 mile and then west for approximately 0.6 mile before crossing Boxley Road. This segment of Route 6 runs through forested land and crosses Dejarnette Mill Run three times, including two crossings north of Boulware Pond. After crossing Boxley Road, Alternative Route 6 turns northwest for approximately 1.2 miles through forested areas east of Reedy Swamp and west of rural residential properties along Boxley Road. Alternative Route 6 then crosses the existing REC 115 kV right-of-way and turns west to enter the proposed Ruther Glen Switching Station.

Alternative Route 6 is approximately 3.9 miles in length and would require 160-foot right-of-way width, affecting 74.1 acres.

All 15 parcels crossed by Alternative Route 6 are privately owned. Land use along the Proposed Route right-of-way currently consists of 46.8 acres of forested land, 14.6 acres of open space, 0.2 acre of developed land, and 0.4 acre of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Alternative Route 6 will traverse approximately 6.9% (5.1 acres) of land with a medium/high or higher probability of containing wetlands and waterbodies. Of this approximately 0.5 acre are of riverine wetlands. Alternative Route 6 has nine waterbody crossings, including two perennial lakes/ponds, and seven unnamed intermittent streams. Alternative Route 6 will impact approximately 46.8 acres of forested land. The proposed Ruther Glen Switching Station will impact 7.5 acres of forested land.

The estimated conceptual cost of the transmission-related work for Ruther Glen Alternative Route 6 is $28.9 million (2024 dollars).

Carmel Church

The Carmel Church study area encompasses an area containing the Project origin (Line #256) and termination points (Carmel Church Switching Station), and is bounded by the following features:

- The Lake Caroline community and the intersection of the Company's existing Line #256 at Rogers Clark Boulevard to the north;
- Verdon Road at Route 1 and the industrial development along Route 1 to the south;
- The Company's existing Line #256 transmission corridor to the east; and
- The Company's existing Line #574 transmission corridor to the west.

The Company considered the facilities required to construct and operate the new infrastructure, the length of new right-of-way that would be required for the Project, the amount of existing development in the area, the potential for environmental impacts and impacts on communities, and cost.

ERM identified and assessed a single route option for the proposed Carmel Church Switching Station that maximizes crossing of lands designated for industrial and data center uses and limited impacts to rural residential.

As discussed in more detail below and in the Routing Study, five potential overhead route variations were identified. These routes were rejected due to cultural constraints, environmental constraints, residential development, and overall route length.

<u>Carmel Church Proposed Route</u>

The Company proposes to construct the Carmel Church Proposed Route (Route 1) by cutting the Company's existing 230 kV Ladysmith CT – Four Rivers Line #256 at Structure #256/227, which is approximately 100 feet south of the Line #256 crossing of Old CC Road. From there, the Proposed Route extends west-northwest across primarily forested land for approximately 0.7 mile, then turns west-southwest, continuing through primarily forested land. The easternmost 1.0 mile of the Proposed Route is within Caroline County's Planned Innovation, Research, and Technology ("PIRT") District. Approximately 1.2 miles west of the tap point, the Proposed Route crosses portions of Reedy Creek, a Columbia Natural Gas easement, and the CSX Railroad line. Following those crossings, the route continues west-southwest for approximately 1.1 miles, passing behind existing industrial development and crossing Ruther Glen Road. The remaining 0.5 mile of the route extends west across forested property held by AVAOI Digital, across Interstate 95 ("I-95"), and into the proposed Carmel Church Switching Station.

The Proposed Route is approximately 2.5 miles in length, affecting 29.8 acres of rights-of-way.

All 14 parcels crossed by the Proposed Route are privately owned. Land use along the Proposed Route right-of-way currently consists of 25.6 acres of forested land, 2.1 acres of open space, 0.7 acre of developed land, and 0.4 acre of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of the Proposed Route, will encompass approximately 9.3% (2.8 acres) of land with a medium/high or higher probability of containing wetlands and waterbodies. Of this approximately 0.1 acre consists of riverine wetlands. The Proposed Route has six waterbody crossings, including a perennial lake/pond associated with Reedy Creek and five unnamed, intermittent streams. Lastly, the Proposed Route will impact about 25.6 acres of forested land. The entirety of the Carmel Church Switching Station's 10.0 forested acres will be located in a planned development and will be cleared by a third party prior to the construction of the Project.

The total estimated conceptual cost of the Carmel Church Project as proposed is approximately $35.9 million, which includes approximately $22.9 million for transmission-related work and approximately $13.0 million for substation-related work (2024 dollars).

Carmel Church Alternative Route 2

The proposed Carmel Church Alternative Route (Route 2) cuts the Company's existing 230 kV St. John's - Four Rivers Line #256 at Structure #256/237, which is approximately 0.5 mile north of the Line #256 crossing of Ruther Glen Road. From there, Route 2 travels west-northwest through forested land for approximately 0.5 mile in parallel on the south side of Granny's Way, then approximately 0.2 mile west-southwest along the edge of an agricultural field (also to the south of Granny's Way) before crossing Ruther Glen Road. Route 2 continues west for approximately 0.5 mile through forested land between residential parcels before turning northwest for approximately 0.4 mile through forested private property. Route 2 crosses I-95 and then continues north paralleling the western edge of I-95 for approximately 1.0 mile. Route 2 crosses a Columbia Natural Gas easement and the CSX Railroad line approximately 0.5 mile before connecting into the Carmel Church Switching Station.

Alternative Route 2 is approximately 2.8 miles in length, affecting 33.1 acres of rights-of-way.

All 12 parcels crossed by the Alternative Route 2 are privately owned. Land use along the Alternative Route 2 right-of-way currently consists of 28.7 acres of forested land, 1.6 acres of open space, 0.7 acres of developed land, and 0.0 acres of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Alternative Route 2 will encompass approximately 5.0% (1.7 acres) of land with a medium/high or higher probability of containing wetlands and waterbodies. Of this, approximately 0.1 acre consists of riverine wetlands. Alternative Route 2 has four waterbody crossings, all of which are unnamed intermittent streams. Lastly, the Alternative Route 2, inclusive of the proposed Carmel Church Switching Station, will impact about 28.7 acres of forested land. The entirety of the Carmel Church Switching Station's 10.0 forested acres will be located in a planned development and will be cleared for a third party prior to the construction of the Project.

The estimated conceptual cost of the transmission-related work for Carmel Church Alternative Route 2 is $26.4 million (2024 dollars).

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

10. Describe the Applicant's construction plans for the project, including how the Applicant will minimize service disruption to the affected load area. Include requested and approved line outage schedules for affected lines as appropriate.

Response: **<u>Ruther Glen Project</u>**

The Company plans to construct the new 230 kV transmission line in a manner that minimizes outage time on existing substation and transmission lines. The #256 line cut-in will require a PJM outage eDart ticket on Line #256. The cut-in should only require a 30-day outage. Assuming a final order from the Commission by August 1, 2025, as requested in Section I.H of this Appendix, the Company estimates that construction of the Project will commence in Spring of 2026. The cut-in of the lines to serve the Company's proposed Tributary Station should start early in 2027, and be completed by April 1, 2027.

The Company will submit outages for this Project to Dominion Energy Virginia's System Operating System and request outages from PJM prior to the date of such outages. It is customary for PJM not to grant approval of outages until shortly before the outages are expected to occur (up until one week prior) and, therefore, it may be subject to change.

<u>Carmel Church Project</u>

The Company plans to construct the new 230 kV transmission line in a manner that minimizes outage time on existing substation and transmission lines. The #256 line cut-in will require a PJM outage eDart ticket on Line #256. The cut-in should only require a 30-day outage. Assuming a final order from the Commission by August 1, 2025, as requested in Section I.H of this Appendix, the Company estimates that construction of the Project will commence in Spring of 2026. The cut-in of the lines to serve the Company's proposed Tributary Station should start early in 2027 and be completed by April 1, 2027.

The Company will submit outages for this Project to Dominion Energy Virginia's System Operating System and request outages from PJM prior to the date of such outages. It is customary for PJM not to grant approval of outages until shortly before the outages are expected to occur (up until one week prior) and, therefore, it may be subject to change.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

11. Indicate how the construction of this transmission line follows the provisions discussed in Attachment 1 of these Guidelines.

Response: Attachment 1 to these Guidelines provides a tool routinely used by the Company in routing its transmission line projects.

<u>**Ruther Glen**</u>

The Proposed Route will avoid or minimize impacts to the maximum extent practicable on national historic places listed in the National Register of Historic Places ("NRHP"). Thus, it is consistent with Guideline #2 (where practical, rights of-way should avoid sites listed on the NRHP). A Stage I Pre-Application Analysis prepared by ERM on behalf of the Company is included with the Environmental Routing Study as Appendix F, which was submitted to the Virginia Department of Historic Resources ("VDHR") on December 11, 2024.

The Company utilized Guideline #1 (existing rights-of-way should be given priority when adding additional facilities) by siting portions the route for the proposed Project along existing road corridors. Collocation numbers for the Proposed and Alternative Routes are presented in Section III.D.

<u>**Carmel Church**</u>

The Proposed Route will avoid or minimize impacts to the maximum extent practicable on national historic places listed in the National Register of Historic Places ("NRHP"). Thus, it is consistent with Guideline #2 (where practical, rights of-way should avoid sites listed on the NRHP). A Stage I Pre-Application Analysis prepared by ERM on behalf of the Company is included with the Environmental Routing Study as Appendix F, which was submitted to the Virginia Department of Historic Resources ("VDHR") on December 11, 2024

The Company utilized Guideline #3 (rights-of-ways should avoid prime or scenic timbered areas, steep slopes and proximity to main highways where practical) by siting the Proposed Route away from main highways. Some crossing of highways was unavoidable; however, most crossings are at nearly perpendicular angles to reduce visual impacts.

The Company has communicated with local, state, and federal agencies and relevant private organizations prior to filing this Application, consistent with Guideline #4 (where government land is involved the applicant should contact the agencies early in the planning process). In particular, the Company has consulted with Caroline County. See Section III.B of this Appendix.

The Company follows recommended construction methods in the Guidelines on a site-specific basis for typical construction projects (Guidelines #8, #10, #11, #15, #16, #18, and #22).

The Company also utilizes recommended guidelines in clearing right-of-way, constructing facilities, and maintaining rights-of-way after construction. Moreover, secondary uses of right-of-way that are consistent with the safe maintenance and operation of facilities are permitted.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way ("ROW")

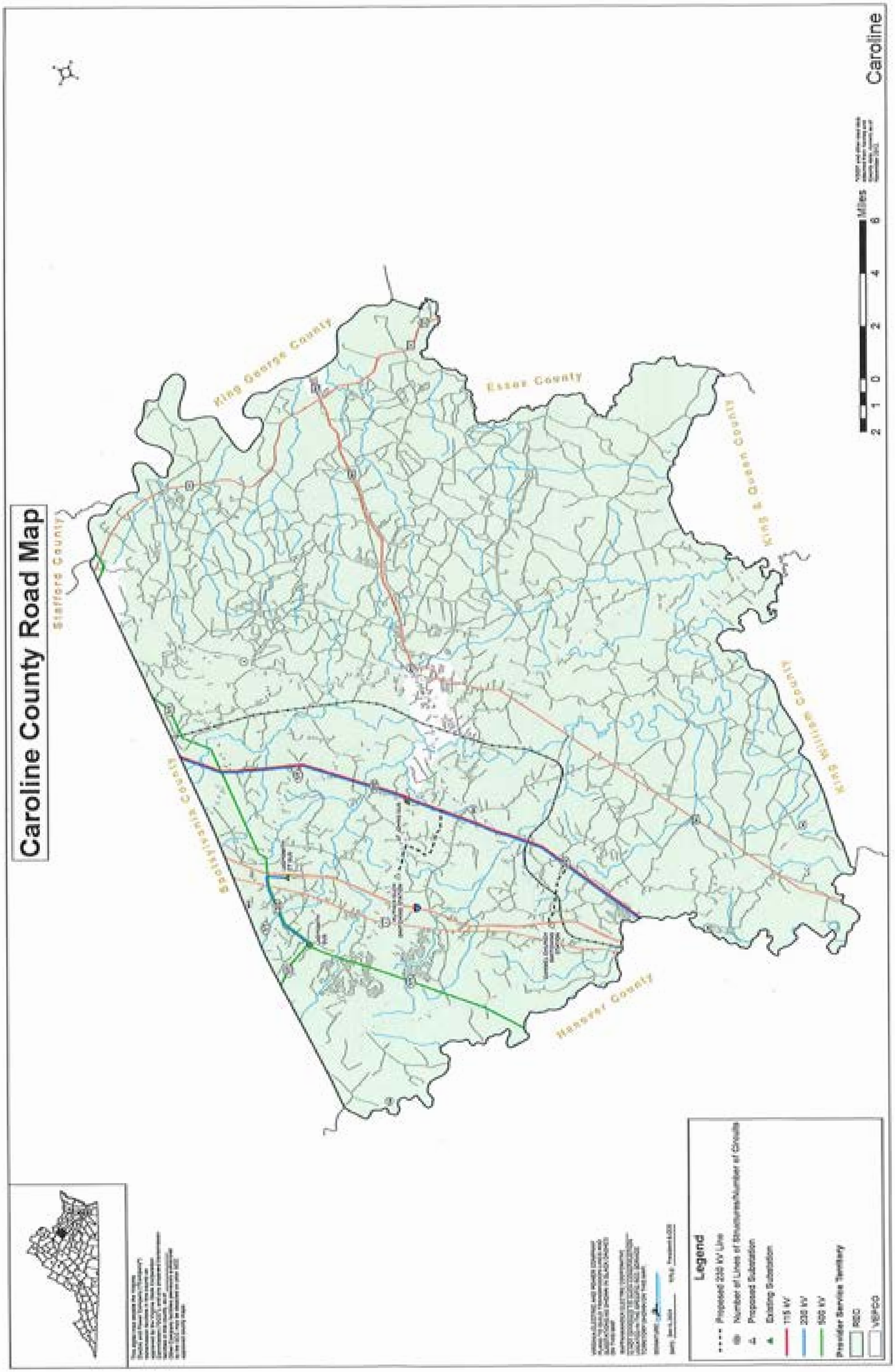
12. a. Detail counties and localities through which the line will pass. If any portion of the line will be located outside of the Applicant's certificated service area: (1) identify each electric utility affected; (2) state whether any affected electric utility objects to such construction; and (3) identify the length of line(s) proposed to be located in the service area of an electric utility other than the Applicant; and

b. Provide three (3) color copies of the Virginia Department of Transportation "General Highway Map" for each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the Applicant. Also, where the line will be located outside of the Applicant's certificated service area, show the boundaries between the Applicant and each affected electric utility. On each map where the proposed line would be outside of the Applicant's certificated service area, the map must include a signature of an appropriate representative of the affected electric utility indicating that the affected utility is not opposed to the proposed construction within its service area.

Response:

a. The proposed Projects traverse Caroline County for a total of 6.5 miles (4.0 miles for Ruther Glen and 2.5 miles for Carmel Church). The Projects are located within REC's service territory. The Company has confirmed that REC does not object to the Projects.

b. An electronic copy of the Virginia Department of Transportation ("VDOT") "General Highway Map" for Caroline County has been marked as required and submitted with the Application. A reduced copy of the map is provided as Attachment II.A.12.b.


Caroline County Road Map
Stafford County
King George County
Essex County
King & Queen County
King William County
Hanover County
Spotsylvania County
Caroline
Miles
2 1 0 2 4 6
Legend
Proposed 230 kV Line
Number of Lines of Structures/Number of Circuits
Proposed Substation
Existing Substation
115 kV
230 kV
500 kV
Provider Service Territory
REC
VEPCO

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

1. Detail the number of circuits and their design voltage, initial operational voltage, any anticipated voltage upgrade, and transfer capabilities.

Response: The proposed double circuit 230 kV lines will be designed and operated at 230 kV with no anticipated voltage upgrade and have a transfer capability of 1,573 MVA.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

2. Detail the number, size(s), type(s), coating and typical configurations of conductors. Provide the rationale for the type(s) of conductor(s) to be used.

Response: The proposed double circuit 230 kV lines will include three-phase twin bundled 768.2 ACSS/TW/HS (20/7) conductors arranged as shown in Attachment II.B.3.a-f. The twin-bundled 768.2 ACSS/TW/HS conductors are a Company standard for new 230 kV construction.

For additional information on the structures, see Section II.B.3.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

3. With regard to the proposed supporting structures over each portion of the ROW for the preferred route, provide diagrams (including foundation reveal) and descriptions of all the structure types, to include:

a. mapping that identifies each portion of the preferred route;

b. the rationale for the selection of the structure type;

c. the number of each type of structure and the length of each portion of the ROW;

d. the structure material and rationale for the selection of such material;

e. the foundation material;

f. the average width at cross arms;

g. the average width at the base;

h. the maximum, minimum and average structure heights;

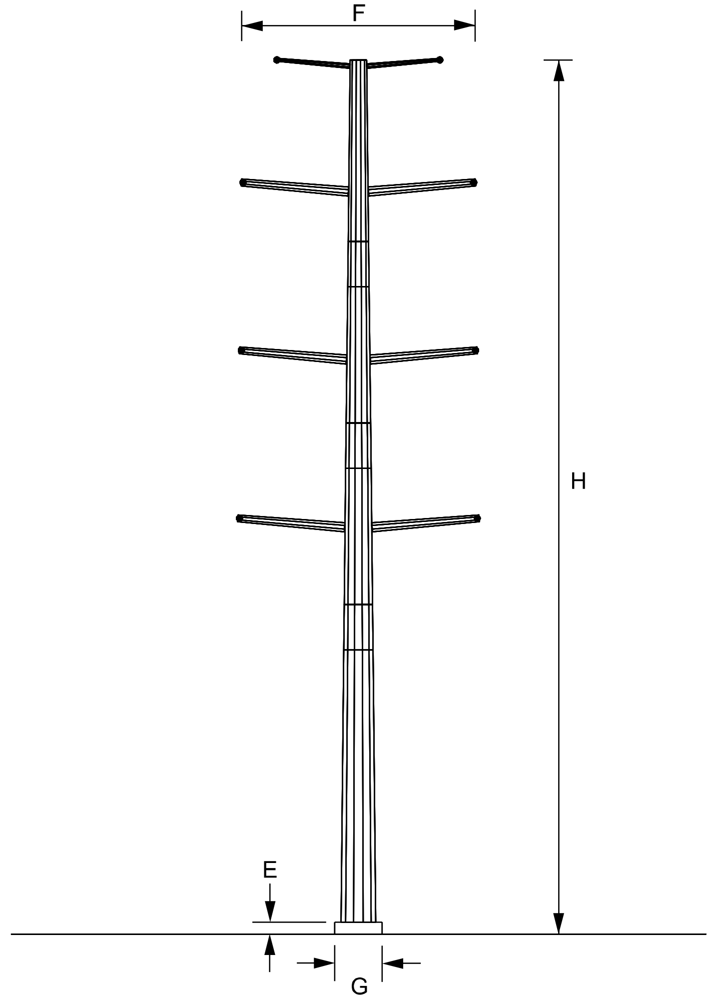
i. the average span length; and

j. the minimum conductor-to-ground clearances under maximum operating conditions.

Response: As discussed in Section II.A.4, there is no existing Company-owned right-of-way that serves the REC customers' proposed data center developments. No overlap between existing easements and the proposed easements for the Projects will occur. See Attachment II.A.6.

See Attachment II.B.3.a-f for subparts (b) through (j) for both Projects.

For subpart (a), see Attachment II.B.3.g for approximate mapping of the proposed structures along the Proposed Routes of the Carmel Church Line and the Ruther Glen Line, which are subject to change during final engineering.



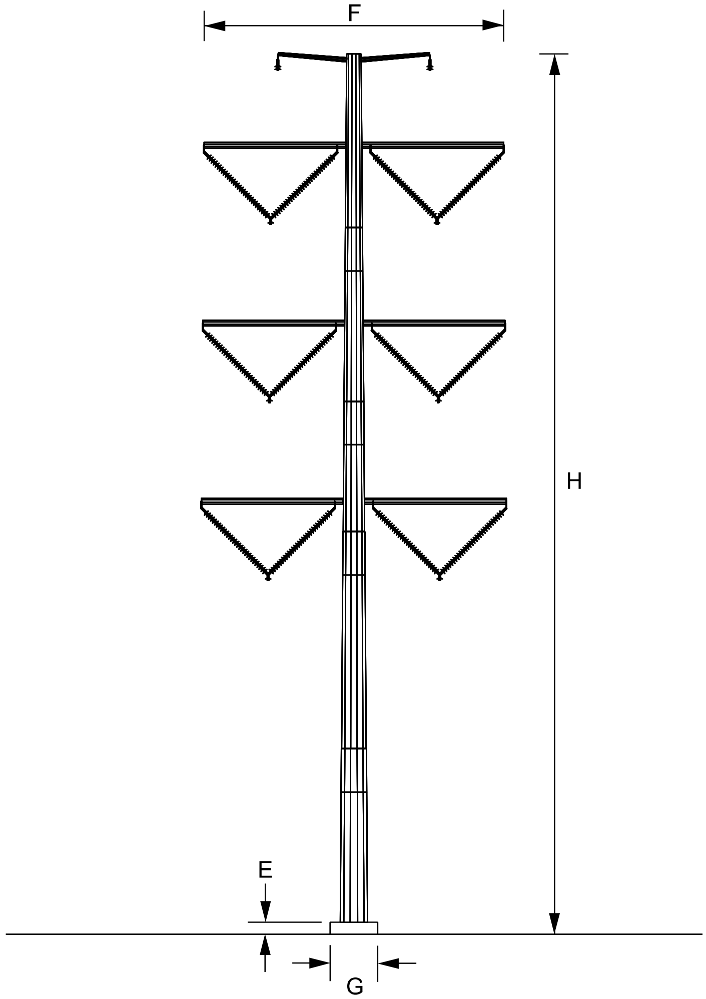
TYPICAL DC ENGINEERED MONOPOLE DOUBLE DEADEND STRUCTURE

A. STRUCTURE MAPPING	N/A
B. RATIONALE FOR STRUCTURE TYPE:	MINIMIZES RIGHT OF WAY ACQUISITION
C. LENGTH OF R/W (STRUCTURE QTY):	4.0 MILES (13 STRUCTURES) - SEE NOTE 1
D. STRUCTURE MATERIAL:	WEATHERING STEEL
RATIONALE FOR STRUCTURE MATERIAL:	MATCH CURRENT STANDARDS AND EXISTING STRUCTURES IN THE AREA
E. FOUNDATION MATERIAL: AVERAGE FOUNDATION REVEAL:	CONCRETE SEE NOTE 2
F. AVERAGE WIDTH AT CROSSARM:	26'
G. AVERAGE WIDTH AT BASE:	SEE NOTE 3
H. MINIMUM STRUCTURE HEIGHT (SEE NOTE 4): MAXIMUM STRUCTURE HEIGHT (SEE NOTE 4): AVERAGE STRUCTURE HEIGHT (SEE NOTE 4):	110' 155' 120'
I. AVERAGE SPAN LENGTH (RANGE):	571' - SEE NOTE 4
J. MINIMUM CONDUCTOR-TO-GROUND:	25.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:

1. ROW LENGTH & STRUCTURE QUANTITY ARE EXCLUSIVE OF COMPANY-OWNED SUBSTATION PROPERTIES
2. MINIMUM FOUNDATION REVEAL SHALL BE 1.5'
3. FOUNDATION DIAMETER SHALL BE BASED ON GEOTECHNICAL FINDINGS DURING FINAL ENGINEERING
4 THE SPAN LENGTHS ASSOCIATED WITH THIS STRUCTURE TYPE ARE THE AHEAD SPANS

THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN	LINES 256, 2410 (ROUTE 5)	ATTACHMENT NO.
Dominion Energy Dominion Energy 5000 Dominion Blvd. Glen Allen, VA 23060	TYPICAL DC ENGINEERED MONOPOLE DOUBLE DEADEND STRUCTURE	II.B.3.a
		DRAWN BY: SDH



TYPICAL DC ENGINEERED MONOPOLE SUSPENSION STRUCTURE (V-STRING)

A. STRUCTURE MAPPING	N/A
B. RATIONALE FOR STRUCTURE TYPE:	MINIMIZES RIGHT OF WAY ACQUISITION; V-STRING INCREASES CLEARANCES AND OPTMIZES EXISTING ROW USAGE
C. LENGTH OF R/W (STRUCTURE QTY):	4.0 MILES (20 STRUCTURES) - SEE NOTE 1
D. STRUCTURE MATERIAL:	WEATHERING STEEL
RATIONALE FOR STRUCTURE MATERIAL:	MATCH CURRENT STANDARDS AND EXISTING STRUCTURES IN THE AREA
E. FOUNDATION MATERIAL: AVERAGE FOUNDATION REVEAL:	CONCRETE SEE NOTE 2
F. AVERAGE WIDTH AT CROSSARM:	34.5'
G. AVERAGE WIDTH AT BASE:	SEE NOTE 3
H. MINIMUM STRUCTURE HEIGHT (SEE NOTE 4): MAXIMUM STRUCTURE HEIGHT (SEE NOTE 4): AVERAGE STRUCTURE HEIGHT (SEE NOTE 4):	105' 135' 115'
I. AVERAGE SPAN LENGTH (RANGE):	571' - SEE NOTE 4
J. MINIMUM CONDUCTOR-TO-GROUND:	25.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:
1. ROW LENGTH & STRUCTURE QUANTITY ARE EXCLUSIVE OF COMPANY-OWNED SUBSTATION PROPERTIES
2. MINIMUM FOUNDATION REVEAL SHALL BE 1.5'
3. FOUNDATION DIAMETER SHALL BE BASED ON GEOTECHNICAL FINDINGS DURING FINAL ENGINEERING
4. THE SPAN LENGTHS ASSOCIATED WITH THIS STRUCTURE TYPE ARE THE AHEAD SPANS

THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN

Dominion Energy
Dominion Energy
5000 Dominion Blvd.
Glen Allen, VA 23060

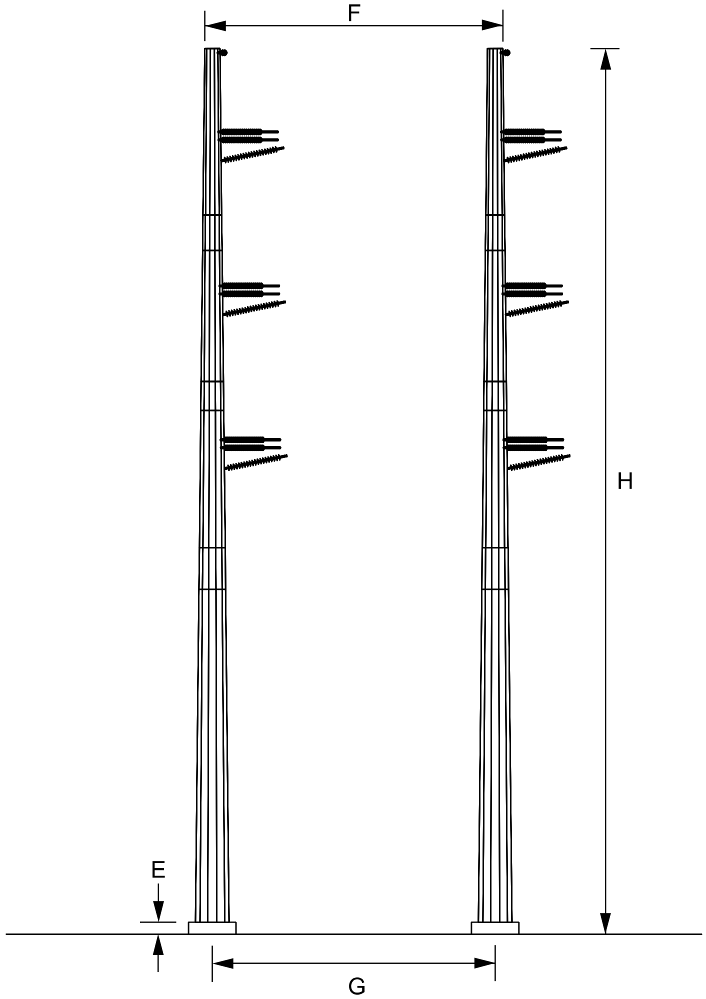
LINES 256, 2410 (ROUTE 5)

TYPICAL DC ENGINEERED MONOPOLE SUSPENSION STRUCTURE (V-STRING)

ATTACHMENT NO.

II.B.3.b

DRAWN BY: SDH



TYPICAL DC ENGINEERED 2-POLE DOUBLE DEADEND STRUCTURE

A. STRUCTURE MAPPING	N/A
B. RATIONALE FOR STRUCTURE TYPE:	MINIMIZES RIGHT OF WAY ACQUISITION; 2-POLES USED FOR HEAVY ANGLES TO OPTIMIZE POLE/FOUNDATION SIZE AND COST
C. LENGTH OF R/W (STRUCTURE QTY):	4.0 MILES (2 STRUCTURES) - SEE NOTE 1
D. STRUCTURE MATERIAL:	WEATHERING STEEL
RATIONALE FOR STRUCTURE MATERIAL:	MATCH CURRENT STANDARDS AND EXISTING STRUCTURES IN THE AREA
E. FOUNDATION MATERIAL: AVERAGE FOUNDATION REVEAL:	CONCRETE SEE NOTE 2
F. AVERAGE WIDTH AT CROSSARM:	36'
G. AVERAGE WIDTH AT BASE:	SEE NOTE 3
H. MINIMUM STRUCTURE HEIGHT (SEE NOTE 4): MAXIMUM STRUCTURE HEIGHT (SEE NOTE 4): AVERAGE STRUCTURE HEIGHT (SEE NOTE 4):	100' 105' 103'
I. AVERAGE SPAN LENGTH (RANGE):	571' - SEE NOTE 4
J. MINIMUM CONDUCTOR-TO-GROUND:	25.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:
1. ROW LENGTH & STRUCTURE QUANTITY ARE EXCLUSIVE OF COMPANY-OWNED SUBSTATION PROPERTIES
2. MINIMUM FOUNDATION REVEAL SHALL BE 1.5'
3. FOUNDATION DIAMETER SHALL BE BASED ON GEOTECHNICAL FINDINGS DURING FINAL ENGINEERING
4. THE SPAN LENGTHS ASSOCIATED WITH THIS STRUCTURE TYPE ARE THE AHEAD SPANS

THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN

Dominion Energy
Dominion Energy
5000 Dominion Blvd.
Glen Allen, VA 23060

LINES 256, 2410 (ROUTE 5)

TYPICAL DC ENGINEERED 2-POLE DOUBLE DEADEND STRUCTURE

ATTACHMENT NO.

II.B.3.c

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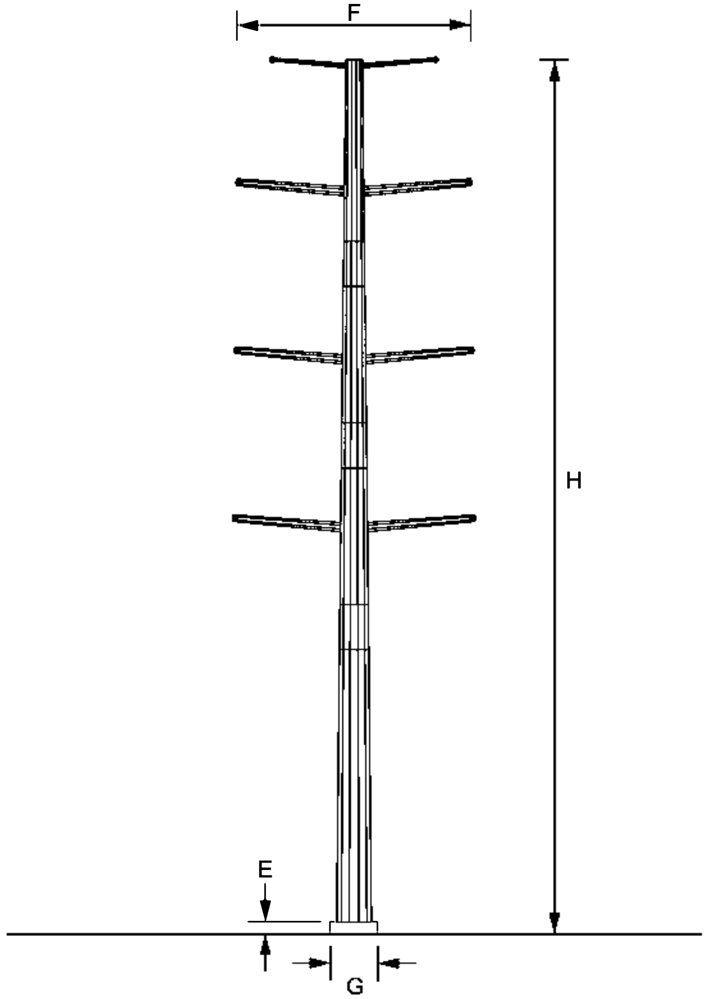


TYPICAL DC ENGINEERED MONOPOLE DOUBLE DEADEND STRUCTURE

A. STRUCTURE MAPPING	N/A
B. RATIONALE FOR STRUCTURE TYPE:	MINIMIZES RIGHT OF WAY ACQUISITION
C. LENGTH OF R/W (STRUCTURE QTY):	2.40 MILES (6 STRUCTURES) - SEE NOTE 1
D. STRUCTURE MATERIAL:	WEATHERING STEEL
RATIONALE FOR STRUCTURE MATERIAL:	MATCH CURRENT STANDARDS AND EXISTING STRUCTURES IN THE AREA
E. FOUNDATION MATERIAL: AVERAGE FOUNDATION REVEAL:	CONCRETE SEE NOTE 2
F. AVERAGE WIDTH AT CROSSARM:	26'
G. AVERAGE WIDTH AT BASE:	SEE NOTE 3
H. MINIMUM STRUCTURE HEIGHT (SEE NOTE 4): MAXIMUM STRUCTURE HEIGHT (SEE NOTE 4): AVERAGE STRUCTURE HEIGHT (SEE NOTE 4):	90' 115' 108'
I. AVERAGE SPAN LENGTH (RANGE):	507' - SEE NOTE 4
J. MINIMUM CONDUCTOR-TO-GROUND:	25.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:
1. ROW LENGTH & STRUCTURE QUANTITY ARE EXCLUSIVE OF COMPANY-OWNED SUBSTATION PROPERTIES
2. MINIMUM FOUNDATION REVEAL SHALL BE 1.5'
3. FOUNDATION DIAMETER SHALL BE BASED ON GEOTECHNICAL FINDINGS DURING FINAL ENGINEERING
4 THE SPAN LENGTHS ASSOCIATED WITH THIS STRUCTURE TYPE ARE THE AHEAD SPANS

THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN

Dominion Energy
Dominion Energy
5000 Dominion Blvd.
Glen Allen, VA 23060

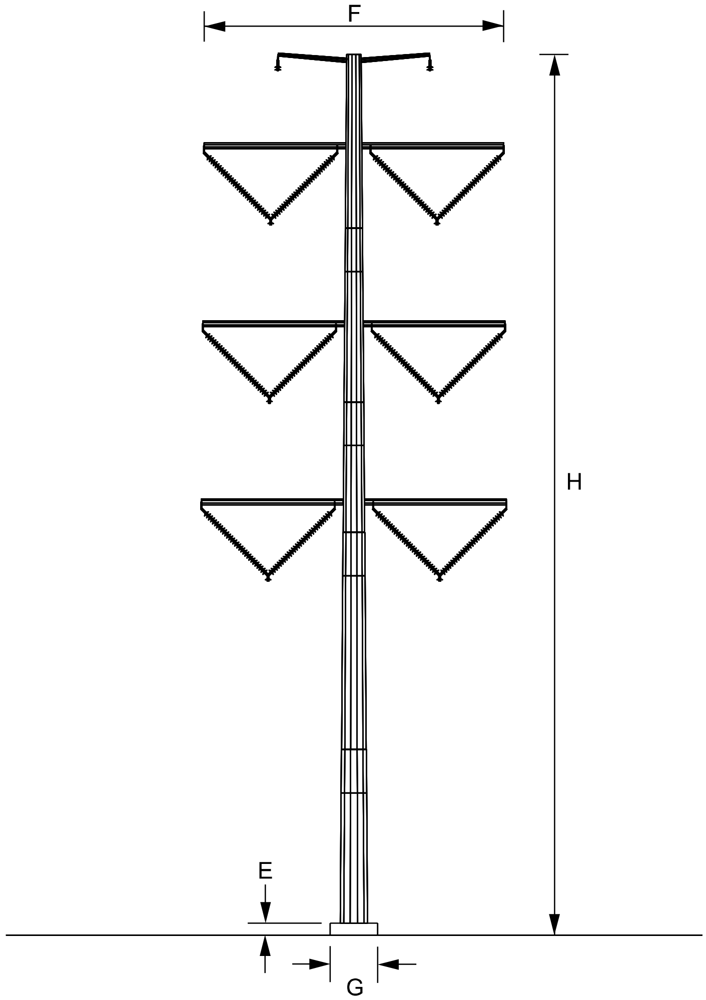
LINES 2410, 2422 (ROUTE 1)

TYPICAL DC ENGINEERED MONOPOLE DOUBLE DEADEND STRUCTURE

ATTACHMENT NO.

II.B.3.d

DRAWN BY: SDH



TYPICAL DC ENGINEERED MONOPOLE SUSPENSION STRUCTURE (V-STRING)

A. STRUCTURE MAPPING	N/A
B. RATIONALE FOR STRUCTURE TYPE:	MINIMIZES RIGHT OF WAY ACQUISITION; V-STRING INCREASES CLEARANCES AND OPTMIZES EXISTING ROW USAGE
C. LENGTH OF R/W (STRUCTURE QTY):	2.40 MILES (14 STRUCTURES) - SEE NOTE 1
D. STRUCTURE MATERIAL:	WEATHERING STEEL
RATIONALE FOR STRUCTURE MATERIAL:	MATCH CURRENT STANDARDS AND EXISTING STRUCTURES IN THE AREA
E. FOUNDATION MATERIAL: AVERAGE FOUNDATION REVEAL:	CONCRETE SEE NOTE 2
F. AVERAGE WIDTH AT CROSSARM:	34.5'
G. AVERAGE WIDTH AT BASE:	SEE NOTE 3
H. MINIMUM STRUCTURE HEIGHT (SEE NOTE 4): MAXIMUM STRUCTURE HEIGHT (SEE NOTE 4): AVERAGE STRUCTURE HEIGHT (SEE NOTE 4):	100' 135' 111'
I. AVERAGE SPAN LENGTH (RANGE):	507' - SEE NOTE 4
J. MINIMUM CONDUCTOR-TO-GROUND:	25.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:
1. ROW LENGTH & STRUCTURE QUANTITY ARE EXCLUSIVE OF COMPANY-OWNED SUBSTATION PROPERTIES
2. MINIMUM FOUNDATION REVEAL SHALL BE 1.5'
3. FOUNDATION DIAMETER SHALL BE BASED ON GEOTECHNICAL FINDINGS DURING FINAL ENGINEERING
4. THE SPAN LENGTHS ASSOCIATED WITH THIS STRUCTURE TYPE ARE THE AHEAD SPANS

THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN

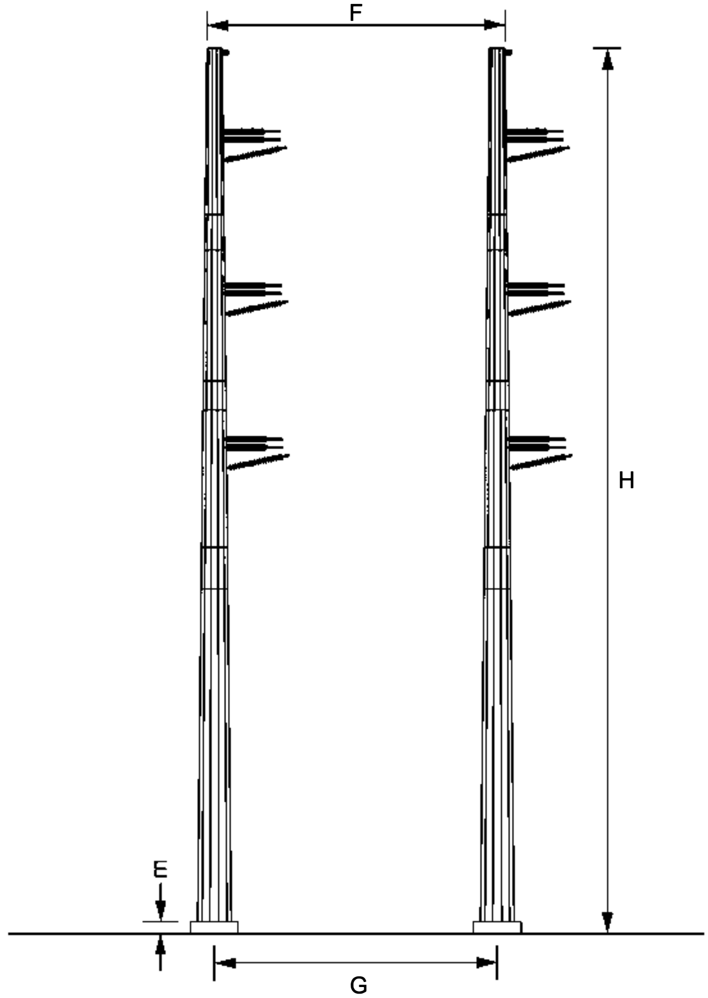
Dominion Energy
Dominion Energy
5000 Dominion Blvd.
Glen Allen, VA 23060

LINES 2410, 2422 (ROUTE 1)

TYPICAL DC ENGINEERED MONOPOLE SUSPENSION STRUCTURE (V-STRING)

ATTACHMENT NO.
II.B.3.e

DRAWN BY: SDH



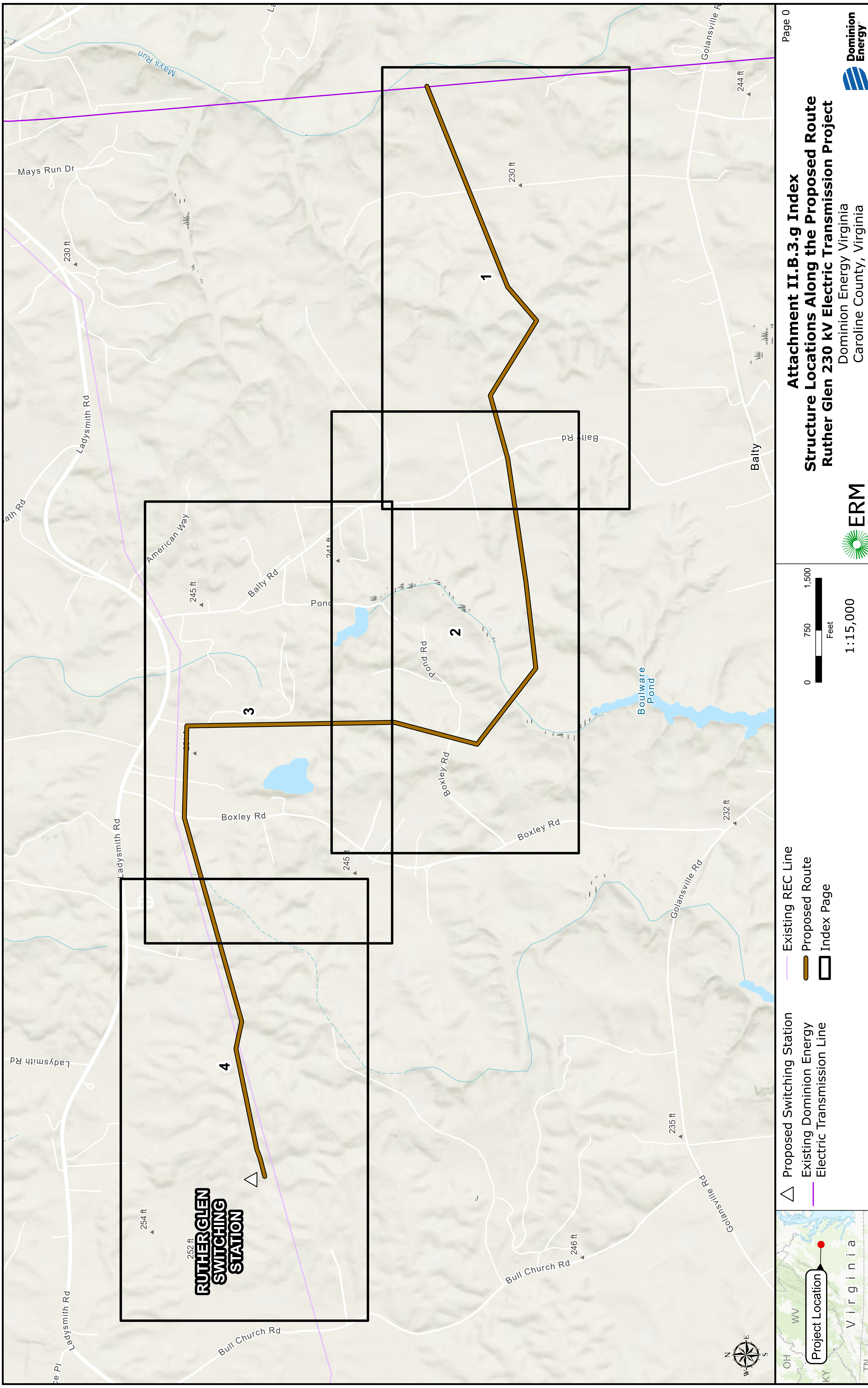
TYPICAL DC ENGINEERED 2-POLE DOUBLE DEADEND STRUCTURE

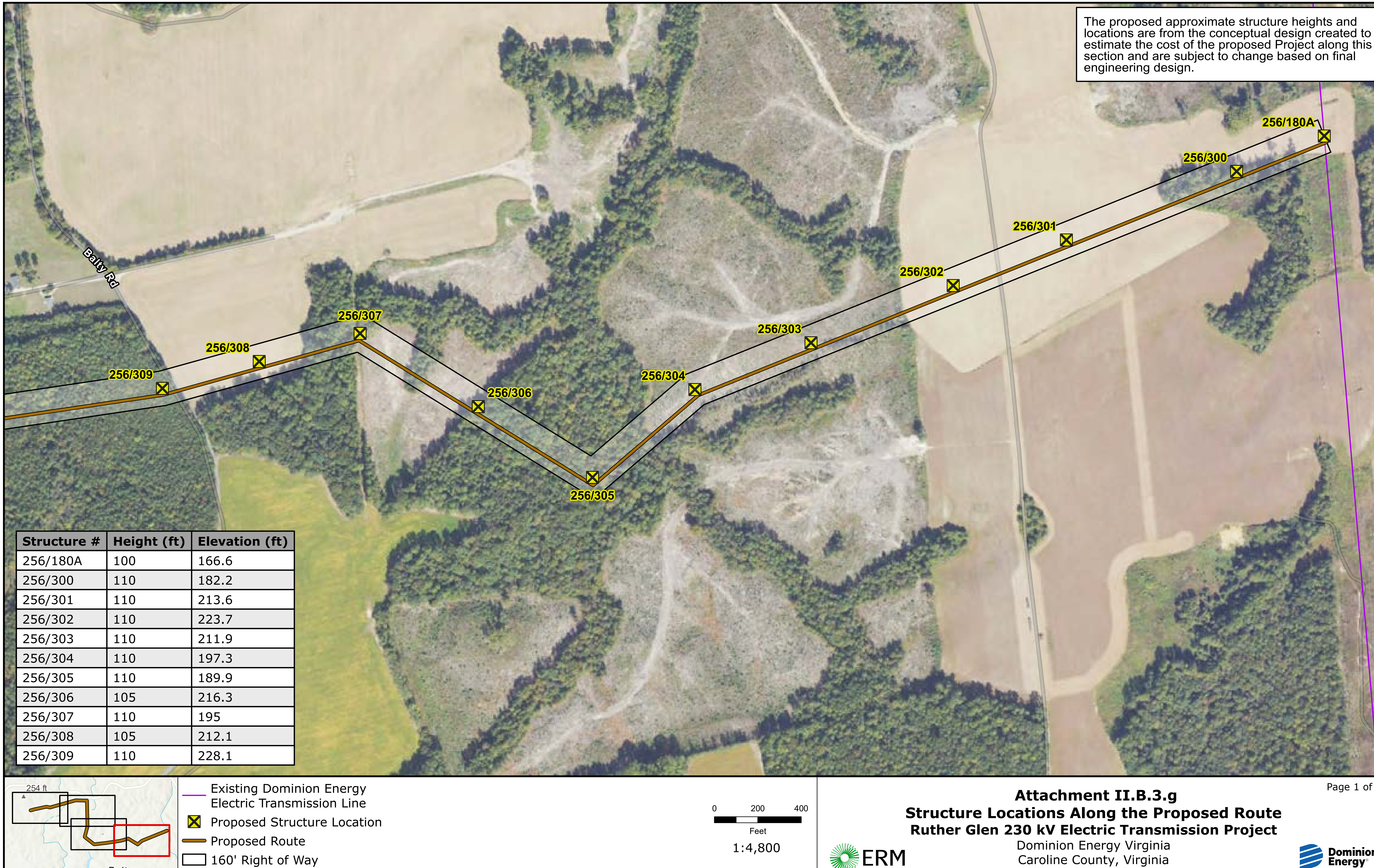
A. STRUCTURE MAPPING	N/A
B. RATIONALE FOR STRUCTURE TYPE:	MINIMIZES RIGHT OF WAY ACQUISITION; 2-POLES USED FOR HEAVY ANGLES TO OPTIMIZE POLE/FOUNDATION SIZE AND COST
C. LENGTH OF R/W (STRUCTURE QTY):	2.40 MILES (3 STRUCTURES) - SEE NOTE 1
D. STRUCTURE MATERIAL:	WEATHERING STEEL
RATIONALE FOR STRUCTURE MATERIAL:	MATCH CURRENT STANDARDS AND EXISTING STRUCTURES IN THE AREA
E. FOUNDATION MATERIAL: AVERAGE FOUNDATION REVEAL:	CONCRETE SEE NOTE 2
F. AVERAGE WIDTH AT CROSSARM:	36'
G. AVERAGE WIDTH AT BASE:	SEE NOTE 3
H. MINIMUM STRUCTURE HEIGHT (SEE NOTE 4): MAXIMUM STRUCTURE HEIGHT (SEE NOTE 4): AVERAGE STRUCTURE HEIGHT (SEE NOTE 4):	100' 100' 100'
I. AVERAGE SPAN LENGTH (RANGE):	507' - SEE NOTE 4
J. MINIMUM CONDUCTOR-TO-GROUND:	25.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:

1. ROW LENGTH & STRUCTURE QUANTITY ARE EXCLUSIVE OF COMPANY-OWNED SUBSTATION PROPERTIES
2. MINIMUM FOUNDATION REVEAL SHALL BE 1.5'
3. FOUNDATION DIAMETER SHALL BE BASED ON GEOTECHNICAL FINDINGS DURING FINAL ENGINEERING
4. THE SPAN LENGTHS ASSOCIATED WITH THIS STRUCTURE TYPE ARE THE AHEAD SPANS

THE INFORMATION CONTAINED ON THIS DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND IS SUBJECT TO CHANGE BASED ON FINAL DESIGN	LINES 2410, 2422 (ROUTE 1)	ATTACHMENT NO.
Dominion Energy Dominion Energy 5000 Dominion Blvd. Glen Allen, VA 23060	TYPICAL DC ENGINEERED 2-POLE DOUBLE DEADEND STRUCTURE	II.B.3.f
		DRAWN BY: SDH


Attachment II.B.3.g Index
Structure Locations Along the Proposed Route
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 0
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Index Page
0
750
1,500
Feet
1:15,000
Project Location
OH
WV
KY
TN
Virginia
ERM
Dominion Energy
RUTHER GLEN SWITCHING STATION
1
2
3
4
Mays Run
Mays Run Dr
Ladysmith Rd
American Way
Balty Rd
Pond Rd
Boxley Rd
Boulware Pond
Golansville Rd
Bull Church Rd
Balty
230 ft
244 ft
245 ft
241 ft
232 ft
235 ft
246 ft
252 ft
254 ft



Structure #	Height (ft)	Elevation (ft)
256/180A	100	166.6
256/300	110	182.2
256/301	110	213.6
256/302	110	223.7
256/303	110	211.9
256/304	110	197.3
256/305	110	189.9
256/306	105	216.3
256/307	110	195
256/308	105	212.1
256/309	110	228.1

Attachment II.B.3.g
Structure Locations Along the Proposed Route
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM

Dominion Energy

The proposed approximate structure heights and locations are from the conceptual design created to estimate the cost of the proposed Project along this section and are subject to change based on final engineering design.

Structure #	Height (ft)	Elevation (ft)
256/308	105	212.1
256/309	110	228.1
256/310	110	226.7
256/311	110	228.5
256/312	115	204.9
256/313	110	203.4
256/314	125	185.3
256/315	115	192.3
256/316	130	187.4
256/317	110	202.6
256/318	120	212.3

Proposed Structure Location
Proposed Route
160' Right of Way

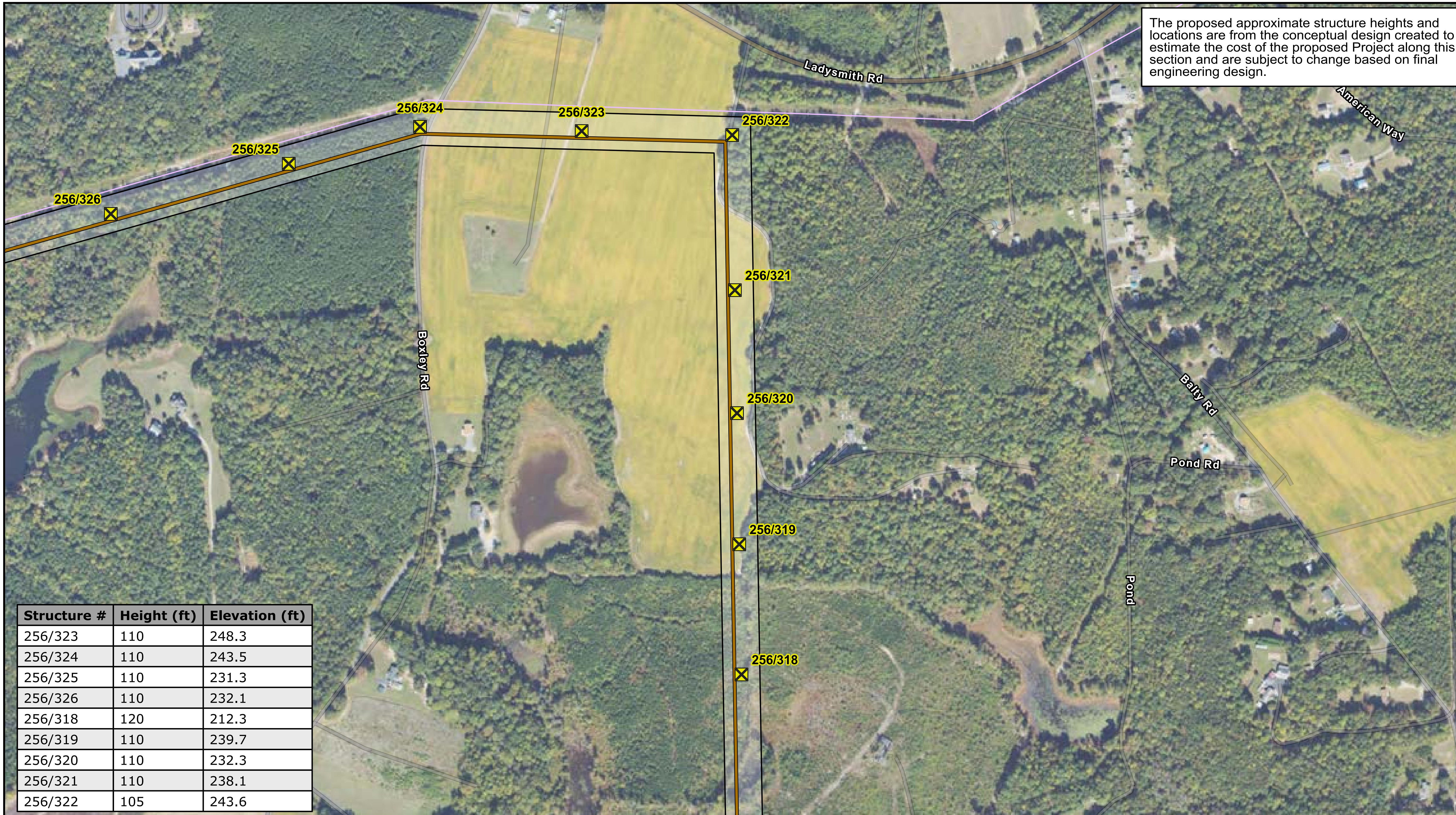
0 200 400
Feet
1:4,800

Attachment II.B.3.g
Structure Locations Along the Proposed Route
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

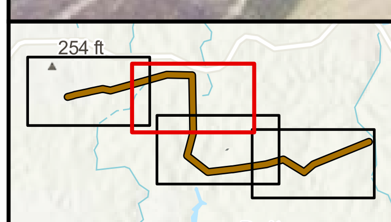
Page 2 of 4

ERM

Dominion Energy



Structure #	Height (ft)	Elevation (ft)
256/323	110	248.3
256/324	110	243.5
256/325	110	231.3
256/326	110	232.1
256/318	120	212.3
256/319	110	239.7
256/320	110	232.3
256/321	110	238.1
256/322	105	243.6



Existing REC Line
Proposed Structure Location
Proposed Route
160' Right of Way

0 200 400
Feet
1:4,800

Attachment II.B.3.g
Structure Locations Along the Proposed Route
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Page 3 of 4

ERM
Dominion Energy

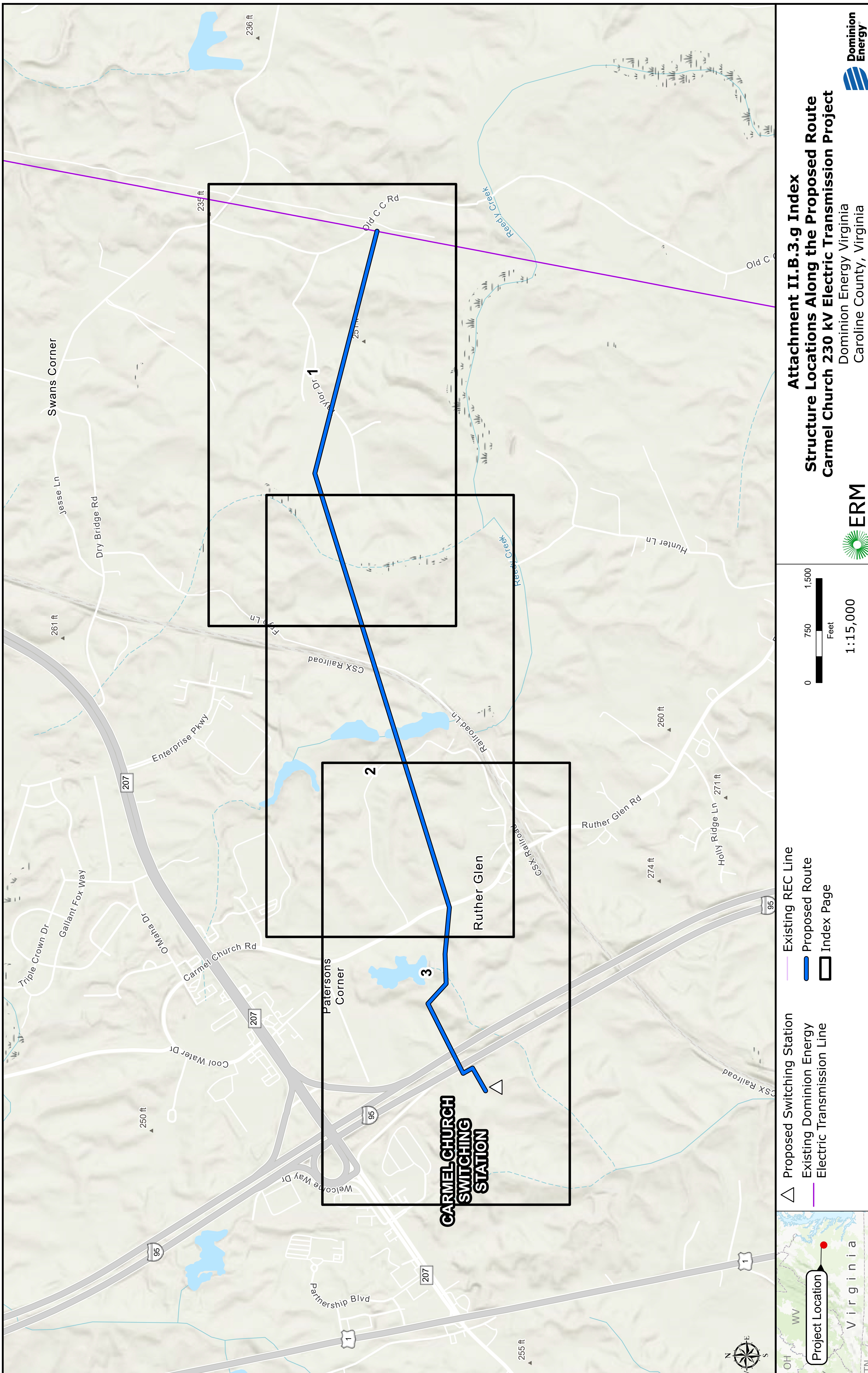
Structure #	Height (ft)	Elevation (ft)
256/328	135	223.8
256/329	155	231.3
256/330	150	232.2
256/331	135	217.7
256/332	120	207.7
256/333	115	217
256/326	110	232.1
256/327	110	235
256/334	75	230.5

Page 4 of 4

Attachment II.B.3.g
Structure Locations Along the Proposed Route
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM

Dominion Energy


Attachment II.B.3.g Index
Structure Locations Along the Proposed Route
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Index Page
0
750
1,500
Feet
1:15,000
ERM
Dominion Energy
Project Location
Virginia
CARMEL CHURCH SWITCHING STATION
1
2
3
Swans Corner
Paterson Corner
Ruther Glen
Old C C Rd
Reedy Creek
Hunter Ln
Jesse Ln
Dry Bridge Rd
Enterprise Pkwy
CSX Railroad
Railroad Ln
Ruther Glen Rd
Holly Ridge Ln
Carmel Church Rd
Cool Water Dr
Welcome Way Dr
Partnership Blvd
Triple Crown Dr
Gallant Fox Way
Omaha Dr
207
95
1

The proposed approximate structure heights and locations are from the conceptual design created to estimate the cost of the proposed Project along this section and are subject to change based on final engineering design.

Structure #	Height (ft)	Elevation (ft)
256/227	100	213.9
256/300	115	196.2
256/301	110	225.6
256/302	110	226.1
256/303	105	228.9
256/304	105	231.4
256/305	115	217.8
256/306	110	206.5
256/307	120	199.8

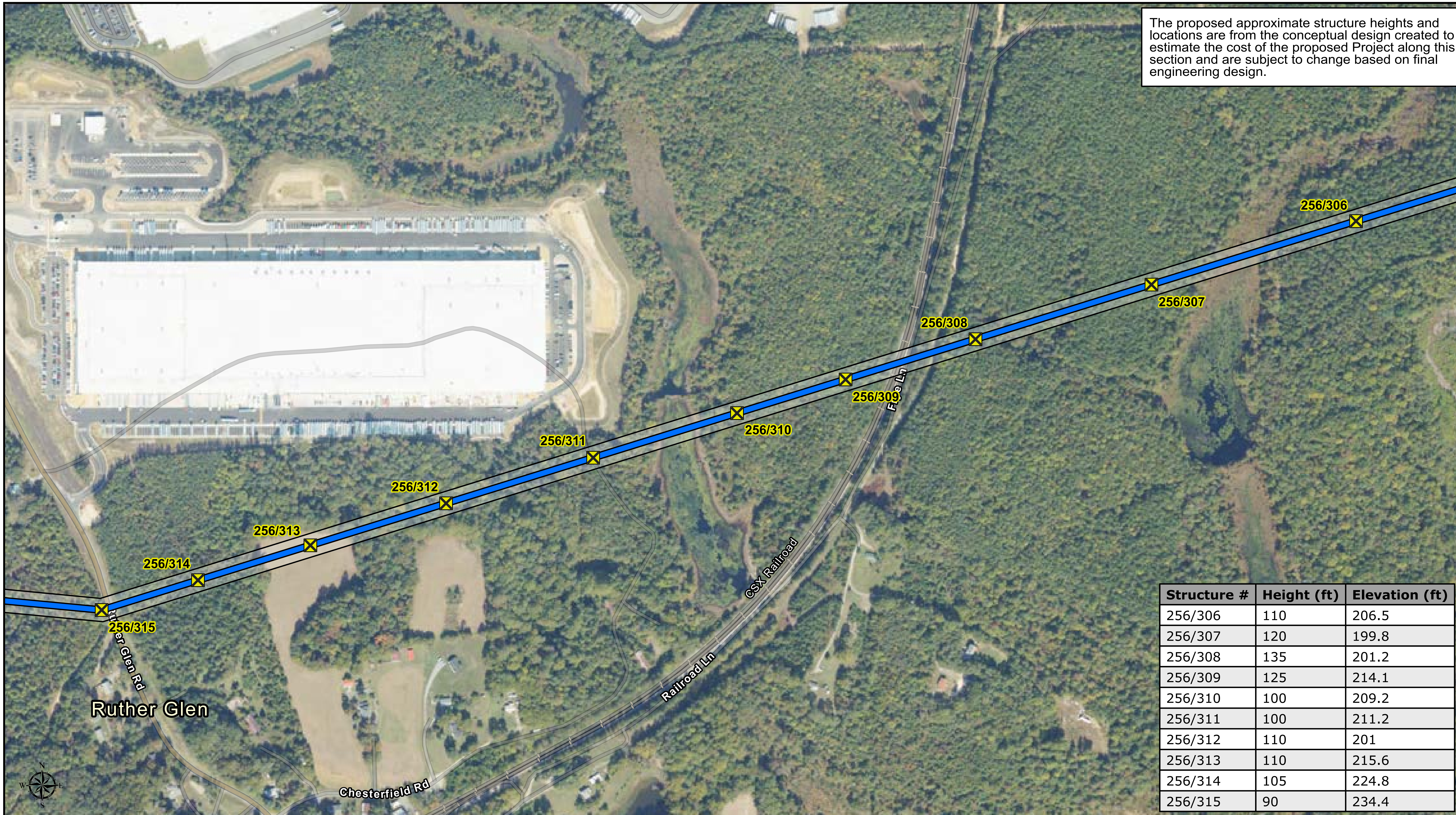
Existing Dominion Energy Electric Transmission Line
Proposed Structure Location
Proposed Route
100' Right of Way

0 200 400
Feet
1:4,800

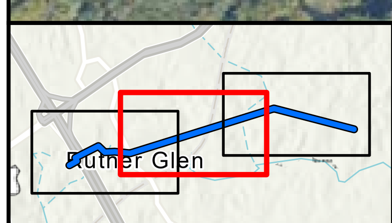
Attachment II.B.3.g
Structure Locations Along the Proposed Route
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM
Dominion Energy

The proposed approximate structure heights and locations are from the conceptual design created to estimate the cost of the proposed Project along this section and are subject to change based on final engineering design.



Structure #	Height (ft)	Elevation (ft)
256/306	110	206.5
256/307	120	199.8
256/308	135	201.2
256/309	125	214.1
256/310	100	209.2
256/311	100	211.2
256/312	110	201
256/313	110	215.6
256/314	105	224.8
256/315	90	234.4



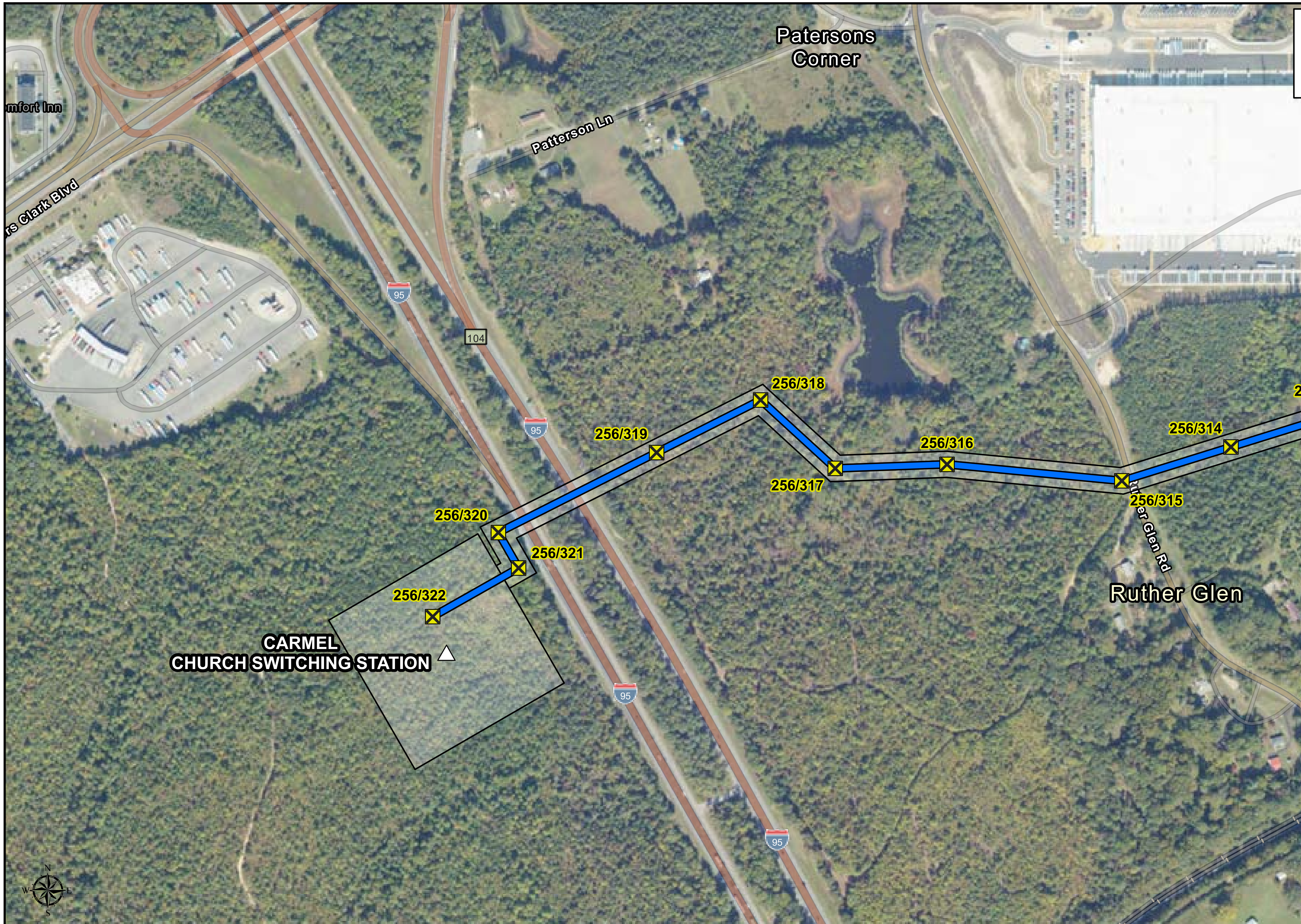
Proposed Structure Location
Proposed Route
100' Right of Way

0 200 400
Feet
1:4,800

Page 2 of 3

Attachment II.B.3.g
Structure Locations Along the Proposed Route
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM
Dominion Energy



The proposed approximate structure heights and locations are from the conceptual design created to estimate the cost of the proposed Project along this section and are subject to change based on final engineering design.

Structure #	Height (ft)	Elevation (ft)
256/321	100	222.4
256/322	75	216.8
256/312	110	201
256/313	110	215.6
256/314	105	224.8
256/315	90	234.4
256/316	105	217.2
256/317	110	209.1
256/318	110	209.2
256/319	110	222
256/320	100	215.2

Attachment II.B.3.g
Structure Locations Along the Proposed Route
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM

Dominion Energy

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

4. With regard to the proposed supporting structures for all feasible alternate routes, provide the maximum, minimum and average structure heights with respect to the whole route.

Response: The approximate structure heights along the Proposed and Alternative Routes are provided in the table below, based on preliminary conceptual design, not including foundation reveal and subject to change based on final engineering design.

Route	Minimum (ft.)	Maximum (ft.)	Average (ft.)
Ruther Glen Loop			
Proposed Route (Route 5)	100	155	116
Alternative Route 4	100	145	114
Alternative Route 6	90	140	111
Carmel Church Loop			
Proposed Route (Route 1)	90	135	109
Alternative Route 2	85	135	111

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

5. For lines being rebuilt, provide mapping showing existing and proposed structure heights for each individual structure within the ROW, as proposed in the application.

Response: Not applicable.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

6. Provide photographs for [a] typical existing facilities to be removed, [b] comparable photographs or representations for proposed structures, and [c] visual simulations showing the appearance of all planned transmission structures at identified historic locations within one mile of the proposed centerline and in key locations identified by the Applicant.

Response:

[a] See Attachment II.B.6.a for a typical existing facility to be removed.

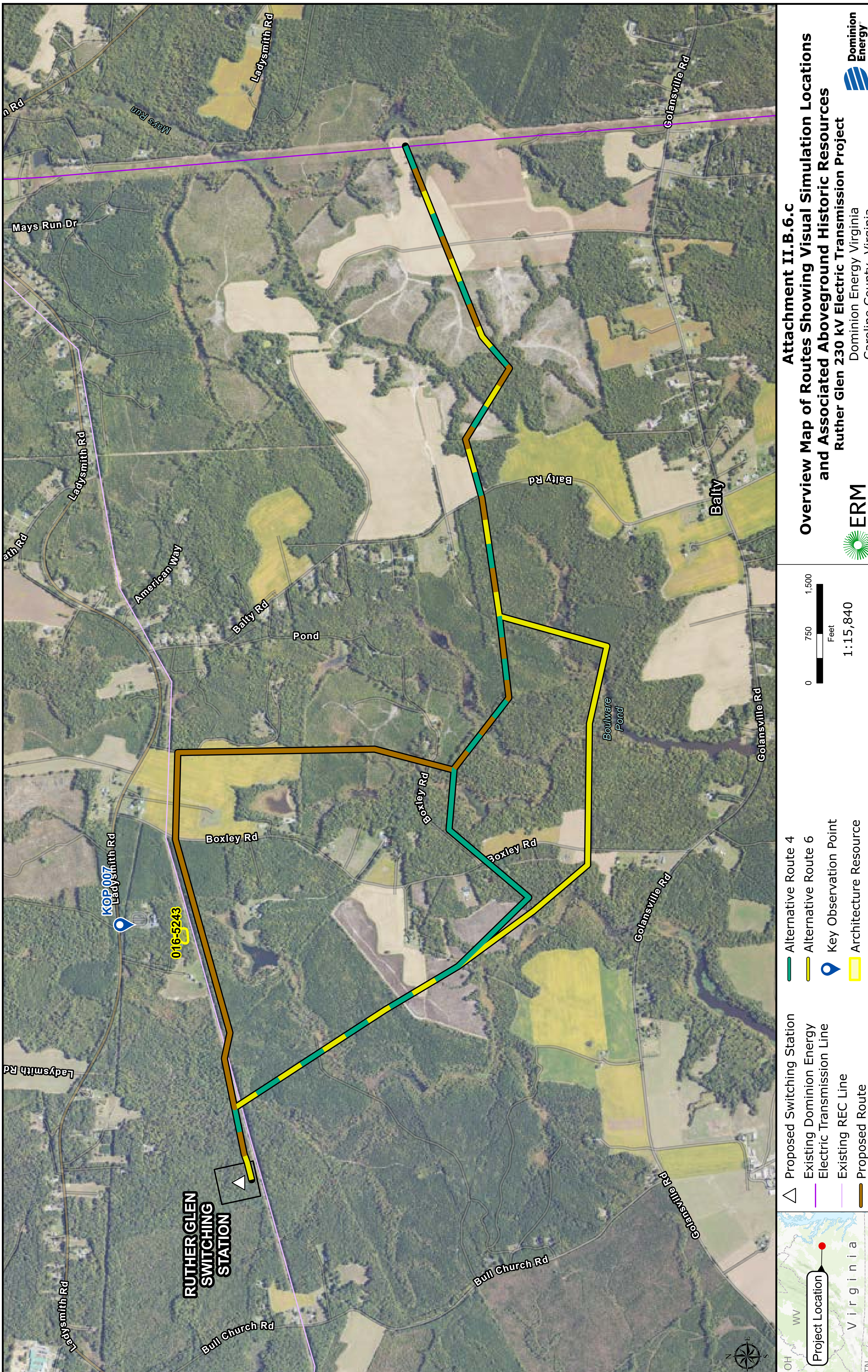
[b] See Attachment II.B.6.b.i-iv for representative photographs of the proposed structure types.

[c] Visual simulations showing the appearance of the proposed transmission structures at identified historic locations within 1.0 mile of Carmel Church Loop Proposed Route and Ruther Glen Loop Proposed Route centerline are provided. See Attachment II.B.6.c for maps depicting each of the simulation locations for the two Projects, the existing views at the historic properties, and simulated proposed views. These simulations were created using GIS modeling to depict whether the proposed structures will be visible from the identified historic property. The historic properties evaluated are described below. See also the Stage I Pre-Application Analysis Report contained in Appendix F of the Environmental Routing Study.

Historic Property	Viewpoint	Comments
Excelsior Industry of Caroline County Historic District 016-5165	KOP 008H	Approximately 0.39 mile to the east of Carmel Church Alternative Route 2 at MP 2.5. Eligible.
Battle of North Anna River 042-0123	KOP 001H KOP 002H KOP 003H	Approximately 0.34 mile to the west of the Carmel Church Proposed Route at MP 0.0. Potentially Eligible (Battlefield).
Rosenwald School 016-5097	KOP 007H	Approximately 0.37 mile east of Carmel Church Alternative Route 2 at MP 2.6. Locally Significant.
Richmond, Fredericksburg and Potomac Railroad 500-0001	KOP 003H KOP 004H	Intersected by the Carmel Church Proposed Route between MP 2.2 and 2.3. Eligible.

	KOP 005H KOP 006H	
7Olive Cemetary 016-5243	KOP 007	Approximately 180 feet north of Ruther Glen Proposed Route at MP 3.3
American Indian Society Parcel (Parcel ID: 93-A-12)	KOP 003	Approximately .1 mile north of Carmel Church Alternative Route 2 at MP 0.7

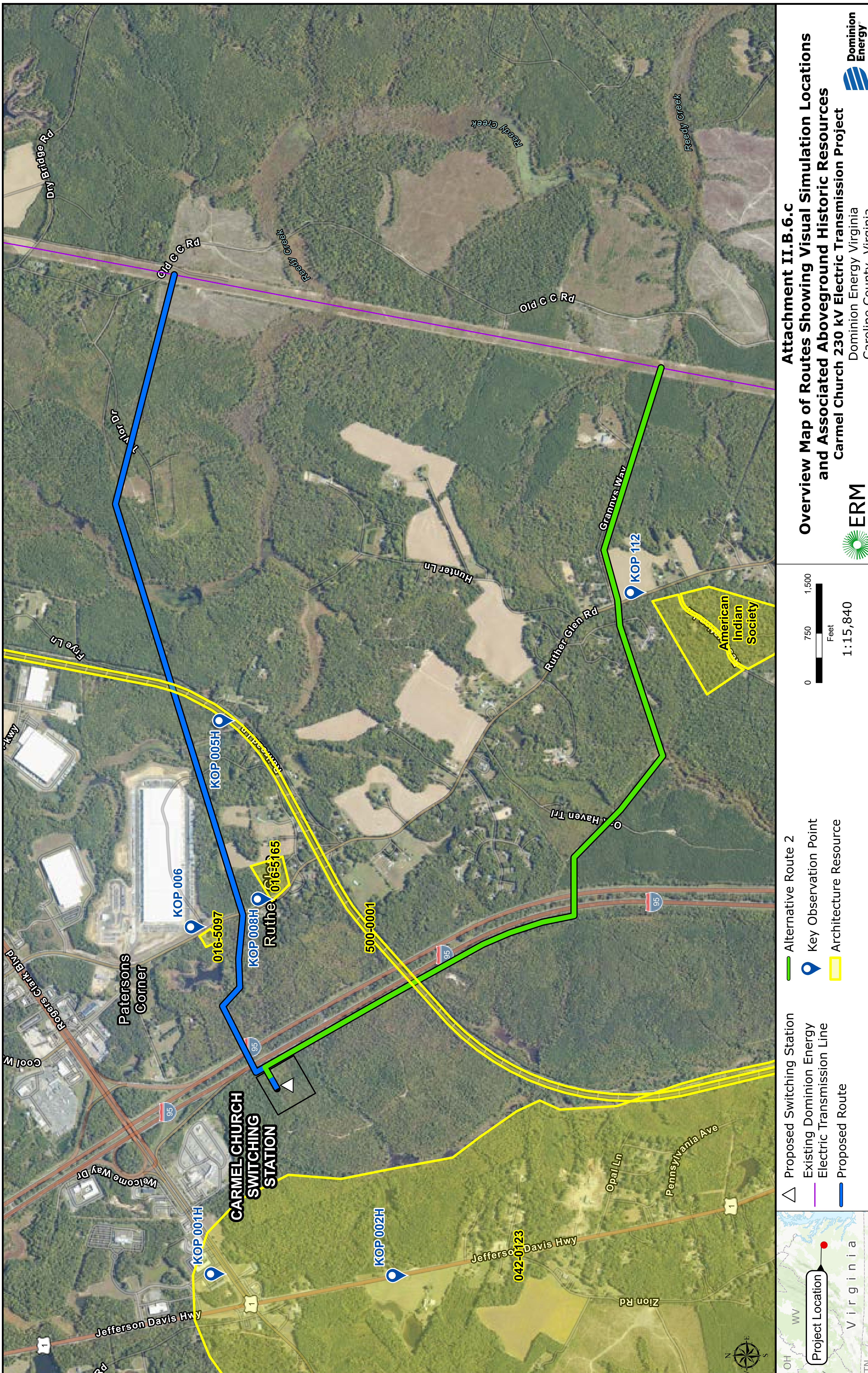
See Attachment III.B.2 for visual simulations and key locations evaluated.



Attachment II.B.6.c
Overview Map of Routes Showing Visual Simulation Locations and Associated Aboveground Historic Resources
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM

Dominion Energy


Attachment II.B.6.c
Overview Map of Routes Showing Visual Simulation Locations and Associated Aboveground Historic Resources
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Proposed Route
Alternative Route 2
Key Observation Point
Architecture Resource
0 750 1,500
Feet
1:15,840
Project Location
Virginia
CARMEL CHURCH SWITCHING STATION
Patersons Corner
KOP 001H
KOP 002H
KOP 005H
KOP 006
KOP 008H
KOP 112
016-5097
016-5165
500-0001
042-0123
American Indian Society
Old C C Rd
Dry Bridge Rd
Reedy Creek
Grannys Way
Hunter Ln
Ruther Glen Rd
Frye Ln
Rogers Clark Blvd
Welcome Way Dr
Jefferson Davis Hwy
Zion Rd
Opal Ln
Pennsylvania Ave

II. DESCRIPTION OF THE PROPOSED PROJECT

C. Describe and furnish plan drawings of all new substations, switching stations, and other ground facilities associated with the proposed project. Include size, acreage, and bus configurations. Describe substation expansion capability and plans. Provide one-line diagrams for each.

Response: **Ruther Glen Switching Station**

The proposed Ruther Glen Switching Station will be constructed with four 230 kV breakers in a breaker-and-half configuration utilizing two 230 kV line terminals and two 230 kV delivery points. The Ruther Glen Switching Station will be designed to incorporate two additional 230 kV circuit breakers for future use, creating two additional 230 kV line terminal points. The total area required to build the Ruther Glen Switching Station is approximately 2.2 acres. The point of demarcation between the Company and the Customer will be the 230 kV switch terminals inside the Ruther Glen Switching Station. REC will bring their bus to the switches located near the Ruther Glen Switching Station fence line.

The one-line and general arrangement diagrams for the proposed Ruther Glen Substation are provided as Attachment II.C.1 and Attachment II.C.2, respectively.

Minor substation work involving relay resets will be performed at Ladysmith CT in conjunction with the Ruther Glen Project.

Carmel Church Switching Station

The proposed Carmel Church Switching Station will be constructed with four 230 kV breakers in a breaker-and-half configuration utilizing two 230 kV line terminals and two 230 kV delivery points. The Carmel Church Switching Station will be designed to incorporate five additional 230 kV circuit breakers for future use, creating four additional 230 kV line terminal points. The total area required to build the Carmel Church Substation is approximately 2.9 acres. The point of demarcation between the Company and the Customer will be the 230 kV switch terminals inside the Carmel Church Substation. REC will bring their bus to the switches located near the Carmel Church Substation fence line.

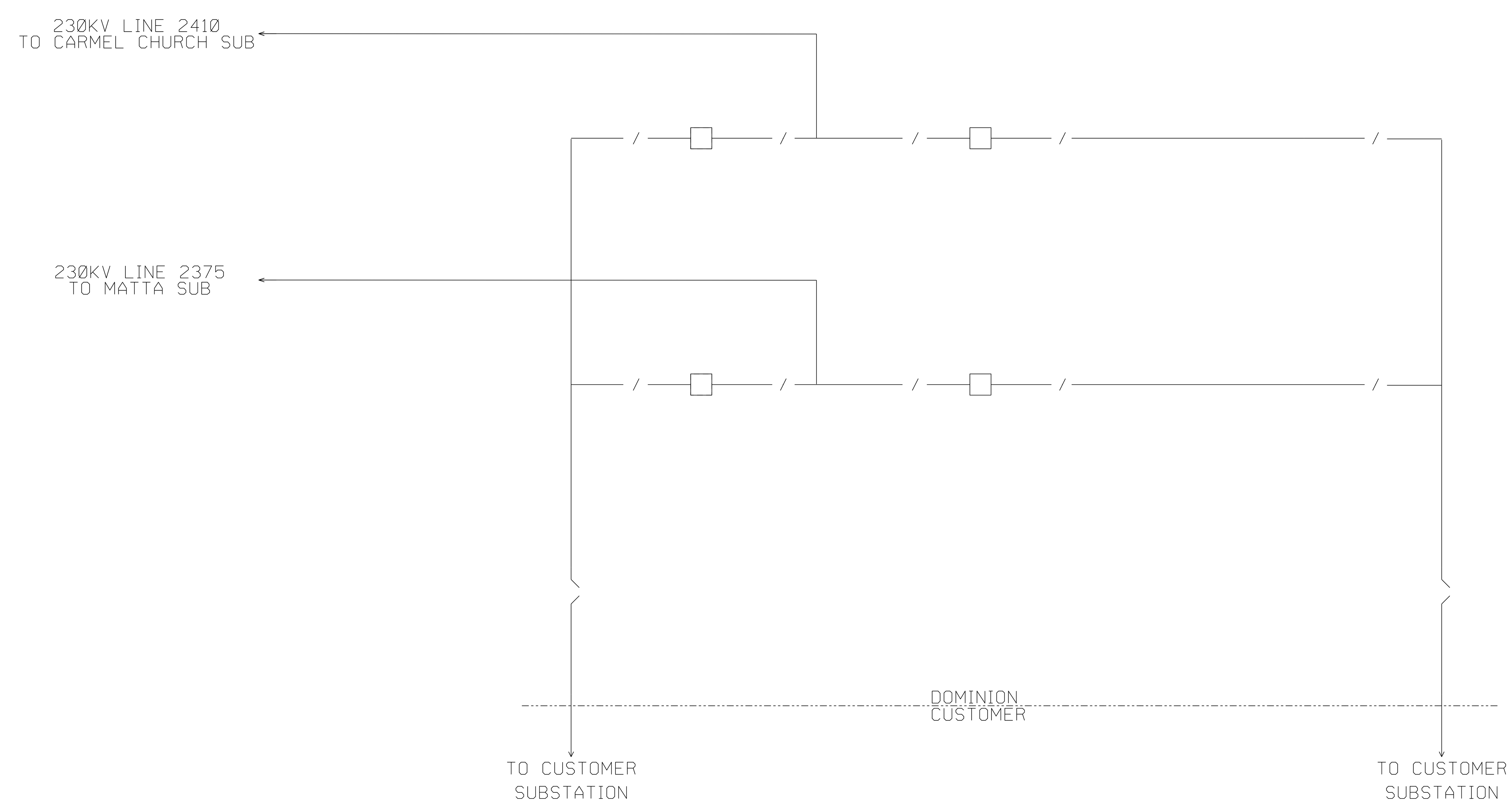
The one-line and general arrangement diagrams for the proposed Carmel Church Switching Station are provided as Attachment II.C.3 and Attachment II.C.4, respectively.

Minor substation work involving relay resets will be performed at Four Rivers Substation in conjunction with the Carmel Church Project.

ATTACHMENT II.C.1

LEGEND

- CIRCUIT BREAKER
- DISCONNECT SWITCH
- DISCONNECT SWITCH



PRELIMINARY
NOT FOR CONSTRUCTION

Drawn By: GCB	Date 09-11-24	Substation RUTHER GLEN SWITCHING STATION
Approval	Date	Drawing No.

Dominion Energy

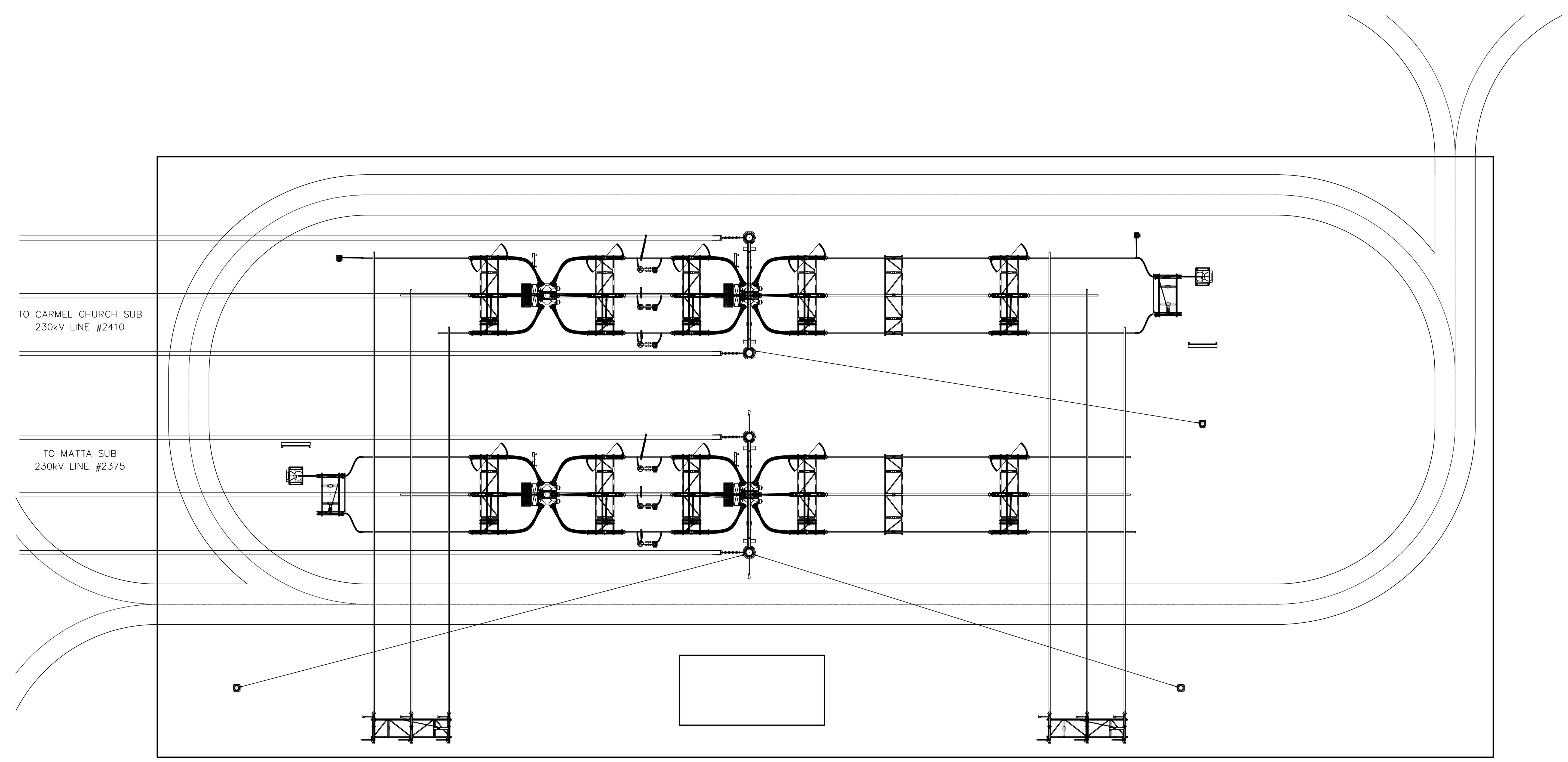
ONE LINE DIAGRAM

Revisions: By: | Approval | Date: | Project No. | Network No. | BM No. | Description

DEMARCATION INDICATOR - SEE SUB. OL.
DEMARCATION INDICATOR - SEE TLIN. OL.
DEMARCATION INDICATOR - SEE DIST. OL.
DEMARCATION INDICATOR - SEE CUST. DOC.

USERNAME

ATTACHMENT II.C.2



PRELIMINARY
NOT FOR CONSTRUCTION

Dominion Energy

GENERAL ARRANGEMENT PLAN
RURTHER GLEN SWITCHING STATION
CAROLINE COUNTY, VIRGINIA

	Name	Date	Project No.	Sheet No.
Designed by:	GCB	09/11/24		1 OF 1
Approvals		–	Scale	
Approvals				
		B/M No.	Revisions	
Cad File Name			Drawing No.	
PLOTTED:	$$$$$$$$$$$SYTIME			

No.	Date	By	Checked/Appr.	Description	Project Number	B/M

Revisions

Typical Drawing Information	Library Location	Cell Name	B/M Assembly	Pipe Stand Foundation Cells (Pier)	Pipe Stand Foundation Cells (Spread)	Foundation Cells for Other Typical Structures	Steel Detail & Assembly
						(Pier) (Spread)	

$USERNAME$

$FILENAME$
PLOTTED: $$$$$$$$$$$$SYTIME
$USERNAME$


LEGEND
CIRCUIT BREAKER
DISCONNECT SWITCH
DISCONNECT SWITCH
230KV LINE 256
TO LADYSMITH CT SUB
230KV LINE 2422
TO FOUR RIVERS SUB
TO CUSTOMER SUBSTATION
DOMINION
CUSTOMER
TO CUSTOMER SUBSTATION
PRELIMINARY
NOT FOR CONSTRUCTION
ATTACHMENT II.C.3
Dominion Energy
ONE LINE DIAGRAM
Substation CARMEL CHURCH SWITCHING STATION
Drawing No.
Drawn By: GCB
Date 09-11-24
Approval
Date
Revisions


GENERAL ARRANGEMENT
CARMEL CHURCH SWITCHING STATION
CAROLINE COUNTY, VIRGINIA
Dominion Energy
Designed by: GCB
Date 09/11/24
Sheet No. 1 OF 1
Drawing No. GEN ARR PRELIM
TO LADYSMITH CT SUB
230kV LINE #256
TO FOUR RIVERS SUB
230kV LINE #2422
PRELIMINARY
NOT FOR CONSTRUCTION
ATTACHMENT II.C.4
Typical Drawing Information
Revisions

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

A. Describe the character of the area that will be traversed by this line, including land use, wetlands, etc. Provide the number of dwellings within 500 feet, 250 feet and 100 feet of the centerline, and within the ROW for each route considered. Provide the estimated amount of farmland and forestland within the ROW that the proposed project would impact.

Response: **Ruther Glen Loop Proposed Route**

The Ruther Glen Proposed Route is approximately 4.0 miles length and is located entirely within Caroline County, Virginia, extending northwest from the cut in location on Line #256 to the proposed Ruther Glen Switching Station. The Proposed Route crosses undeveloped forested land and forested land marketed by Caroline County for future data center development. Portions of the Reedy Swamp are crossed by the Proposed Route. The Proposed Route will require 43.9 right-of-way acres of forested land.

According to County parcel data, zoning data, and aerial photo analysis, there are four residential dwellings located within 500 feet of the proposed centerline, one dwelling located within 250 feet of the proposed centerline, and no dwellings located within 100 feet of the proposed centerline or within the right-of-way of the Proposed Route. See Attachment III.A.1 and Section 2.L of the DEQ Supplement for the estimated amount of farmland and forestland within the right-of-way that the Proposed Route would impact.

For additional description of the character of the area that will be traversed by the Proposed Route and the related impacts, see the DEQ Supplement, specifically as to land use (Sections 2.G and 2.L), wetlands (Section 2.D), forests (Section 2.L), agricultural lands (Section 2.L), historic resources (Section 2.I), and wildlife (Sections 2.G and 2.K).

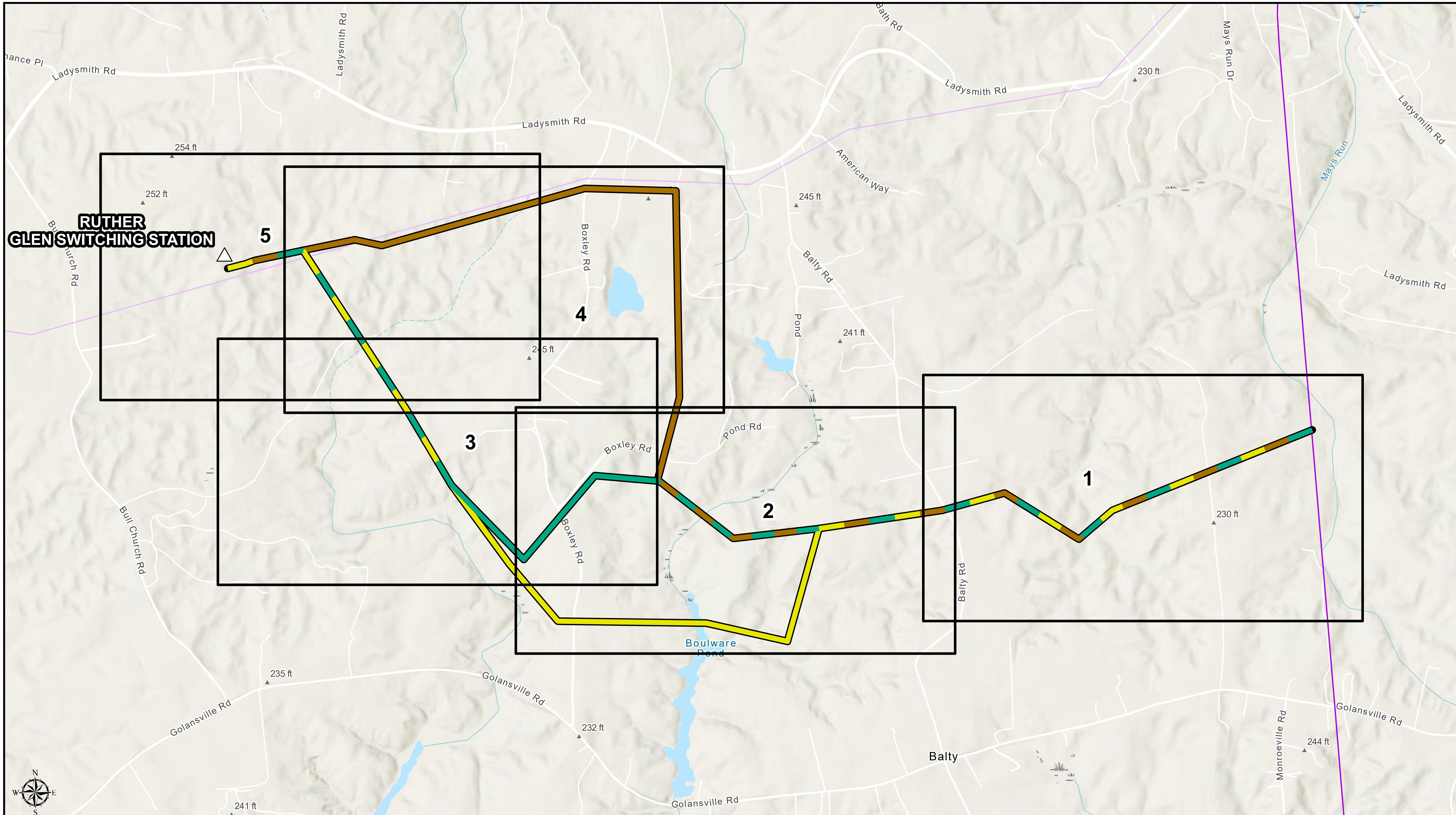
Carmel Church Loop Proposed Route

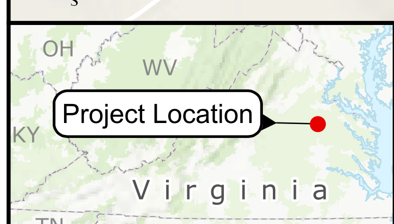
The Carmel Church Proposed Route is 2.5 miles in length and is located entirely within Caroline County, extending west from the cut-in location on Line #256 to the proposed Carmel Church Switching Station. The Proposed Route crosses sections of forested land and industrial land that is designated by the County for future industrial and data center development. At least 87% (2.21 miles) of Route 1 is located within land designated for Industrial Parks or within the Planned Innovation, Research, and Technology (PIRT) district that is likely to be cleared by industrial developers prior to transmission line construction. Currently, the Proposed Route will require 25.6 acres of right-of-way across forested lands.

According to County parcel data, zoning data, and aerial photo analysis, there are four residential dwellings within 500 feet of the proposed centerline, and no dwellings within 250 feet of the proposed centerline or within the right-of-way of the Proposed Route.

See Attachment III.A.1 and Section 2.L of the DEQ Supplement for the estimated amount of farmland and forestland within the right-of-way that the Proposed Route would impact.

For additional description of the character of the area that will be traversed by the Proposed Route and the related impacts, see the DEQ Supplement, specifically as to land use (Sections 2.G and 2.L), wetlands (Section 2.D), forests (Section 2.L), agricultural lands (Section 2.L), historic resources (Section 2.I), and wildlife (Sections 2.G and 2.K).





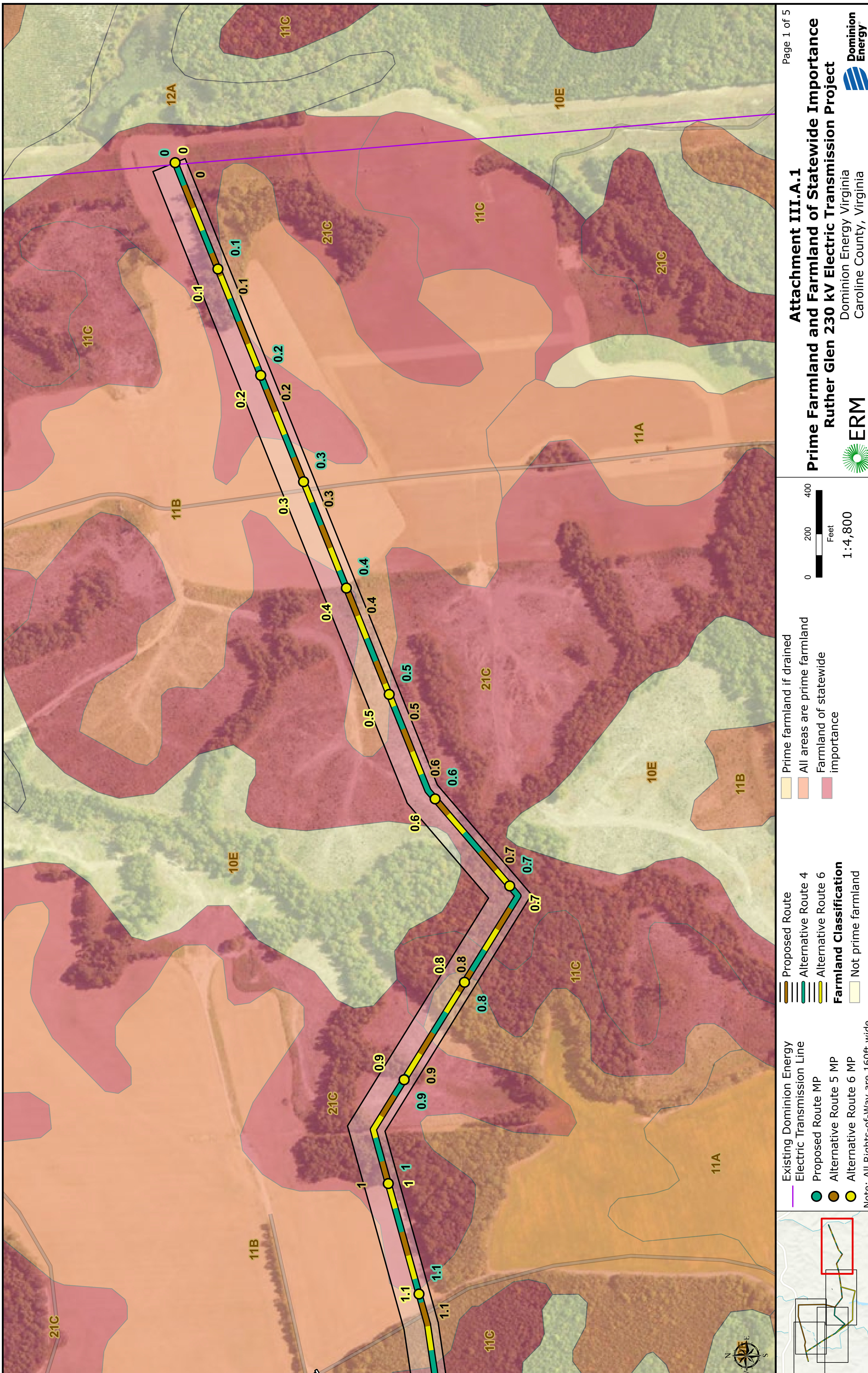
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Alternative Route 4
Alternative Route 6
Index Page

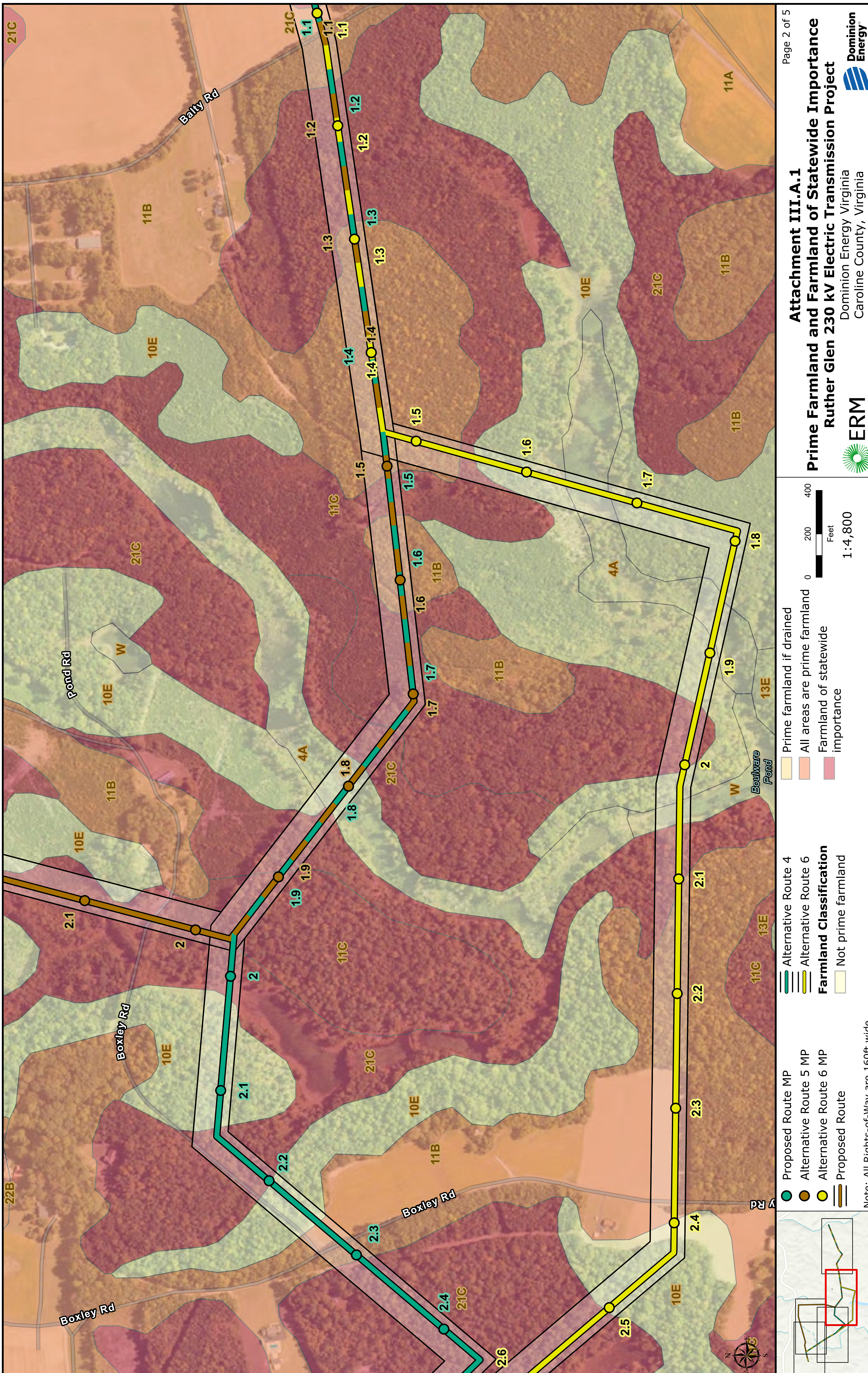
0 660 1,320
Feet
1:16,000

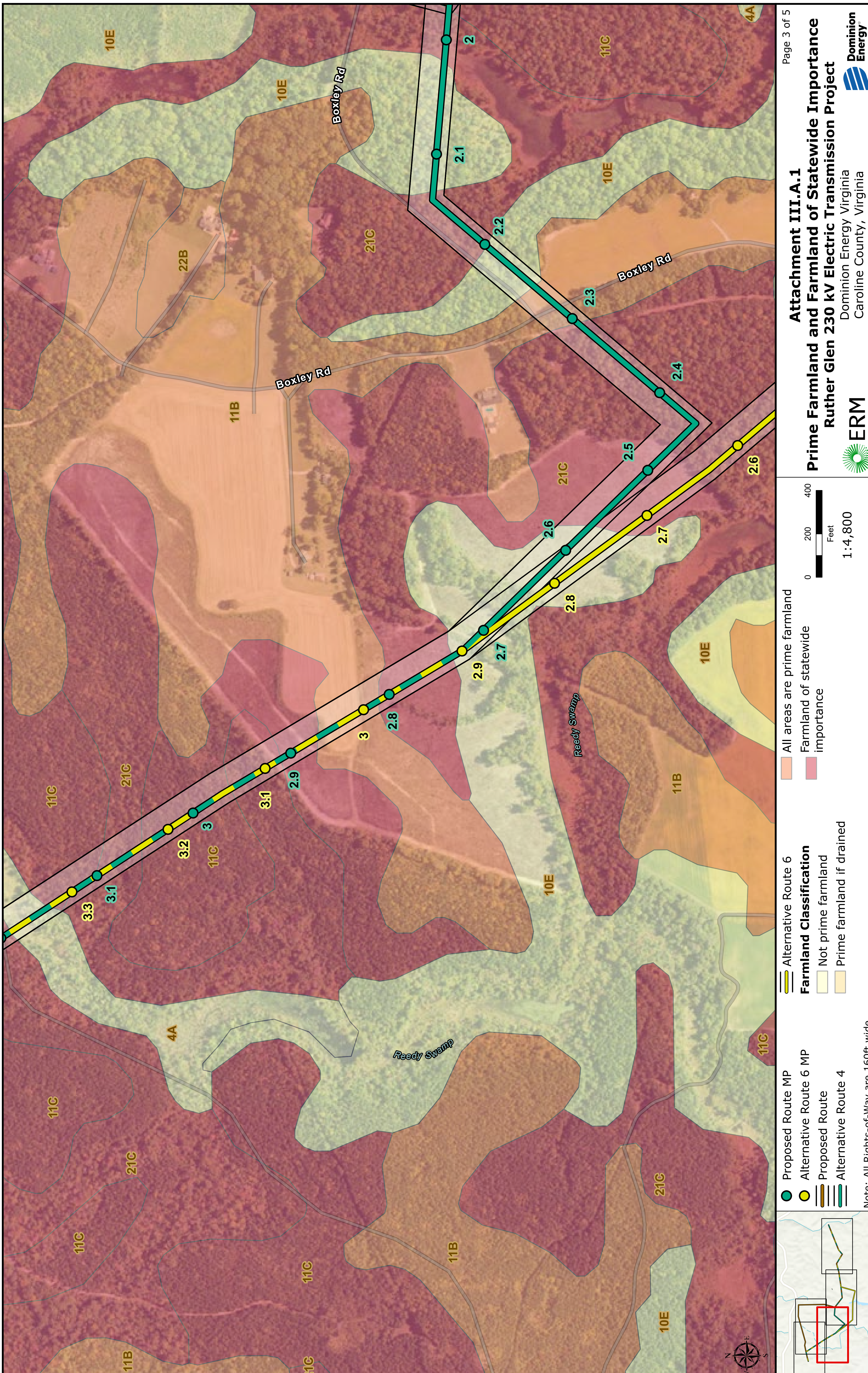
Page 0

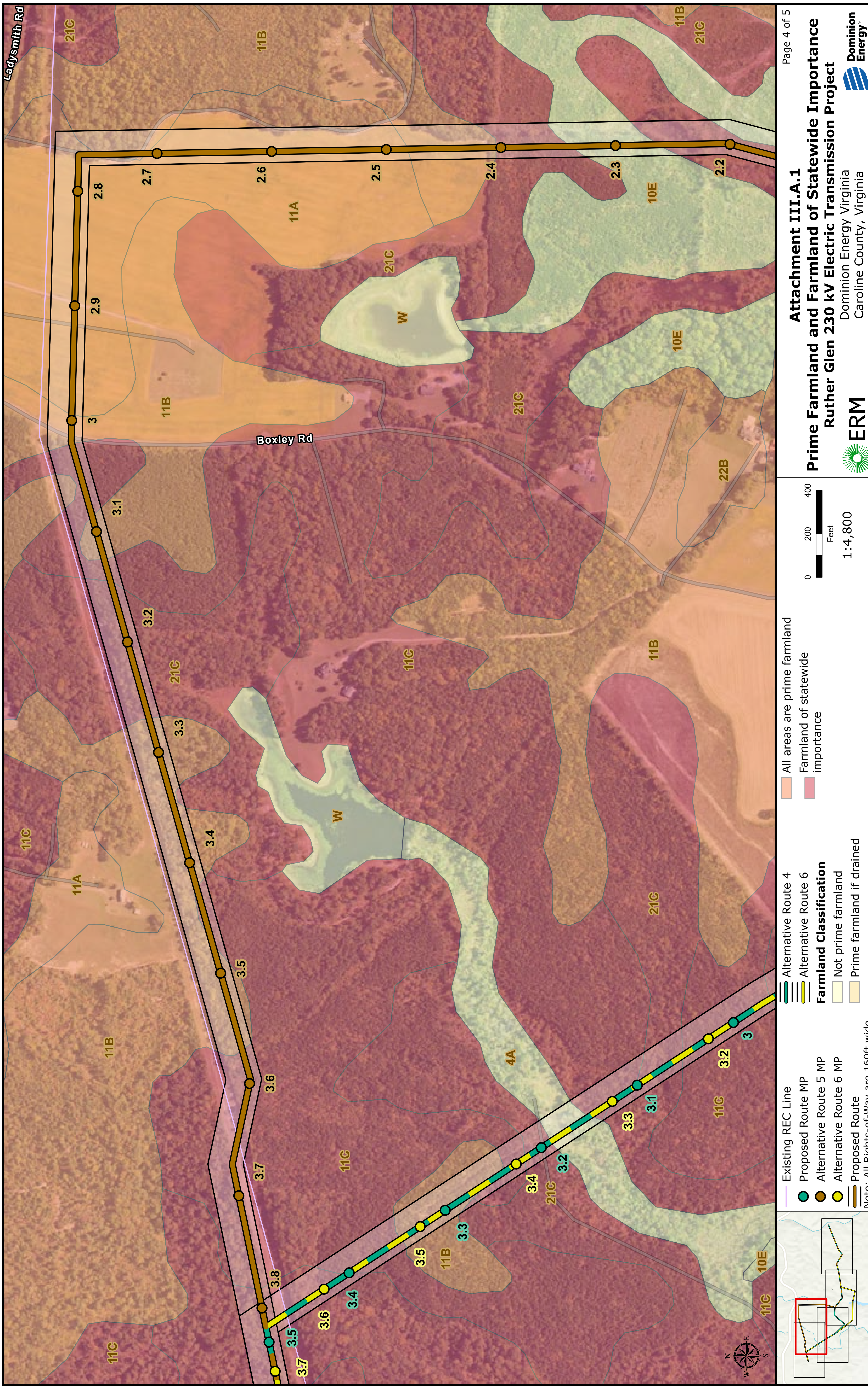
Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

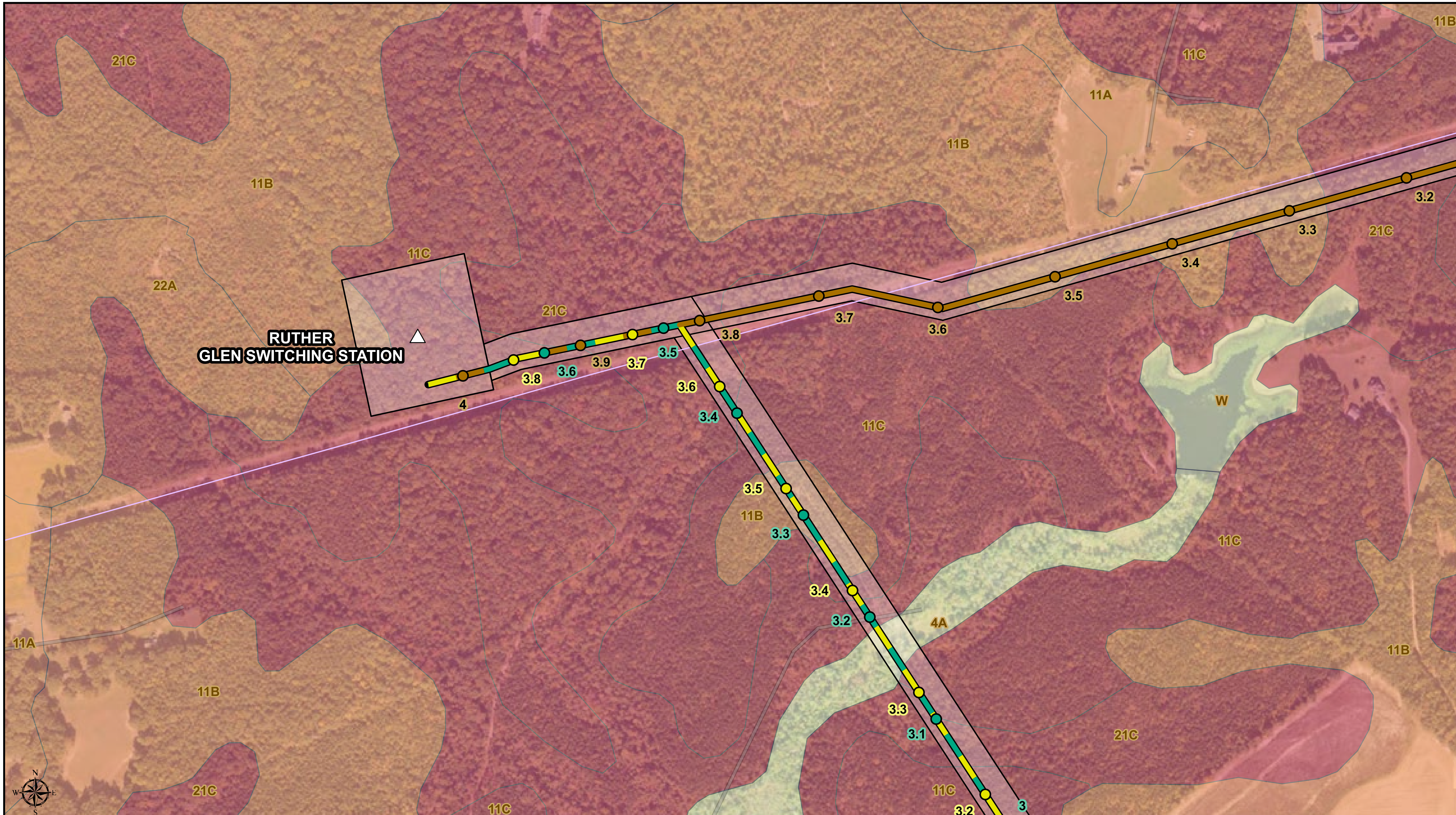
ERM
Dominion Energy

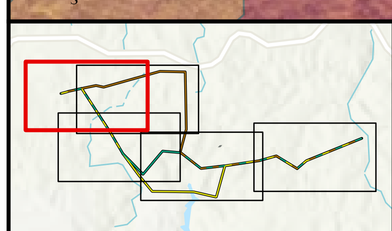

Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 1 of 5
ERM
Dominion Energy
Existing Dominion Energy Electric Transmission Line
Proposed Route MP
Alternative Route 5 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance
Note: All Rights-of-Way are 160ft wide.
0 200 400
Feet
1:4,800


Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 2 of 5
ERM
Dominion Energy
Proposed Route MP
Alternative Route 5 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance
0 200 400
Feet
1:4,800
Note: All Rights-of-Way are 160ft wide.
Balty Rd
Pond Rd
Boxley Rd
Boulware Pond


Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 3 of 5
Proposed Route 6 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance
0
200
400
Feet
1:4,800
Note: All Rights-of-Way are 160ft wide.
ERM
Dominion Energy
Boxley Rd
Reedy Swamp
10E
11C
21C
22B
11B
4A
2
2.1
2.2
2.3
2.4
2.5
2.6
2.7
2.8
2.9
3
3.1
3.2
3.3


Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 4 of 5
ERM
Dominion Energy
Existing REC Line
Proposed Route MP
Alternative Route 5 MP
Alternative Route 6 MP
Proposed Route
Alternative Route 4
Alternative Route 6
Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance
0 200 400
Feet
1:4,800
Note: All Rights-of-Way are 160ft wide.
Ladysmith Rd
Boxley Rd





- Proposed Switching Station
- Existing REC Line
- Proposed Route MP
- Alternative Route 5 MP
- Alternative Route 6 MP
- Proposed Route
- Alternative Route 4
- Alternative Route 6

Farmland Classification

- Not prime farmland
- Prime farmland if drained
- All areas are prime farmland
- Farmland of statewide importance

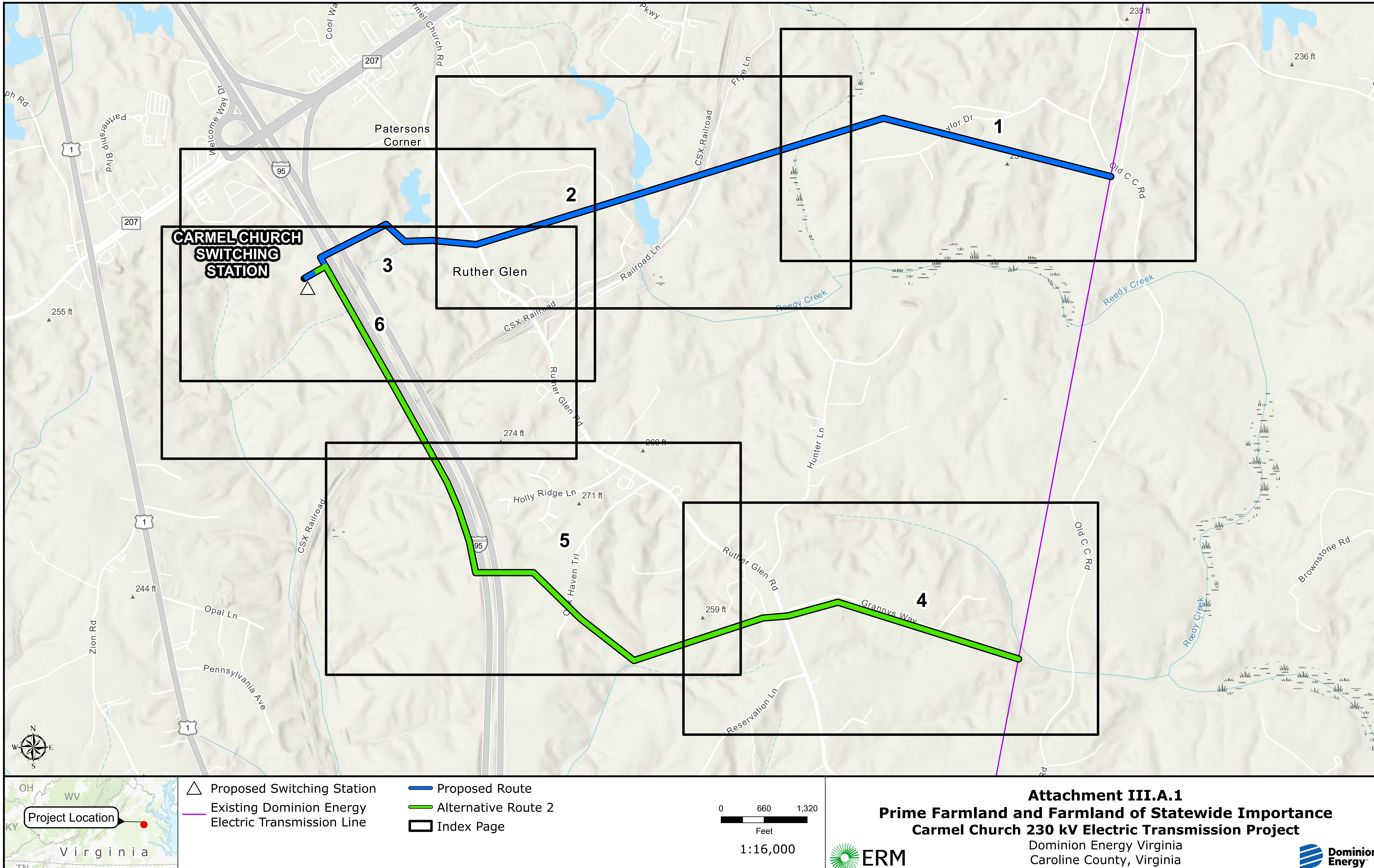
Note: All Rights-of-Way are 160ft wide.

0 200 400
Feet
1:4,800

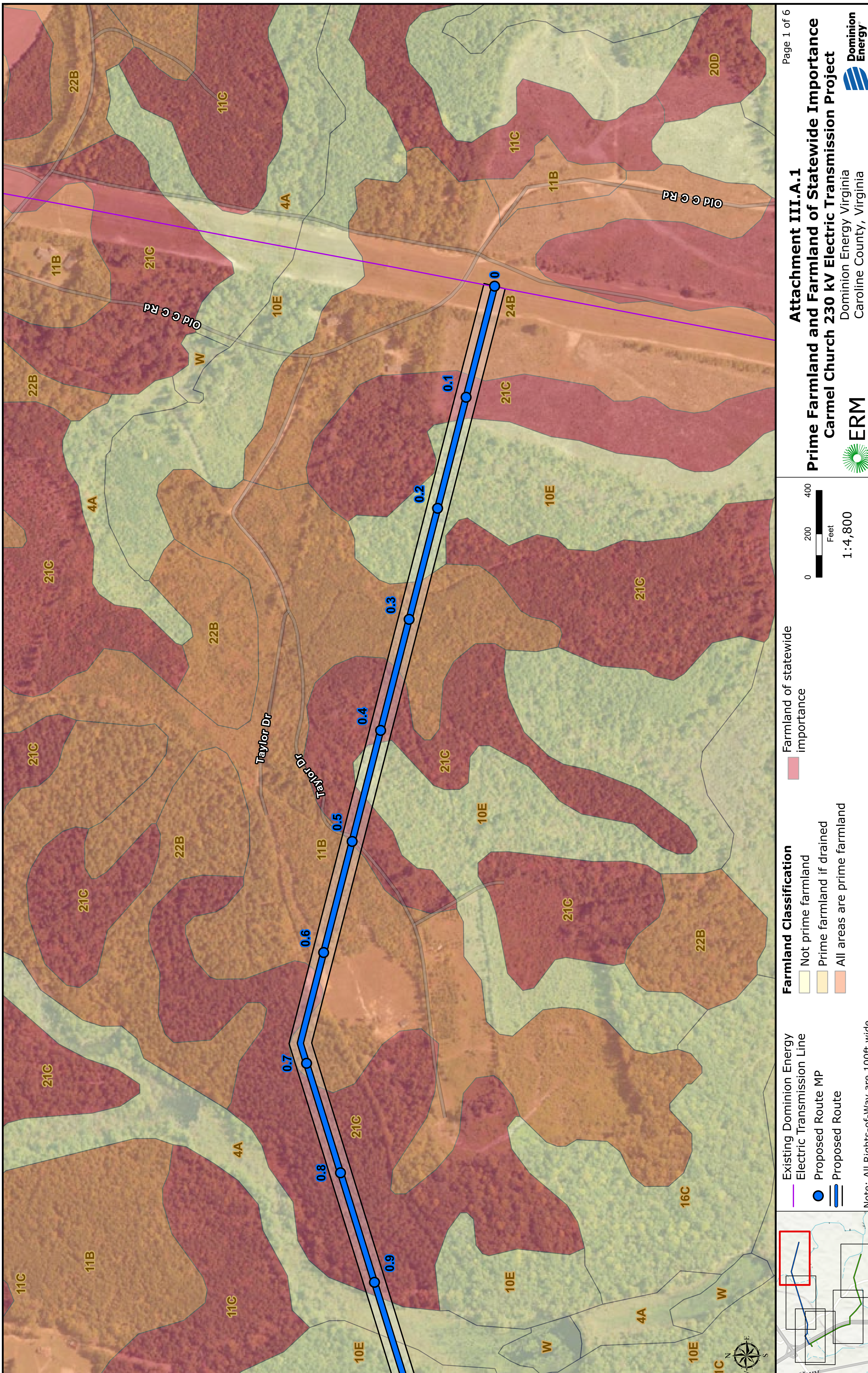
Page 5 of 5

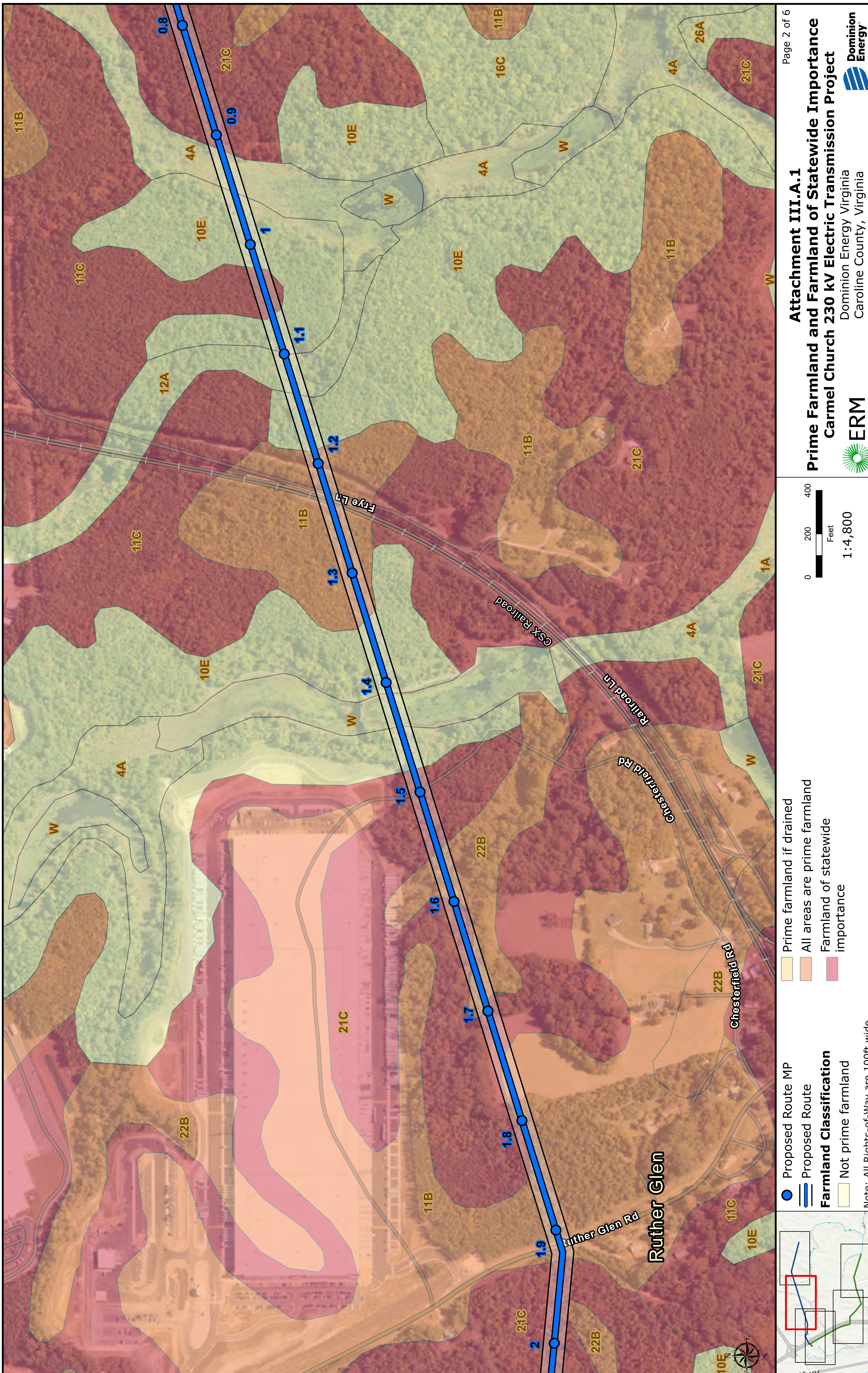
Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM
Dominion Energy



Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia


Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 1 of 6
ERM
Dominion Energy
Existing Dominion Energy Electric Transmission Line
Proposed Route MP
Proposed Route
Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance
Note: All Rights-of-Way are 100ft wide.
0
200
400
Feet
1:4,800
Old C C Rd
Taylor Dr
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
11B
11C
21C
22B
24B
4A
10E
20D
16C
W


Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 2 of 6
ERM
Dominion Energy
0 200 400
Feet
1:4,800
Proposed Route MP
Proposed Route
Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance
Note: All Rights-of-Way are 100ft wide.
0.8
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
Frye Ln
CSX Railroad
Railroad Ln
Chesterfield Rd
Ruther Glen Rd
Ruther Glen
avis Hwy
11B
21C
4A
10E
16C
26A
W
11C
12A
22B
1A

Proposed Switching Station
Proposed Route MP
Alternative Route 2
Proposed Route
Alternative Route 2

Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance

0 200 400
Feet
1:4,800

Note: All Rights-of-Way are 100ft wide.

Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM
Dominion Energy

Existing Dominion Energy Electric Transmission Line

Alternative Route 2

Alternative Route 2

Note: All Rights-of-Way are 100ft wide.

Farmland Classification

Not prime farmland

Prime farmland if drained

All areas are prime farmland

Farmland of statewide importance

0 200 400
Feet
1:4,800

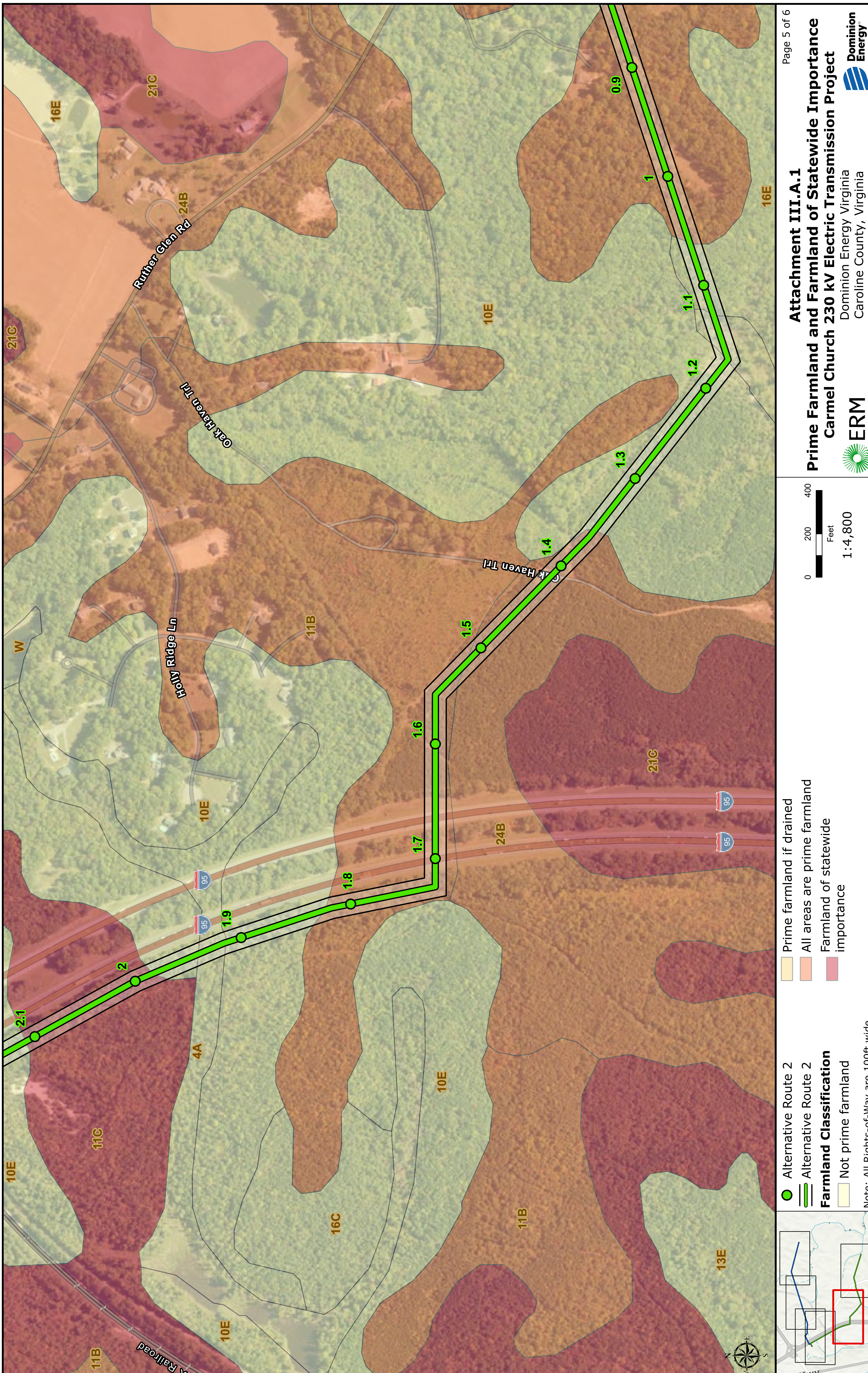
Page 4 of 6

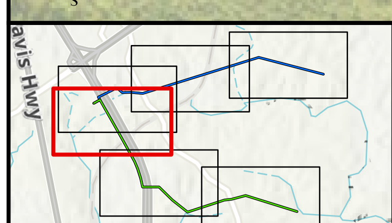
Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Carmel Church 230 kV Electric Transmission Project

ERM

Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy


Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Page 5 of 6
ERM
Dominion Energy
0 200 400
Feet
1:4,800
Alternative Route 2
Alternative Route 2
Farmland Classification
Not prime farmland
Prime farmland if drained
All areas are prime farmland
Farmland of statewide importance
Note: All Rights-of-Way are 100ft wide.
Ruther Glen Rd
Oak Haven Trl
Holly Ridge Ln
CSX Railroad
95
0.9
1
1.1
1.2
1.3
1.4
1.5
1.6
1.7
1.8
1.9
2
2.1
10E
11B
11C
13E
16C
16E
21C
24B
4A
W



- Proposed Switching Station
- Proposed Route MP
- Alternative Route 2
- Proposed Route
- Alternative Route 2

Farmland Classification

- Not prime farmland
- Prime farmland if drained
- All areas are prime farmland
- Farmland of statewide importance

0 200 400
Feet
1:4,800

Note: All Rights-of-Way are 100ft wide.

Page 6 of 6

Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM
Dominion Energy

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

B. Describe any public meetings the Applicant has had with neighborhood associations and/or officials of local, state or federal governments that would have an interest or responsibility with respect to the affected area or areas.

Response: Stakeholder Engagement

On July 1, 2024, the Company announced the proposed Projects to the public with a letter and launched an internet website dedicated to the proposed Projects: www.dominionenergy.com/carmelchurchrutherglen (the "Project website"). The website includes a description and benefits of the proposed Projects, an explanation of need, an interactive map where property owners can search project areas and see route options, copies of letters mailed to the community, and information on the Commission review process. The website also contains key project documents translated into Spanish.

The July 2024 project announcement letter was sent to properties of more than 7,000 parcels within the project study area. Each letter included information about the need for the Projects, a map of the study area, and a fact sheet. Additionally, the communication indicated an in-person community meeting would be held on July 23, 2024. Lastly, the letter explained how to contact the Project team to provide any feedback or questions. A copy of the July 2024 letter, study area map, and fact sheet are available on the Project website.

The Company mailed a postcard to the same list of property owners on July 12, 2024, to provide additional details about the July 23, 2024 community meeting. A copy of the July 2024 postcard is available on the Project website.

On July 18, 2024, the Company mailed a letter to property owners within the study area to share the initial routes under consideration. The letter also explained how to view the routes in detail on the Project website by using MapChat by ERM, an interactive mapping tool. A copy of the July 2024 letter is available on the Project website.

Newspaper print advertisements regarding the Projects and open house were placed in The Free Lance Star (20,195 circulation on Tuesday, July 16, 2024) and Mechanicsville Ashland Local (29,758 circulation on Wednesday, July 17, 2024).

Additionally, from July 12, 2024 to Oct. 13, 2024, the Company used paid digital and social media campaigns to drive awareness and educate the public regarding the Company's Projects, the interactive mapping tool, and the community meetings. Digital advertisements were displayed in English and Spanish. Copies of the digital advertisements, print advertisements, and digital advertisement campaign results are included as Attachment III.B.1.

The July 23, 2024 community meeting was held from 5:00 p.m. to 7:00 p.m. at the Caroline Family YMCA, and there were 89 community members in attendance. The Company answered questions from the community in an open house-style meeting where community members could speak with Project team members individually. Traditional open house materials have been posted on the website for the proposed Projects, including simulations of the proposed Projects from key locations. The key location simulations are included as Attachment III.B.2.

The Company mailed a postcard to the same list of property owners on September 3, 2024 to provide additional details about a second community meeting on Sept. 10, 2024 community meeting. A copy of the September 2024 postcard is available on the Project website (www.dominionenergy.com/carmelchurchrutherglen).

The September 17, 2024 community meeting was held from 5:00 p.m. to 7:00 p.m. at Caroline High School and there were 30 community members in attendance. The Company began the meeting with a presentation, where project team members provided an update on the project and next steps. Then the meeting proceeded into open house style where project team members answered questions from the community. Simulations of various points along the route were on display. Open house materials have been posted on the website for the proposed Projects, including a recording of the presentation.

On Nov. 18, 2024, the Company mailed a letter to property owners within the project study areas to provide an update to the project, including routes that have changed, or were removed from consideration. A copy of the letter is available on the Project website.

Environmental Justice

Ruther Glen Loop Proposed Route

As set forth in Section 4.5. of the Routing Study, the Company researched the demographics of the surrounding communities using data from the U.S. Census Bureau's American Community Survey 5-Year Estimates (2018-2022). This review revealed that four Census Block Groups ("CBGs") are located within one mile of the Proposed Route, inclusive of the proposed switching station. A review of census data for several demographic characteristics identified populations within the Project study area that meet the Virginia Environmental Justice Act ("VEJA") thresholds for Environmental Justice Communities ("EJ Communities") (Va. Code §§ 2.2-234, 2.2-235).

Of the four CBGs within the Project study area, one CBG is crossed by the Project's Proposed Route. The CBG crossed (CT 0305.03 BG 1) appears to contain populations of color and populations with less than a high school education, but do not meet low-income thresholds.

Carmel Church Loop Proposed Route

As set forth in Section 4.5. of the Routing Study, the Company researched the demographics of the surrounding communities using data from the U.S. Census Bureau's American Community Survey 5-Year Estimates (2018-2022). This review revealed that four Census Block Groups ("CBGs") are located within one mile of the Proposed Route, inclusive of the proposed switching station. A review of census data for several demographic characteristics identified populations within the Project study area that meet the Virginia Environmental Justice Act ("VEJA") thresholds for Environmental Justice Communities ("EJ Communities") (Va. Code §§ 2.2-234, 2.2-235).

Of the four CBGs within the Project study area, two CBGs are crossed by the Project's Proposed Route. The CBGs crossed (CT 0306.00 BG 2 & CT 0302.01 BG 1) appear to contain populations of color and populations with less than a high school education, but do not meet low-income thresholds.

As set forth above in this Section III.B, the Company has engaged extensively all communities within the Projects' study areas, including people in the EJ Community CGBs discussed herein. This engagement has included accommodations for Spanish and Vietnamese speakers at the community meetings, and translations of Project information into other languages. The Company believes that 1) its work has allowed for the fair treatment and meaningful involvement of all interested people, regardless of race, color, national origin, income, faith, or disability, and 2) the Projects' Proposed Routes minimize potential impacts to EJ Communities and other populations, and will not result in a disproportionate impact on EJ Communities.

In addition to its evaluation of impacts, the Company has and will continue to engage the EJ Communities in a manner that allows them to meaningfully participate in development of the Projects and the approval process so that the Company can take their views and input into consideration. See Attachment III.B.3 for a copy of the Company's Environmental Justice Policy.

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

Pre-Event
Print

Print

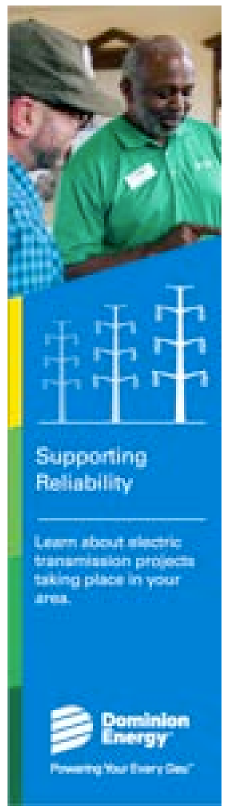
charles ryan associates

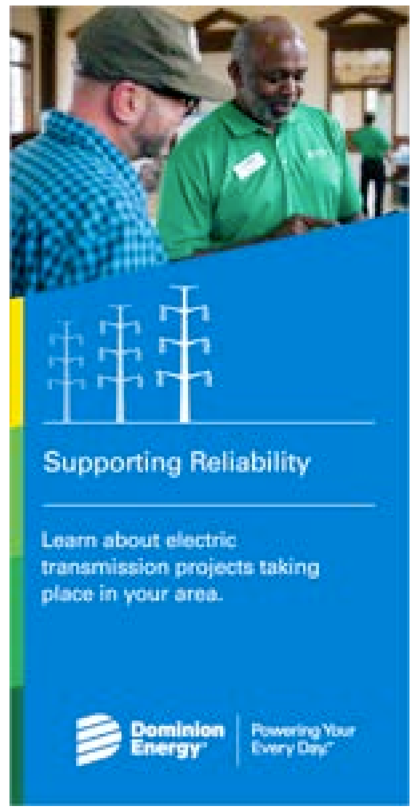
Dominion Energy Electric Transmission Contact:
Ann Gordon Mickel, Ann.Gordon.Mickel@dominionenergy.com

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

Announcement Display
English





charles ryan associates

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

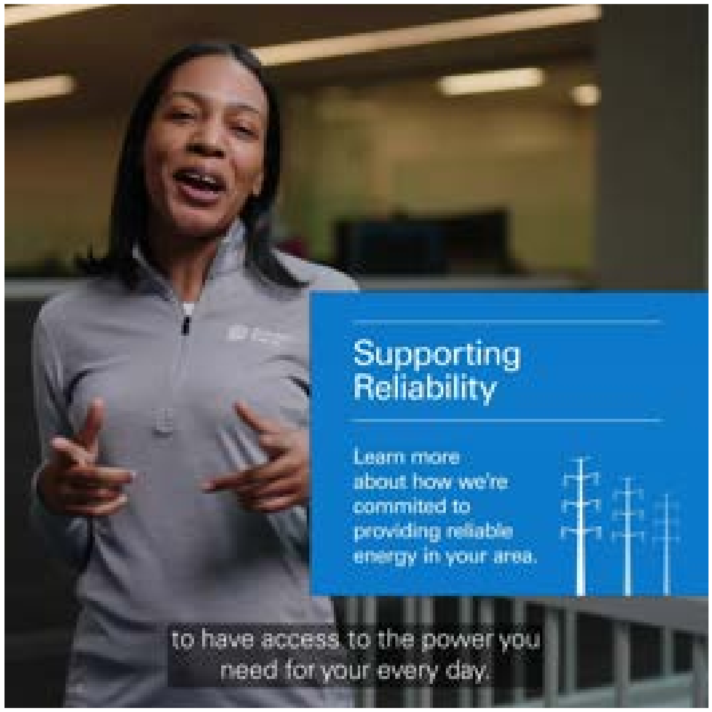
Announcement Display
Spanish

Dominion Energy Electric Transmission

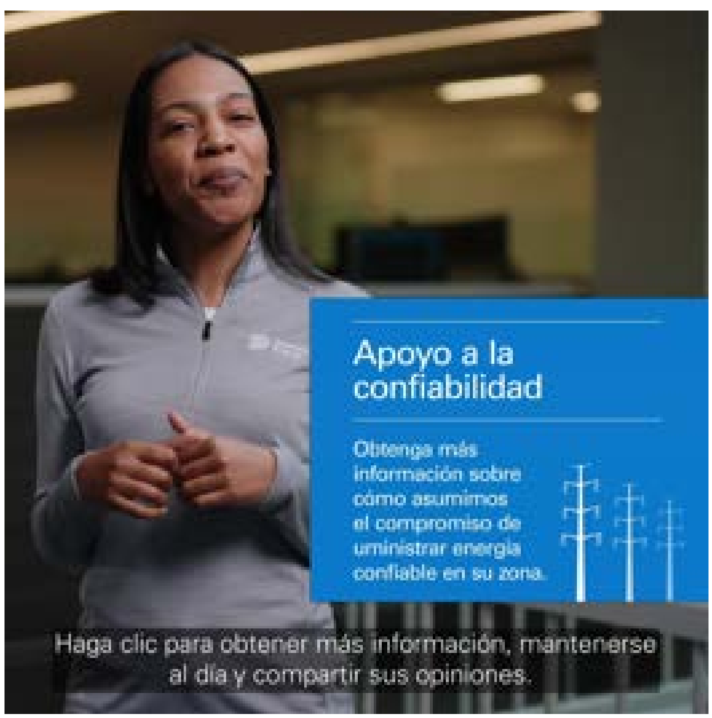
Carmel Church
Ruther Glen Project

Announcement
Social Videos

Announcement Video English (Click to Play)



Announcement Video Spanish (Click to Play)



Dominion Energy Electric Transmission

Carmel Church Project

Announcement
Social Images

Announcement – Nextdoor – 1200 x 628

charles ryan associates

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

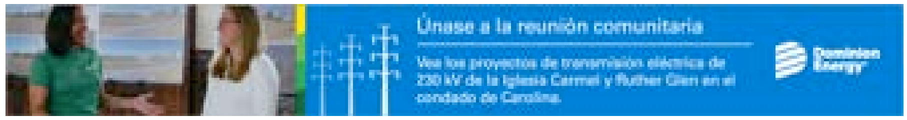
Pre-Event Display
English

charles ryan associates

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

Pre-Event Display
Spanish

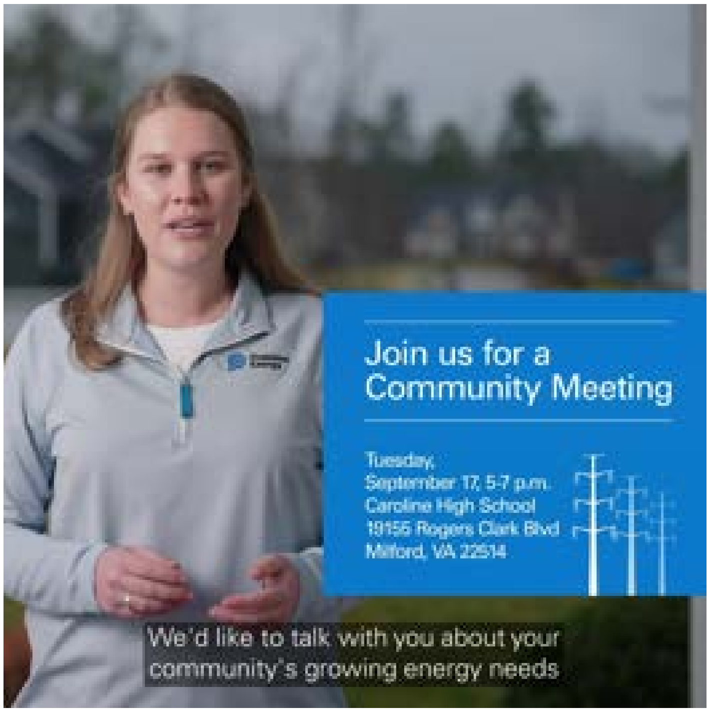


Dominion Energy Electric Transmission

Carmel Church
Ruther Glen Project

Pre-Event
Social Videos

Pre-Event Video English (Click to Play)



Pre-Event Video Spanish (Click to Play)

charles ryan associates

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

Pre-Event
Print

Print

Dominion Energy Electric Transmission

Carmel Church
Ruther Glen Project

Pre-Event
Responsive Display

Pre-Event – Native – 1200x627

Pre-Event – Streaming Audio
620 x 620 & 1200 x 1200

charles ryan associates

Dominion Energy Electric Transmission

Carmel Church
Ruther Glen Project

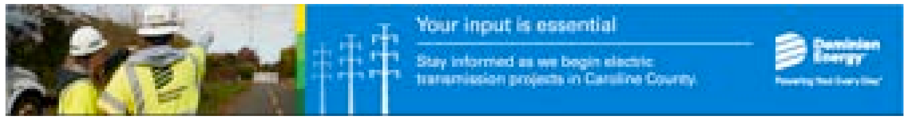
Pre-Event
Social Images

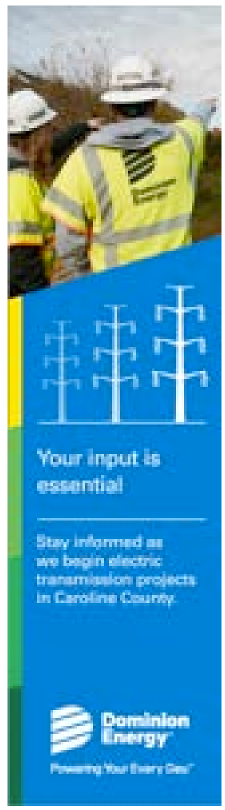
Pre-Event – Nextdoor – 1200 x 628

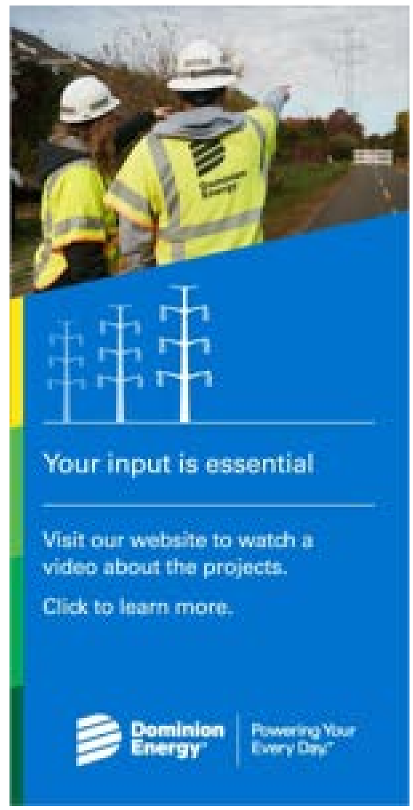
Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

Post-Event Display
English







charles ryan associates

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

Post-Event Display
Spanish

Dominion Energy
Electric Transmission

Carmel Church
Ruther Glen Project

Social Videos

Post-Event Video (Click to Play)

Post-Event Spanish Video (Click to Play)

Dominion Energy Electric Transmission

Carmel Church
Ruther Glen Project

Post-Event
Responsive Display

Post-Event – Native – 1200x627

Post Event – Streaming Audio
620 x 620 & 1200 x 1200

Dominion Energy Electric Transmission

Carmel Church
Ruther Glen Project

Post-Event
Social Images

Post-Event – Nextdoor – 1200 x 628

DE Transmission

Carmel Church & Ruther Glen

December 5, 2024

charles ryan associates

Dominion Energy®

DET | Carmel Church & Ruther Glen | 7/12/24 – 8/2/24 | Overall Report

1,277,363 impressions
of ads were delivered to target audiences.

13,600 clicks
have taken audiences to the landing pages.

136,110 video views with an average 40.32% VCR.

1.06% CTR
Most CTRs near or above benchmarks.

80,567 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The 300x600 Display Pre-Event ad had the highest CTR at 9.20%, which is 1,740% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 7/12/24 – 7/23/24 | English Pre-Event Report

474,758 impressions
of ads were delivered to target audiences.

5,194 clicks
have taken audiences to the landing pages.

72,705 video views with an average 43.55% VCR.

1.09% CTR
Most CTRs near or above benchmarks.

35,108 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The 300x600 Display Pre-Event ad had the highest CTR at 9.20%, which is 1,740% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 7/12/24 – 7/23/24 | Spanish Pre-Event Report

122,512 impressions
of ads were delivered to target audiences.

1,694 clicks
have taken audiences to the landing pages.

10,354 video views with an average 46.27% VCR.

1.38% CTR
Most CTRs near or above benchmarks.

9,524 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Spanish 300x600 Display Pre-Event ad had the highest CTR at 6.01%, which is 1,102% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 7/24/24 – 8/2/24 | English Post-Event Report

566,001 impressions
of ads were delivered to target audiences.

5,606 clicks
have taken audiences to the landing pages.

45,510 video views with an average 33.05% VCR.

0.99% CTR
Most CTRs near or above benchmarks.

30,006 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Post-Event 300x600 Display ad had the highest CTR at 4.34%, which is 768% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 7/24/24 – 8/2/24 | Spanish Post-Event Report

114,092 impressions
of ads were delivered to target audiences.

1,106 clicks
have taken audiences to the landing pages.

7,541 video views with an average 44.92% VCR.

0.97% CTR
Most CTRs near or above benchmarks.

5,929 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Spanish Post-Event 300x600 Display ad had the highest CTR at 3.97%, which is 694% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

Summary:

- The Pre-Event 300x600 Display ad was the highest-performing ad with a CTR of 9.20%.
- Females 65+ were the top engagers within the English campaigns, while males 25-44 were the top engagers within the Spanish campaigns.
- Facebook was the top-performing platform for the campaign and ended the campaign with a CTR 119% over the 0.90% Facebook benchmark.
- Video ads performed well in this campaign with 136,110 video views. There were 54,882 completed video views across the platforms for a total VCR of 40.32%.
- The electricity provider, energy industry information and electric companies audience segments had the highest CTRs on Google.

Platform Benchmarks:
Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% |
LinkedIn CTR Benchmark: 0.26%

DE Transmission

Carmel Church & Ruther Glen

charles ryan associates

Dominion Energy

DET | Carmel Church & Ruther Glen | 9/6/24 – 10/13/24 | Overall Report

1,013,542 impressions
of ads were delivered to target audiences.

9,215 clicks
have taken audiences to the landing pages.

154.493 video views with an average 45.29% VCR.

0.91% CTR
Most CTRs near or above benchmarks.

71,547 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The DET Spanish 160x600 Display Pre-Event ad had the highest CTR at 13.74%, which is 2,648% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 9/6/24 – 9/17/24 | English Pre-Event Report

512,692 impressions
of ads were delivered to target audiences.

2,915 clicks
have taken audiences to the landing pages.

81,795 video views with an average 41.96% VCR.

0.57% CTR
Most CTRs near or above benchmarks.

32,901 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The 300x600 Display Pre-Event ad had the highest CTR at 4.99%, which is 898% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 9/6/24 – 9/17/24 | Spanish Pre-Event Report

151,502 impressions
of ads were delivered to target audiences.

1,174 clicks
have taken audiences to the landing pages.

5,276 video views with an average 15.81% VCR.

0.77% CTR
Most CTRs near or above benchmarks.

5,362 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Spanish 160x600 Display Pre-Event ad had the highest CTR at 13.74%, which is 2,648% higher than the 0.50% Display benchmark.

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 10/4/24 – 10/13/24 | English Post-Event Report

277,072 impressions
of ads were delivered to target audiences.

4,195 clicks
have taken audiences to the landing pages.

62,303 video views with an average 52.17% VCR.

1.51% CTR
Most CTRs near or above benchmarks.

28,324 ad engagements
such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Post-Event 300x250 Display ad had the highest CTR at 5.02%, which is 904% higher than the 0.50% Display benchmark.

154

Attachment III.B.1

Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

DET | Carmel Church & Ruther Glen | 10/4/24 – 10/13/24 | Spanish Post-Event Report

72,276 impressions

of ads were delivered to target audiences.

931 clicks

have taken audiences to the landing pages.

5,119 video views with an average 45.15% VCR.

1.29% CTR

Most CTRs near or above benchmarks.

4,960 ad engagements

such as reactions, likes, comments, shares and saves have been made on the ads.

Notable Creative

The Spanish Post-Event 300x600 Display ad had the highest CTR at 5.21%, which is 942% higher than the 0.50% Display benchmark.

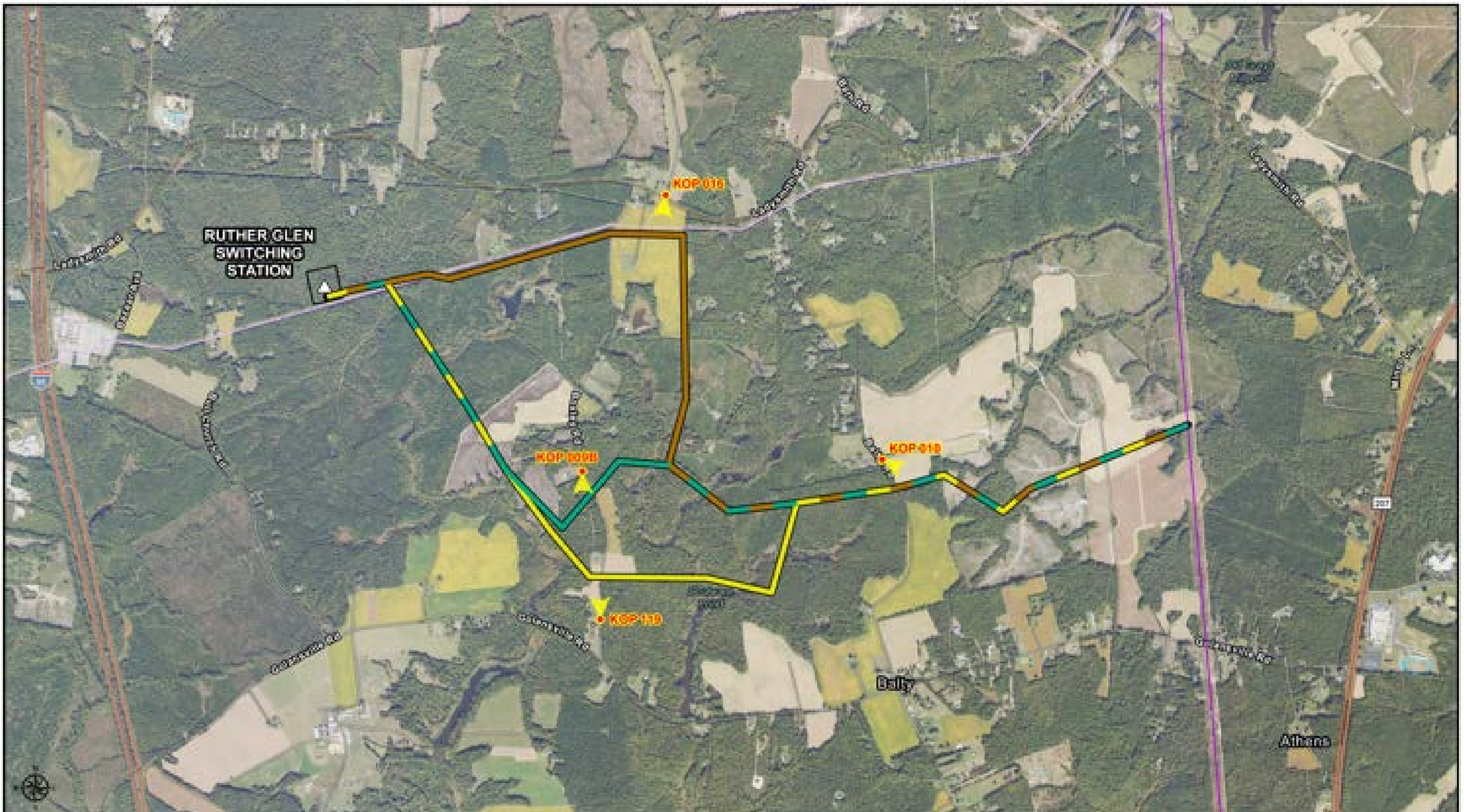
Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% | Google Search CTR Benchmark: 3.17% | Google Display CTR Benchmark: 0.50% | Google Video Benchmark: 15%| Nextdoor CTR Benchmark: 0.15%

Summary:

- The Spanish Pre-Event 160x600 Display ad was the highest-performing ad with a CTR of 13.74%.
- Females 65+ were the top engagers within the English campaigns, while males 25-44 were the top engagers within the Spanish campaigns.
- Nextdoor was the top-performing platform for the campaign and ended the campaign with a CTR 353% over the 0.15% Nextdoor benchmark.
- Video ads performed well in this campaign with 154,493 video views. There were 69,968 completed video views across the platforms for a total VCR of 45.29%.
- The electricity provider, energy industry information and electric companies audience segments had the highest CTRs on Google.

December 5, 2024

Platform Benchmarks:
Facebook CTR Benchmark: 0.90% | Twitter CTR Benchmark: 1.11% |
LinkedIn CTR Benchmark: 0.26%



△ Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Alternative Route 4
Alternative Route 6
KOP View Direction

0 750 1,500
Feet
1:20,000

Attachment III.B.2
Overview Map of Routes Showing Visual Simulation Locations
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

ERM

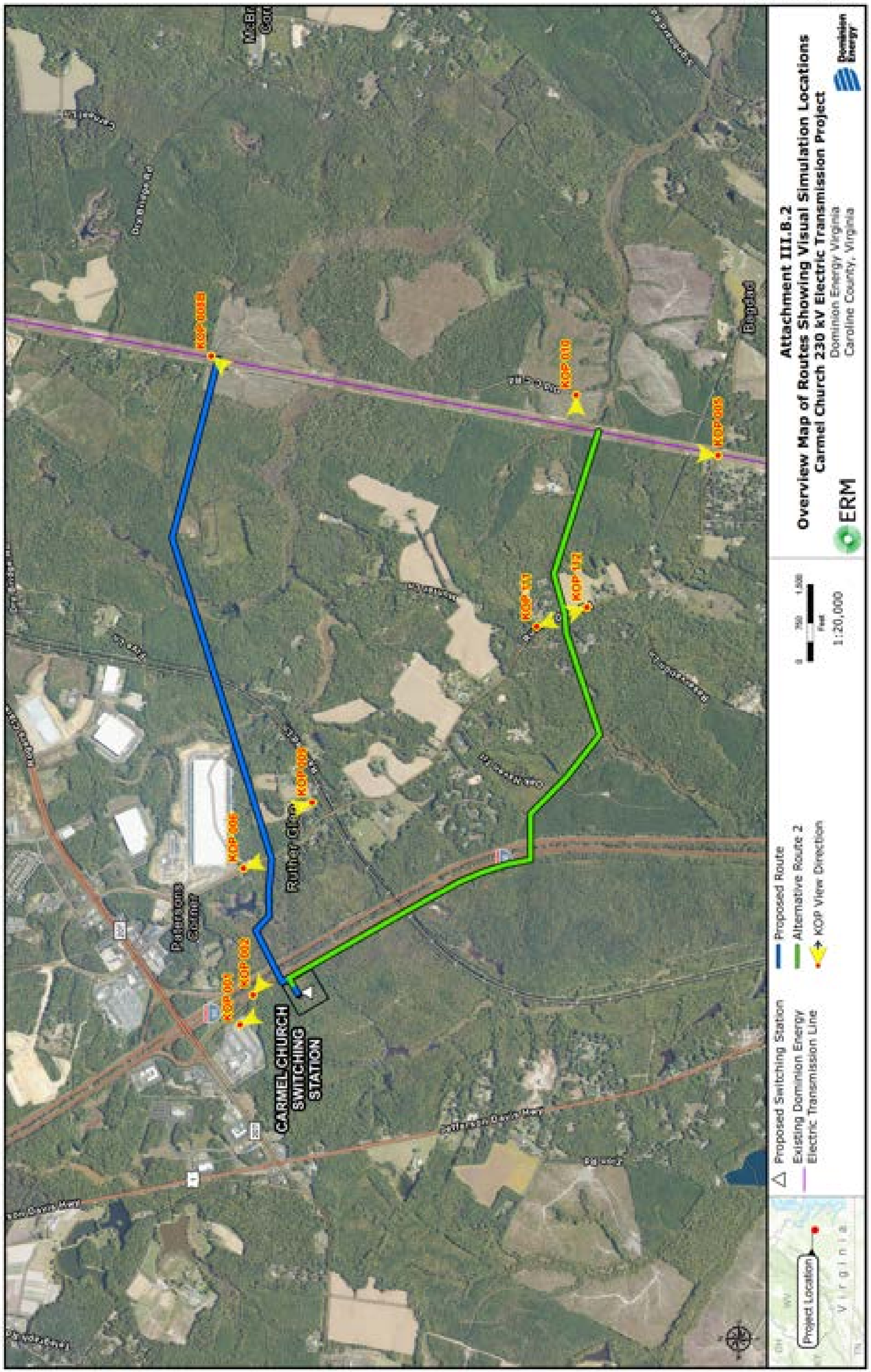

Attachment III.B.2
Overview Map of Routes Showing Visual Simulation Locations
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Proposed Route
Alternative Route 2
KOP View Direction
1:20,000
Feet
Project Location
Virginia
CARMEL CHURCH SWITCHING STATION
KOP 001
KOP 002
KOP 006
KOP 008
KOP 008B
KOP 010
KOP 005
KOP 111
KOP 112
Ruther Glen
Jefferson Davis Hwy
Bagdad

Figure 1. Aerial photograph depicting land use and photo view for 016-5243.

RUTHER GLEN
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 007

Ladysmith Rd

Figure 2
Route: 4
Date:07/25/2024
Time: 03:53 pm
Viewing Direction: Southwest
Distance to closest feature: 0.6 miles

Legend

- KOP View Direction
- Existing REC Line
- Route 4
- 100ft Right-of-Way

Note: Project components illustrated are based on proposed preliminary designs.
The images contained on this page show the proposed project within a wider landscape context and are not representative of scale and distance when viewed from the actual view point.

Figure 3. Aerial photograph depicting land use and photo view for 016-5243.


EXISTING CONDITIONS


PROPOSED CONDITIONS

RUTHER GLEN
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 007

Ladysmith Rd

Figure 4
Route: 5
Date:07/25/2024
Time: 03:53 pm
Viewing Direction: South
Distance to closest feature: 0.2 miles

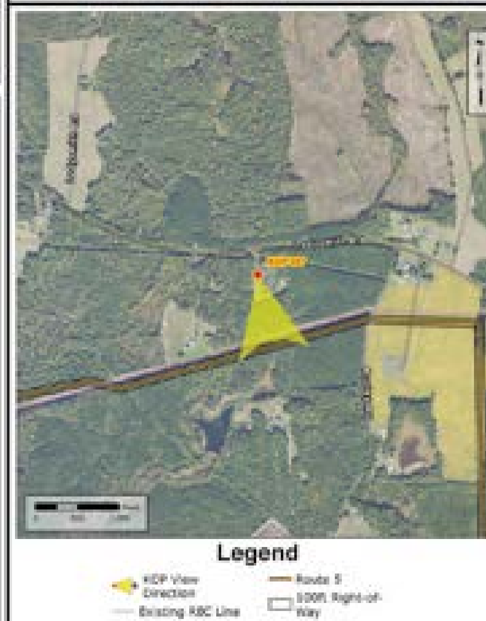


Figure 5. Aerial photograph depicting land use and photo view for 016-5243.

RUTHER GLEN
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 007

Ladysmith Rd

Figure 6
Route: 6
Date:07/25/2024
Time: 03:53 pm
Viewing Direction: Southwest
Distance to closest feature: 0.6 miles

EXISTING CONDITIONS

PROPOSED CONDITIONS

Legend

KOP View Direction
Existing REC Line
Route 6
100ft Right-of-Way

Note: Project components illustrated are based on proposed preliminary designs.
The images contained on this page show the proposed project within a wider landscape context and are not representative of scale and distance when viewed from the actual view point.

Figure 1. Aerial photograph depicting land use and photo view for 016-5097.

EXISTING CONDITIONS

PROPOSED CONDITIONS

CARMEL CHURCH
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 006

Ladysmith Rd

Figure 2
Route: 1
Date:07/24/2024
Time: 10:10 am
Viewing Direction: Southeast
Distance to closest feature: 0.1 miles

Legend

KOP View Direction
Route 1
Right-of-Way
Substation Boundary

Figure 3. Aerial photograph depicting land use and photo view for 016-5165.

CARMEL CHURCH
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

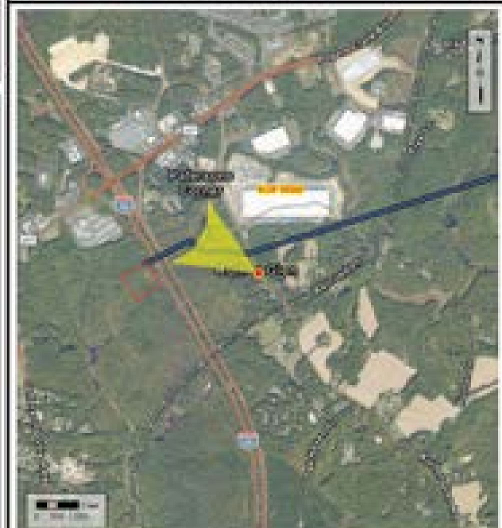
KOP 008

Old C C Rd

Figure 4
Route: 1
Date:09/03/2024
Time: 1:15 pm
Viewing Direction: Northwest
Distance to closest feature: 0.1 miles

EXISTING CONDITIONS

PROPOSED CONDITIONS



Legend

KOP View Direction
Route 1
Right-of-Way
Substation Boundary

Note: Project components illustrated are based on proposed preliminary designs.
The images contained on this page show the proposed project within a wider landscape context and are not representative of scale and distance when viewed from the actual view point.

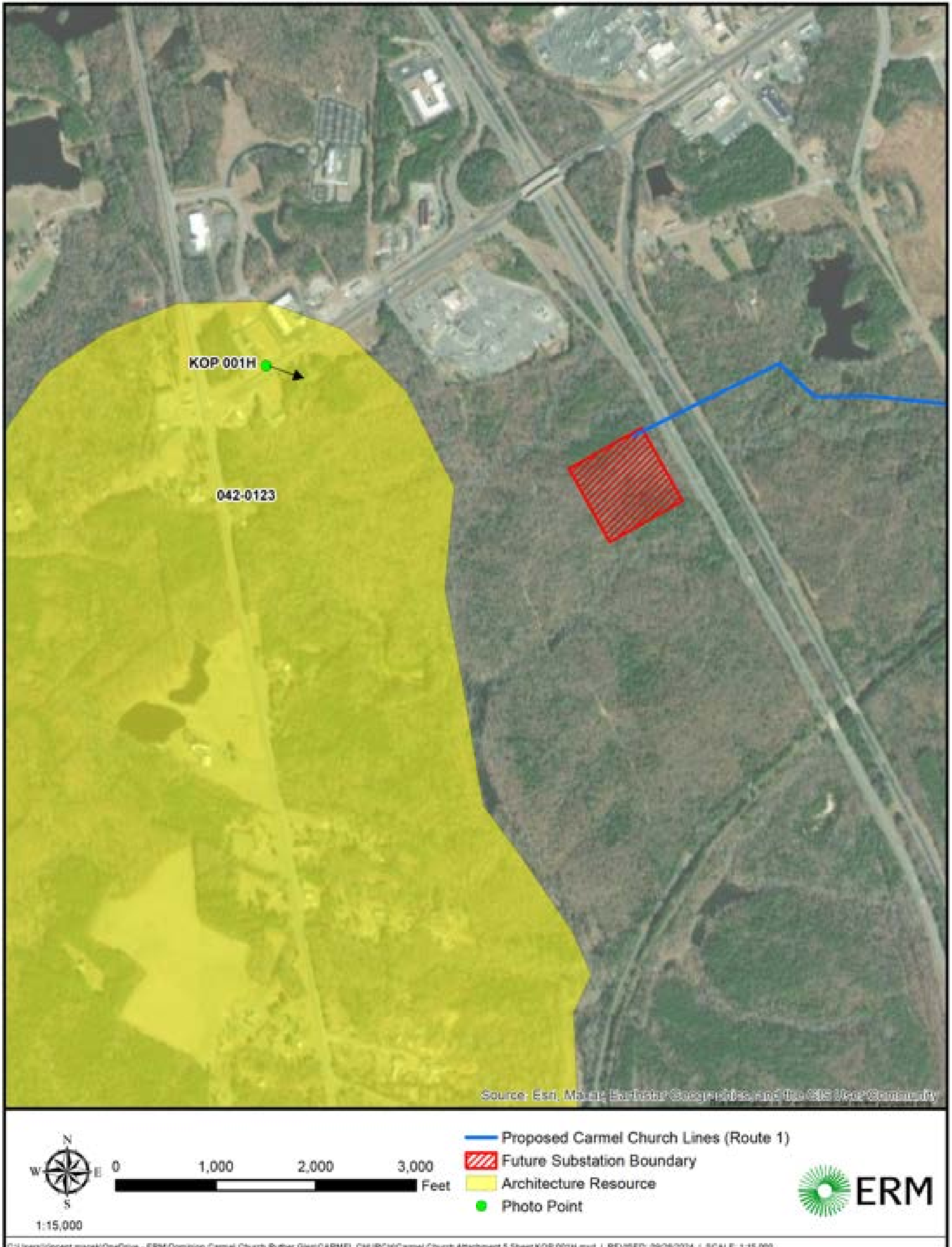


Figure 5. Aerial photograph depicting land use and photo view for 042-0123

EXISTING CONDITIONS

PROPOSED CONDITIONS

CARMEL CHURCH
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 001H

Rogers Clark Blvd

Figure 6
Route: 1
Date:09/03/2024
Time: 11:39 am
Viewing Direction: Southeast
Distance to closest feature: 0.6 miles

Note: Project components illustrated are based on proposed preliminary designs.
The images contained on this page show the proposed project within a wider landscape context and are not representative of scale and distance when viewed from the actual view point.

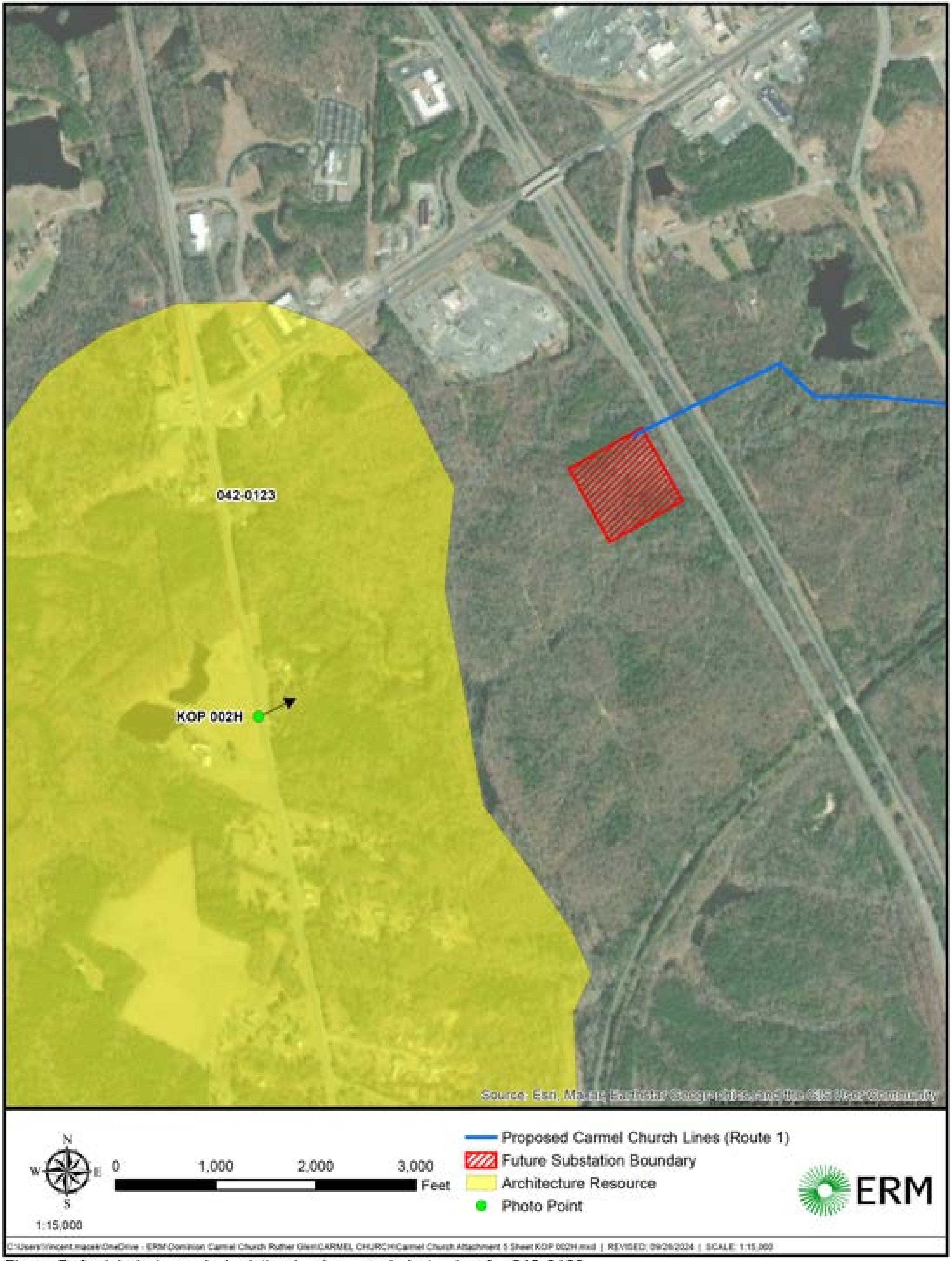


Figure 7. Aerial photograph depicting land use and photo view for 042-0123

CARMEL CHURCH
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 002H

Jefferson Davis Hwy

Figure 8
Route: 1
Date:09/03/2024
Time: 11:58 am
Viewing Direction: Southeast
Distance to closest feature: 0.7 miles

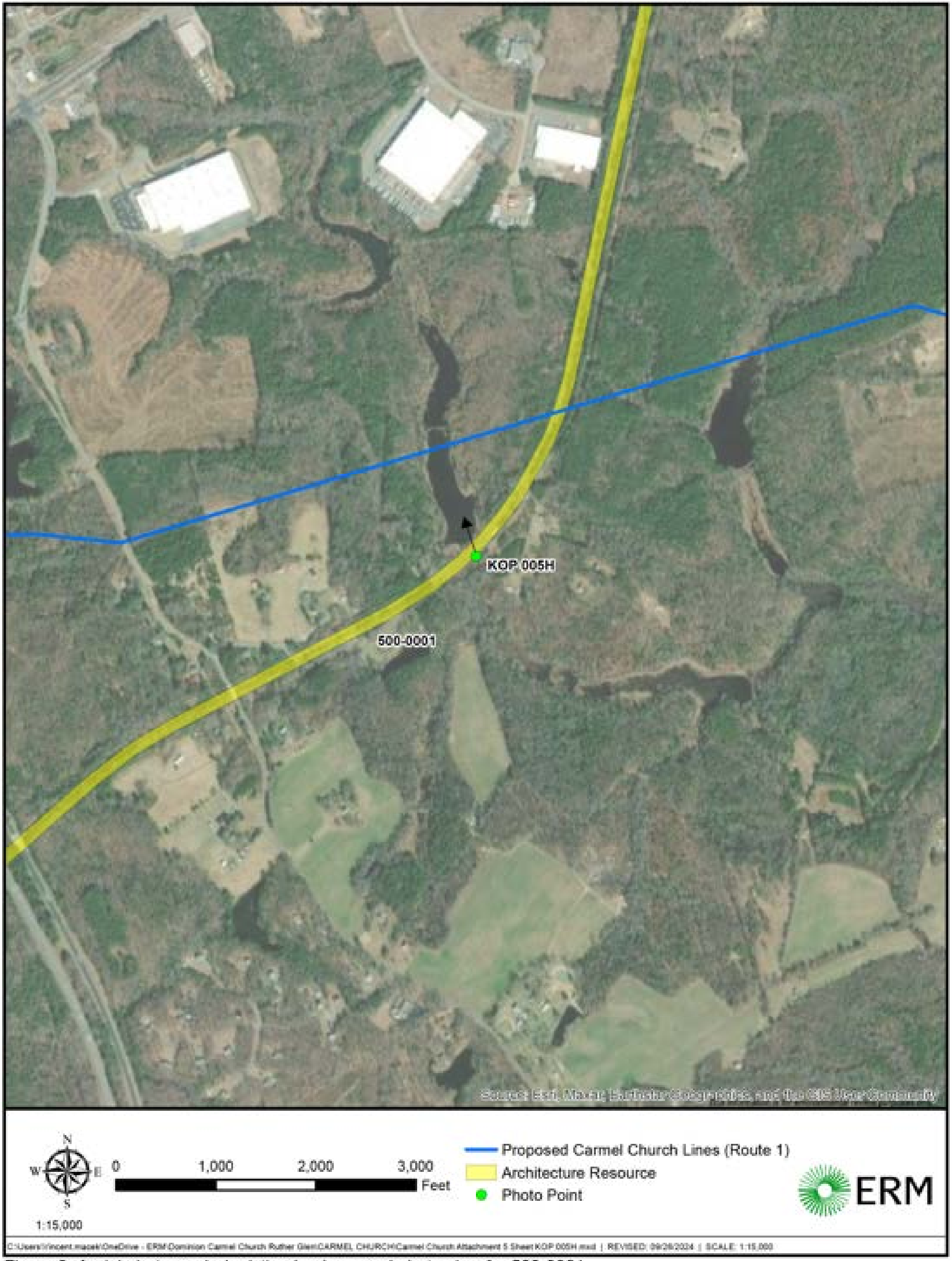


Figure 9. Aerial photograph depicting land use and photo view for 500-0001.

CARMEL CHURCH

230 kV Electric Transmission Project

Dominion Energy Virginia

Caroline County, Virginia

Dominion Energy

KOP 005H

Railroad Ln

Figure 10

Route: 1

Date:09/03/2024

Time: 01:37 pm

Viewing Direction: Northwest

Distance to closest feature: 0.1 miles

Legend

KOP View Direction

Route 1

Existing Dominion Transmission Line

Right-of-Way

Substation Boundary

Figure 11. Aerial photograph depicting land use and photo view for 016-5097.

EXISTING CONDITIONS

PROPOSED CONDITIONS

CARMEL CHURCH

230 kV Electric Transmission Project

Dominion Energy Virginia

Caroline County, Virginia

Dominion Energy

KOP 006

Railroad Ln

Figure 12

Route: 2

Date:07/24/2024

Time: 10:10 am

Viewing Direction: Southwest

Distance to closest feature: 0.4 miles

Legend

KOP View Direction

Route 2

Right-of-Way

Substation Boundary

Figure 13. Aerial photograph depicting land use and photo view for 016-5165.

EXISTING CONDITIONS

PROPOSED CONDITIONS

CARMEL CHURCH
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 008H

Ruther Glen Rd

Figure 14
Route: 2
Date:09/03/2024
Time: 1:15 pm
Viewing Direction: Northwest
Distance to closest feature: 0.4 miles

Legend

KOP View Direction
Route 2
Route 2 Substation Boundary
Route 2,100ft ROW

Note: Project components illustrated are based on proposed preliminary designs.
The images contained on this page show the proposed project within a wider landscape context and are not representative of scale and distance when viewed from the actual view point.

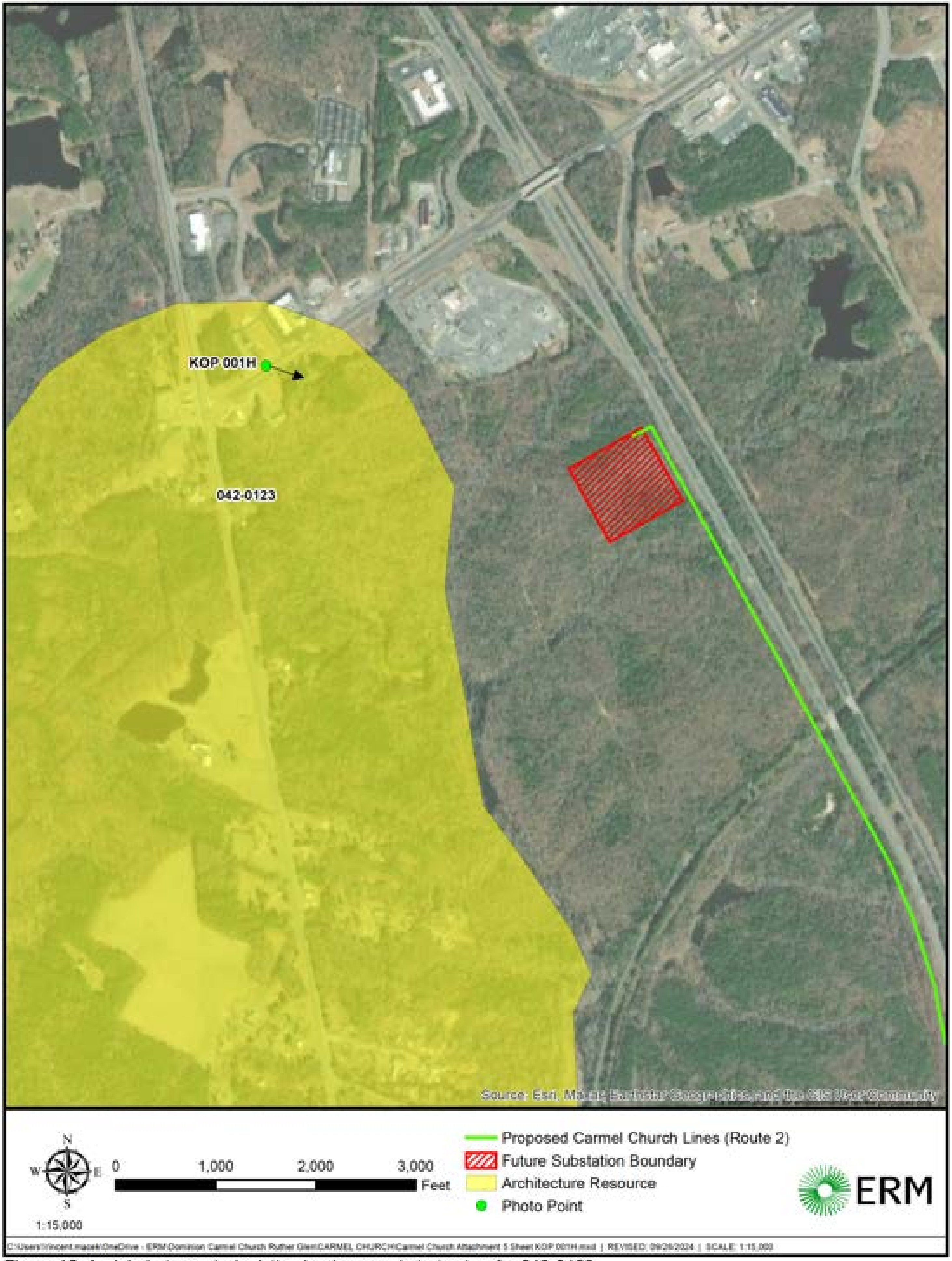


Figure 15. Aerial photograph depicting land use and photo view for 042-0123

EXISTING CONDITIONS

PROPOSED CONDITIONS

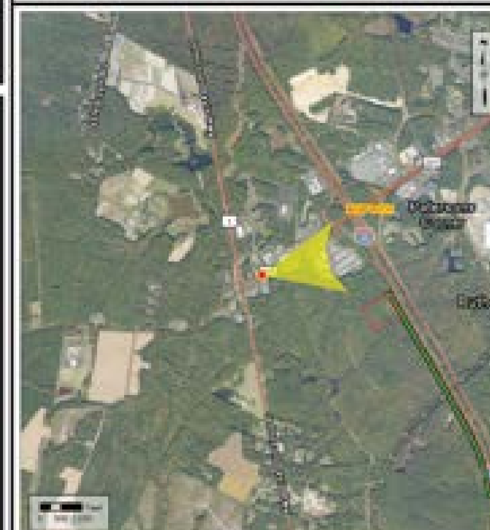
CARMEL CHURCH
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 001H

Rogers Clark Blvd

Figure 16
Route: 2
Date:09/03/2024
Time: 11:39 am
Viewing Direction: East
Distance to closest feature: 0.6 miles



Legend

KOP View Direction
Route 2
Right-of-way
Substation Boundary

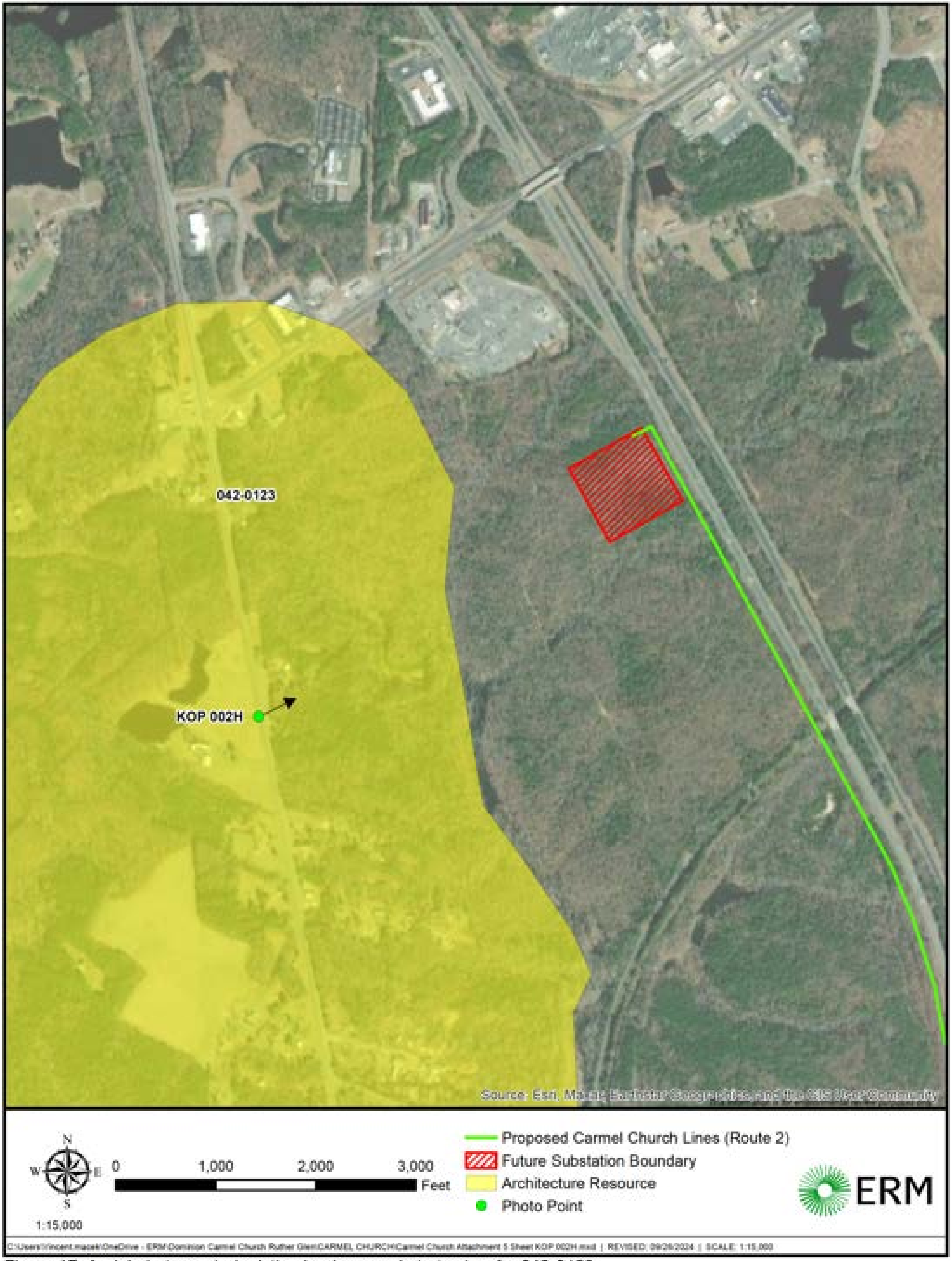


Figure 17. Aerial photograph depicting land use and photo view for 042-0123

CARMEL CHURCH
230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia

Dominion Energy

KOP 002H

Jefferson Davis Hwy

Figure 18
Route: 2
Date:09/03/2024
Time: 11:58 am
Viewing Direction: East
Distance to closest feature: 0.7 miles

EXISTING CONDITIONS

PROPOSED CONDITIONS

Legend

KOP View Direction
Route 2
Right-of-Way
Substation Boundary

Note: Project components illustrated are based on proposed preliminary designs.
The images contained on this page show the proposed project within a wider landscape context and are not representative of scale and distance when viewed from the actual view point.

Figure 19. Aerial photograph depicting land use and photo view for 500-0001.

CARMEL CHURCH

230 kV Electric Transmission Project

Dominion Energy Virginia

Caroline County, Virginia

Dominion Energy

KOP 009

Chesterfield Rd

Figure 20

Route: 2

Date:07/24/2024

Time: 10:30 am

Viewing Direction: West

Distance to closest feature: 0.5 miles

Legend

KOP View Direction

Route 2

Right-of-Way

Substation Boundary

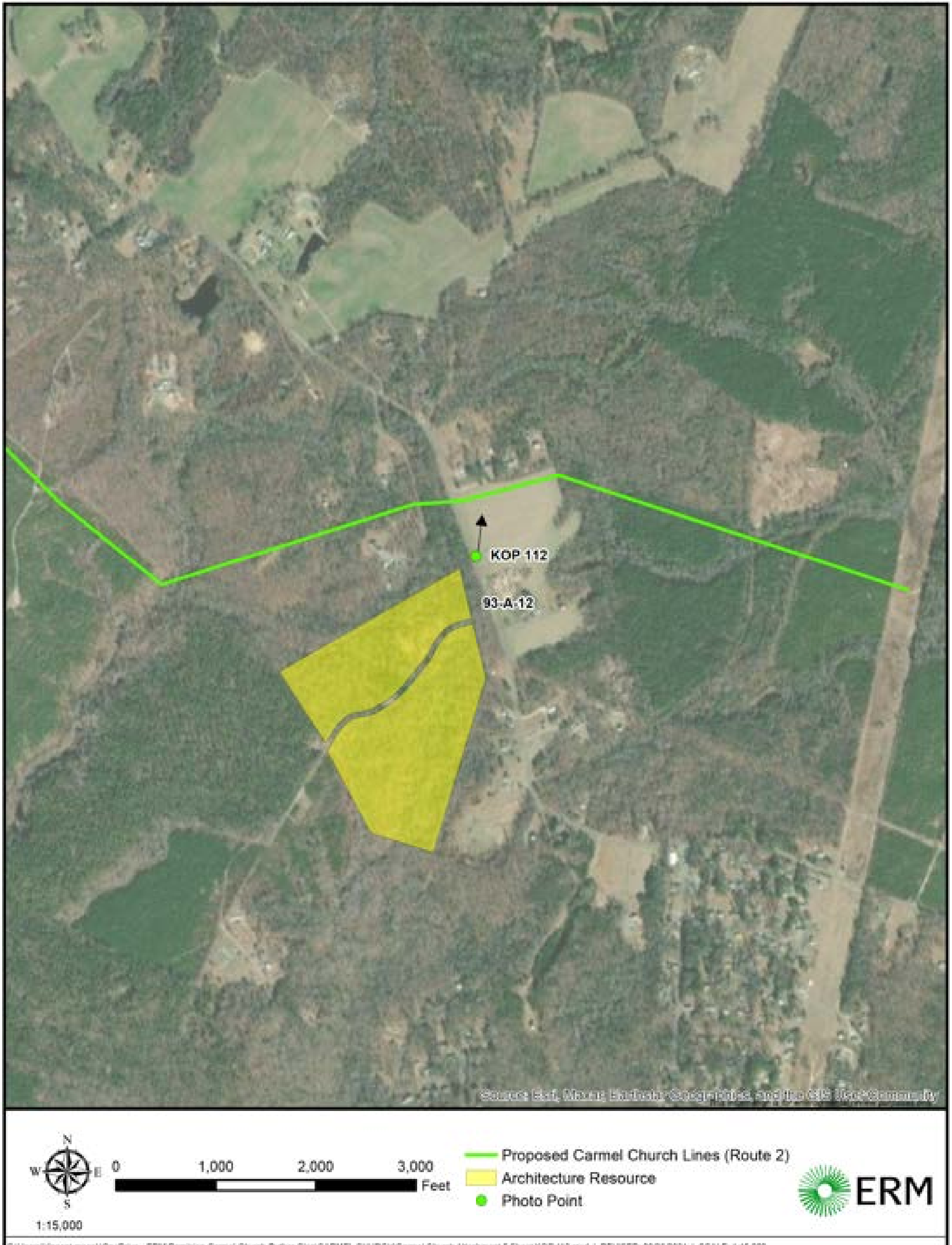


Figure 21. Aerial photograph depicting land use and photo view for 93-A-12.

EXISTING CONDITIONS

PROPOSED CONDITIONS

CARMEL CHURCH

230 kV Electric Transmission Project

Dominion Energy Virginia

Caroline County, Virginia

Dominion Energy

KOP 112

Ruther Glen Rd

Figure 22

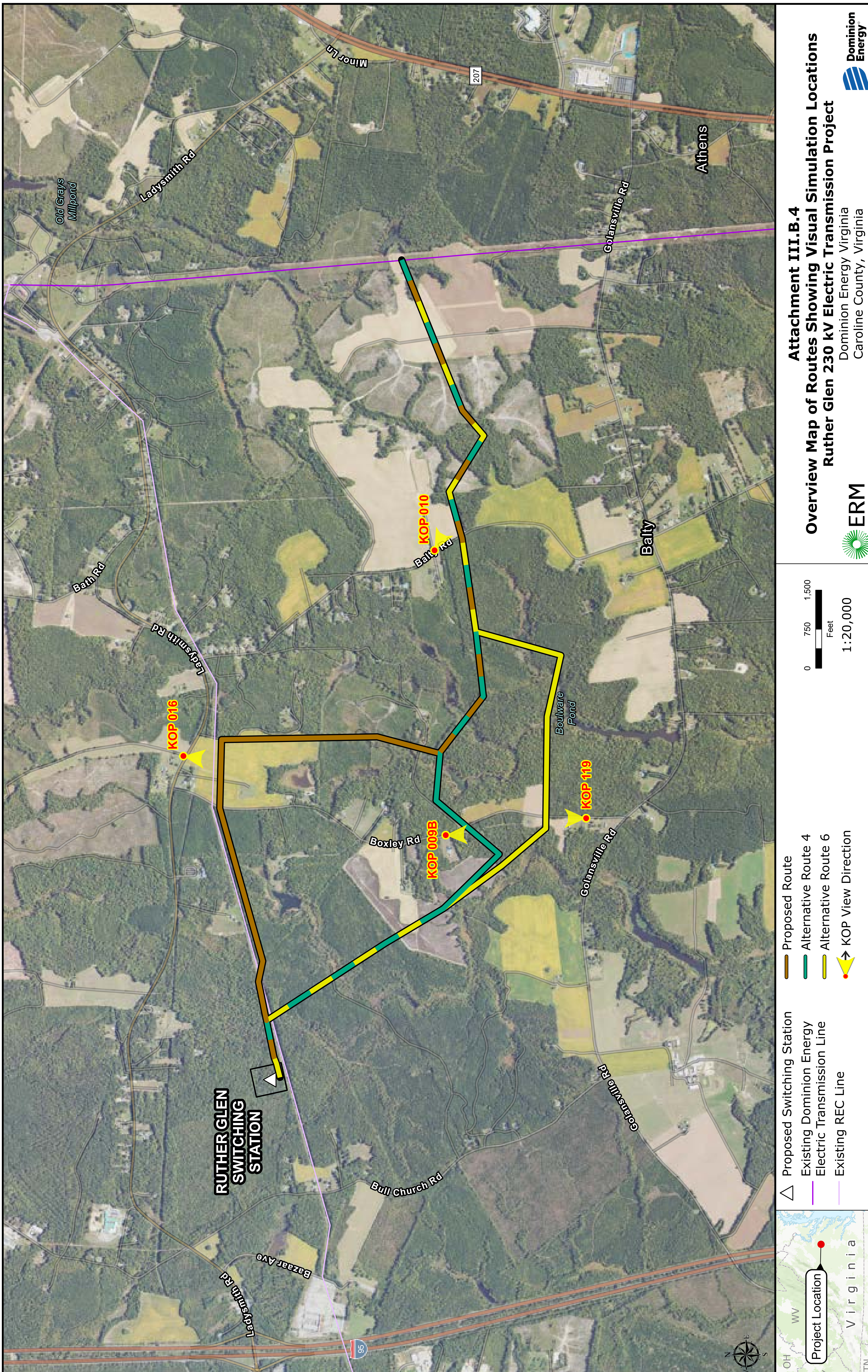
Route: 2

Date:09/03/2024

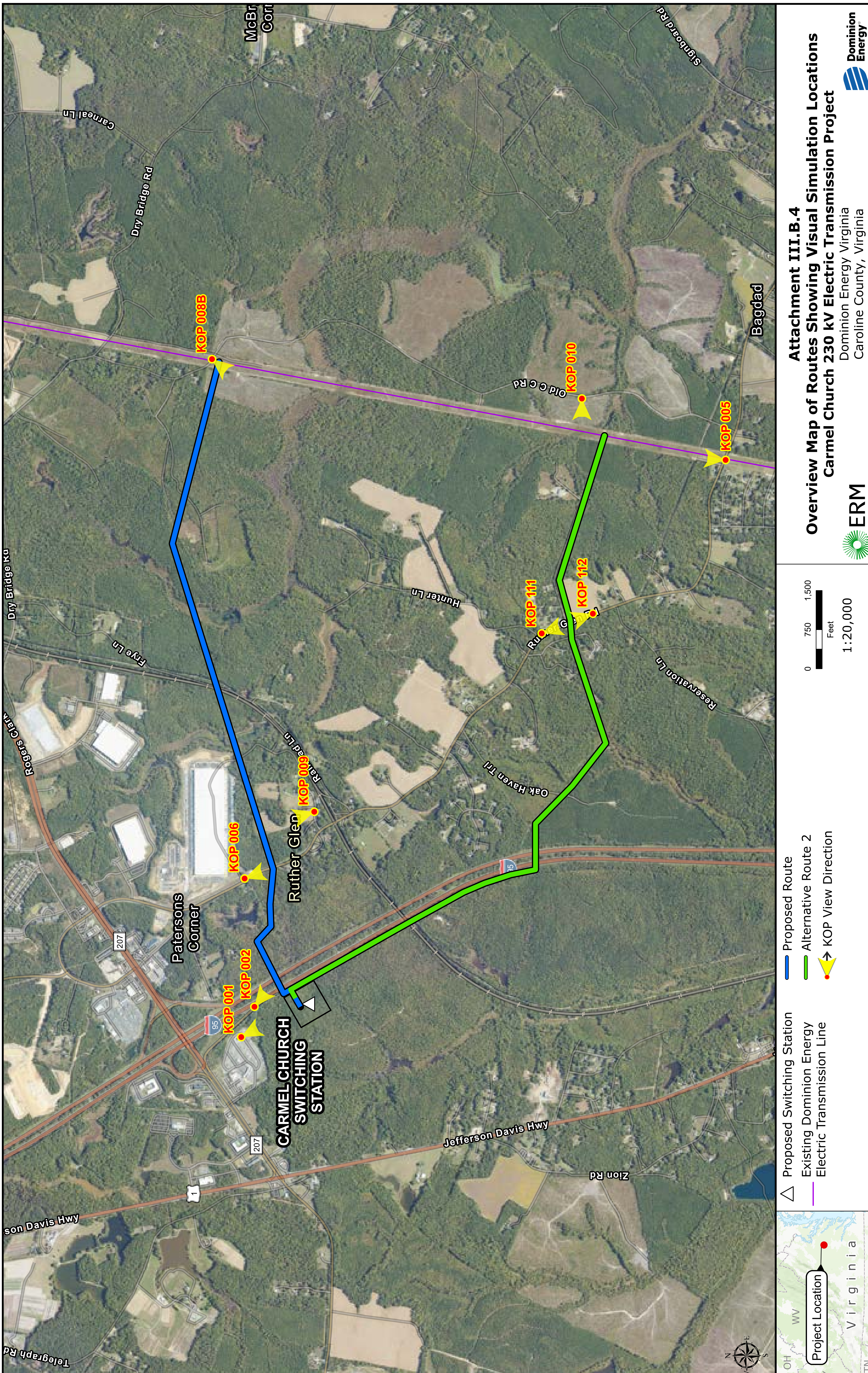
Time: 02:33 pm

Viewing Direction: Northeast

Distance to closest feature: 0.1 miles



Attachment III.B.4
Overview Map of Routes Showing Visual Simulation Locations
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
0 750 1,500
Feet
1:20,000
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Alternative Route 4
Alternative Route 6
KOP View Direction
Project Location
Virginia
OH
WV
KY
TN
RUTHER GLEN SWITCHING STATION
KOP 016
KOP 010
KOP 009B
KOP 119
Minor Ln
207
Ladysmith Rd
Old Grays Millpond
Athens
Golansville Rd
Bath Rd
Balty Rd
Balty
Boulware Pond
Boxley Rd
Bull Church Rd
Bazaar Ave
95


Attachment III.B.4
Overview Map of Routes Showing Visual Simulation Locations
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
0 750 1,500
Feet
1:20,000
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Proposed Route
Alternative Route 2
KOP View Direction
Project Location
Virginia
OH
WV
KY
TN
CARMEL CHURCH SWITCHING STATION
KOP 001
KOP 002
KOP 005
KOP 006
KOP 008B
KOP 009
KOP 010
KOP 111
KOP 112
Patersons Corner
Ruther Glen
Bagdad
Dry Bridge Rd
Carneal Ln
Signboard Rd
Old C C Rd
Hunter Ln
Frye Ln
Rogers Clark
Railroad Ln
Oak Haven Trl
Reservation Ln
Jefferson Davis Hwy
Zion Rd
Telegraph Rd
95
207
1

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

C. Detail the nature, location, and ownership of each building that would have to be demolished or relocated if the project is built as proposed.

Response: No buildings would have to be demolished or relocated to construct the proposed Projects along the Proposed Routes or Alternative Routes.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

D. Identify existing physical facilities that the line will parallel, if any, such as existing transmission lines, railroad tracks, highways, pipelines, etc. Describe the current use and physical appearance and characteristics of the existing ROW that would be paralleled, as well as the length of time the transmission ROW has been in use.

Response: **Ruther Glen Proposed Route (Route 5)**

The Ruther Glen Proposed Route (Route 5) would be collocated for a total of 1.3 miles, all of which is collocation with the 115 kV REC line.

Ruther Glen Alternative Route 4

Ruther Glen Alternative Route 4 would collocate for 0.4 mile along the existing 115 kV REC line.

Ruther Glen Alternative Route 6

Ruther Glen Alternative Route 6 would collocate for 0.2 mile along the existing 115 kV REC line.

Carmel Church Proposed Route (Route 1)

The Carmel Church Proposed Route (Route 1) does not collocate with any existing utility easements or roadways.

Carmel Church Alternative Route 2

Carmel Church Alternative Route 2 would be collocated for a total of 1.5 miles, all of which is collocation with I-95, a multi-lane separated interstate maintained by VDOT.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

E. Indicate whether the Applicant has investigated land use plans in the areas of the proposed route and indicate how the building of the proposed line would affect any proposed land use.

Response: The Caroline County Comprehensive Plan (the "Comprehensive Plan") was adopted in 2010 and amended most recently in 2023. The Comprehensive Plan includes for the Ladysmith Community Plan and Carmel Church Community that encompass the Ruther Glen and Carmel Church study areas respectively. The Ladysmith Community Plan focuses on planned growth that encourages technology related investments while minimizing visual and construction impacts on the existing community. The Ruther Glen Project does not have route impacts within the footprint of the Ladysmith Community Plan area. The Proposed Ruther Glen Route traverses primarily rural and agricultural areas designated as Rural Preservation. No additional development zones are planned within the proposed transmission line rights-of-way.

The Carmel Church Community Plan states that it has three goals, "help establish the boundaries of the Carmel Church Community; navigate the future direction of the community; and provide guidance towards establishing a community identity." Both the Proposed and Alterative Routes for Carmel Church are located fully within the footprint of the Carmel Church Community Plan. This area also includes plans for a new overlay district known at the PIRT (Planned Innovation, Research, and Technology) that is intended to preserve land for high value technology uses, including research and development, data centers, higher education, and appropriate ancillary uses. Although, both Carmel Church Loop routes navigate primarily through properties that are currently forested and undeveloped properties, the Proposed Route (Route 1) is located with areas designated by the Comprehensive Plan for future development. The Proposed Route is located with the PIRT for 37% of its total length. It also spans areas designated as Industrial Parks for 56% of its total length. The Company engaged with Caroline County for feedback on the proposed Projects and to understand any concerns or comments on the Projects. See Section V.D. The proposed Projects are not expected to interfere with future planning in Caroline County.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

F. Government Bodies

1. **Indicate if the Applicant determined from the governing bodies of each county, city and town in which the proposed facilities will be located whether those bodies have designated the important farmlands within their jurisdictions, as required by § 3.2-205 B of the Code.**

2. **If so, and if any portion of the proposed facilities will be located on any such important farmland:**

    a. **Include maps and other evidence showing the nature and extent of the impact on such farmlands;**

    b. **Describe what alternatives exist to locating the proposed facilities on the affected farmlands, and why those alternatives are not suitable; and**

    c. **Describe the Applicant's proposals to minimize the impact of the facilities on the affected farmland.**

Response: (1) In coordination with Caroline County, the Company has identified that no land is designated as important farmlands within the study area.

(2) Not applicable.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

G. Identify the following that lie within or adjacent to the proposed ROW:

1. **Any district, site, building, structure, or other object included in the National Register of Historic Places maintained by the U.S. Secretary of the Interior;**

2. **Any historic architectural, archeological, and cultural resources, such as historic landmarks, battlefields, sites, buildings, structures, districts or objects listed or determined eligible by the Virginia Department of Historic Resources ("DHR");**

3. **Any historic district designated by the governing body of any city or county;**

4. **Any state archaeological site or zone designated by the Director of the DHR, or its predecessor, and any site designated by a local archaeological commission, or similar body;**

5. **Any underwater historic assets designated by the DHR, or predecessor agency or board;**

6. **Any National Natural Landmark designated by the U.S. Secretary of the Interior;**

7. **Any area or feature included in the Virginia Registry of Natural Areas maintained by the Virginia Department of Conservation and Recreation ("DCR");**

8. **Any area accepted by the Director of the DCR for the Virginia Natural Area Preserves System;**

9. **Any conservation easement or open space easement qualifying under §§ 10.1-1009 – 1016, or §§ 10.1-1700 – 1705, of the Code (or a comparable prior or subsequent provision of the Code);**

10. **Any state scenic river;**

11. **Any lands owned by a municipality or school district; and**

12. **Any federal, state or local battlefield, park, forest, game or wildlife preserve, recreational area, or similar facility. Features, sites, and the like listed in 1 through 11 above need not be identified again.**

Response: **Ruther Glen Proposed Route**

1. None
2. None
3. None
4. None
5. None
6. None
7. None
8. None
9. None
10. None
11. None
12. None

Carmel Church Proposed Route

1. The RF&P Railroad Historic District (500-0001) was determined eligible for the NRHP under Criterion A for its significance in the economic and transportation history of the region through which it passes and the development of the cities along its route, and it is intersected by the Proposed Route.
2. None
3. None
4. None
5. None
6. None
7. None
8. None
9. None

10. None

11. None

12. None

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

H. List any registered aeronautical facilities (airports, helipads) where the proposed route would place a structure or conductor within the federally-defined airspace of the facilities. Advise of contacts, and results of contacts, made with appropriate officials regarding the effect on the facilities' operations.

Response: The Federal Aviation Administration ("FAA") is responsible for overseeing air transportation in the United States. The FAA manages air traffic in the United States and evaluates physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. The prime objective of the FAA in conducting an obstruction evaluation is to ensure the safety of air navigation and the efficient utilization of navigable airspace by aircraft.

The Company has reviewed the FAA's website[12] to identify airports within 10.0 nautical miles of the proposed Projects. Based on this review, the following FAA-restricted airports are located within 10.0 nautical miles of the Projects:

Airport Name	**Approximate Distance and Direction from Proposed Projects** **(nautical miles (approx.))**	**Use**
Robbie Campbell Memorial Airfield (4VG8)	7.5 nm north of the proposed Ruther Glen Switching Stations and western terminus of all Ruther Glen Proposed and Alternative Routes.	Private
Cool Water Airport (4VG2)	9.5 nm southeast of Ruther Glen Alternative Route 6.	Private

The Company retained ERM to conduct an airport analysis to determine if any of FAA-defined Civil Airport Imaginary Surface would be penetrated by structures associated with the Projects. The regulations that govern objects that may affect navigable airspace are codified in the Code of Federal Regulations, Title 14, Part 77. In these regulations, it states that restrictions to structure heights only apply to public use airports and do not apply to privately owned airports. Of the five airports

[12] *See* https://oeaaa.faa.gov/oeaaa/external/portal.jsp and https://adip.faa.gov/agis/public/#/public.

identified within 10 nautical miles of the Carmel Church and Ruther Glen study areas, four are private use airports, and one is a military-use airport (Mary Walker LZ Airport). No public use airports were identified within the study area. None of the private facilities listed are anticipated to have a conflict with the Proposed and Alternative Route locations.

As such, no FAA notification thresholds are anticipated to be penetrated, and unless specifically requested by the FAA, no notification to the FAA is anticipated to be required. If the FAA were to ask for additional information regarding the proposed Projects for any reason, the Company could be required to utilize FAA Form 7460-1, Notice of Proposed Construction or Alteration, pursuant to 14 CFR Part 77 for FAA notification. Any submittal would occur after a route is selected by the Commission during the permitting phase of the Projects.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

I. Advise of any scenic byways that are in close proximity to or that will be crossed by the proposed transmission line and describe what steps will be taken to mitigate any visual impacts on such byways. Describe typical mitigation techniques for other highways' crossings.

Response: No scenic byways are in close proximity to the study area for either of the proposed Projects.[13] Perpendicular road crossings, which are preferred by VDOT and Caroline County, will be utilized at other road crossings to mitigate impacts.

[13] VDOT 2021 Virginia's Scenic Roads Map. Accessed: January 2024. Retrieved from: https://www.vdot.virginia.gov/media/vdotvirginiagov/travel-and-traffic/maps/16054_ScenicMap_front.pdf.

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

J. Identify coordination with appropriate municipal, state, and federal agencies.

Response: As described in Sections III.B and V.D of the Appendix, the Company solicited feedback from Caroline County regarding the proposed Projects. Below is a list of coordination that has occurred with municipal, state, and federal agencies:

- Coordination with the U.S. Army Corps of Engineers, DEQ, and VDOT will take place as appropriate to obtain necessary approvals for the Project.
- Letters dated November 12, 2024, and November 20, 2024, were submitted to Caroline County to describe the Project and request comments. See Section V.D.
- A Stage I Pre-Application Analysis has been prepared and was submitted to VDHR on December 11, 2024. See Attachment 2.I.1 to the DEQ Supplement.

On October 7, 2024, the Company solicited comments via letter from several federally recognized Native American tribes, including:

Name	Tribe
Chief Walt "Red Hawk" Brown	Cheroenhaka (Nottoway) Indian Tribe
Mary Frances Wilkerson	Cheroenhaka (Nottoway) Indian Tribe
Chief Stephen Adkins	Chickahominy Indian Tribe
Assistant Chief Reginald Stewart	Chickahominy Indian Tribe
Chief Gerald A. Stewart	Chickahominy Indian Tribe Eastern Division
Jessica Phillips	Chickahominy Indian Tribe Eastern Division
Dana Adkins	Chickahominy Tribe
Chief Mark Custalow	Mattaponi Tribe
Chief Diane Shields	Monacan Indian Nation
Chief Keith Anderson	Nansemond Indian Nation
Chief Lynette Allston	Nottoway Indian Tribe of Virginia
Ms. Beth Roach	Nottoway Indian Tribe of Virginia
Chief Robert Gray	Pamunkey Indian Tribe
Kendall Stevens	Pamunkey Indian Tribal Resource Office
Chief Charles (Bootsie) Bullock	Patawomeck Indian Tribe of Virginia
Chief G. Anne Richardson	Rappahannock Tribe
Assistant Chief	Rappahannock Tribe
Chief W. Frank Adams	Upper Mattaponi Indian Tribe
Leigh Mitchell	Upper Mattaponi Indian Tribe

Name	Tribe
Dr. Wenonah G. Haire	Catawba Indian Nation
Caitlin Rogers	Catawba Indian Nation
Katelyn Lucas	Delaware Nation, Oklahoma
Deborah Dotson	Delaware Nation, Oklahoma

A copy of the letter template and map is included as Attachment III.J.1.

On November 6, 2024, the Company received an emailed letter from Catawba Indian Nation in response to the Company's Tribal letter. A copy of the response letter from the Catawba Indian Nation is included as Attachment III.J.2.

See also Sections III.B, III.K and V.D of this Appendix, and the DEQ Supplement.

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261
DominionEnergy.com

Dominion Energy

Oct. 3, 2024

Proposed Carmel Church and Ruther Glen 230 kV Electric Transmission Projects

Dear [redacted]

Dominion Energy is dedicated to maintaining safe, reliable, and affordable electric service in the communities we serve. You are receiving this project announcement letter as part of our efforts to proactively communicate early with Tribal Nations who may have an interest in this area. With your unique perspective, you can help us better plan projects in their earliest stages. Please note, this letter is not a notification of formal government-to-government consultation from any state or federal agency. Dominion Energy has been and continues to be committed to creating and maintaining strong, open, supportive, and mutually beneficial relationships with Tribal Nations.

We are reaching out to you now as we have two upcoming projects in Caroline County, Virginia, and you may have interest in this area. To address recent growth in Caroline County, we are working with Rappahannock Electric Cooperative (REC) to plan for new electric infrastructure to meet the new power needs, maintain federal reliability rules, and keep the grid operating efficiently. As such, we are proposing two new electric transmission projects:

- **Ruther Glen 230 kV Electric Transmission Project**
- **Carmel Church 230 kV Electric Transmission Project**

Each project proposes a new substation and an associated double-circuit 230 kilovolt (kV) electric transmission line. The new electric transmission infrastructure will serve REC, which provides electric distribution service to a large portion of Caroline County.

Enclosed, you will find a fact sheet with more information about the projects. This project requires review by the Virginia State Corporation Commission (SCC). Providing your input now allows us to consider any concerns that you may have as we work to meet the project's needs. Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, other recipients of this letter include county and state historic, cultural, and scenic organizations, as well as Tribal Nations.

If you have questions or would like to set up a meeting to discuss the project, contact me by sending an email to ann.gordon.mickel@dominionenergy.com or calling 804-363-9783. You may also contact Tribal Relations Manager Ken Custalow by sending an email to Ken.Custalow@dominionenergy.com.

Sincerely,

Ann Gordon Mickel

Ann Gordon Mickel
Communications Consultant

The Electric Transmission Project Team

Carmel Church and Ruther Glen 230 kV Electric Transmission Projects

CAROLINE COUNTY, VIRGINIA

Dominion Energy
Powering Your Every Day.℠

OVERVIEW

At Dominion Energy, we are committed to providing the reliable, affordable, and increasingly clean energy that powers our customers every day. Caroline County and surrounding areas are experiencing growing energy demands. To address this development, we are proposing two new electric transmission projects.

- **Ruther Glen 230 kV Electric Transmission Project**
- **Carmel Church 230 kV Electric Transmission Project**

Each project proposes a new substation and corresponding 230 kV electric transmission line to connect to the existing electric transmission grid.

QUICK FACTS

- **Location:**
  - **The proposed Ruther Glen Substation is located in the Mattaponi District of Caroline County, less than one mile east of I-95 and a half mile south of Ladysmith Road.**
  - **The proposed Carmel Church Substation is located in the Reedy Church District of Caroline County, approximately 6 miles south of Ruther Glen, between I-95, Route 1, and Rogers Clark Boulevard.**
- **Study Area: The area currently under consideration for new corridors to connect the future substation to an existing transmission line. While most of the study area is located in Caroline County, the study area for the Carmel Church extends into Hanover County.**
- **The new electric transmission infrastructure will serve REC, which provides electric distribution service to a large portion of Caroline County.**
- **For each of the two projects, Dominion Energy will review multiple route options, and list one proposed route to the Virginia State Corporation Commission (SCC), with alternatives listed. Only one route will be selected to construct for each project.**
- **The routes shown in the early stages of the project are subject to change. Stay up to date by visiting our interactive mapping tool on our project website.**

Example of proposed structures:
- **230 kV double-circuit monopoles**
- **Weathering steel finish**
- **Average height: 110–130 ft**

PROJECT SCHEDULE

DATE	ACTIVITY
Summer 2024	Project announcement
Summer 2024	Community Meetings
Fall 2024	File application with the Virginia State Corporation Commission (SCC)
Summer 2025	Anticipated SCC ruling
2025 – Summer 2026	• Permitting • Finalize engineering • Pre-construction outreach
Summer 2026	Construction to begin
Early 2027	Construction complete, restoration begins

CONTINUED ON BACK

Carmel Church and Ruther Glen 230 kV Electric Transmission Projects CONTINUED

PROJECT OVERSIGHT AND APPROVAL

Dominion Energy has an obligation to serve and maintain reliability for all customers. Entities such as PJM – which operates the electric grid in 13 states – and NERC, North American Electric Reliability Corporation, oversee standards to ensure reliability and the prudency of investments by utility companies like Dominion Energy.

The SCC is the regulatory body with jurisdiction over electric transmission lines in Virginia. Both projects will be reviewed by the SCC in one application, which we intend to file in fall 2024. Our SCC application and associated documents are made public upon filing and will be available for viewing. Visit the legal section of our project website for more details.

Although the SCC is the primary state agency reviewing and ultimately approving the project, there may be additional permits needed from various agencies, such as the Army Corps of Engineers.

DETERMINING THE ROUTES

Dominion Energy is currently in the initial stages of the siting and routing process. New line routes will need to connect the new substations to nearby existing 230 kV electric transmission lines.

The planning and evaluation of electric transmission routes and any potential alternatives are one of the most challenging things we do at Dominion Energy. We recognize the impact a new transmission line has on the community. Multiple factors are considered when deciding where to build a new line including, but not limited to, land use, historic and cultural resources, environmental impacts, wetlands, environmental justice, and tribal property. We consider these factors to avoid or limit community impact and take community feedback into our plans wherever possible.

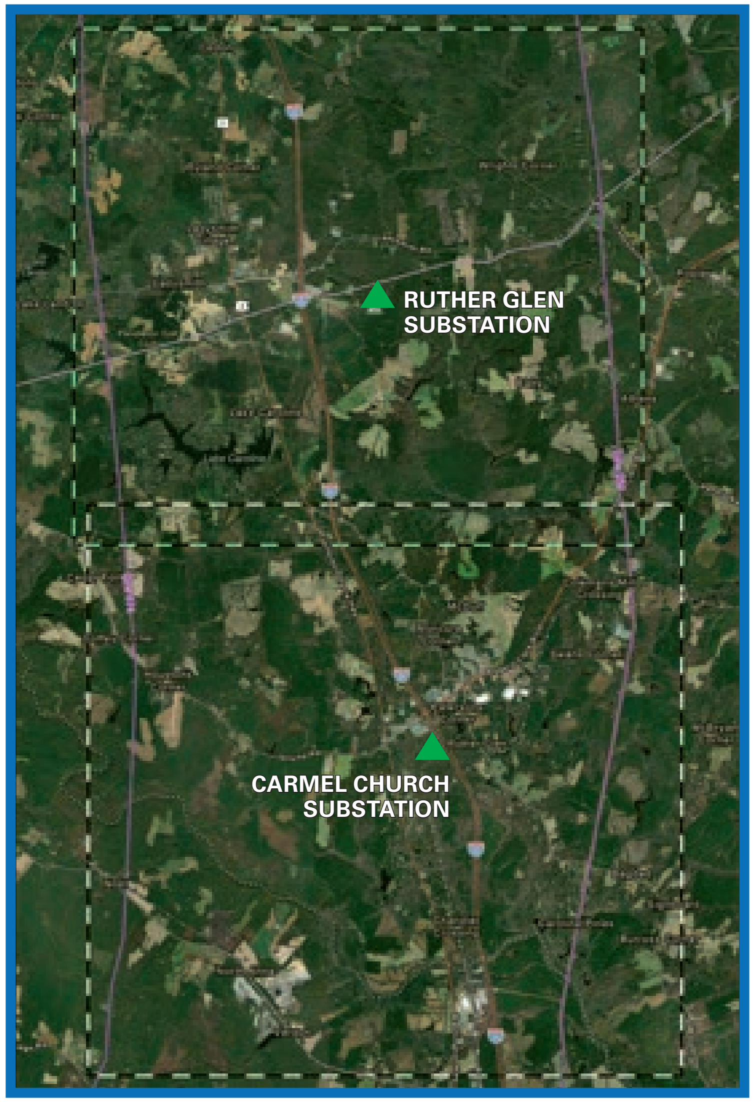
Ultimately, the SCC must approve the project need and route(s) prior to construction

YOUR FEEDBACK MATTERS

We want to hear your input on our proposed routes, as the routes have not been finalized. The purpose of our public engagement is to share, listen and learn in order to make appropriate project changes. The SCC also considers public input in its review process. There are multiple ways to share your feedback with our team:

- Contact us by email at powerline@dominionenergy.com or by phone at 888-291-0190.
- Leave your comments in our interactive mapping tool, which will be available on our project website in summer 2024.
- Attend our community meetings.
- Invite us to your community or property.

STUDY AREA



FOR MORE INFORMATION

Visit our website at DominionEnergy.com/carmelchurchrutherglen.

You may also contact us by sending an email to powerline@dominionenergy.com or calling 888-291-0190.

Carmel Church and Ruther Glen
230 kV Electric Transmission Projects
Caroline County, Virginia

Interested in learning more about this project?
Check out MapChat by ERM, an interactive mapping tool on our project website.

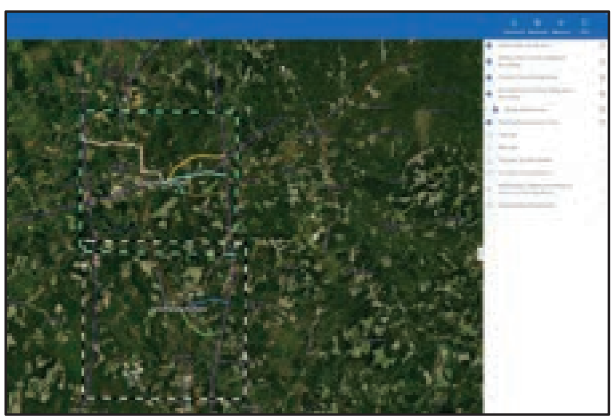
ERM MAPCHAT

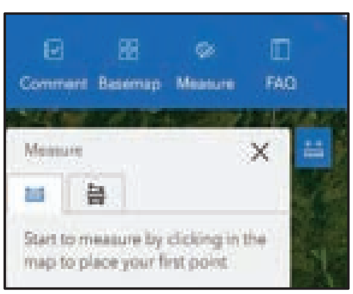
Step 1: Go to - **DominionEnergy.com/carmelchurchrutherglen**

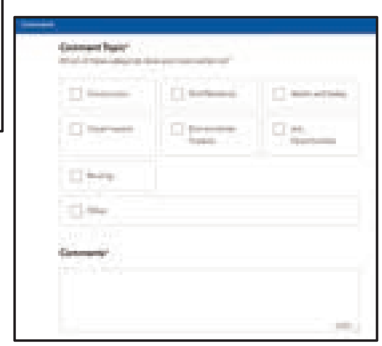
Step 2: Visit the Maps Section in the upper right-hand corner of the page

Step 3: Use the tool to -

- Zoom in on areas that matter to you, or search for an address
- View both existing structures and simulations of proposed structures
- View changes for each individual structure







Use your iPhone camera or the QR reader app on other smartphones to access the mapping website directly.

Contact Us
email: powerline@dominionenergy.com
phone: 888-291-0190

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Office 803-328-2427
Fax 803-328-5791

November 6, 2024

Attention: Ann Gordon Mickel
Dominion Energy
P.O. Box 26666
Richmond, VA 23261

Re. THPO #	TCNS #	Project Description
2025-1108-2		Proposed Carmel Church and Ruther Glen 230 kV Electric Transmission Projects

Dear Ms. Mickel,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. **However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.**

If you have questions please contact Caitlin Rogers at 803-328-2427 ext. 226, or e-mail Caitlin.Rogers@catawba.com.

Sincerely,

Caitlin Rogers for

Wenonah G. Haire
Tribal Historic Preservation Officer

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

K. Identify coordination with any non-governmental organizations or private citizen groups.

Response: On June 21, 2024, the Company solicited comments via letter from the community leaders, environmental groups, and business groups identified below. A copy of the letter template and map is included as Attachment III.K.1.

Name	Organization
Ms. Elizabeth S. Kostelny	Preservation Virginia
Mr. Thomas Gilmore	American Battlefield Trust
Mr. Jim Campi	American Battlefield Trust
Mr. Max Hokit	American Battlefield Trust
Mr. Steven Williams	Colonial National Historical Park
Ms. Eleanor Breen, PhD, RPA	Council of Virginia Archaeologists
Ms. Elaine Chang	National Trust for Historic Preservation
Ms. Leighton Powell	Scenic Virginia
Ms. Julie Bolthouse	Piedmont Environmental Council
Mr. John McCarthy	Piedmont Environmental Council
Dr. Cassandra Newby-Alexander, Dean	Norfolk State University
Mr. Roger Kirchen, Archaeologist	Virginia Department of Historic Resources
Ms. Adrienne Birge-Wilson	Virginia Department of Historic Resources
Mr. Dave Dutton	Dutton + Associates, LLC

On June 18, 2024, ERM, on behalf of the Company, solicited additional information via email from the Director of Planning and Community Development for Caroline County, Virginia, B. Leon Hughes, regarding locally significant historic buildings, properties, and areas that may be affected by the Proposed Projects. A copy of the email and corresponding maps are included as Attachment III.K.2.

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261
DominionEnergy.com

Dominion Energy

June 21, 2024

Proposed Carmel Church 230 kV Electric Transmission Project

Dear [redacted]

At Dominion Energy, we are dedicated to finding the best solution for our long-term needs in the communities we serve. As a valued stakeholder with a vested interest in the community, we invite you to participate in the development of two new electric transmission projects in Caroline County, Virginia.

Caroline County is experiencing growing energy demands as new business is developing in the area. To address this growth, we are working with Rappahannock Electric Cooperative (REC) to plan for new electric infrastructure to meet the new power needs, maintain federal reliability rules, and keep the grid operating efficiently. As such, we are proposing two new electric transmission projects:

- **Ruther Glen 230 kV Electric Transmission Project**
- **Carmel Church 230 kV Electric Transmission Project**

Each project proposes a new substation and an associated double-circuit 230 kilovolt (kV) electric transmission line. The new electric transmission infrastructure will serve REC, which provides electric distribution service to a large portion of Caroline County.

These projects are currently in the conceptual phase, and we are seeking your input prior to filing an application with the Virginia State Corporation Commission (SCC) in fall 2024. Doing so allows us to hear any concerns you may have as we work to meet the project's needs. Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, other recipients of this letter include countywide and statewide historic, cultural, and scenic organizations, as well as Native American Tribes.

Enclosed, you will find an overview map with the study areas under consideration. Preliminary routes will be shared in the coming weeks. Please visit the project website, DominionEnergy.com/carmelchurchrutherglen for more project information. We appreciate your assistance as we move through the planning process. Please provide your comments by July 25, 2024, so we have adequate time to review and consider your comments in our project design.

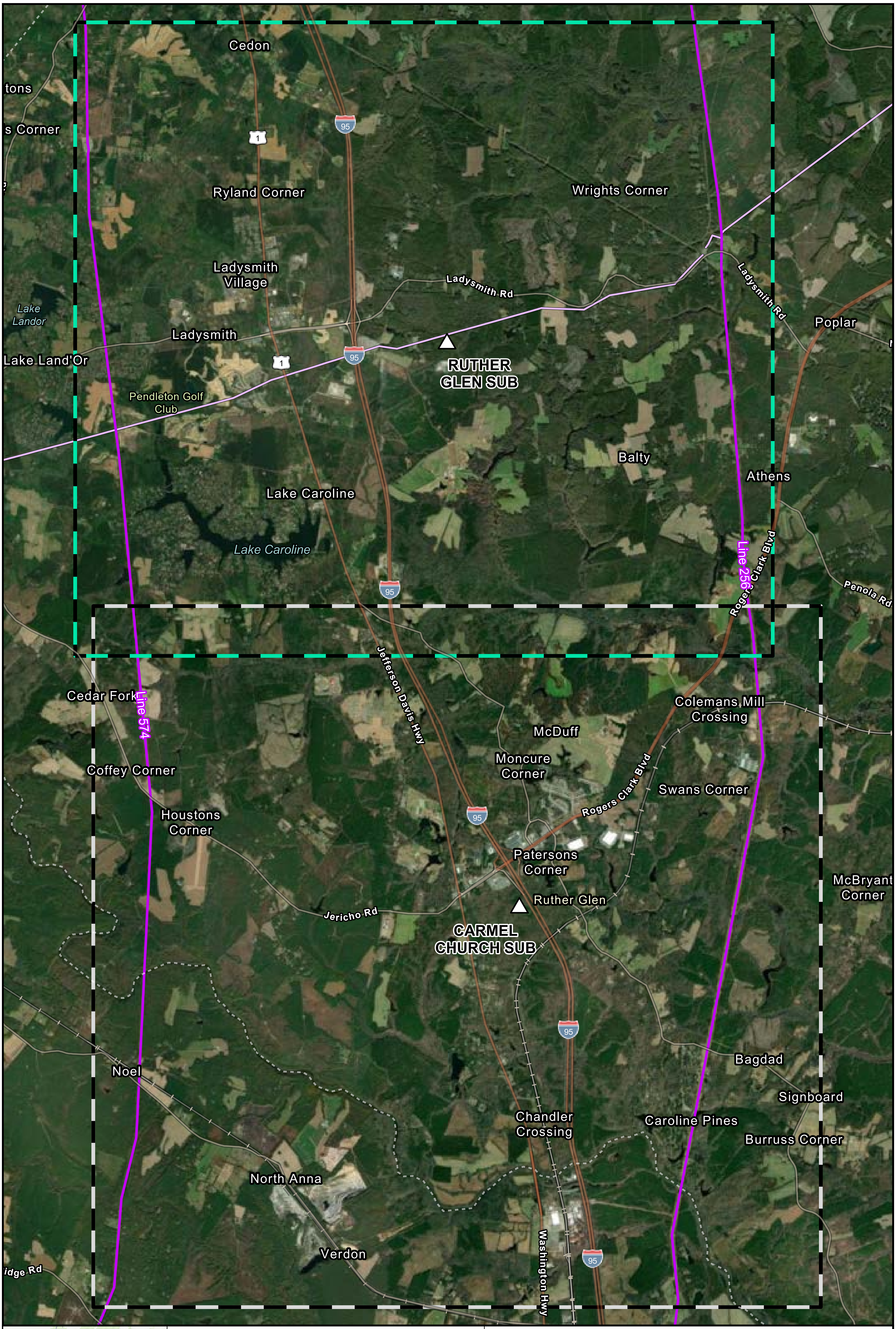
If you would like any additional information, have questions, or would like to set up a meeting to discuss the project, please do not hesitate to contact me by sending an email to ann.gordon.mickel@dominionenergy.com or calling 804-363-9783.

Sincerely,

Ann Gordon Mickel

Ann Gordon Mickel
Communications Consultant

The Electric Transmission Project Team



Proposed Substation
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Carmel Church Study Area
Ruther Glen Study Area

1:60,000
0 0.5 1 Miles

Project Overview
Carmel Church and Ruther Glen
230 kV Electric Transmission Projects
Dominion Energy Virginia
Caroline County, Virginia

ERM
Dominion Energy

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From:	MacKenzie Carroll
To:	bhughes@co.caroline.va.us
Cc:	Megan Wiginton; Rachel Tippett; blair.parks@dominionenergy.com
Subject:	Historic Property Search
Date:	Tuesday, June 18, 2024 10:44:15 AM
Attachments:	image001.png DOM_CRCH_RG_Overview_StreetView.pdf DOM_CRCH_RG_Overview.pdf

Dear Leon Hughes:

Environmental Research Management (ERM) is reaching out on behalf of Dominion Energy Virginia (Dominion) to gather information on locally significant historic buildings, properties or areas that may be affected by proposed projects in your area (see project details below). Please see the attached street map and aerial photograph showing the study areas for the proposed projects.

Dominion is proposing two projects, named Carmel Church and Ruther Glen, within Caroline County. The Carmel Church Project (Project 1) includes a single double circuit 230 kV transmission line connecting the planned Carmel Church Switching Station to either the existing Line 256 transmission corridor to the east or the existing Line 574 transmission corridor to the west. Project 1 would measure approximately 2.30 miles to the east or 3.90 miles to the west with a new 100-feet-wide right-of-way. The Ruther Glen Project (Project 2) is located north of Project 1 and includes either two double circuit 230 kV lines connecting from the proposed Ruther Glen Substation to the existing Line 256 with 160-feet of new right-of-way (Project 2 - Option 1) or two separate double circuit 230 kV lines tapping both Line 256 and Line 574 to the east and west (Project 2 – Option 2). Project 2 – Option 1 would measure approximately 2.55 miles of new right-of-way and Project 2 – Option 2 would require approximately 6.05 miles of new right-of-way.

ERM is assisting Dominion to gather information on potential locally significant historic buildings, properties, or areas in the study area to complete a study that minimizes impacts to historic resources. The study is necessary for transmission line projects regulated by the State Corporation Commission (SCC) and will be completed in accordance with the Virginia Department of Historic Resources' (VDHR's) Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia. We are seeking locational information on architectural resources that are 50 years or older and that play a significant role in your community. Some examples include the Battle of North Anna River and the Ruther Glen School. Please note that this contact is in no way related to zoning—we are asking only about impacts made to locally significant historic buildings, properties, or areas.

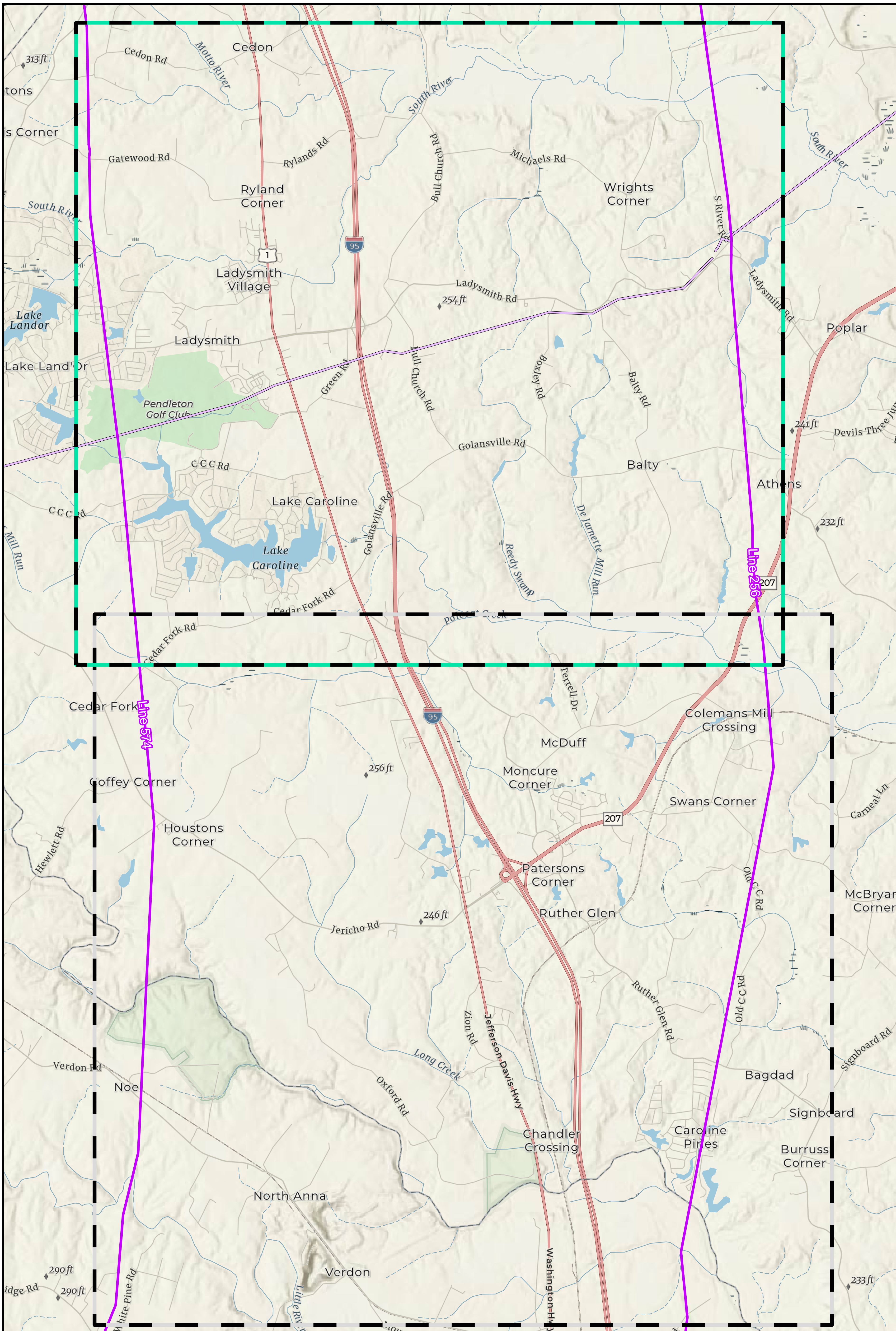
Your assistance in expediting this matter is greatly appreciated. We would greatly appreciate your response within two weeks of receiving this letter, or at your earliest convenience. Please contact Megan Wiginton at the following email addresses: Megan.Wiginton@erm.com or CFS@erm.com.

Thank you for your time,

Sustainability is our business

MacKenzie Carroll
Architectural Historian
She/Her/Hers

Rochester
9169957179
erm.com



OH
WV
KY
Project Location
Virginia
TN
NC

Existing Dominion Transmission Line
Existing REC Line
Carmel Church Study Area
Ruther Glen Study Area

N

1:60,000

0 0.5 1 Miles

Project Overview
Carmel Church and Ruther Glen Transmission Line Projects
Dominion Energy Virginia
Caroline County, Virginia

ERM

Dominion Energy

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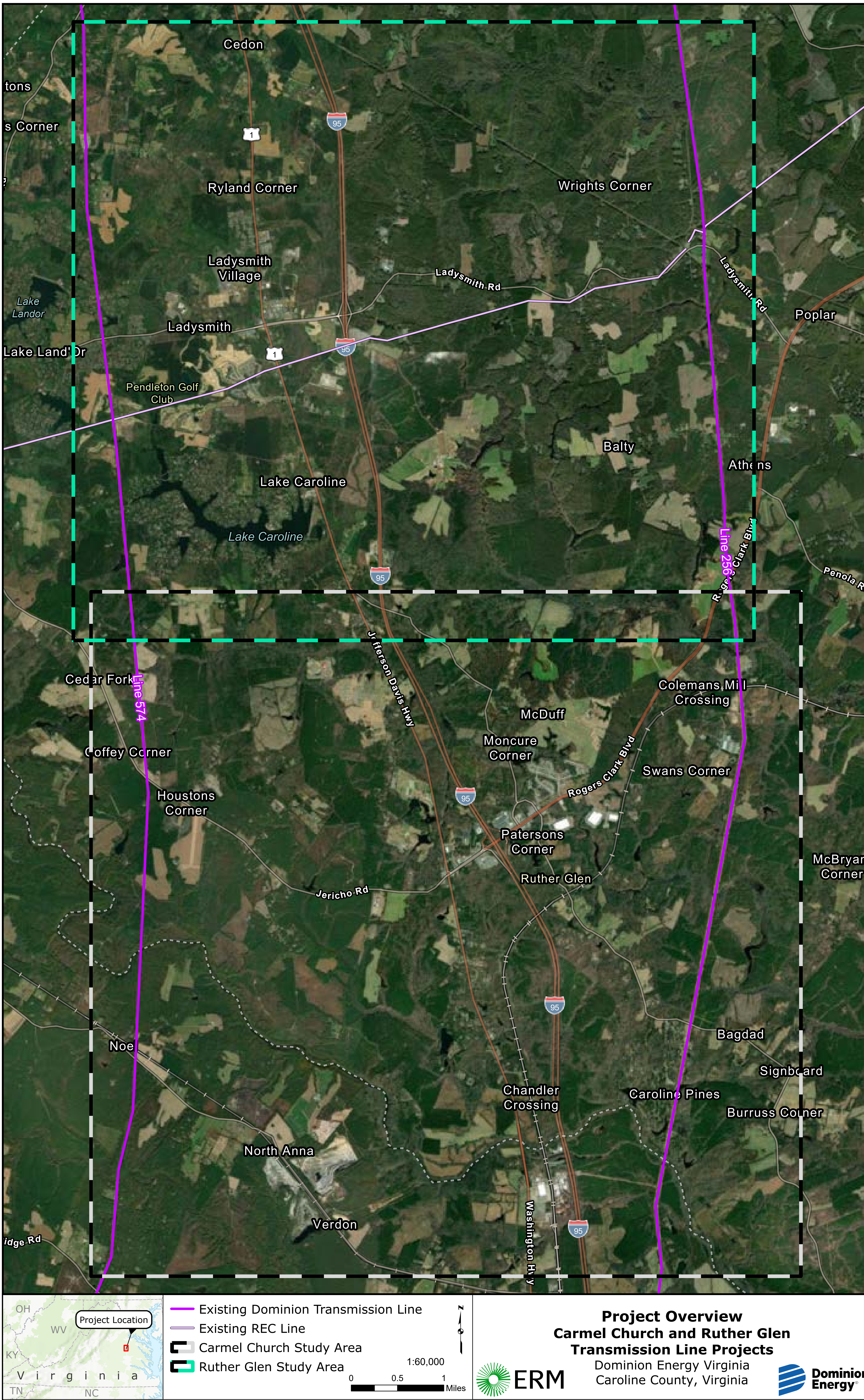

Cedon
tons
s Corner
Ryland Corner
Wrights Corner
Ladysmith Village
Ladysmith Rd
Lake Landor
Ladysmith
Lake Land'Or
Poplar
Pendleton Golf Club
Balty
Athens
Lake Caroline
Lake Caroline
Line 256
Rogers Clark Blvd
Penola Rd
Jefferson Davis Hwy
Cedar Fork
Line 574
Colemans Mill Crossing
McDuff
Moncure Corner
Coffey Corner
Swans Corner
Houstons Corner
Rogers Clark Blvd
Patersons Corner
McBryant Corner
Ruther Glen
Jericho Rd
Bagdad
Noe
Signboard
Chandler Crossing
Caroline Pines
Burruss Corner
North Anna
Verdon
Washington Hwy
idge Rd
95
1
OH
WV
KY
Virginia
TN
NC
Project Location
Existing Dominion Transmission Line
Existing REC Line
Carmel Church Study Area
Ruther Glen Study Area
N
1:60,000
0
0.5
1
Miles
Project Overview
Carmel Church and Ruther Glen Transmission Line Projects
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
MPLS M:\US\Projects\D-F\Dominion\Carmel_Church_ArcGIS\2024\05\Overview_Figure\DOM_CRCH_RG_Figure.aprx\DOM_CRCH_RG_Overview | REVISED: 05/29/2024 | SCALE: 1:60,000 when printed at 11x17
DRAWN BY: NAD

III. IMPACT OF LINE ON SCENIC, ENVIRONMENTAL AND HISTORIC FEATURES

L. Identify any environmental permits or special permissions anticipated to be needed.

Response: The permits or special permissions that are likely to be required for the proposed Projects are listed below.

Potential Permits

Activity	Potential Permit	Agency/Organization
Impacts to wetlands and other waters of the U.S.	Nationwide Permit 57	U.S. Army Corps of Engineers
Impacts to state waters, to include wetlands	Virginia Water Protection Permit	Virginia Department of Environmental Quality
Discharge of stormwater from construction	Construction General Permit	Virginia Department of Environmental Quality
Work within VDOT rights-of-way	Land Use Permit	Virginia Department of Transportation
Airspace obstruction evaluation	FAA 7460-1	Federal Aviation Administration

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

A. Provide the calculated maximum electric and magnetic field levels that are expected to occur at the edge of the ROW. If the new transmission line is to be constructed on an existing electric transmission line ROW, provide the present levels as well as the maximum levels calculated at the edge of ROW after the new line is operational.

Response: Public exposure to magnetic fields is best estimated by field levels from power lines calculated at annual average loading. For any day of the year, the EMF levels associated with average conditions provide the best estimate of potential exposure. Maximum (peak) values are less relevant as they may occur for only a few minutes or hours each year.

This section describes the levels of EMF associated with the proposed transmission lines. EMF levels are provided for future (2029) annual average and maximum (peak) loading conditions.

Proposed Project – Projected Average Loading in 2029

EMF levels were calculated for the proposed Projects at the ***projected average*** load condition (1827 amps for Lines #256, 2410 and 2422) at a maximum operating voltage of 241.5 kV when supported on the proposed Project structures. See Attachment II.A.5.a (Ruther Glen) and Attachment II.A.5.b (Carmel Church).

These field levels were calculated at mid-span where the conductors are closest to the ground at a projected average load operating temperature. Values were calculated for the Proposed Routes under the assumption that the current travels in the same direction for Line 256, Line #256 and Line #2410.

EMF levels at the edge of the rights-of-way for the proposed Projects at the projected average peak loading for a typical span:

Proposed Lines - Projected Average Loading					
		Looking Towards Ruther Glen and Carmel Church Switching Stations			
		Left Edge of R/W		**Right Edge of R/W**	
Attachment	**Route**	Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.a	Ruther Glen Proposed Route (Route 5)	0.630	38.076	0.036	17.164
II.A.5.b	Carmel Church Proposed Route (Route 1)	0.585	53.052	0.617	41.248

Proposed Project – Projected Peak Loading in 2029

EMF levels were calculated for the proposed Project at the ***projected peak*** load condition (2811 amps for Lines #256, 2410 and 2422) and at a maximum operating voltage of 241.5 kV when supported on the proposed Project structures. See Attachment II.A.5.a (Ruther Glen) and Attachment II.A.5.b (Carmel Church).

These field levels were calculated at mid-span where the conductors are closest to the ground at a projected peak load operating temperature. Values were calculated for the Proposed Routes under the assumption that the current travels in the same direction for Line 256, Line #2410 and Line #2422.

EMF levels at the edge of the rights-of-way for the proposed Projects at the projected peak loading for a typical span:

Proposed Lines - Projected Peak Loading					
Attachment	**Route**	**Looking Towards Ruther Glen and Carmel Church Switching Stations**			
		Left Edge of R/W		**Right Edge of R/W**	
		Electric Field (kV/m)	Magnetic Field (mG)	Electric Field (kV/m)	Magnetic Field (mG)
II.A.5.a	Ruther Glen Proposed Route (Route 5)	0.652	59.981	0.036	25.920
II.A.5.b	Carmel Church Proposed Route (Route 1)	0.585	81.625	0.617	63.424

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF")

B. If the Applicant is of the opinion that no significant health effects will result from the construction and operation of the line, describe in detail the reasons for that opinion and provide references or citations to supporting documentation.

Response: The conclusions of multidisciplinary scientific review panels assembled by national and international scientific agencies during the past few decades are the foundation of the Company's opinion that no adverse health effects are anticipated to result from the operation of the proposed Project. Each of these panels has evaluated the scientific research related to health and extremely low frequency ("ELF") EMF, also referred to as power-frequency (50/60 Hertz ("Hz")) EMF, and provided conclusions that form the basis of guidance to governments and industries. The Company regularly monitors the recommendations of these expert panels to guide their approach to EMF.

Research on EMF and human health varies widely in approach. Some studies evaluate the effects on biological responses of high, short-term EMF exposure not typically found in people's day-to-day lives, while others evaluate the effects of common, low EMF exposures found throughout communities. Studies also have evaluated the possibility of effects (*e.g.*, cancer, neurodegenerative diseases, and reproductive effects) of long-term exposure. Altogether, this research includes well over 100 epidemiologic studies of people in their natural environment and many more laboratory studies of animals (*in vivo*) and isolated cells and tissues (*in vitro*). Standard scientific procedures, such as weight-of-evidence methods, were used by the expert panels assembled by scientific agencies to identify, review, and summarize the results of this large and diverse research.

The reviews of ELF EMF-related biological and health research have been conducted by numerous scientific and health agencies, including, for example, the European Health Risk Assessment Network on Electromagnetic Fields Exposure ("EFHRAN"), the International Commission on Non-Ionizing Radiation Protection ("ICNIRP"), the World Health Organization ("WHO"), the IEEE's International Committee on Electromagnetic Safety ("ICES"), the Scientific Committee on Health, Environmental and Emerging Risks ("SCHEER") (formerly the Scientific Committee on Emerging and Newly Identified Health Risks ["SCENIHR"]) of the European Commission, and the Swedish Radiation Safety Authority ("SSM") (formerly the Swedish Radiation Protection Authority ["SSI"]) (WHO, 2007; SCENIHR, 2009, 2015; EFHRAN, 2010, 2012; ICNIRP, 2010; SSM, 2015, 2016, 2018, 2019, 2020, 2021, 2022; ICES, 2019; SCHEER, 2023). The general scientific consensus of the agencies that have reviewed this research, relying on generally accepted scientific methods, is that the scientific evidence does not confirm that common sources of EMF in the environment, including transmission lines and other parts of the electric system, appliances, etc., are a cause of any adverse health effects.

The most recent reviews on this topic include the 2015 and 2023 reports by SCENIHR and SCHEER, respectively, and annual reviews published by SSM (i.e., for the years 2015 through 2022). These reports, similar to previous reviews, found that the scientific evidence does not confirm the existence of any adverse health effects caused by environmental or community exposure to EMF.

WHO has recommended that countries adopt recognized international standards published by ICNIRP and ICES. Typical levels of EMF from Dominion Energy Virginia's high voltage power lines outside its property and rights-of-way are far below the screening reference levels of EMF recommended for the general public and still lower than exposures equivalent to restrictions to limits on fields within the body (ICNIRP, 2010; ICES, 2019).

Thus, based on the conclusions of scientific reviews and the levels of EMF associated with the proposed Project, the Company has determined that no adverse health effects are anticipated to result from the operation of the proposed Project.

References

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Report on the Analysis of Risks Associated to Exposure to EMF: *In Vitro* and *In Vivo* (Animals) Studies. Milan, Italy: EFHRAN, 2010.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields (Revised). Report D2 of the EFHRAN Project. Milan, Italy: EFHRAN, 2012.

International Commission on Non-ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Phys 99: 818-36, 2010.

International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels with Respect to Human Exposure to Electromagnetic Fields 0 to 300 GHz. IEEE Std C95.1-2019. New York, NY: IEEE, 2019.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Health Effects of Exposure to EMF. Brussels, Belgium: European Commission, 2009.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF). Brussels, Belgium: European Commission, 2015.

Scientific Committee on Health, Environmental and Emerging Risks (SCHEER). Preliminary Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF): Update with regard to frequencies between 1Hz and 100 kHz. Brussels, Belgium: European Commission, 2023.

Swedish Radiation Safety Authority (SSM). Research 2015:19. Recent Research on EMF and Health Risk - Tenth report from SSM's Scientific Council on Electromagnetic Fields. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2015.

Swedish Radiation Safety Authority (SSM). Research 2016:15. Recent Research on EMF and Health Risk - Eleventh report from SSM's Scientific Council on Electromagnetic Fields, 2016. Including Thirteen years of electromagnetic field research monitored by SSM's Scientific Council on EMF and health: How has the evidence changed over time? Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2016.

Swedish Radiation Safety Authority (SSM). Research 2018:09. Recent Research on EMF and Health Risk - Twelfth report from SSM's Scientific Council on Electromagnetic Fields, 2017. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2018.

Swedish Radiation Safety Authority (SSM). Research 2019:08. Recent Research on EMF and Health Risk – Thirteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2018. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2019.

Swedish Radiation Safety Authority (SSM). Research 2020:04. Recent Research on EMF and Health Risk – Fourteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2019. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2020.

Swedish Radiation Safety Authority (SSM). Research 2021:08. Recent Research on EMF and Health Risk – Fifteenth report from SSM's Scientific Council on Electromagnetic Fields, 2020. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2021.

Swedish Radiation Safety Authority (SSM). Research 2022:16. Recent Research on EMF and Health Risk – Sixteenth report from SSM's Scientific Council on Electromagnetic Fields, 2021. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2022.

World Health Organization (WHO). Environmental Health Criteria 238: Extremely Low Frequency (ELF) Fields. Geneva, Switzerland: World Health Organization, 2007.

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS ("EMF") *[rev. June 2021]*

C. Describe and cite any research studies on EMF the Applicant is aware of that meet the following criteria:

1. Became available for consideration since the completion of the Virginia Department of Health's most recent review of studies on EMF and its subsequent report to the Virginia General Assembly in compliance with 1985 Senate Joint Resolution No. 126;

2. Include findings regarding EMF that have not been reported previously and/or provide substantial additional insight into findings; and

3. Have been subjected to peer review.

Response: The Virginia Department of Health ("VDH") conducted its most recent review and issued its report on the scientific evidence on potential health effects of extremely low frequency ELF EMF in 2000: "[T]he Virginia Department of Health is of the opinion that there is no conclusive and convincing evidence that exposure to extremely low frequency EMF emanated from nearby high voltage transmission lines is causally associated with an increased incidence of cancer or other detrimental health effects in humans."[14]

The continuing scientific research on ELF EMF exposure and health has resulted in many peer-reviewed publications since 2000. The accumulating research results have been regularly and repeatedly reviewed and evaluated by national and international health, scientific, and government agencies, including most notably:

- WHO, which published one of the most comprehensive and detailed reviews of the relevant scientific peer-reviewed literature in 2007;
- SCHEER (formerly SCENIHR), a committee of the European Commission, which published its assessments in 2009, 2015 and 2023;
- The SSM, which has published annual reviews of the relevant peer-reviewed scientific literature since 2003, with its most recent review published in 2022; and,
- EFHRAN, which published its reviews in 2010 and 2012.

The above reviews provide detailed analyses and summaries of relevant recent peer-reviewed scientific publications. The conclusions of these reviews that the evidence overall does not confirm the existence of any adverse health effects due to exposure to EMF below scientifically established guideline values are consistent with the conclusions of the VDH report. With respect to the statistical association observed in some of the childhood leukemia epidemiologic studies, the most recent

[14] *See* http://www.vdh.virginia.gov/content/uploads/sites/12/2016/02/highfinal.pdf.

comprehensive review of the literature by SCENIHR, published in 2015, concluded that "no mechanisms have been identified and no support is existing [*sic*] from experimental studies that could explain these findings, which, together with shortcomings of the epidemiological studies prevent a causal interpretation" (SCENIHR, 2015, p. 16). In their 2023 Preliminary Opinion providing an update on the potential health effects of exposure to electromagnetic fields in the 1 Hz to 100 kilohertz ("kHz") range, SCHEER concluded that "overall, there is weak evidence concerning the association of ELF-MF [magnetic field] exposure with childhood leukaemia" (SCHEER 2023, p. 2).

While research is continuing on multiple aspects of EMF exposure and health, many of the recent publications have focused on an epidemiologic assessment of the relationship between EMF exposure and childhood leukemia and EMF exposure and neurodegenerative diseases. Of these, the following recent publications, published following the inclusion date (June 2014) for the SCENIHR (2015) report through March 2024, provide additional evidence and contribute to clarification of previous findings. Overall, new research studies have not provided evidence to alter the previous conclusions of scientific and health organizations, including WHO and SCENIHR.

Epidemiologic studies of EMF and childhood leukemia published during the above referenced period include:

- Bunch et al. (2015) assessed the potential association between residential proximity to high voltage underground cables and development of childhood cancer in the United Kingdom largely using the same epidemiologic data as in a previously published study on overhead transmission lines (Bunch et al., 2014). No statistically significant associations or trends were reported with either distance to underground cables or calculated magnetic fields from underground cables for any type of childhood cancers.

- Pedersen et al. (2015) published a case-control study that investigated the potential association between residential proximity to power lines and childhood cancer in Denmark. The study included all cases of leukemia (n=1,536), central nervous system tumors, and malignant lymphoma (n=417) diagnosed before the age of 15 between 1968 and 2003 in Denmark, along with 9,129 healthy control children matched on sex and year of birth. Considering the entire study period, no statistically significant increases were reported for any of the childhood cancer types.

- Salvan et al. (2015) compared measured magnetic-field levels in the bedroom for 412 cases of childhood leukemia under the age of 10 and 587 healthy control children in Italy. Although the statistical power of the study was limited because of the small number of highly exposed subjects, no consistent statistical associations or trends were reported between measured magnetic-field levels and the occurrence of leukemia among children in the study.

- Bunch et al. (2016) and Swanson and Bunch (2018) published additional analyses using data from an earlier study (Bunch et al., 2014). Bunch et al. (2016) reported that the association with distance to power lines observed in earlier years was linked to calendar year of birth or year of cancer diagnosis, rather than the age of the power lines. Swanson and Bunch (2018) re-analyzed data using finer exposure categories (*e.g.*, cut-points of every 50-meter distance) and broader groupings of diagnosis date (*e.g.*, 1960-1979, 1980-1999, and 2000 and after) and reported no overall associations between exposure categories and childhood leukemia for the later periods (1980 and after), and consistent pattern for the periods prior to 1980.

- Crespi et al. (2016) conducted a case-control epidemiologic study of childhood cancers and residential proximity to high voltage power lines (60 kV to 500 kV) in California. Childhood cancer cases, including 5,788 cases of leukemia and 3,308 cases of brain tumor, diagnosed under the age of 16 between 1986 and 2008, were identified from the California Cancer Registry. Controls, matched on age and sex, were selected from the California Birth Registry. Overall, no consistent statistically significant associations for leukemia or brain tumor and residential distance to power lines were reported.

- Kheifets et al. (2017) assessed the relationship between calculated magnetic-field levels from power lines and development of childhood leukemia within the same study population evaluated in Crespi et al. (2016). In the main analyses, which included 4,824 cases of leukemia and 4,782 controls matched on age and sex, the authors reported no consistent patterns, or statistically significant associations between calculated magnetic-field levels and childhood leukemia development. Similar results were reported in subgroup and sensitivity analyses. In two subsequent studies, Amoon et al. (2018a, 2019) examined the potential impact of residential mobility (i.e., moving residences between birth and diagnosis) on the associations reported in Crespi et al. (2016) and Kheifets et al. (2017). Amoon et al. (2018a) concluded that changing residences was not associated with either calculated magnetic-field levels or proximity to the power lines, while Amoon et al. (2019) concluded that while uncontrolled confounding by residential mobility had some impact on the association between EMF exposure and childhood leukemia, it was unlikely to be the primary driving force behind the previously reported associations in Crespi et al. (2016) and Kheifets et al. (2017).

- Amoon et al. (2018b) conducted a pooled analysis of 29,049 cases and 68,231 controls from 11 epidemiologic studies of childhood leukemia and residential distance from high voltage power lines. The authors reported no statistically-significant association between childhood leukemia and proximity to transmission lines of any voltage. Among subgroup analyses, the reported associations were slightly stronger for leukemia cases diagnosed before 5 years of age and in study periods prior to 1980. Adjustment for various potential confounders (*e.g.*, socioeconomic status, dwelling type, residential mobility) had little effect on the estimated associations.

- Kyriakopoulou et al. (2018) assessed the association between childhood acute leukemia and parental occupational exposure to social contacts, chemicals, and electromagnetic fields. The study was conducted at a major pediatric hospital in Greece and included 108 cases and 108 controls matched for age, gender, and ethnicity. Statistically non-significant associations were observed between paternal exposure to magnetic fields and childhood acute leukemia for any of the exposure periods examined (1 year before conception; during pregnancy; during breastfeeding; and from birth until diagnosis); maternal exposure was not assessed due to the limited sample size. No associations were observed between childhood acute leukemia and exposure to social contacts or chemicals.

- Auger et al. (2019) examined the relationship between exposure to EMF during pregnancy and risk of childhood cancer in a cohort of 784,000 children born in Quebec. Exposure was defined using residential distance to the nearest high voltage transmission line or transformer station. The authors reported statistically non-significant associations between proximity to transformer stations and any cancer, hematopoietic cancer, or solid tumors. No associations were reported with distance to transmission lines.

- Crespi et al. (2019) investigated the relationship between childhood leukemia and distance from high voltage lines and calculated magnetic-field exposure, separately and combined, within the California study population previously analyzed in Crespi et al. (2016) and Kheifets et al. (2017). The authors reported that neither close proximity to high voltage lines nor exposure to calculated magnetic fields alone were associated with childhood leukemia; an association was observed only for those participants who were both close to high voltage lines (< 50 meters) and had exposure to high calculated magnetic fields (≥ 0.4 microtesla ["μT"]) (i.e., ≥ 4 milligauss ["mG"]). No associations were observed with low-voltage power lines (< 200 kV). In a subsequent study, Amoon et al. (2020) examined the potential impact of dwelling type on the associations reported in Crespi et al. (2019). Amoon et al. (2020) concluded that while the type of dwelling at which a child resides (*e.g.*, single-family home, apartment, duplex, mobile home) was associated with socioeconomic status and race or ethnicity, it was not associated with childhood leukemia and did not appear to be a potential confounder in the relationship between childhood leukemia and magnetic-field exposure in this study population.

- Swanson et al. (2019) conducted a meta-analysis of 41 epidemiologic studies of childhood leukemia and magnetic-field exposure published between 1979 and 2017 to examine trends in childhood leukemia development over time. The authors reported that while the estimated risk of childhood leukemia initially increased during the earlier period, a statistically non-significant decline in estimated risk has been observed from the mid-1990s until the present (i.e., 2019).

- Talibov et al. (2019) conducted a pooled analysis of 9,723 cases and 17,099 controls from 11 epidemiologic studies to examine the relationship between parental occupational exposure to magnetic fields and childhood leukemia. No statistically significant association was found between either paternal or maternal exposure and leukemia (overall or by subtype). No associations were observed in the meta-analyses.

- Núñez-Enríquez et al. (2020) assessed the relationship between residential magnetic-field exposure and B-lineage acute lymphoblastic leukemia ("B-ALL") in children under 16 years of age in Mexico. The study included 290 cases and 407 controls matched on age, gender, and health institution; magnetic-field exposure was assessed through the collection of 24-hour measurements in the participants' bedrooms. While the authors reported some statistically significant associations between elevated magnetic-field levels and development of B-ALL, the results were dependent on the chosen cut-points.

- Seomun et al. (2021) performed a meta-analysis based on 33 previously published epidemiologic studies investigating the potential relationship between magnetic-field exposure and childhood cancers, including leukemia and brain cancer. For childhood leukemia, the authors reported statistically significant associations with some, but not all, of the chosen cut-points for magnetic-field exposure. The associations between magnetic-field exposure and childhood brain cancer were statistically non-significant. The study provided limited new insight as most of the studies included in the current meta-analysis, were included in previously conducted meta- and pooled analyses.

- Amoon et al. (2022) conducted a pooled analysis of four studies of residential exposure to magnetic fields and childhood leukemia published following a 2010 pooled analysis by Kheifets et al. (2010). The study by Amoon et al. (2022) compared the exposures of 24,994 children with leukemia to the exposures of 30,769 controls without leukemia in California, Denmark, Italy, and the United Kingdom. Exposure was assessed by measured or calculated magnetic fields at their residences. The exposure of these two groups to magnetic fields were found not to significantly differ. A decrease in the combined effect estimates in epidemiologic studies was observed over time, and the authors concluded that their findings, based on the most recent studies, were "not in line" with previous pooled analyses that reported an increased risk of childhood leukemia.

- Brabant et al. (2022) performed a literature review and meta-analysis of studies of childhood leukemia and magnetic-field exposure. The overall analysis included 21 epidemiologic studies published from 1979 to 2020. The authors reported a statistically significant association, which they noted was "mainly explained by the studies conducted before 2000." The authors reported a statistically significant association between childhood leukemia and measured or calculated magnetic-field exposures > 0.4 μT (4 mG); no statistically significant overall associations were reported between childhood leukemia and lower magnetic-field exposure (< 0.4 μT [4 mG]), residential distance from power lines, or wire coding configuration. An association between childhood leukemia and electric blanket use was also reported. The overall results were likely influenced by the inclusion of a large number of earlier studies; 10 of the 21 studies in the main analysis were published prior to 2000. Studies published prior to 2000 included fewer studies deemed to be of higher study quality, as determined by the authors, compared to studies published after 2000.

- Nguyen et al. (2022) investigated whether potential pesticide exposure from living in close proximity to commercial plant nurseries confounds the association between magnetic-field exposure and childhood leukemia development reported within the California study population previously analyzed in Crespi et al. (2016) and Kheifets et al. (2017). The authors in Nguyen et al. (2022) noted that while the association between childhood leukemia and magnetic-field exposure was "slightly attenuated" after adjusting for nursery proximity or when restricting to subjects living > 300 meters from nurseries, their results "do not support plant nurseries as an explanation for observed childhood leukemia risks." The authors further noted that close residential proximity to nurseries may be an independent risk factor for childhood leukemia.

- Guo et al. (2023) reported conducting a systematic review and meta-analysis of studies published from 2015 to 2022 that evaluated associations between magnetic-field exposure and childhood leukemia development. Three meta-analyses were conducted to evaluate the relationship using different exposure metrics. In the first meta-analysis, magnetic-field levels ranging from 0.4 μT (4 mG) to 0.2 μT (2 mG) were associated with a statistically significant reduced risk of childhood leukemia development (i.e., a protective association). In the second meta-analysis, exposure was based on wiring configuration codes, and the reported pooled relative risk estimates demonstrated a statistically significant increased association with childhood leukemia. In the third meta-analysis, exposure was categorized into groupings of magnetic-field strength; no statistically significant associations with childhood leukemia were reported for any of the groupings, including for magnetic-field levels ≥ 0.4 μT (4 mG). There are significant limitations of this study that prevent meaningful interpretations of the results. Most of the analyses of magnetic fields did not state whether measurements and calculations were included, and the authors provided no description of the methods used for their analyses, no data tables to support their findings, and no references to the number and type of studies included. In fact, much of the article's introduction discusses ionized radiation. The authors also do not report relevant metrics for evaluating meta-analyses such as study heterogeneity.

- Malagoli et al. (2023) examined associations between exposure to magnetic fields from high voltage power lines (≥ 132 kV) and childhood leukemia development in a case-control study of children in Italy. The study included 182 cases diagnosed with childhood leukemia between 1998 and 2019 and 726 controls matched based on age, sex, and Italian province. The authors assessed magnetic-field exposure by calculating the distance from each participant's residence to the nearest high voltage power line and classifying that distance into one of three exposed categories (participants living < 100 meters, 100 to < 200 meters, or 200 to < 400 meters from the power lines) or as unexposed (participants living ≥ 400 meters from the power lines). The authors reported a non-statistically significant association between childhood leukemia and a residence distance of <100 meters; no statistically significant associations were reported for any distance, including when stratifying by age (< 5 or ≥ 5 years) or when restricting to acute lymphoblastic leukemia (ALL).

- Nguyen et al. (2023) extended their previous investigation (Nguyen et al., 2022) into whether pesticide exposure was an independent risk factor or confounder for childhood leukemia in the presence of magnetic-field exposure from high voltage power lines by examining the potential impact of specific pesticide exposure factors (*e.g.*, intended use, chemical class, active ingredient). The authors found no statistically significant associations between distance to high voltage power lines or magnetic-field exposure and childhood leukemia, including when adjusting for pesticide exposures. Several of the examined pesticides were determined by the authors to be potential independent risk factors for childhood leukemia.

- Zagar et al. (2023) examined the relationship between magnetic fields and childhood cancers, including childhood leukemia, in Slovenia. Cancer cases, including 194 cases of leukemia, were identified from the Slovenian Cancer Registry; cases were then classified into one of five calculated magnetic-field exposure levels (ranging from < 0.1 μT [< 1 mG] to ≥ 0.4 μT [≥ 4 mG]) based on residential distance to high voltage (*e.g.*, 110-kV, 220-kV, and 400-kV) power lines. The authors reported that less than 1% of Slovenian children and adolescents lived in an area near high voltage power lines. No differences in the development of childhood cancers, including leukemia, brain tumors, or all cancers combined, were reported across the five exposure categories.

- Crespi et al. (2024) assessed the association between residential proximity to electricity transformers in multi-story residential buildings and childhood leukemia development in the International Transformer Exposure study. Participants were required to live in an apartment building that contained a built-in transformer; exposure was estimated using the participants' apartment location relative to the transformer and categorized as high exposure (located above or adjacent to the transformer), intermediate exposure (located on the same floor as apartments in the high exposure category), or unexposed (all other apartments). In the pooled analyses of five countries' data, a total of 74 cases and 20,443 controls were included; 18 of the 74 cases were identified in the intermediate or high exposure categories. No significant associations were reported between proximity to residential transformers and childhood leukemia. Sensitivity analyses performed using the data from one of the five countries (Finland) where a cohort study design was used, also reported no significant associations. The authors concluded that the evidence for an elevated risk of childhood leukemia from proximity to residential transformers was "weak."

- Duarte-Rodríguez et al. (2024) conducted a population-based case-control study to examine the geographical distribution of childhood ALL cases in Mexico City, Mexico. Cases and controls were geolocated using the most recent residential address, and a spatial scan statistic was used to detect spatial clusters of cancer cases. The authors identified eight spatial clusters of cases, representing nearly 40% of all cases included in the study (n=1,054 cases). The authors noted that six of the eight spatial clusters were located in proximity to high voltage power lines and high voltage electric installations (distances not specified), and that the remaining two clusters were located near former petrochemical industrial facility sites. Since the study did not directly assess magnetic-field exposure and made no conclusions about magnetic-field exposure and cancer development, this study adds little value to the existing literature regarding a potential association between exposure to ELF EMF and childhood leukemia development.

- Malavolti et al. (2024) examined the association between magnetic-field exposure from transformer stations and childhood leukemia in the same Italian study population as Malagoli et al. (2023). Magnetic-field exposure was estimated based on residential distance to the nearest transformer station, and participants were then categorized as exposed or unexposed using two different distance cut-points: residing within a radius of 15 or 25 meters from the transformer station (exposed); residing ≥ 15 meters or ≥ 25 meters from the transformer station (unexposed). No significant associations were reported for all leukemias, or ALL specifically, when either distance cut-point was used, and in fact no association at all (an odds ratio = 1.0) was observed when the more stringent cut-point of 15 meters was used. In sub-analyses that stratified by participant age (< 5 years vs. ≥ 5 years), no significant associations were reported for either age category.

Epidemiologic studies of EMF and neurodegenerative diseases published during the above referenced period include:

- Seelen et al. (2014) conducted a population-based case-control study in the Netherlands and included 1,139 cases diagnosed with amyotrophic lateral sclerosis ("ALS") between 2006 and 2013 and 2,864 frequency-matched controls. The shortest distance from the case and control residences to the nearest high voltage power line (50 to 380 kV) was determined by geocoding. No statistically significant associations between residential proximity to power lines with voltages of either 50 to 150 kV or 220 to 380 kV and ALS were reported.

- Sorahan and Mohammed (2014) analyzed mortality from neurodegenerative diseases in a cohort of approximately 73,000 electricity supply workers in the United Kingdom. Cumulative occupational exposure to magnetic-fields was calculated for each worker in the cohort based on their job titles and job locations. Death certificates were used to identify deaths from neurodegenerative diseases. No associations or trends for any of the included neurodegenerative diseases (Alzheimer's disease, Parkinson's disease, and ALS) were observed with various measures of calculated magnetic fields.

- Koeman et al. (2015, 2017) analyzed data from the Netherlands Cohort Study of approximately 120,000 men and women who were enrolled in the cohort in 1986 and followed up until 2003. Lifetime occupational history, obtained through questionnaires, and job-exposure matrices on ELF magnetic fields and other occupational exposures were used to assign exposure to study subjects. Based on 1,552 deaths from vascular dementia, the researchers reported a statistically not significant association of vascular dementia with estimated exposure to metals, chlorinated solvents, and ELF magnetic fields. However, because no exposure-response relationship for cumulative exposure was observed and because magnetic fields and solvent exposures were highly correlated with exposure to metals, the authors attributed the association with ELF magnetic fields and solvents to confounding by exposure to metals (Koeman et al., 2015). Based on a total of 136 deaths from ALS among the cohort members, the authors reported a statistically significant, approximately two-fold association with ELF magnetic fields in the highest exposure category. This association, however, was no longer statistically significant when adjusted for exposure to insecticides (Koeman et al., 2017).

- Fischer et al. (2015) conducted a population-based case-control study that included 4,709 cases of ALS diagnosed between 1990 and 2010 in Sweden and 23,335 controls matched to cases on year of birth and sex. The study subjects' occupational exposures to ELF magnetic fields and electric shocks were classified based on their occupations, as recorded in the censuses and corresponding job-exposure matrices. Overall, neither magnetic fields nor electric shocks were related to ALS.

- Vergara et al. (2015) conducted a mortality case-control study of occupational exposure to electric shock and magnetic fields and ALS. They analyzed data on 5,886 deaths due to ALS and over 58,000 deaths from other causes in the United States between 1991 and 1999. Information on occupation was obtained from death certificates and job-exposure matrices were used to categorize exposure to electric shocks and magnetic fields. Occupations classified as "electric occupations" were moderately associated with ALS. The authors reported no consistent associations for ALS, however, with either electric shocks or magnetic fields, and they concluded that their findings did not support the hypothesis that exposure to either electric shocks or magnetic fields explained the observed association of ALS with "electric occupations."

- Pedersen et al. (2017) investigated the occurrence of central nervous system diseases among approximately 32,000 male Danish electric power company workers. Cases were identified through the national patient registry between 1982 and 2010. Exposure to ELF magnetic fields was determined for each worker based on their job titles and area of work. A statistically significant increase was reported for dementia in the high exposure category when compared to the general population, but no exposure-response pattern was identified, and no similar increase was reported in the internal comparisons among the workers. No other statistically significant increases among workers were reported for the incidence of Alzheimer's disease, Parkinson's disease, motor neuron disease, multiple sclerosis, or epilepsy, when compared to the general population, or when incidence among workers was analyzed across estimated exposure levels.

- Vinceti et al. (2017) examined the association between ALS and calculated magnetic-field levels from high voltage power lines in Italy. The authors included 703 ALS cases and 2,737 controls; exposure was assessed based on residential proximity to high voltage power lines. No statistically significant associations were reported and no exposure-response trend was observed. Similar results were reported in subgroup analyses by age, calendar period of disease diagnosis, and study area.

- Checkoway et al. (2018) investigated the association between Parkinsonism[15] and occupational exposure to magnetic fields and several other agents (endotoxins, solvents, shift work) among 800 female textile workers in Shanghai. Exposure to magnetic fields was assessed based on the participants' work histories. The authors reported no statistically significant associations between Parkinsonism and occupational exposure to any of the agents under study, including magnetic fields.

- Gunnarsson and Bodin (2018) conducted a meta-analysis of occupational risk factors for ALS. The authors reported a statistically significant association between occupational exposures to EMF, estimated using a job-exposure matrix, and ALS among the 11 studies included. Statistically significant associations were also reported between ALS and jobs that involve working with electricity, heavy physical work, exposure to metals (including lead) and chemicals (including pesticides), and working as a nurse or physician. The authors reported some evidence for publication bias. In a subsequent publication, Gunnarsson and Bodin (2019) updated their previous meta-analysis to also include Parkinson's disease and Alzheimer's disease. A slight, statistically significant association was reported between occupational exposure to EMF and Alzheimer's disease; no association was observed for Parkinson's disease.

- Huss et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of ALS and occupational exposure to magnetic fields. The authors reported a weak overall association; a slightly stronger association was observed in a subset analysis of six studies with full occupational histories available. The authors noted substantial heterogeneity among studies, evidence for publication

[15] Parkinsonism is defined by Checkoway et al. (2018) as "a syndrome whose cardinal clinical features are bradykinesia, rest tremor, muscle rigidity, and postural instability. Parkinson disease is the most common neurodegenerative form of [parkinsonism]" (p. 887).

bias, and a lack of a clear exposure-response relationship between exposure and ALS.

- Jalilian et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of occupational exposure to magnetic fields and Alzheimer's disease. The authors reported a moderate, statistically significant overall association; however, they noted substantial heterogeneity among studies and evidence for publication bias.

- Röösli and Jalilian (2018) performed a meta-analysis using data from five epidemiologic studies examining residential exposure to magnetic fields and ALS. A statistically non-significant negative association was reported between ALS and the highest exposed group, where exposure was defined based on distance from power lines or calculated magnetic-field level.

- Gervasi et al. (2019) assessed the relationship between residential distance to overhead power lines in Italy and risk of Alzheimer's dementia and Parkinson's disease. The authors included 9,835 cases of Alzheimer's dementia and 6,810 cases of Parkinson's disease; controls were matched by sex, year of birth, and municipality of residence. A weak, statistically non-significant association was observed between residences within 50 meters of overhead power lines and both Alzheimer's dementia and Parkinson's disease, compared to distances of over 600 meters.

- Peters et al. (2019) examined the relationship between ALS and occupational exposure to both magnetic fields and electric shock in a pooled study of data from three European countries. The study included 1,323 ALS cases and 2,704 controls matched for sex, age, and geographic location; exposure was assessed based on occupational title and defined as low (background), medium, or high. Statistically significant associations were observed between ALS and ever having been exposed above background levels to either magnetic fields or electric shocks; however, no clear exposure-response trends were observed with exposure duration or cumulative exposure. The authors also noted significant heterogeneity in risk by study location.

- Filippini et al. (2020) investigated the associations between ALS and several environmental and occupational exposures, including electromagnetic fields, within a case-control study in Italy. The study included 95 cases and 135 controls matched on age, gender, and residential province; exposure to electromagnetic fields was assessed using the participants' responses to questions related to occupational use of electric and electronic equipment, occupational EMF exposure, and residential distance to overhead power lines. The authors reported a statistically significant association between ALS and residential proximity to overhead power lines and a statistically non-significant association between ALS and occupational exposure to EMF; occupational use of electric and electronic equipment was associated with a statistically non-significant decrease in ALS development.

- Huang et al. (2020) conducted a meta-analysis of 43 epidemiologic studies examining potential occupational risk factors for dementia or mild cognitive impairment. The authors included five cohort studies and seven case-control studies related to magnetic-field exposure. For both study types, the authors reported positive associations between dementia and work-related magnetic-field exposures. The paper, however, provided no information on the occupations held by the study participants, their magnetic-field exposure levels, or how magnetic-field levels were assessed; therefore, the results are difficult to interpret. The authors also reported a high level of heterogeneity among studies. Thus, this analysis adds little, if any, to the overall weight of evidence on a potential association between dementia and magnetic fields.

- Jalilian et al. (2020) conducted a meta-analysis of ALS and occupational exposure to both magnetic fields and electric shocks within 27 studies from Europe, the United States, and New Zealand. A weak, statistically significant association was reported between magnetic-field exposure and ALS; however, the authors noted evidence of study heterogeneity and publication bias. No association was observed between ALS and electric shocks.

- Chen et al. (2021) conducted a case-control study to examine the association between occupational exposure to electric shocks, magnetic fields, and motor neuron disease ("MND") in New Zealand. The study included 319 cases with a MND diagnosis (including ALS) and 604 controls, matched on age and gender; exposure was assessed using the participants' occupational history questionnaire responses and previously developed job-exposure matrices for electric shocks and magnetic fields. The authors reported no associations between MND and exposure to magnetic fields; positive associations were reported between MND and working at a job with the potential for electric shock exposure.

- Grebeneva et al. (2021) evaluated disease rates among electric power company workers in the Republic of Kazakhstan. The authors included three groups of "exposed" workers who "were in contact with equipment generating [industrial frequency EMF]" (a total of 161 workers), as well as 114 controls "who were not associated with exposure to electromagnetic fields." Disease rates were assessed "based on analyzing the sick leaves of employees" from 2010 to 2014 and expressed as "incidence rate per 100 employees." The authors reported a higher "incidence rate" of "diseases of the nervous system" in two of the exposed categories compared to the non-exposed group. No meaningful conclusions from the study could be drawn, however, because no specific diagnoses within "diseases of the nervous system" were identified in the paper and no clear description was provided on how the authors defined and calculated "incidence rate" for the evaluated conditions. In addition, no measured or calculated magnetic-field levels were presented by the authors.

- Filippini et al. (2021) conducted a meta-analysis to assess the dose-response relationship between residential exposure to magnetic fields and ALS. The authors identified six ALS epidemiologic studies, published between 2009 and 2020, that assessed exposure to residential magnetic fields by either distance from overhead power lines or magnetic-field modeling. They reported a decrease in risk of ALS in the highest exposure categories for both distance-based and modeling-based exposure estimates. The authors also reported that their dose-response analyses "showed little association between distance from power lines and ALS"; the data were too sparse to conduct a dose-response analysis for modeled magnetic-field estimates. The authors noted that their study was limited by small sample size, "imprecise" exposure categories, the potential for residual confounding, and by "some publication bias."

- Jalilian et al. (2021) conducted a meta-analysis of occupational exposure to ELF magnetic fields and electric shocks and development of ALS. The authors included 27 studies from Europe, the United States, and New Zealand that were published between 1983 and 2019. A weak, statistically significant association was reported between magnetic-field exposure and ALS, and no association was observed between electric shocks and ALS. Indications of publication bias and "moderate to high" heterogeneity were identified for the studies of magnetic-field exposure and ALS, and the authors noted that "the results should be interpreted with caution."

- Goutman et al. (2022) examined occupational exposures, including "electromagnetic radiation" exposure, and associations with ALS in a case-control study of Michigan workers across various industries. The study included 381 cases diagnosed with ALS, all patients at the University of Michigan's Pranger ALS clinic, and 272 controls recruited from an online database for the University of Michigan. Participants were enrolled from 2010 to 2020 and completed a written survey of their work history and occupational exposures to nine exposure categories, including electromagnetic fields, particulate matter (PM), and pesticides. Exposure to electromagnetic fields was ascertained with a binary question asking whether they were "[e]xposed to power lines, transformation [*sic*] stations or other EM [electromagnetic radiation]?" The analysis was adjusted for age, sex, and military service. No association was observed between electromagnetic field exposure and ALS, while exposure to PM, pesticides, and metals, among others, were determined by the authors to be "associated with an increased ALS risk in this cohort."

- Sorahan and Nichols (2022) investigated magnetic-field exposure and mortality from MND in a large cohort of employees of the former Central Electricity Generating Board of England and Wales. The study included nearly 38,000 employees first hired between 1942 and 1982 and still employed in 1987. Estimates of exposure magnitude, frequency, and duration were calculated using data from the power stations and the employees' job histories, and were described in detail in a previous publication (Renew et al., 2003). Mortality from MND in the total cohort was observed to be similar to national rates. No statistically significant dose-response trends were observed with lifetime, recent, or distant magnetic-field exposure; statistically significant associations were observed for some categories of recent exposure, but not for the highest exposure category.

- Duan et al. (2023) conducted a meta-summary of ALS and exposure to magnetic fields, which was 1 of 22 non-genetic risk factors evaluated across 67 studies for its association with ALS. Six of the 67 studies examined magnetic-field exposure and associations with ALS; of the six studies identified, the authors included four case-control studies and one cohort study in their meta-analysis. Pooling results from these studies resulted in significant increased odds of ALS among individuals with higher (but undefined) exposure to magnetic fields. However, this pooled odds ratio for magnetic-field exposure (1.22) was below the minimum odds ratio threshold of 1.3 set by the authors as the criterion for defining an exposure as an ALS risk factor. In addition, the authors identified "substantial" heterogeneity between studies evaluating magnetic-field exposure and ALS.

- In a subsequent publication of the same study as Goutman et al. (2022), Goutman et al. (2023) assessed the potential for the same nine exposure categories, including "electromagnetic radiation" exposure, to be risk factors for ALS progression, including survival and onset segment (bulbar, cervical, lumbar). Electromagnetic field exposure was not significantly associated with ALS survival or with bulbar onset compared to lumbar, but was significantly associated with cervical onset compared to lumbar. It is worth noting that an association with cervical onset compared to lumbar was observed in the majority (7/9) of the exposure categories. The authors make no concluding statements on electromagnetic field exposure and ALS and instead emphasize that occupational pesticide exposure and working in military operations were significantly associated with worse ALS survival.

- Saucier et al. (2023) carried out three systematic reviews of studies that evaluated relationships between urbanization, air pollution, and water pollution, and ALS development. The authors identified five studies that assessed whether electromagnetic fields (of varying frequencies) and high voltage infrastructure were significant urbanization risk factors for ALS, but make no conclusion about magnetic-field exposure and ALS development based on these studies, therefore adding little value to the existing literature.

- Vasta et al. (2023) examined the relationship between residential distance to power lines and ALS development in a cohort study of 1,098 participants in Italy. The authors reported no differences in the age of ALS onset or ALS progression rate between low-exposed and high-exposed participants based on residential distance to power lines at the time of the participants' diagnosis. Similarly, no differences were observed when exposure was based on residential distance to repeater antennas.

- Vitturi et al. (2023) conducted a systematic review and meta-analysis of case-control studies examining potential occupational risk factors related to multiple sclerosis, including solvents, mercury, pesticides, and low-frequency magnetic fields. The authors included 24 studies in their review, but only one of the included studies investigated exposure to magnetic fields (Pedersen et al., 2017, discussed above), thereby adding little new information to the existing body of research.

References

Amoon AT, Oksuzyan S, Crespi CM, Arah OA, Cockburn M, Vergara X, Kheifets L. Residential mobility and childhood leukemia. Environ Res 164:459-466, 2018a.

Amoon AT, Crespi CM, Ahlbom A, Bhatnagar M, Bray I, Bunch KJ, Clavel J, Feychting M, Hemon D, Johansen C, Kreis C, Malagoli C, Marquant F, Pedersen C, Raaschou-Nielsen O, Röösli M, Spycher BD, Sudan M, Swanson J, Tittarelli A, Tuck DM, Tynes T, Vergara X, Vinceti M, Wunsch-Filho V, Kheifets L. Proximity to overhead power lines and childhood leukaemia: an international pooled analysis. Br J Cancer 119:364-373, 2018b.

Amoon AT, Arah OA, Kheifets L. The sensitivity of reported effects of EMF on childhood leukemia to uncontrolled confounding by residential mobility: a hybrid simulation study and an empirical analysis using CAPS data. Cancer Causes Control 30:901-908, 2019.

Amoon AT, Crespi CM, Nguyen A, Zhao X, Vergara X, Arah OA, and Kheifets L. The role of dwelling type when estimating the effect of magnetic fields on childhood leukemia in the California Power Line Study (CAPS). Cancer Causes Control 31:559-567, 2020.

Amoon AT, Swanson J, Magnani C, Johansen C, Kheifets L. Pooled analysis of recent studies of magnetic fields and childhood leukemia. Environ Res 204(Pt A):111993, 2022.

Auger N, Bilodeau-Bertrand M, Marcoux S, Kosatsky T. Residential exposure to electromagnetic fields during pregnancy and risk of child cancer: A longitudinal cohort study. Environ Res 176:108524, 2019.

Brabant C, Geerinck A, Beaudart C, Tirelli E, Geuzaine C, Bruyère O. Exposure to magnetic fields and childhood leukemia: a systematic review and meta-analysis of case-control and cohort studies. Rev Environ Health 38(2):229-253, 2022.

Bunch KJ, Keegan TJ, Swanson J, Vincent TJ, Murphy MF. Residential distance at birth from overhead high voltage powerlines: childhood cancer risk in Britain 1962-2008. Br J Cancer 110:1402-1408, 2014.

Bunch KJ, Swanson J, Vincent TJ, Murphy MF. Magnetic fields and childhood cancer: an epidemiological investigation of the effects of high voltage underground cables. J Radiol Prot 35:695-705, 2015.

Bunch KJ, Swanson J, Vincent TJ, Murphy MF. Epidemiological study of power lines and childhood cancer in the UK: further analyses. J Radiol Prot 36:437-455, 2016.

Checkoway H, Ilango S, Li W, Ray RM, Tanner CM, Hu SC, Wang X, Nielsen S, Gao DL, Thomas DB. Occupational exposures and parkinsonism among Shanghai women textile workers. Am J Ind Med 61:886-892, 2018.

Chen GX, Mannetje A, Douwes J, Berg LH, Pearce N, Kromhout H, Glass B, Brewer N, McLean DJ. Occupational exposure to electric shocks and extremely low-frequency magnetic fields and motor neurone disease. Am J Epidemiol 190(3):393-402, 2021.

Crespi CM, Vergara XP, Hooper C, Oksuzyan S, Wu S, Cockburn M, Kheifets L. Childhood leukaemia and distance from power lines in California: a population-based case-control study. Br J Cancer 115:122-128, 2016.

Crespi CM, Swanson J, Vergara XP, Kheifets L. Childhood leukemia risk in the California Power Line Study: Magnetic fields versus distance from power lines. Environ Res 171:530-535, 2019.

Crespi CM, Sudan M, Juutilainen J, Roivainen P, Hareuveny R, Huss A, Kandel S, Karim-Kos HE, Thuróczy G, Jakab Z, Spycher BD, Flueckiger B, Vermeulen R, Vergara X, Kheifets L. International study of childhood leukemia in residences near electrical transformer rooms. Environ Res 249:118459, 2024.

Duan QQ, Jiang Z, Su WM, Gu XJ, Wang H, Cheng YF, Cao B, Gao X, Wang Y, Chen YP. Risk factors of amyotrophic lateral sclerosis: a global meta-summary. Front Neurosci 17:1177431, 2023.

Duarte-Rodríguez DA, Flores-Lujano J, McNally RJQ, et al. Evidence of spatial clustering of childhood acute lymphoblastic leukemia cases in Greater Mexico City: report from the Mexican Inter-Institutional Group for the identification of the causes of childhood leukemia. Front Oncol 14:1304633, 2024.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Report on the Analysis of Risks Associated to Exposure to EMF: *In Vitro* and *In Vivo* (Animals) Studies. Milan, Italy: EFHRAN, 2010.

European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN). Risk Analysis of Human Exposure to Electromagnetic Fields (Revised). Report D2 of the EFHRAN Project. Milan, Italy: EFHRAN, 2012.

Filippini T, Tesauro M, Fiore M, Malagoli C, Consonni M, Violi F, Iacuzio L, Arcolin E, Oliveri Conti G, Cristaldi A, Zuccarello P, Zucchi E, Mazzini L, Pisano F, Gagliardi I, Patti F, Mandrioli J, Ferrante M, Vinceti M. Environmental and occupational risk factors of amyotrophic lateral sclerosis: A population-based case-control study. Int J Environ Res Public Health 17(8):2882, 2020.

Filippini T, Hatch EE, Vinceti M. Residential exposure to electromagnetic fields and risk of amyotrophic lateral sclerosis: a dose-response meta-analysis. Sci Rep 11(1):11939, 2021.

Fischer H, Kheifets L, Huss A, Peters TL, Vermeulen R, Ye W, Fang F, Wiebert P, Vergara XP, Feychting M. Occupational Exposure to Electric Shocks and Magnetic Fields and Amyotrophic Lateral Sclerosis in Sweden. Epidemiology 26:824-830, 2015.

Gervasi F, Murtas R, Decarli A, Giampiero Russo A. Residential distance from high voltage overhead power lines and risk of Alzheimer's dementia and Parkinson's disease: a population-based case-control study in a metropolitan area of Northern Italy. Int J Epidemiol 48(6):1949-1957, 2019.

Grebeneva OV, Rybalkina DH, Ibrayeva LK, Shadetova AZ, Drobchenko EA, Aleshina NY. Evaluating occupational morbidity among energy enterprise employees in industrial region of Kazakhstan. Russian Open Medical Journal 10(3):e0319, 2021.

Goutman SA, Boss J, Godwin C, Mukherjee B, Feldman EL, Batterman SA. Associations of self-reported occupational exposures and settings to ALS: a case-control study. Int Arch Occup Environ Health 95(7):1567-1586, 2022.

Goutman SA, Boss J, Godwin C, Mukherjee B, Feldman EL, Batterman SA. Occupational history associates with ALS survival and onset segment. Amyotroph Lateral Scler Frontotemporal Degener 24(3-4):219-229, 2023.

Gunnarsson LG and Bodin L. Amyotrophic lateral sclerosis and occupational exposures: A systematic literature review and meta-analyses. Int J Environ Res Public Health 15(11):2371, 2018.

Gunnarsson LG and Bodin L. Occupational exposures and neurodegenerative diseases: A systematic literature review and meta-analyses. Int J Environ Res Public Health 16(3):337, 2019.

Guo H, Kang L, Qin W, Li Y. Electromagnetic Radiation Exposure and Childhood Leukemia: Meta-Analysis and Systematic Review. Altern Ther Health Med 29(8):75-81, 2023.

Huang LY, Hu HY, Wang ZT, Ma YH, Dong Q, Tan L, Yu JT. Association of occupational factors and dementia or cognitive impairment: A systematic review and meta-analysis. J Alzheimers Dis 78(1):217-227, 2020.

Huss A, Peters S, Vermeulen R. Occupational exposure to extremely low-frequency magnetic fields and the risk of ALS: A systematic review and meta-analysis. Bioelectromagnetics 39:156-163, 2018.

Jalilian H, Teshnizi SH, Röösli M, Neghab M. Occupational exposure to extremely low frequency magnetic fields and risk of Alzheimer disease: A systematic review and meta-analysis. Neurotoxicology 69:242-252, 2018.

Jalilian H, Najafi K, Khosravi Y, and Röösli M. Amyotrophic lateral sclerosis, occupational exposure to extremely low frequency magnetic fields and electric shocks: A systematic review and meta-analysis. Rev Environ Health 36(1):129-142, 2021.

Kheifets L, Crespi CM, Hooper C, Cockburn M, Amoon AT, Vergara XP. Residential magnetic fields exposure and childhood leukemia: a population-based case-control study in California. Cancer Causes Control 28:1117-1123, 2017.

Koeman T, Schouten LJ, van den Brandt PA, Slottje P, Huss A, Peters S, Kromhout H, Vermeulen R. Occupational exposures and risk of dementia-related mortality in the prospective Netherlands Cohort Study. Am J Ind Med 58:625-635, 2015.

Koeman T, Slottje P, Schouten LJ, Peters S, Huss A, Veldink JH, Kromhout H, van den Brandt PA, Vermeulen R. Occupational exposure and amyotrophic lateral sclerosis in a prospective cohort. Occup Environ Med 74: 578-585, 2017.

Kyriakopoulou A, Meimeti E, Moisoglou I, Psarrou A, Provatopoulou X, Dounias G. Parental Occupational Exposures and Risk of Childhood Acute Leukemia. Mater Sociomed 30: 209-214, 2018.

Malagoli C, Malavolti M, Wise LA, Balboni E, Fabbi S, Teggi S, Palazzi G, Cellini M, Poli M, Zanichelli P, Notari B, Cherubini A, Vinceti M, Filippini T. Residential exposure to magnetic fields from high voltage power lines and risk of childhood leukemia. Environ Res 232:116320, 2023.

Malavolti M, Malagoli C, Wise LA, Poli M, Notari B, Taddei I, Fabbi S, Teggi S, Balboni E, Pancaldi A, Palazzi G, Vinceti M, Filippini T. Residential exposure to magnetic fields from transformer stations and risk of childhood leukemia. Environ Res 245:118043, 2024.

Nguyen A, Crespi CM, Vergara X, Kheifets L. Commercial outdoor plant nurseries as a confounder for electromagnetic fields and childhood leukemia risk. Environ Res 212(Pt C):113446, 2022.

Nguyen A, Crespi CM, Vergara X, Kheifets L. Pesticides as a potential independent childhood leukemia risk factor and as a potential confounder for electromagnetic fields exposure. Environ Res 238(Pt 1):116899, 2023.

Núñez-Enríquez JC, Correa-Correa V, Flores-Lujano J, Pérez-Saldivar ML, Jiménez-Hernández E, Martín-Trejo JA, Espinoza-Hernández LE, Medina-Sanson A, Cárdenas-Cardos R, Flores-Villegas LV, Peñaloza-González JG, Torres-Nava JR, Espinosa-Elizondo RM, Amador-Sánchez R, Rivera-Luna R, Dosta-Herrera JJ, Mondragón-García JA, González-Ulibarri JE, Martínez-Silva SI, Espinoza-Anrubio G, Duarte-Rodríguez DA, García-Cortés LR, Gil-Hernández AE, Mejía-

Aranguré JM. Extremely low-frequency magnetic fields and the risk of childhood B-lineage acute lymphoblastic leukemia in a city with high incidence of leukemia and elevated exposure to ELF magnetic fields. Bioelectromagnetics 41(8):581-597, 2020.

Pedersen C, Johansen C, Schüz J, Olsen JH, Raaschou-Nielsen O. Residential exposure to extremely low-frequency magnetic fields and risk of childhood leukaemia, CNS tumour and lymphoma in Denmark. Br J Cancer 113:1370-1374, 2015.

Pedersen C, Poulsen AH, Rod NH, Frei P, Hansen J, Grell K, Raaschou-Nielsen O, Schüz J, Johansen C. Occupational exposure to extremely low-frequency magnetic fields and risk for central nervous system disease: an update of a Danish cohort study among utility workers. Int Arch Occup Environ Health 90:619-628, 2017.

Peters S, Visser AE, D'Ovidio F, Beghi E, Chio A, Logroscino G, Hardiman O, Kromhout H, Huss A, Veldink J, Vermeulen R, van den Berg LH. Associations of Electric Shock and Extremely Low-Frequency Magnetic Field Exposure With the Risk of Amyotrophic Lateral Sclerosis. Am J Epidemiol 188:796-805, 2019.

Renew DC, Cook RF, Ball MC. A method for assessing occupational exposure to power-frequency magnetic fields for electricity generation and transmission workers. J Radiol Prot 23(3):279-303, 2003.

Röösli M and Jalilian H. A meta-analysis on residential exposure to magnetic fields and the risk of amyotrophic lateral sclerosis. Rev Environ Health 33:295-299, 2018.

Salvan A, Ranucci A, Lagorio S, Magnani C. Childhood leukemia and 50 Hz magnetic fields: findings from the Italian SETIL case-control study. Int J Environ Res Public Health 12:2184-2204, 2015.

Saucier D, Registe PPW, Bélanger M, O'Connell C. Urbanization, air pollution, and water pollution: Identification of potential environmental risk factors associated with amyotrophic lateral sclerosis using systematic reviews. Front Neurol 14:1108383, 2023.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Health Effects of Exposure to EMF. Brussels, Belgium: European Commission, 2009.

Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR). Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF). Brussels, Belgium: European Commission, 2015.

Scientific Committee on Health, Environmental and Emerging Risks (SCHEER). Preliminary Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (EMF): Update with regard to frequencies between 1Hz and 100 kHz.

Brussels, Belgium: European Commission, 2023.

Seelen M, Vermeulen RC, van Dillen LS, van der Kooi AJ, Huss A, de Visser M, van den Berg LH, Veldink JH. Residential exposure to extremely low frequency electromagnetic fields and the risk of ALS. Neurology 83:1767-1769, 2014.

Seomun G, Lee J, Park J. Exposure to extremely low-frequency magnetic fields and childhood cancer: A systematic review and meta-analysis. PLoS One 16:e0251628, 2021.

Sorahan T and Mohammed N. Neurodegenerative disease and magnetic field exposure in UK electricity supply workers. Occup Med (Lond) 64:454-460, 2014.

Sorahan T and Nichols L. Motor neuron disease risk and magnetic field exposures. Occup Med (Lond) 72(3):184-190, 2022.

Swanson J and Bunch KJ. Reanalysis of risks of childhood leukaemia with distance from overhead power lines in the UK. J Radiol Prot 38:N30-N35, 2018.

Swanson J, Kheifets L, and Vergara X. Changes over time in the reported risk for childhood leukaemia and magnetic fields. J Radiol Prot 39:470-488, 2019.

Swedish Radiation Safety Authority (SSM). Research 2019:08. Recent Research on EMF and Health Risk – Thirteenth Report from SSM's Scientific Council on Electromagnetic Fields, 2018. Stockholm, Sweden: Swedish Radiation Safety Authority (SSM), 2019.

Talibov M, Olsson A, Bailey H, Erdmann F, Metayer C, Magnani C, Petridou E, Auvinen A, Spector L, Clavel J, Roman E, Dockerty J, Nikkila A, Lohi O, Kang A, Psaltopoulou T, Miligi L, Vila J, Cardis E, Schüz J. Parental occupational exposure to low-frequency magnetic fields and risk of leukaemia in the offspring: findings from the Childhood Leukaemia International Consortium (CLIC). Occup Environ Med 76:746-753, 2019.

Vasta R, Callegaro S, Grassano M, Canosa A, Cabras S, Di Pede F, Matteoni E, De Mattei F, Casale F, Salamone P, Mazzini L, De Marchi F, Moglia C, Calvo A, Chiò A, Manera U. Exposure to electromagnetic fields does not modify neither the age of onset nor the disease progression in ALS patients. Amyotroph Lateral Scler Frontotemporal Degener 24(3-4):343-346, 2023.

Vergara X, Mezei G, Kheifets L. Case-control study of occupational exposure to electric shocks and magnetic fields and mortality from amyotrophic lateral sclerosis in the US, 1991-1999. J Expo Sci Environ Epidemiol 25:65-71, 2015.

Vinceti M, Malagoli C, Fabbi S, Kheifets L, Violi F, Poli M, Caldara S, Sesti D, Violanti S, Zanichelli P, Notari B, Fava R, Arena A, Calzolari R, Filippini T, Iacuzio L, Arcolin E, Mandrioli J, Fini N, Odone A, Signorelli C, Patti F, Zappia M, Pietrini V, Oleari P, Teggi S, Ghermandi G, Dimartino A, Ledda C, Mauceri C, Sciacca S, Fiore M, Ferrante M. Magnetic fields exposure from high voltage power lines and risk of amyotrophic lateral sclerosis in two Italian populations. Amyotroph Lateral Scler Frontotemporal Degener 18:583-589, 2017.

Vitturi BK, Montecucco A, Rahmani A, Dini G, Durando P. Occupational risk factors for multiple sclerosis: a systematic review with meta-analysis. Front Public Health 11:1285103, 2023.

World Health Organization (WHO). Environmental Health Criteria 238: Extremely Low Frequency (ELF) Fields. Geneva, Switzerland: World Health Organization, 2007.

Zagar T, Valic B, Kotnik T, Korat S, Tomsic S, Zadnik V, Gajsek P. Estimating exposure to extremely low frequency magnetic fields near high voltage power lines and assessment of possible increased cancer risk among Slovenian children and adolescents. Radiol Oncol 57(1):59-69, 2023.

V. NOTICE

A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project. For all routes that the Applicant proposed to be noticed, provide minimum, maximum and average structure heights.

Response: The Ruther Glen 230 kV Electric Transmission Project includes construction of a new double circuit overhead 230 kV transmission line on new right-of-way (Ruther Glen Loop) and a new switching station (Ruther Glen Switching Station) entirely within Caroline County.

The Carmel Church 230 kV Electric Transmission Project includes construction of a new double circuit overhead 230 kV transmission line on new right-of-way (Carmel Church Loop) and a new switching station (Carmel Church Switching Station) entirely within Caroline County.

A map is provided in Attachment V.A showing the routes of the Ruther Glen Loop, including the overhead Proposed Route (Route 5), Alternative Route 4, Alternative Route 6, the routes of the Carmel Church Loop, including the overhead Proposed Route (Route 1) and Alternative Route 2, the location of the Ruther Glen Switching Station and the location of the proposed Carmel Church Switching Station. A written description of the Ruther Glen Loop Proposed and Alternative Routes and the Carmel Church Loop Proposed and Alternative Route is as follows:

Ruther Glen Project

Ruther Glen Proposed Route (Route 5)

The Ruther Glen Proposed Route cuts the Company's existing Line #256 approximately 0.8 mile due north of Golansville Road and extends west for approximately 1.1 miles across agricultural fields, forested land, a Columbia Gas Natural Gas easement and Balty Road. At this point, the Ruther Glen Proposed Route turns north to cross Bath Road/Pond Road and extends north for approximately 0.80 mile through forested parcels and along the eastern edge of an agricultural parcel. The Ruther Glen Proposed Route then turns west to run parallel to and south of the existing REC 115 kV easement for approximately 0.8 mile through agricultural and then forested land. The Ruther Glen Proposed Route then crosses and runs parallel to the north side of the REC easement for approximately 0.4 mile through forested land before entering the Ruther Glen Switching Station. The Ruther Glen Switching Station will sit approximately 0.6 miles southwest of the intersection of Ladysmith Road and Bull Church Road.

The Ruther Glen Proposed Route will be constructed on new right-of-way primarily supported by double circuit weathering steel monopoles. For the Ruther Glen Proposed Route, the minimum structure height is 100 feet, the maximum structure height is 114 feet, and the average structure height is 145 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Ruther Glen Alternative Route 4

Alternative Route 4 cuts the Company's existing Line #256 approximately 0.8 mile due north of Golansville Road and extends west for approximately 1.1 miles across agricultural fields, forested land, a Columbia Gas Natural Gas easement and Balty Road. Following property lines west of Balty Road, Alternative Route 4 passes through forested parcels and crosses Dejarnette Mill Run twice before turning southwest to cross Boxley Road approximately 0.6 mile north of Golansville Road. West of Boxley Road, Alternative Route 4 turns northwest for a approximately 1.1 miles through forested land east of Reedy Swamp and west of rural residential properties before turning west to enter the proposed Ruther Glen Switching Station. The Ruther Glen Switching Station will sit approximately 0.6 miles southwest of the intersection of Ladysmith Road and Bull Church Road.

Alternative Route 4 will be constructed on new right-of-way primarily supported by double circuit weathering steel monopoles. For Alternative Route 4, the minimum structure height is 90 feet, the maximum structure height is 140 feet, and the average structure height is 111 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Ruther Glen Alternative Route 6

Alternative Route 6 cuts the Company's existing Line #256 in the same location as Alternative Route 4 and follows the same path as Alternative Route 4 for the first approximately 1.5 miles. At this point, Alternative Route 6 turns south for approximately 0.3 mile and then west for approximately 0.6 mile before crossing Boxley Road. This segment of Alternative Route 6 runs through forested land and crosses Dejarnette Mill Run three times, including two crossings north of Boulware Pond. After crossing Boxley Road, Alternative Route 6 turns northwest for approximately 1.2 miles through forested areas east of Reedy Swamp and west of rural residential properties along Boxley Road. Alternative Route 6 then crosses the existing REC 115kV easement and turns west to enter the proposed Ruther Glen Switching Station. The Ruther Glen Switching Station will sit approximately 0.6 miles southwest of the intersection of Ladysmith Road and Bull Church Road.

Alternative Route 6 will be constructed on new right-of-way primarily supported by double circuit weathering steel monopoles. For Alternative Route 6, the minimum structure height is 90 feet, the maximum structure height is 140 feet, and the average structure height is 111 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

<u>Carmel Church Project</u>

Carmel Church Proposed Route (Route 1)

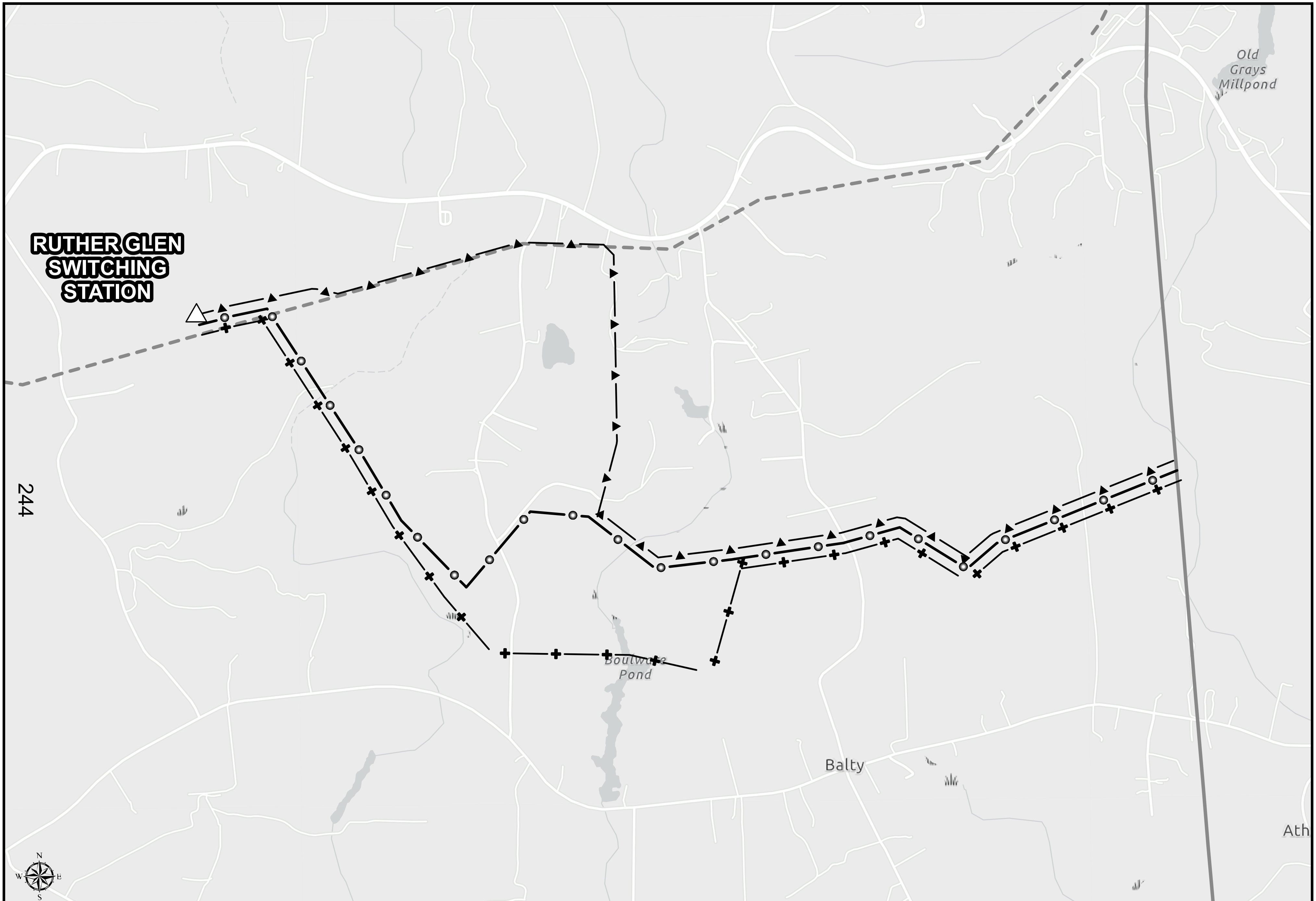
The Carmel Church Proposed Route (Route 1) is approximately 2.5 miles in length. The cut in is approximately 100 feet south of the Line #256 crossing of Old CC Road. From there, Route 1 extends west-northwest across primarily forested land for approximately 0.7 mile, then turns west-southwest, continuing through primarily forested land. The easternmost 1.0 mile of Route 1 is within Caroline County's Planned Innovation, Research, and Technology (PIRT) District. Approximately 1.2 miles west of the tap point, the Carmel Church Proposed Route crosses portions of Reedy Creek, a Columbia Natural Gas easement, and the CSX Railroad line. Following those crossings, the route continues west-southwest for approximately 1.1 miles, passing behind existing industrial development and crossing Ruther Glen Road. The remaining 0.5 mile of the route extends west across forested property held by AVAOI Digital, across I-95, and into the proposed Carmel Church Switching Station. The Carmel Church Switching Station will sit to the southwest of the intersection of I-95 and Rogers Clark Boulevard.

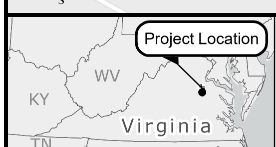
The Carmel Church Proposed Route will be constructed on new right-of-way primarily supported by double circuit weathering steel monopoles. For the Carmel Church Proposed Route, the minimum structure height is 90 feet, the maximum structure height is 135 feet, and the average structure height is 109 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.

Carmel Church Alternative Route 2

Alternative Route 2 extends from a tap along the Company's existing Line #256 to the proposed Carmel Church Switching Station at the northern end of the Washington DC South development. The tap is approximately 0.5-mile north of the existing line's crossing of Ruther Glen Road. From there, Alternative Route 2 travels west-northwest through forested land for approximately 0.5 mile parallelling south of Granny's Way, then approximately 0.2 mile west-southwest along the edge of an agricultural field (also to the south of Granny's Way) before crossing Ruther Glen Road. Alternative Route 2 continues west for about 0.5 mile through forested between residential parcels land before turning northwest for approximately 0.4 mile through forested property held by AVAOI Digital. Alternative Route 2 crosses I-95 and then continues north paralleling the western edge of I-95 for approximately 1.0 mile. Alternative Route 2 crosses a Columbia Natural Gas easement and the CSX Railroad line approximately 0.5 mile before connecting into the Carmel Church Switching Station. The Carmel Church Switching Station will sit to the southwest of the intersection of I-95 and Rogers Clark Boulevard.

Alternative Route 2 will be constructed on new right-of-way primarily supported by double circuit weathering steel monopoles. For Alternative Route 2, the minimum structure height is 85 feet, the maximum structure height is 135 feet, and the average structure height is 111 feet, based on preliminary conceptual design, not including foundation reveal, and subject to change based on final engineering design.



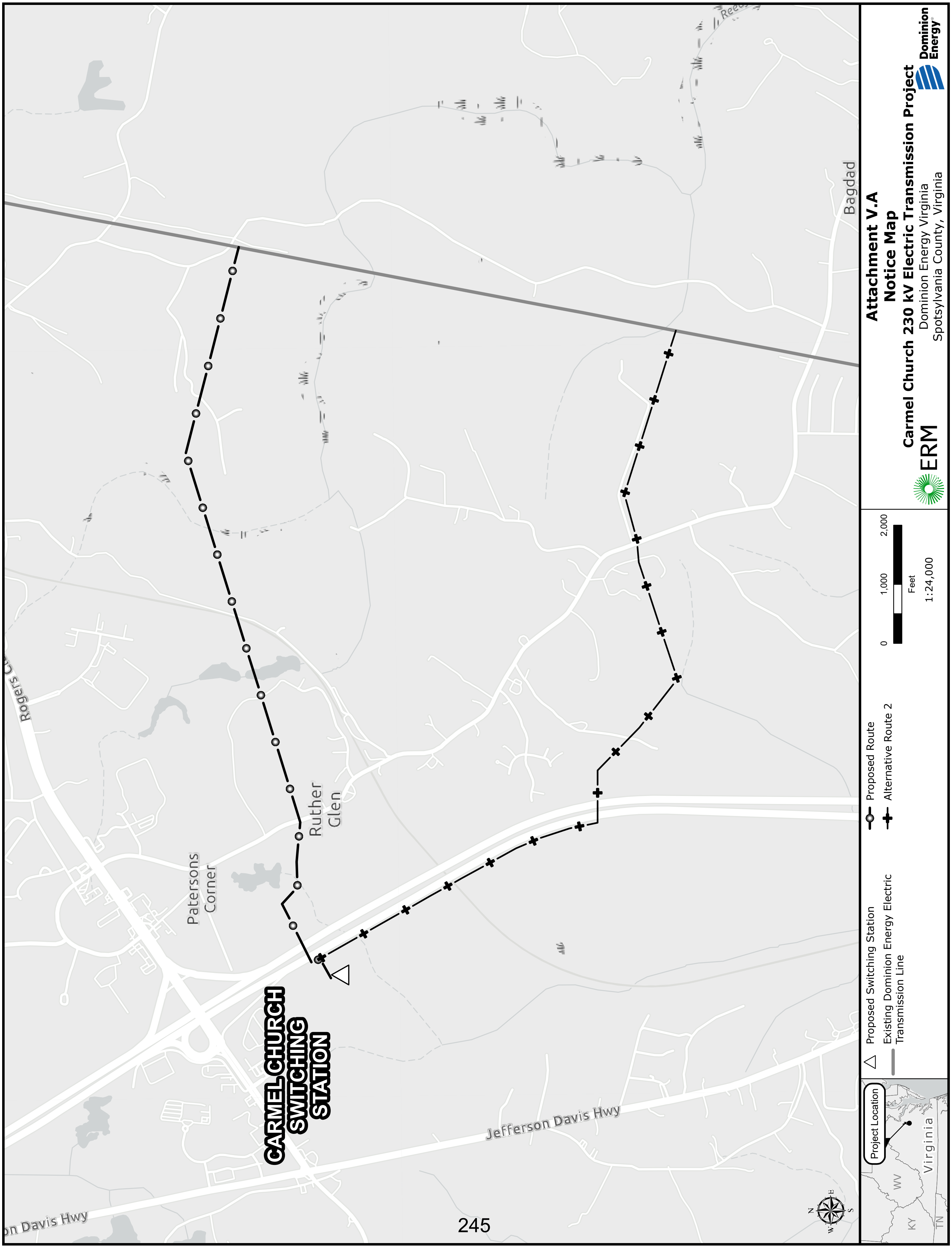


Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Proposed Route
Alternative Route 4
Alternative Route 6

0 1,000 2,000
Feet
1:24,000

Attachment V.A
Notice Map
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Spotsylvania County, Virginia

ERM
Dominion Energy


Attachment V.A
Notice Map
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Spotsylvania County, Virginia
Dominion Energy
ERM
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Proposed Route
Alternative Route 2
0
1,000
2,000
Feet
1:24,000
Project Location
Virginia
WV
KY
TN
CARMEL CHURCH SWITCHING STATION
Ruther Glen
Patersons Corner
Bagdad
Rogers
Jefferson Davis Hwy
on Davis Hwy

V. NOTICE

B. List Applicant offices where members of the public may inspect the application. If applicable, provide a link to website(s) where the application may be found.

Response: Shortly after filing, the Application will be made available electronically for public inspection at: www.dominionenergy.com/carmelchurchrutherglen.

V. NOTICE

C. List all federal, state, and local agencies and/or officials that may reasonably be expected to have an interest in the proposed construction and to whom the Applicant has furnished or will furnish a copy of the application.

Response:

Ms. Bettina Rayfield
Virginia Department of Environmental Quality
Office of Environmental Impact Review
1111 East Main Street, Suite 1400
Richmond, Virginia 23219
bettina.rayfield@deq.virginia.gov

Ms. Michelle Henicheck
Virginia Department of Environmental Quality
Office of Wetlands and Streams
1111 East Main Street, Suite 1400
Richmond, Virginia 23219

Ms. Rene Hypes
Virginia Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, Suite 1400
Richmond, Virginia 23219

Environmental Reviewer
Virginia Department of Conservation and Recreation
Planning & Recreation Bureau
600 East Main Street, 17th Floor
Richmond, Virginia 23219

Ms. Hannah Schul
Virginia Department of Wildlife Resources
Wildlife Information and Environmental Services
7870 Villa Park, Suite 400
Henrico, Virginia 23228

Mr. Keith Tignor
Virginia Department of Agriculture and Consumer Services
Office of Plant Industry Services
102 Governor Street
Richmond, Virginia 23219

Mr. Clint Folks
Virginia Department of Forestry
Forestland Conservation Division
900 Natural Resources Drive, Suite 800

Charlottesville, Virginia 22903

Scoping at VMRC
Virginia Marine Resources Commission
Habitat Management Division
Building 96, 380 Fenwick Road
Ft. Monroe, Virginia 23651

Mr. Troy Andersen
US Fish and Wildlife Service
Virginia Field Office, Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Ms. Regena Bronson
U.S. Army Corps of Engineers
Fredericksburg Field Office
10300 Spotsylvania Parkway, Suite 230
Fredericksburg, VA 22408

Mr. Phil Skorupa
Virginia Department of Energy
1100 Bank Street
Washington Building, 8th Floor
Richmond, Virginia 23219

Ms. Arlene Fields Warren
Virginia Department of Health
Office of Drinking Water
109 Governor Street, 6th Floor
Richmond, VA 23219

Mike Helvey
Obstruction Evaluation Group Manager
Federal Aviation Administration, FAA Eastern Regional Office
800 Independence Ave, SW, Room 400 East
Washington, DC 20591

Sunil Rabindranath
Project Manager, Engineering Division
Metropolitan Washington Airports Authority
P.O. Box 17045, MA-224
Washington, DC 20041
Mr. Scott Denny
Virginia Department of Aviation
Airport Services Division

5702 Gulfstream Road
Richmond, Virginia 23250

Ms. Martha Little
Virginia Outdoors Foundation
600 East Main Street, Suite 402
Richmond, Virginia 23219

John D. Lynch
Northern Virginia District Engineer
Virginia Department of Transportation, Northern Virginia District Office
4975 Alliance Drive
Fairfax, Virginia 22030
Kamal Suliman
Regional Operations Director
Virginia Department of Transportation, Northern Virginia District Office
4975 Alliance Drive
Fairfax, Virginia 22030

Tim Hemstreet
Loudoun County Administrator
PO Box 7000
Leesburg, Virginia 20177

V. NOTICE

D. If the application is for a transmission line with a voltage of 138 kV or greater, provide a statement and any associated correspondence indicating that prior to the filing of the application with the SCC the Applicant has notified the chief administrative officer of every locality in which it plans to undertake construction of the proposed line of its intention to file such an application, and that the Applicant gave the locality a reasonable opportunity for consultation about the proposed line (similar to the requirements of § 15.2-2202 of the Code for electric transmission lines of 150 kV or more).

Response: In accordance with Va. Code § 15.2-2202 E, letters dated November 12, 2024 and November 20, 2024, were sent to Mr. Charles M. Culley, Jr., County Administrator in Caroline County, where the Projects are located. The letters stated the Company's intention to file this Application and invited the County to consult with the Company about the Project. These letters are included as <u>Attachment V.D.1</u>.

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
DominionEnergy.com

Mr. Charles M. Culley, Jr.
County Administrator, Caroline County
212 N Main Street
Bowling Green, VA 22427

November 12, 2024

RE: Dominion Energy Virginia's Carmel Church and Ruther Glen 230 kV Transmission Line Projects

Notice Pursuant to Va. Code § 15.2-2202 E

Dear Mr. Culley,

Dominion Energy Virginia (the "Company") is proposing to construct a new 230 kV switching station (the "Ruther Glen Switching Station") and a new double circuit overhead 230 kV transmission line (the "Ruther Glen Loop") that connects the proposed Ruther Glen Switching Station to the existing 230 kV transmission system in Caroline County, Virginia. Together, this work is referred to as the "Ruther Glen Project"). Separately, the Company is proposing to construct a new 230 kV switching station (the "Carmel Church Switching Station") and a new double circuit overhead 230 kV transmission line (the "Carmel Church Loop") that connects the proposed Carmel Church Switching Station to the existing 230 kV transmission system in Caroline County, Virginia. While the Ruther Glen Project and the Carmel Church Project have separate need drivers, the project areas are geographically in close proximity to each other, and for that reason, they are being combined for the Virginia State Corporation Commission (the "Commission") filing.

The Projects are needed to provide serviced requested by Rappahannock Electric Cooperative ("REC") for REC to provide service to its two new data center customers in Caroline County, Virginia, maintain reliable service for the overall growth in the Projects' area, and comply with mandatory North American Electric Reliability Corporation Standards.

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
DominionEnergy.com

The Company is preparing to file one application for a Certificate of Public Convenience and Necessity ("CPCN") with the Commission for both Projects. Pursuant to § 15.2-2202 E of the Code of Virginia, the Company is writing to notify Caroline County of the proposed Projects in advance of the CPCN application filing and respectfully requests that you submit any comments or additional information you feel would have bearing on the Projects within 30 days of the date of this letter. Once filed, the CPCN application filing will be available for review on the Company's website at http://www.dominionenergy.com/carmelchurchrutherglen.

Enclosed are the Project Overview Maps depicting the Projects' route alternatives, as well as the general location of the Projects. All final materials, including maps, will be available in the Company's CPCN application filing to the Commission.

If you would like to receive GIS shapefiles of the routes to assist in your review of the Projects or if you have any questions, please do not hesitate to contact me directly at 804-658-7316 or blair.parks@dominionenergy.com.

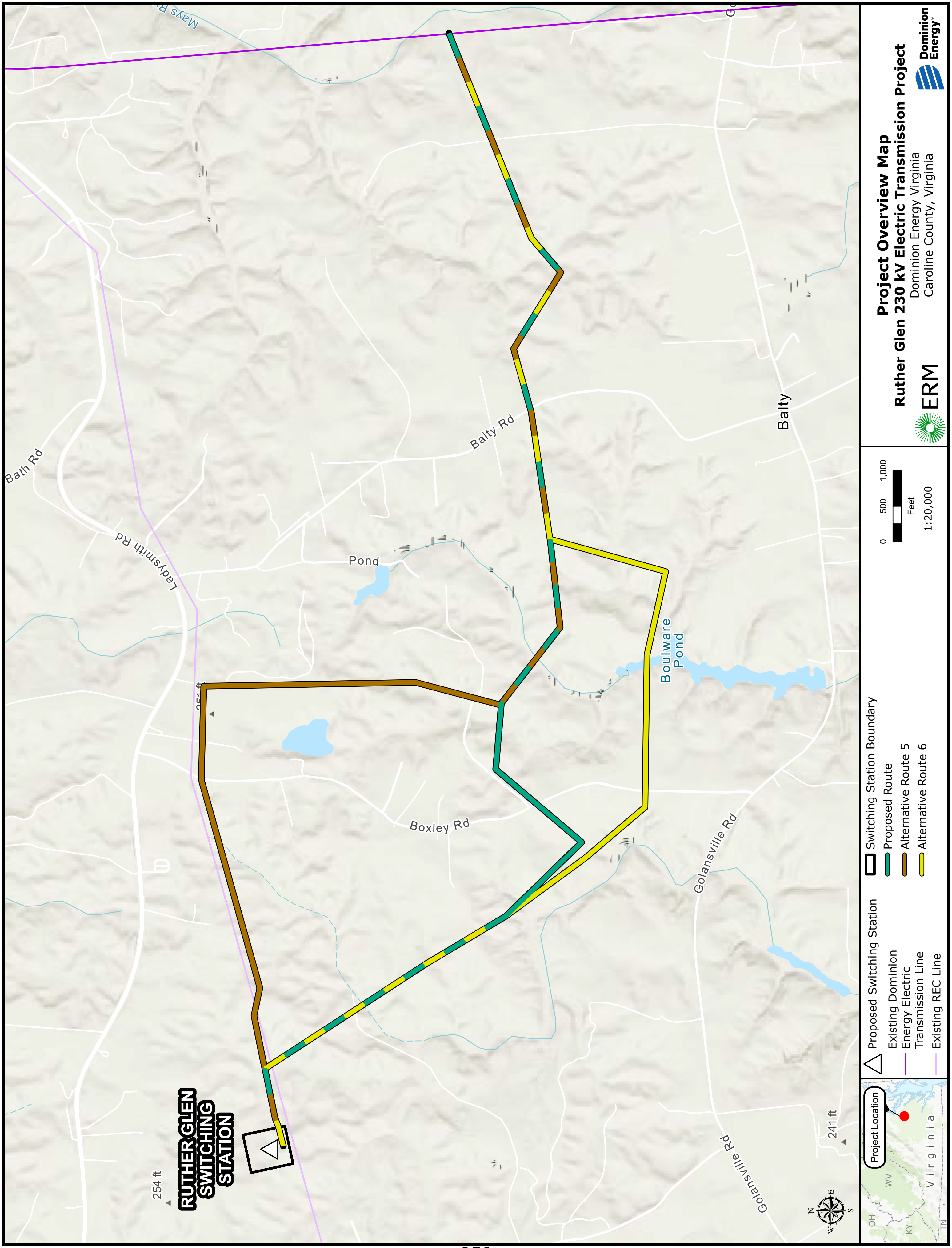
The Company appreciates your assistance with the review of these Projects and looks forward to any additional information you may have to offer.

Regards,

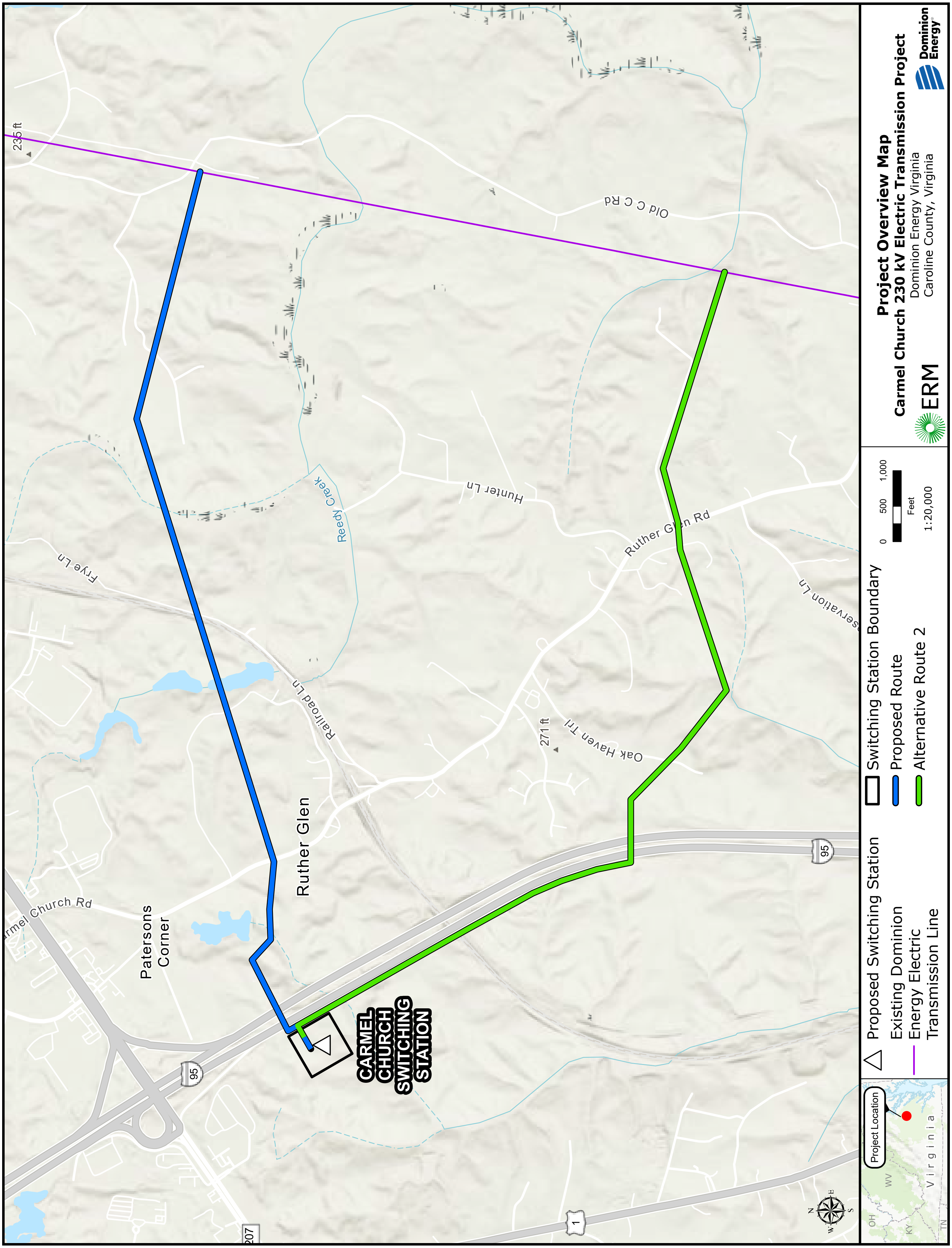
Blair Parks

Blair Parks

Senior Siting and Permitting Specialist
Electric Transmission
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
804-658-7316



Project Overview Map
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
0 500 1,000
Feet
1:20,000
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Switching Station Boundary
Proposed Route
Alternative Route 5
Alternative Route 6
Project Location
Virginia
WV
OH
KY
TN
RUTHER GLEN SWITCHING STATION
Bath Rd
Ladysmith Rd
Balty Rd
Pond
Boulware Pond
Boxley Rd
Golansville Rd
Balty
254 ft
241 ft


Project Overview Map
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Dominion Energy
ERM
0 500 1,000
Feet
1:20,000
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Switching Station Boundary
Proposed Route
Alternative Route 2
Project Location
WV
OH
KY
TN
Virginia
CARMEL CHURCH SWITCHING STATION
Ruther Glen
Patersons Corner
Carmel Church Rd
Ruther Glen Rd
Railroad Ln
Reedy Creek
Hunter Ln
Frye Ln
Oak Haven Trl
Old C C Rd
235 ft
271 ft
95
1
207

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
DominionEnergy.com

Mr. Charles M. Culley, Jr.
County Administrator, Caroline County
212 N Main Street
Bowling Green, VA 22427

November 20, 2024

RE: Dominion Energy Virginia's Carmel Church and Ruther Glen 230 kV Transmission Line Projects

Notice Pursuant to Va. Code § 15.2-2202 E

Dear Mr. Culley,

By letter dated November 12, 2024, Dominion Energy Virginia (the "Company") informed you of its proposal to construct a new 230 kV switching station (the "Ruther Glen Switching Station") and a new double circuit overhead 230 kV transmission line (the "Ruther Glen Loop") that connects the proposed Ruther Glen Switching Station to the existing 230 kV transmission system in Caroline County, Virginia (the "Ruther Glen Project") and a new 230 kV switching station (the "Carmel Church Switching Station") and a new double circuit overhead 230 kV transmission line (the "Carmel Church Loop") that connects the proposed Carmel Church Switching Station to the existing 230 kV transmission system in Caroline County, Virginia (the "Carmel Church Project"). As noted in that correspondence, while the Ruther Glen and Carmel Church Projects have separate need drivers, the project areas are geographically in close proximity to each other, and for that reason, they are being combined for the Virginia State Corporation Commission (the "Commission") filing. The Projects are needed to provide serviced requested by Rappahannock Electric Cooperative ("REC") for REC to provide service to its two new data center customers in Caroline County, Virginia, maintain reliable service for the overall growth in the Projects' area, and comply with mandatory North American Electric Reliability Corporation Standards.

As also noted in the November 12th letter, the Company is in the process of preparing an application for a Certificate of Public Convenience and Necessity from the State Corporation Commission of Virginia (the "Commission"). Enclosed with that letter was were two Project Overview Maps depicting the proposed and alternative routes of the Ruther Glen Loop and Carmel Church Loop, as well as the general locations of the Projects. Note that the attached Project Overview Maps have been updated to remove the designations of "Proposed Route" and "Alternative Route."

Dominion Energy Services, Inc.
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
DominionEnergy.com

All routes in the updated maps are indicated by route number. There are no other changes to the maps that were provided with the November 12th letter. All final materials, including maps, will be available in the Company's application filing to the Commission.

If there are any questions, please do not hesitate to contact me at 804-658-7316 or blair.parks@dominionenergy.com. We appreciate your assistance with the review of these Projects and look forward to any additional information you may have to offer.

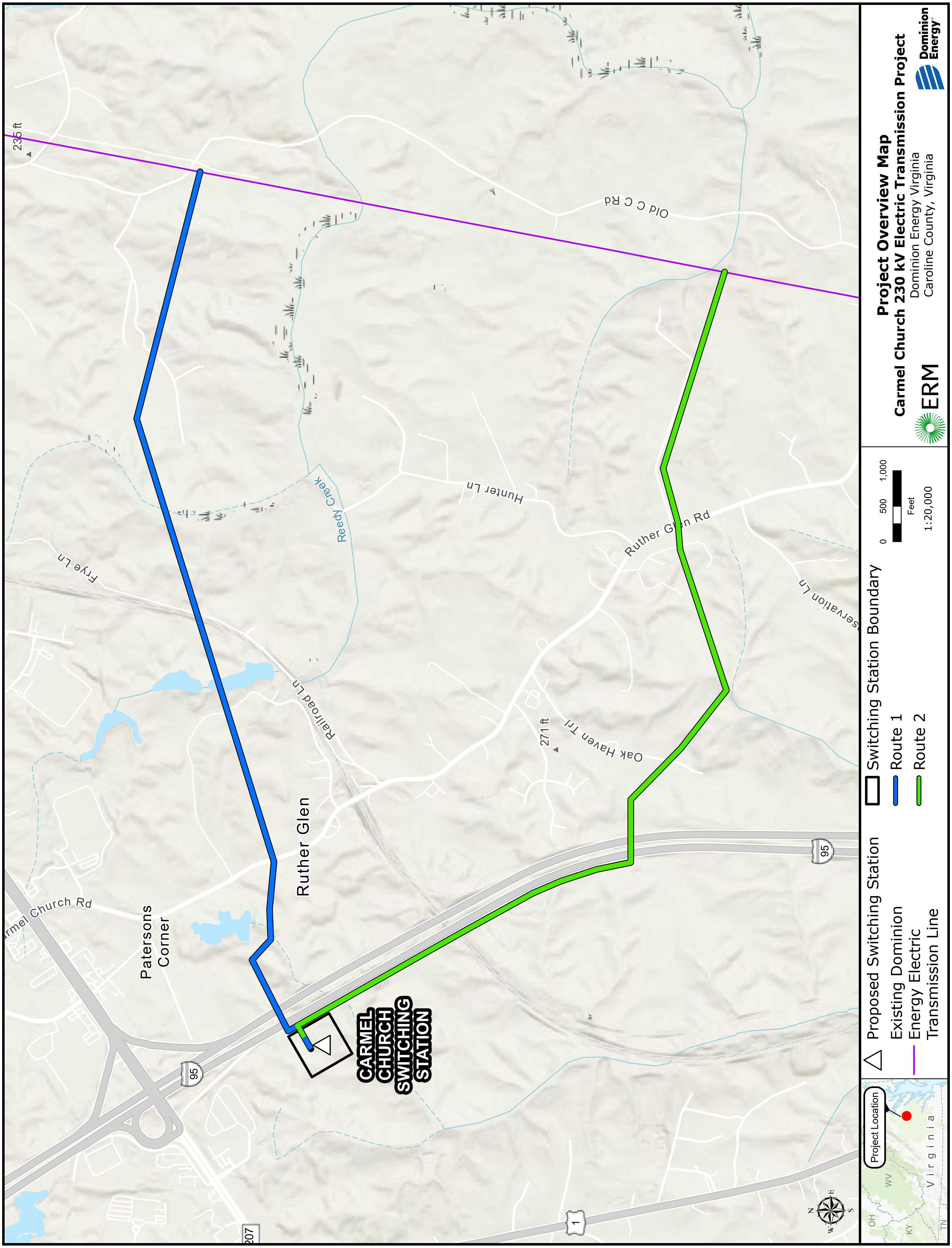
Regards,

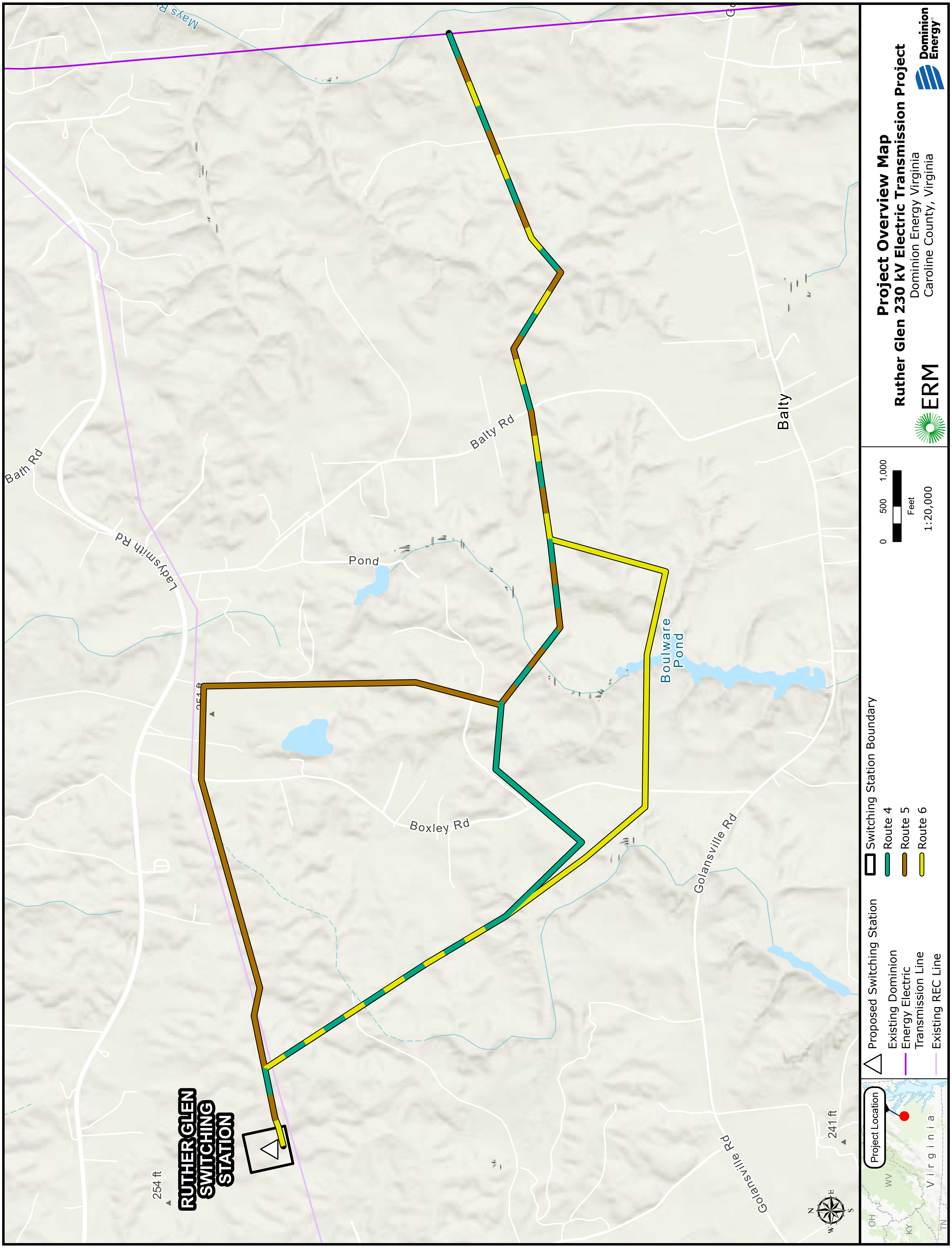
Blair Parks

Blair Parks

Senior Siting and Permitting Specialist
Electric Transmission
5000 Dominion Boulevard, 3rd Floor
Glen Allen, VA 23060
804-658-7316

Enclosure: Updated Project Maps


Project Overview Map
Carmel Church 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
Dominion Energy
ERM
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Switching Station Boundary
Route 1
Route 2
0
500
1,000
Feet
1:20,000
Project Location
Virginia
WV
OH
KY
TN
CARMEL CHURCH SWITCHING STATION
Ruther Glen
Patersons Corner
Carmel Church Rd
Ruther Glen Rd
Railroad Ln
Reedy Creek
Hunter Ln
Frye Ln
Old C C Rd
Oak Haven Trl
Conservation Ln
235 ft
271 ft
95
207
1


Project Overview Map
Ruther Glen 230 kV Electric Transmission Project
Dominion Energy Virginia
Caroline County, Virginia
ERM
Dominion Energy
0 500 1,000
Feet
1:20,000
Proposed Switching Station
Existing Dominion Energy Electric Transmission Line
Existing REC Line
Switching Station Boundary
Route 4
Route 5
Route 6
Project Location
OH
WV
KY
TN
Virginia
RUTHER GLEN SWITCHING STATION
Bath Rd
Ladysmith Rd
Balty Rd
Boxley Rd
Golansville Rd
Pond
Boulware Pond
Balty
254 ft
241 ft

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2024-00221
	)	
For approval and certification of electric transmission facilities: Carmel Church and Ruther Glen 230 kV Transmission Line Projects	)	

IDENTIFICATION, SUMMARIES, AND TESTIMONY OF DIRECT WITNESSES OF <u>VIRGINIA ELECTRIC AND POWER COMPANY</u>

Jason S. Whitlow

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Sergio E. De Hoyos Irizarry

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

George C. Brimmer

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Blair Parks

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Rachel Tippett

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Jason S. Whitlow

Title: Engineer III – Electric Transmission Planning

Summary:

Company Witness Jason S. Whitlow sponsors those portions of the Appendix describing the Company's electric transmission system and the need for, and benefits of, the proposed Projects, as follows:

- Section I.B: This section details the engineering justifications for the proposed projects.
- Section I.C: This section describes the present system and details how the proposed projects will effectively satisfy present and projected future load demand requirements.
- Section I.D: This section, when applicable, describes critical contingencies and associated violations due to the inadequacy of the existing system.
- Section I.E: This section explains feasible project alternatives, when applicable
- Section I.G: This section provides a system map for the affected area.
- Section I.H: This section provides the desired in-service date of the proposed projects and the estimated construction time.
- Section I.J: This section provides information about the projects if approved by the RTO.
- Section I.K: This section, when applicable, provides outage history and maintenance history for existing transmission lines if the proposed project is a rebuild and is due in part to reliability issues.
- Section I.M: This section, when applicable, contains information for transmission lines interconnecting a non-utility generator.
- Section I.N: This section provides the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations, and other ground facilities associated with the proposed project.
- Section II.A.3: This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed projects.
- Section II.A.10: This section provides details of the construction plans for the proposed projects, including requested line outage schedules.

Additionally, Company Witness Whitlow co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Witnesses, Sergio E. De Hoyos Irizarry, George C. Brimmer, Blair Parks, and Rachel Tippett): This section details the primary justifications for the proposed projects.
- Section I.L (co-sponsored with Company Witness Sergio E. De Hoyos Irizarry): This section, when applicable, provides details on the deterioration of structures and associated equipment.

A statement of Mr. Whitlow's background and qualifications is attached to his testimony as Appendix A.

**DIRECT TESTIMONY
OF
JASON S. WHITLOW
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2024-00221**

Q. Please state your name, position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), and business address.

A. My name is Jason S. Whitlow, and I am an Engineer III in the Electric Transmission Planning Department for the Company. My business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for planning the Company's electric transmission system for voltages of 69 kilovolt ("kV") through 500 kV.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by Rappahannock Electric Cooperative ("REC" or the "Customer") for REC to provide service to its two new data center customers in Caroline County, Virginia, to maintain reliable service for the overall load growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Caroline County, Virginia, to:

(i) **Ruther Glen Loop**: Cut the Company's existing 230 kilovolt ("kV") Line # 256 (Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410 (the "Ruther Glen Loop"). From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[1]

(ii) **Ruther Glen Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Ruther Glen Switching Station").

(iii) **Carmel Church Loop**: From the proposed Ruther Glen Switching Station, extend a new double circuit overhead 230 kV transmission line approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church - Four Rivers Line #2422 (the "Carmel Church Loop"). As proposed, existing 230 kV Ladysmith CT – Four Rivers Line #256 will be cut at Structure #256/227, and to effectuate the cut-in location, the Company will remove one single circuit H-frame tangent structure and install one two-pole double dead-end structure within the existing right-of-way. From the proposed cut-in location within existing right-of-way, Lines #2410 and #2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) **Carmel Church Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Carmel Church Switching Station").

The Ruther Glen Loop, the Ruther Glen Switching Station, and the substation-related work are referred to as the "Ruther Glen Project." The Carmel Church Loop, the Carmel Church Switching Station, and the substation-related work are referred to as the "Carmel Church Project." The Ruther Glen Project and the Carmel Church Project are referred to together as the "Projects." While the Projects have separate need drivers, the project areas are geographically in close proximity to each other.

[1] Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power (megavolt ampere reactive or "MVAR").

The purpose of my testimony is to describe the Company's electric transmission system and the need for, and benefits of, the proposed Projects. I sponsor Sections I.B, I.C, I.D, I.E, I.G, I.H., I.J, I.K, I.M, I.N, II.A.3, and II.A.10 of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Sergio E. De Hoyos Irizarry, George C. Brimmer, Blair Parks, and Rachel Tippett; and Section I.L with Company Witness Sergio E. De Hoyos Irizarry.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
JASON S. WHITLOW

Jason Whitlow received a B.S. in Mechanical Engineering from Virginia Tech in 2007. Mr. Whitlow has been employed by the Company since 2013, where he has worked in both natural gas and electric transmission planning. Prior to joining the Company, he worked as a Project Manager for The Whiting-Turner Contracting Company.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Sergio E. De Hoyos Irizarry

Title: Engineer III – Electric Transmission Line Engineering

Summary:

Company Witness Sergio E. De Hoyos Irizarry sponsors those sections of the Appendix providing an overview of the design characteristics of the transmission facilities for the proposed Projects, and discussing electric and magnetic field levels, as follows:

- Section I.F: This section, when applicable, describes any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project.
- Section II.A.5: This section provides drawings of the right-of-way cross section showing typical transmission lines structure placements.
- Sections II.B.1 to II.B.2: These sections provide the line design and operational features of the proposed projects, as applicable.
- Section IV: This section provides analysis on the health aspects of electric and magnetic field levels.

Additionally, Company Witness De Hoyos Irizarry co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Jason S. Whitlow, George C. Brimmer, Blair Parks, and Rachel Tippett): This section details the primary justifications for the proposed projects.
- Section I.I. (co-sponsored with Company Witness George C. Brimmer): This section provides the estimated total cost of the proposed projects.
- Section I.L (co-sponsored with Company Witness Jason S. Whitlow): This section, when applicable, provides details on the deterioration of structures and associated equipment.
- Section II.A.4 (co-sponsored with Company Witnesses Blair Parks and Rachel Tippett): This section explains why the existing right-of-way is not adequate to serve the need.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Blair Parks): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Blair Parks and Rachel Tippett): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section V.A (co-sponsored with Company Witnesses Blair Parks and Rachel Tippett): This section provides the proposed route descriptions and structure heights for notice purposes.

A statement of Mr. De Hoyos Irizarry's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
SERGIO E. DE HOYOS IRIZARRY
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2024-00221

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Sergio E. De Hoyos Irizarry, and I am an Engineer III in the Electric Transmission Line Engineering Department of the Company. My business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for the estimating and conceptual design of high voltage transmission line projects from 69 kilovolt ("kV") to 500 kV.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by Rappahannock Electric Cooperative ("REC" or the "Customer") for REC to provide service to its two new data center customers in Caroline County, Virginia, to maintain reliable service for the overall load growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Caroline County, Virginia, to:

(i) **Ruther Glen Loop**: Cut the Company's existing 230 kilovolt ("kV") Line # 256 (Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410 (the "Ruther Glen Loop"). From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[2]

(ii) **Ruther Glen Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Ruther Glen Switching Station").

(iii) **Carmel Church Loop**: From the proposed Ruther Glen Switching Station, extend a new double circuit overhead 230 kV transmission line approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church - Four Rivers Line #2422 (the "Carmel Church Loop"). As proposed, existing 230 kV Ladysmith CT – Four Rivers Line #256 will be cut at Structure #256/227, and to effectuate the cut-in location, the Company will remove one single circuit H-frame tangent structure and install one two-pole double dead-end structure within the existing right-of-way. From the proposed cut-in location within existing right-of-way, Lines #2410 and 2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) **Carmel Church Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Carmel Church Switching Station").

The Ruther Glen Loop, the Ruther Glen Switching Station, and the substation-related work are referred to as the "Ruther Glen Project." The Carmel Church Loop, the Carmel Church Switching Station, and the substation-related work are referred to as the "Carmel Church Project." The Ruther Glen Project and the Carmel Church Project are referred to

[2] Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power (megavolt ampere reactive or "MVAR").

together as the "Projects." While the Projects have separate need drivers, the project areas are geographically in close proximity to each other.

The purpose of my testimony is to describe the design characteristics of the transmission facilities for the proposed Projects and to discuss electric and magnetic field levels. I sponsor Sections I.F, II.A.5, II.B.1, II.B.2, and IV of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Jason S. Whitlow, George C. Brimmer, Blair Parks, and Rachel Tippett; Section I.I with Company Witness George C. Brimmer; Section I.L with Company Witness Jason S. Whitlow; Sections II.B.3 to II.B.5 with Company Witness Blair Parks; and Sections II.A.4, II.B.6 and V.A with Company Witnesses Blair Parks and Rachel Tippett.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
SERGIO E. DE HOYOS IRIZARRY

Sergio E. De Hoyos Irizarry received a Bachelor of Science degree in Civil Engineering from the University of Puerto Rico in 2010 and a Master of Science degree in Civil Engineering from City University of New York in 2013. He was employed by Exelon from 2014-2023 and has worked with Dominion since 2023. Mr. De Hoyos Irizarry's experience includes Overhead Transmission Standards Development & Overhead Transmission Engineering (2014-2018, 2023-Present), Underground Transmission Engineering (2018-2021), and Substation Engineering (2021-2023).

Mr. De Hoyos Irizarry has held a Professional Engineering license in the State of Virginia since 2019.

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WITNESS DIRECT TESTIMONY SUMMARY

Witness: George C. Brimmer

Title: Engineer III—Substation Engineering

Summary:

Company Witness George C. Brimmer sponsors or co-sponsors the following sections of the Appendix describing the substation work to be performed for the proposed Projects as follows:

- Section I.A (co-sponsored with Company Witnesses Jason S. Whitlow, Sergio E. De Hoyos Irizarry, Blair Parks, and Rachel Tippett): This section details the primary justifications for the proposed projects.

- Section I.I (co-sponsored with Company Witness Sergio E. De Hoyos Irizarry): This section provides the estimated total cost of the proposed projects.

- Section II.C: This section describes and furnishes a one-line diagram of the substation associated with the proposed projects.

A statement of Mr. Brimmer's background and qualifications is attached to his testimony as Appendix A.

DIRECT TESTIMONY
OF
GEORGE C. BRIMMER
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2024-00221

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is George C. Brimmer, and I am an Engineer III in the Substation Engineering section of the Electric Transmission group of the Company. My business address is 2400 Grayland Avenue, Richmond, Virginia 23220. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for evaluation of the substation project requirements, feasibility studies, conceptual physical design, scope development, preliminary engineering, and cost estimating for high voltage transmission and distribution substations.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by Rappahannock Electric Cooperative ("REC" or the "Customer") for REC to provide service to its two new data center customers in Caroline County, Virginia, to maintain reliable service for the overall load growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Caroline County, Virginia, to:

(i) **Ruther Glen Loop**: Cut the Company's existing 230 kilovolt ("kV") Line # 256

(Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410 (the "Ruther Glen Loop"). From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[3]

(ii) **Ruther Glen Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Ruther Glen Switching Station").

(iii) **Carmel Church Loop**: From the proposed Ruther Glen Switching Station, extend a new double circuit overhead 230 kV transmission line approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church - Four Rivers Line #2422 (the "Carmel Church Loop"). As proposed, existing 230 kV Ladysmith CT – Four Rivers Line #256 will be cut at Structure #256/227, and to effectuate the cut-in location, the Company will remove one single circuit H-frame tangent structure and install one two-pole double dead-end structure within the existing right-of-way. From the proposed cut-in location within existing right-of-way, Lines #2410 and #2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) **Carmel Church Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Carmel Church Switching Station").

The Ruther Glen Loop, the Ruther Glen Switching Station, and the substation-related work are referred to as the "Ruther Glen Project." The Carmel Church Loop, the Carmel Church Switching Station, and the substation-related work are referred to as the "Carmel Church Project." The Ruther Glen Project and the Carmel Church Project are referred to

[3] Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power (megavolt ampere reactive or "MVAR").

together as the "Projects." While the Projects have separate need drivers, the project areas are geographically in close proximity to each other.

The purpose of my testimony is to describe the substation and switching station work to be performed as part of the Projects. As it pertains to station work, I sponsor Section II.C of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Jason S. Whitlow, Sergio E. De Hoyos Irizarry, Blair Parks, and Rachel Tippett; and Section I.I of the Appendix with Company Witness Sergio E. De Hoyos Irizarry.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
GEORGE C. BRIMMER

George C. Brimmer received a Bachelor of Science degree in Electrical Engineering from Virginia Commonwealth University in 2014. Mr. Brimmer also received a Bachelor of Science degree in Psychology in 2008. Prior to joining the Company, he worked as Cable Technician for American Systems Corporation from 2010 to 2011. Mr. Brimmer has been employed by the Company since 2013. He joined the Dominion Energy Substation Engineering department in November 2016 as an Engineer II. He was promoted to Engineer III in July 2021. Mr. Brimmer's responsibilities included the evaluation of the substation project requirements, development of project scope documents, estimates, development of detailed physical drawings, bill of materials, electrical schematics and wiring diagrams. His areas of expertise are substation and grounding design.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Blair Parks

Title: Senior Siting and Permitting Specialist

Summary:

Company Witness Blair Parks sponsors those portions of the Appendix providing an overview of the design of the route for the proposed Projects, and related permitting, as follows:

- Section II.A.12: This section identifies the counties and localities through which the proposed project will pass and provides General Highway Maps for these localities.
- Sections V.B–D: These sections provide information related to public notice of the proposed projects.

Additionally, Company Witness Parks co-sponsors the following portion of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Jason S. Whitlow, Sergio E. De Hoyos Irizarry, George C. Brimmer, and Rachel Tippett): This section details the primary justifications for the proposed projects.
- Section II.A.1 (co-sponsored with Company Witness Rachel Tippett): This section provides the length of the proposed corridor and viable alternatives to the proposed projects.
- Section II.A.2 (co-sponsored with Company Witness Rachel Tippett): This section provides a map showing the route of the proposed projects in relation to notable points close to the proposed projects.
- Section II.A.4 (co-sponsored with Company Witnesses Sergio E. De Hoyos Irizarry and Rachel Tippett): This section explains why the existing right-of-way is not adequate to serve the need.
- Sections II.A.6 to II.A.8 (co-sponsored with Company Rachel Tippett): These sections provide detail regarding the right-of-way for the proposed projects.
- Section II.A.9 (co-sponsored with Company Witness Rachel Tippett): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Rachel Tippett): This section details how the construction of the proposed projects follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Sergio E. De Hoyos Irizarry): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witnesses Sergio E. De Hoyos Irizarry and Rachel Tippett): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Rachel Tippett): This section details the impact of the proposed project on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Sergio E. De Hoyos Irizarry and Rachel Tippett): This section provides the proposed route descriptions and structure heights for notice purposes.

Finally, Ms. Parks sponsors the DEQ Supplement filed with the Application along with Company Witness Rachel Tippett. A statement of Ms. Parks' background and qualifications is attached to her testimony as Appendix A.

DIRECT TESTIMONY
OF
BLAIR PARKS
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2024-00221

Q. Please state your name, position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), and business address.

A. My name is Blair Parks, and I am a Senior Siting and Permitting Specialist for Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"). My business address is 5000 Dominion Boulevard, Glen Allen, Virginia 23060. A statement of my qualifications and background is provided as Appendix A.

Q. Please describe your areas of responsibility with the Company.

A. I am responsible for identifying appropriate routes for transmission lines and obtaining necessary federal, state, and local approvals and environmental permits for those facilities. In this position, I work closely with government officials, permitting agencies, property owners, and other interested parties, as well as with other Company personnel, to develop facilities needed by the public so as to reasonably minimize environmental and other impacts on the public in a reliable, cost-effective manner.

Q. What is the purpose of your testimony in this proceeding?

A. In order to provide service requested by Rappahannock Electric Cooperative ("REC" or the "Customer") for REC to provide service to its two new data center customers in Caroline County, Virginia, to maintain reliable service for the overall load growth in the area, and to comply with mandatory North American Electric Reliability Corporation

("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Caroline County, Virginia, to:

(i) **Ruther Glen Loop**: Cut the Company's existing 230 kilovolt ("kV") Line # 256 (Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410 (the "Ruther Glen Loop"). From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[4]

(ii) **Ruther Glen Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Ruther Glen Switching Station").

(iii) **Carmel Church Loop**: From the proposed Ruther Glen Switching Station, extend a new double circuit overhead 230 kV transmission line approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church - Four Rivers Line #2422 (the "Carmel Church Loop"). As proposed, existing 230 kV Ladysmith CT – Four Rivers Line #256 will be cut at Structure #256/227, and to effectuate the cut-in location, the Company will remove one single circuit H-frame tangent structure and install one two-pole double dead-end structure within the existing right-of-way. From the proposed cut-in location within existing right-of-way, Lines #2410 and #2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) **Carmel Church Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Carmel Church Switching Station").

[4] Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power (megavolt ampere reactive or "MVAR").

The Ruther Glen Loop, the Ruther Glen Switching Station, and the substation-related work are referred to as the "Ruther Glen Project." The Carmel Church Loop, the Carmel Church Switching Station, and the substation-related work are referred to as the "Carmel Church Project." The Ruther Glen Project and the Carmel Church Project are referred to together as the "Projects." While the Projects have separate need drivers, the project areas are geographically in close proximity to each other.

The purpose of my testimony is to provide an overview of the routes and permitting for the proposed Projects. I sponsor Sections II.A.12 and V.B to V.D of the Appendix. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Jason S. Whitlow, Sergio E. De Hoyos Irizarry, George C. Brimmer, and Rachel Tippett; Sections II.A.1, II.A.2, II.A.6 to II.A.9, II.A.11, and III with Company Witness Rachel Tippett; Sections II.B.3 to II.B.5 with Company Sergio E. De Hoyos Irizarry; and Sections II.A.4, II.B.6 and V.A with Company Witnesses Sergio E. De Hoyos Irizarry and Rachel Tippett. Finally, I co-sponsor the DEQ Supplement with Company Witness Rachel Tippett.

Q. Has the Company complied with Va. Code § 15.2-2202 E?

A. Yes. In accordance with Va. Code § 15.2-2202 E, a letter dated July 15, 2024, was sent to Dr. Joseph Casey, Administrator of Chesterfield County, where the Project is located. The letter stated the Company's intention to file this Application and invited the County to consult with the Company about the Project. A copy of the letter is included as Appendix Attachment V.D.1.

Q. Does this conclude your pre-filed direct testimony

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
BLAIR PARKS

Blair Parks graduated from Virginia Commonwealth University in 2017 with a Bachelor of Science in Environmental Studies. She was previously a Regulatory Specialist for Stantec Consulting Services, Inc., where she was responsible for permitting electric distribution and transportation projects. Ms. Parks joined Dominion Energy Virginia's Siting and Permitting Group in 2022, and she was promoted to Senior Siting and Permitting Specialist in July 2024.

Ms. Parks has previously testified before the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Rachel Tippett

Title: Managing Consultant, Planner with ERM

Summary:

Company Witness Rachel Tippett sponsors the Environmental Routing Study provided as part of the Company's Application.

Additionally, Ms. Tippett co-sponsors the following portions of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Jason S. Whitlow, Sergio E. De Hoyos Irizarry, George C. Brimmer, and Blair Parks): This section details the primary justifications for the proposed projects.
- Section II.A.1 (co-sponsored with Company Witness Blair Parks): This section provides the length of the proposed corridor and viable alternatives to the proposed projects.
- Section II.A.2 (co-sponsored with Company Witness Blair Parks): This section provides a map showing the route of the proposed projects in relation to notable points close to the proposed projects.
- Section II.A.4 (co-sponsored with Company Witnesses Blair Parks and Sergio E. De Hoyos Irizarry): This section explains why the existing right-of-way is not adequate to serve the need.
- Sections II.A.6 to II.A.8 (co-sponsored with Company Witness Blair Parks): These sections provide detail regarding the right-of-way for the proposed projects.
- Section II.A.9 (co-sponsored with Company Witness Blair Parks): This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11 (co-sponsored with Company Witness Blair Parks): This section details how the construction of the proposed projects follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Section II.B.6 (co-sponsored with Company Witnesses Sergio E. De Hoyos Irizarry and Blair Parks): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.
- Section III (co-sponsored with Company Witness Blair Parks): This section details the impact of the proposed projects on scenic, environmental, and historic features.
- Section V.A (co-sponsored with Company Witnesses Sergio E. De Hoyos Irizarry and Blair Parks): This section provides the proposed route descriptions and structure heights for notice purposes.

Finally, Ms. Tippett co-sponsors the DEQ Supplement filed with this Application with Company Witness Blair Parks.

A statement of Ms. Tippett's background and qualifications is attached to her testimony as Appendix A.

DIRECT TESTIMONY
OF
RACHEL TIPPETT
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2024-00221

Q. Please state your name, position and place of employment and business address.

A. My name is Rachel Tippett. I am employed as a Managing Consultant, Planner with Environmental Resource Management ("ERM"). My business address is 1001 Boulders Parkway, Suite 300, Richmond, VA 23225. A statement of my qualifications and background is provided as Appendix A.

Q. What professional experience does Timmons Group have with the routing of linear energy transportation facilities?

A. ERM has extensive experience in the routing, feasibility assessments, and permitting of energy infrastructure projects. It has assisted its clients in the identification, evaluation and development of linear energy facilities for the past 30 years. During this time, it has developed a consistent approach for linear facility routing and route selection based on the identification, mapping and comparative evaluation of routing constraints and opportunities within defined study areas. ERM uses data-intensive Geographic Information System spatial and dimensional analysis and the most current and refined data layers and aerial photography resources available for the identification, evaluation and selection of transmission line routes.

In addition to Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), its clients include some of the largest energy companies in the United

States, Canada, and the world, including ExxonMobil, TC Energy, Shell, NextEra Energy, Phillips 66, Kinder Morgan, British Petroleum, Enbridge Energy, and others. ERM also routinely assists the staff of the Federal Energy Regulatory Commission, United States Army Corps of Engineers, and the U.S. Forest Service in the identification and/or evaluation of linear energy routes to support federal National Environmental Policy Act evaluations. ERM works on both small and large energy projects and has assisted in or conducted the routing and route evaluation of some of the largest electric transmission line and pipeline facilities in North America.

In Virginia, ERM served as routing consultant to Dominion Energy Virginia for many projects over the last 15 years, including:

- Cannon Branch-Cloverhill 230 kV transmission line project in the City of Manassas and Prince William County (Case No. PUE-2011-00011);
- Dahlgren 230 kV double circuit transmission line project in King George County (Case No. PUE-2011-00113);
- Surry-Skiffes Creek-Whealton 500 and 230 kV transmission lines (Case No. PUE-2012-00029);
- Remington CT-Warrenton 230 kV double circuit transmission line (Case No. PUE-2014-00025);
- Haymarket 230 kV Line and Substation Project (Case No. PUE-2015-00107);
- Remington-Gordonsville Electric Transmission Project (Case No. PUE-2015-00117);
- Norris Bridge (Case No. PUE-2016-00021);
- Idylwood-Tysons 230 kV single circuit underground transmission line, Tysons Substation rebuild, and related transmission facilities (Case No. PUR-2017-00143);
- Lockridge 230 kV Line Loop and Substation (Case No. PUR-2019-00215);
- Coastal Virginia Offshore Wind Commercial Project (Case No. PUR-2021-00142);
- DTC 230 kV Line Loop and DTC Substation (Case No. PUR-2021-00280);

- Aviator 230 kV Line Loop and Substation (Case. No. PUR-2022-00012);
- Nimbus Substation and 230 Farmwell-Nimbus Transmission Line (Case No. PUR-2022-00027);
- 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop (Case No. PUR-2022-00183);
- 500-230 kV Unity Switching Station, 230 kV Tunstall-Unity Lines #2259 and #2262, 230-36.5 kV Tunstall, Evans Creek, Raines Substations, and 230 kV Substation Interconnect Lines (Case No. PUR-2022-00167);
- Butler Farm to Clover 230 kV Line and Butler Farm to Finneywood 230 kV Line (Case No. PUR-2022-00175);
- 230 kV Altair Loop and Altair Switching Station (Case No. PUR-2022-00197);
- 230 kV Finneywood-Jeffress Lines and Jeffress Switching Station Conversion (Case No. PUR-2023-00088);
- 230 kV White Oak Lines and White Oak Substation Expansion (Case No. PUR-2023-00110);
- 230 kV Germanna Lines and Germanna Substation (Case No. PUR-2023-00206); and
- Daves Store 230 kV Line Extension (Case No. PUR 2024-00021).

Most recently, ERM served as the routing consultant for the Company's the Aspen-Golden 500-230 kV Electric Transmission Project, in Case No. PUR-2024-00032; the Apollo-Twin Creeks Electric Transmission Project, in Case No. PUR-2024-00044; the Line #588 Rebuild & Fentress-Yadkin Line #5005, in Case No. PUR-2024-00105; 230 kV Rebuild, Reconductoring, and New Line Projects to Network Takeoff Substation, in Case No. PUR-2024-00131; and Centreport 230 kV Electric Transmission Project, in Case No. PUR-2024-00170.

ERM's role as routing consultant for each of these transmission line projects included preparation of an Environmental Routing Study for the project and submission of testimony sponsoring it.

Q. What were you asked to do in connection with this case?

A. In order to provide service requested by Rappahannock Electric Cooperative ("REC" or the "Customer") for REC to provide service to its two new data center customers in Caroline County, Virginia, to maintain reliable service for the overall load growth in the area, and to comply with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Caroline County, Virginia, to:

(i) **Ruther Glen Loop**: Cut the Company's existing 230 kilovolt ("kV") Line # 256 (Ladysmith CT – Four Rivers) near St. John's Substation between existing structures #256/180 and #256/181 and construct a new double circuit overhead 230 kV line approximately 4.0 miles in and out of a proposed new switching station, Ruther Glen Switching Station, resulting in (i) 230 kV Ladysmith CT – Ruther Glen Line #256 and (ii) 230 kV Ruther Glen – Carmel Church Line #2410 (the "Ruther Glen Loop"). From the proposed cut-in location within existing right-of-way, Lines #256 and #2410 will extend approximately 4.0 miles within a new 160-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[5]

(ii) **Ruther Glen Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Ruther Glen Switching Station").

(iii) **Carmel Church Loop**: From the proposed Ruther Glen Switching Station, extend a new double circuit overhead 230 kV transmission line approximately 2.5 miles in and out of the proposed new switching station, Carmel Church Switching Station resulting in (i) 230 kV Ruther Glen - Carmel Church Line #2410 and (ii) 230 kV Carmel Church

[5] Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power (megavolt ampere reactive or "MVAR").

- Four Rivers Line #2422 (the "Carmel Church Loop"). As proposed, existing 230 kV Ladysmith CT – Four Rivers Line #256 will be cut at Structure #256/227, and to effectuate the cut-in location, the Company will remove one single circuit H-frame tangent structure and install one two-pole double dead-end structure within the existing right-of-way. From the proposed cut-in location within existing right-of-way, Lines #2410 and #2422 will extend approximately 2.5 miles within a new predominantly 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) **Carmel Church Switching Station**: Construct a new 230 kV switching station in Caroline, County, Virginia on property owned by the Customer (the "Carmel Church Switching Station").

The Ruther Glen Loop, the Ruther Glen Switching Station, and the substation-related work are referred to as the "Ruther Glen Project." The Carmel Church Loop, the Carmel Church Switching Station, and the substation-related work are referred to as the "Carmel Church Project." The Ruther Glen Project and the Carmel Church Project are referred to together as the "Projects." While the Projects have separate need drivers, the project areas are geographically in close proximity to each other.

ERM was engaged on behalf of the Company to assist it in the identification and evaluation of route alternatives to resolve the identified electrical need that would meet the applicable criteria of Virginia law and the Company's operating needs.

The purpose of my testimony is to introduce and sponsor the Environmental Routing Study, which is included as part of the Application filed by the Company in this proceeding. Additionally, I co-sponsor the Executive Summary and Section I.A with Company Witnesses Jason S. Whitlow, Sergio E. De Hoyos Irizarry, George C. Brimmer, and Blair Parks; Sections II.A.1, II.A.2, II.A.6 to II.A.9, II.A.11, and III with Company Witness Blair Parks ; and Sections II.A.4, II.B.6 and V.A with Company Witnesses Sergio E. De Hoyos Irizarry and Blair Parks. Lastly, I co-sponsor the DEQ Supplement with Company Witness Blair Parks.

Q. Does this conclude your pre-filed direct testimony?

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS
OF
RACHEL TIPPETT

Rachel Tippett received a Bachelor of Arts degree in History and Historic Preservation from the University of Mary Washington in 2013 as well as a Master of Urban and Regional Planning ("MURP") from Virginia Commonwealth University in 2015. She has been employed by Environmental Resources Management ("ERM") since 2023 as a Managing Consultant, Planner.