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eFiling CASE Document Cover Sheet**

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March 9, 2023

BY ELECTRONIC FILING

Hon. Bernard J. Logan, Clerk
State Corporation Commission
Tyler Building, 1st Floor
1300 East Main Street
Richmond, VA 23219

Re: Application of Virginia Electric and Power Company for Approval and Certification of Electric Transmission Facilities: Possum Point 2nd Transformer and New 230 KV Tie Line #2216 – Case No. PUR-2023-00029.

Dear Mr. Logan:

Please find enclosed for electronic filing in the above-captioned proceeding the application for approval of electric facilities on behalf of Virginia Electric and Power Company (the "Company"). This filing contains the Application, Appendix, Direct Testimony, and DEQ Supplement, 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 Prince William County, as well as the digital geographic information system ("GIS") map required by Va. Code § 56-46.1, which is Attachment II.A.2 to the Appendix, were provided via an e-room to the Commission's Division of Public Utility Regulation.

If you have any questions or need further information, please feel free to contact us.

Sincerely,

Andrew J. Flavin

A handwritten signature in black ink, appearing to read "A. J. Flavin".

Timothy L. McHugh

A handwritten signature in black ink, appearing to read "Timothy L. McHugh".

Enclosures

cc: William H. Chambliss, Esq.
Mr. David Essah (without enclosures)
Mr. Neil Joshipura (without enclosures)
Mr. Michael A. Cizenski (without enclosures)
David J. DePippo, Esq.
Annie C. Larson, Esq.
Bonnie S. Gill, Esq.
William T. Smith, Esq.



**Application, Appendix,
DEQ Supplement, Direct
Testimony and Exhibits of
Virginia Electric and Power
Company**

**Before the State Corporation
Commission of Virginia**

**Possum Point 2nd Transformer
and New 230 kV Tie Line #2216**

Application No. 322

Case No. PUR-2023-00029

Filed: March 9, 2023

Volume 1 of 2

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF
VIRGINIA ELECTRIC AND POWER COMPANY
FOR APPROVAL AND CERTIFICATION
OF ELECTRIC TRANSMISSION FACILITIES

Possum Point 2nd Transformer and
New 230 kV Tie Line #2216

Application No. 322

Case No. PUR-2023-0029

Filed: March 9, 2023

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

APPLICATION OF)	
)	
VIRGINIA ELECTRIC AND POWER)	Case No. PUR-2023-00029
COMPANY)	
)	
For approval and certification of electric)	
transmission facilities: Possum Point 2nd)	
Transformer and New 230 kV Tie Line)	

**APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY
FOR APPROVAL AND CERTIFICATION OF
ELECTRIC TRANSMISSION FACILITIES:
POSSUM POINT 2ND TRANSFORMER AND NEW 230 KV TIE LINE**

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 shows 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.

(collectively, the "Project").

4. There is an immediate and current need for the proposed Project to ensure that Dominion Energy Virginia can continue to provide reliable electric transmission service consistent with the Company's obligation under Virginia law to serve retail electric customers in its exclusive service territory. The Project is located in the Company's Northern Virginia Load Area, which encompasses the Company's transmission facilities located in the Alexandria-Arlington Planning Zone 351, Fairfax Planning Zone 352 and the Woodbridge Planning Zone 353. The Project area is typically one of the fastest growing areas located in the Company's service territory with a large portion of this load growth being driven by data center development. Specifically, an additional 500-230 kV transformer bank is required at the Possum Point 500 kV Substation to continue to adequately serve the needs of the Company and its customers by resolving system reliability criteria violations. Currently, this load area is primarily served by the 500-230 kV transformers which are located at Clifton, Ox, and Possum Point Switching Stations where these transformers support the transfer of capacity and energy from the 500 kV System to the 230 kV system. An additional 500-230 kV transformer is needed at Possum Point 500 kV Substation to allow the Company to continue to provide reliable service to its customers located in this load area, consistent with NERC Reliability Criteria.

5. To support the additional 500-230 kV transformer at Possum Point Substation, the Company proposes replacing Line #2078, located between the Possum Point 500 kV and 230 kV Substations at Possum Point Power Station. The Company also proposes installing approximately 0.95 miles of a new 230 kV transmission line, Line #2216, between the Company's existing Possum Point 500 kV and 230 kV Substations along the majority of the Line #2078 corridor and primarily collocated with the Line #2078 structures, with three new structures on Company-owned

property in a new approximately 0.29-mile corridor adjacent to the existing Possum Point 500 kV Substation.

6. The length of the existing transmission corridor to be used for the Project, which is approximately 0.8 miles, is adequate to construct the Project, with the exception of approximately 0.29 miles of new corridor that will be required to extend new Line #2216 to interconnect with the Possum Point 500 kV Substation. Because the Company-owned property is adequate to construct the proposed Project, including the new approximately 0.29-mile corridor, no new property or right-of-way is necessary. Accordingly, the underlying goal of the statutory preference given to the use of existing rights-of-way is achieved. Moreover, because additional costs and environmental impacts would be associated with the acquisition of and construction on new right-of-way, the Company did not consider any alternate routes requiring new right-of-way outside of the Company-owned property for the Project.

7. The desired in-service target date for the Project is November 30, 2025. The Company estimates it will take approximately 18 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 May 1, 2024. Should the Commission issue a final order by May 1, 2024, the Company estimates that construction should begin in July 2024, and be completed by the in-service target date of November 30, 2025. The necessity for the proposed Project is described in detail in Section I of the Appendix attached to this Application.

8. The estimated conceptual cost of the Project is approximately \$31.5 million (in 2022 dollars), which includes \$8.0 million for transmission-related work and \$23.5 million for substation-related work (\$21.2 million for the 500 kV Substation and \$2.3 million for the 230 kV Substation).

9. The proposed Project will afford the best means of meeting the continuing need for reliable service while reasonably minimizing adverse impact on the scenic, environmental, and historic assets of the area.

10. 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.

11. 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.

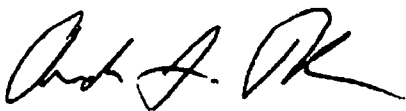
12. Section V of the Appendix provides a proposed route description for public notice purposes and a list of federal, state, and local agencies and officials that the Company has notified or will notify about the Application.

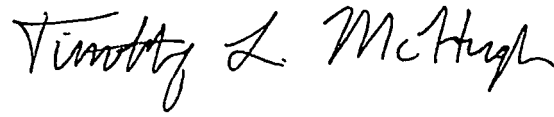
13. In addition to the information provided in the Appendix and the DEQ Supplement, this Application is supported by the pre-filed direct testimony of Company Witnesses Steven J. Schweiger, Logan J. Manzuk, Charles H. Weil, and Santosh Bhattarai, filed with this Application.

WHEREFORE, Dominion Energy Virginia respectfully requests that the Commission:

- a) direct that notice of this Application be given as required by Va. Code § 56-46.1;
- b) approve pursuant to Va. Code § 56-46.1 the construction of the Project; and,
- c) grant a certificate of public convenience and necessity for the Project under the Utility Facilities Act, Va. Code §§ 56-265.1, *et seq.*, by May 1, 2024 if possible.

VIRGINIA ELECTRIC AND POWER COMPANY

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March 9, 2023

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF
VIRGINIA ELECTRIC AND POWER COMPANY
FOR APPROVAL AND CERTIFICATION
OF ELECTRIC TRANSMISSION FACILITIES

Possum Point 2nd Transformer and
New 230 kV Tie Line #2216

Application No. 322

Appendix

Containing Information in Response to
“Guidelines for Transmission Line Applications Filed Under Title 56 of the Code of Virginia”

Case No. PUR-2023-00029

Filed: March 9, 2023

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EXECUTIVE SUMMARY

In order to maintain the reliability of its transmission system in compliance with mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Prince William County the following:

- (1) Install a second 500-230 kV transformer bank at the Possum Point 500 kV Substation and perform associated bus work;
- (2) Rebuild approximately 0.8 miles of existing 230 kV transmission Line #2078 between the Company's existing Possum Point 500 kV and 230 kV Substations within an existing corridor on Company-owned property,¹ in order to utilize the existing corridor to accommodate a second circuit following the addition of a 500-230 kV transformer bank at the Possum Point 500 kV Substation;
- (3) Install approximately 0.95 miles of a new 230 kV transmission line, Line #2216, between the Company's existing Possum Point 500 kV and 230 kV Substations along the majority of the Line #2078 corridor and primarily collocated with the Line #2078 structures, with three new structures on Company-owned property in a new approximately 0.29-mile corridor adjacent to the existing Possum Point 500 kV Substation;
- (4) Install a circuit breaker and line terminal equipment at the Possum Point 230 kV Substation; and
- (5) Install two new structures to raise Lines #215/#2001 and Lines #237/#2022 to provide clearance for Line #2078 and Line #2216.²

(collectively, the "Project").

The proposed Project is necessary to maintain reliable service for the Company's customers, specifically those located in the Project area, and to comply with mandatory NERC Reliability Standards. The Project is located in the Company's Northern Virginia Load Area, which

¹ The Project, which is located within Company-owned property, includes multiple crossings of the Richmond, Fredericksburg and Potomac ("RF&P") railroad, which traverses the Company's property. Existing Line #2078, Lines #215 and #2001, and Lines #237 and #2022 already cross the RF&P railroad at three locations, which are allowed pursuant to an existing master license agreement. The Company will pursue an amendment to the existing master license agreement for the crossing of Line #2216. See Sections II.A.6, II.A.8 and III.D.

² The Company considers the work associated with Lines #215/#2001 and Lines #237/#2022, which includes the installation of two new structures, to qualify as "ordinary extensions or improvements in the usual course of business" pursuant to § 56-265.2 A 1 of the Code of Virginia ("Va. Code") and, therefore, does not require approval pursuant to Va. Code § 56-46.1 B or a certificate of public convenience and necessity ("CPCN") from the State Corporation Commission of Virginia ("Commission"). Because the Company considers this work to be ordinary course, detailed supporting documentation has not been provided in the Appendix. Should the Commission determine that a CPCN is required for the work associated with Lines #215/#2001 and Lines #237/#2022 as described herein, the Company requests that the Commission grant such CPCNs as part of its final order in this proceeding.

encompasses the Company's transmission facilities located in the Alexandria-Arlington Planning Zone 351, Fairfax Planning Zone 352 and the Woodbridge Planning Zone 353. The Project area is typically one of the fastest growing areas located in the Company's service territory with a large portion of this load growth being driven by data center development.

The length of the existing transmission corridor to be used for the Project, which is approximately 0.8 miles, is adequate to construct the Project, with the exception of approximately 0.29 miles of new corridor that will be required to extend new Line #2216 to interconnect with Possum Point 500 kV Substation. Because the Company-owned property is adequate to construct the proposed Project, including the new approximately 0.29-mile corridor, no new property is necessary. Accordingly, the underlying goal of the statutory preference given to the use of existing rights-of-way is achieved. Moreover, because additional costs and environmental impacts would be associated with the acquisition of and construction on new right-of-way, the Company did not consider any alternate routes requiring new right-of-way outside of the Company-owned property for the Project. As discussed in Section II.A.9, the Company considered alternative routes for new Line #2216 within the Company-owned property; however, they were rejected and are not proposed for public notice because they would have to be routed around an existing 500 kV tower, which created conflicts with an existing road, two 500 kV lines, the Possum Point 500 kV Substation, and the coal ash pond.

The estimated conceptual cost of the Project is approximately \$31.5 million (in 2022 dollars), which includes \$8.0 million for transmission-related work and \$23.5 million for substation-related work (\$21.2 million for the 500 kV Substation and \$2.3 million for the 230 kV Substation). The desired in-service target date for the Project is November 30, 2025. The Company estimates it will take approximately 18 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 May 1, 2024. Should the Commission issue a final order by May 1, 2024, the Company estimates that construction should begin in July 2024, and be completed by the in-service target date of November 30, 2025.

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 proposed Project is necessary to maintain the reliability of the Company's transmission system in compliance with mandatory NERC Reliability Standards. See Attachment I.A.1 for a Project overview map.

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, Old Dominion Electric Cooperative, 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 "Dominion Energy Zone" or the "Dom Zone").

Dominion Energy Virginia is part of PJM Interconnection, LLC ("PJM"), the regional transmission organization that 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 166,929 megawatts ("MW") for summer peak demand, of which Dominion Energy Virginia's load portion was approximately 19,256 MW serving 2.4 million customers. On August 9, 2022, the Company set a record high of 21,156 MW for summer peak demand. On December 24, 2022, the Company set a winter peak and all-time record demand of 22,189 MW. Based on the 2023 PJM load forecast, the Dominion Energy Zone is expected to grow with average growth rates of 5.0% summer and 4.8% winter over the next 10 years compared to the PJM average of 0.8% and 1.0% over the same period for the summer and winter, respectively.

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.

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.³

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 for noncompliance of approximately \$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.⁴ 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.⁵ 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, Reliability First, SERC Reliability Corporation, PJM, and TOs; (ii) network upgrades are new or upgraded facilities required primarily to eliminate reliability 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. While supplemental projects are included in the RTEP, the PJM Board does not actually approve such projects. The Project is classified as a baseline project resolving several system reliability criteria violations. See

³ See FAC-001-3 (R1, R3) (effective April 1, 2021), which can be found at <https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/virginia/parallel-generation/facility-interconnection-requirements-signed.pdf>.

⁴ PJM Manual 14B (effective July 1, 2021) focuses on the RTEP process and can be found at <https://www.pjm.com/-/media/documents/manuals/m14b.ashx>.

⁵ See PJM Manual 14B, Attachment D: PJM Reliability Planning Criteria. See *supra*, n. 4.

Section I.J for a discussion of the PJM process as it relates to this Project.

Need for the Project

This Project is necessary to maintain reliable service for the Company's customers, specifically those located in the Project area, and to comply with mandatory NERC Reliability Standards. The Project is located in the Company's Northern Virginia Load Area, which encompasses the Company's transmission facilities located in the Alexandria-Arlington Planning Zone 351, Fairfax Planning Zone 352 and the Woodbridge Planning Zone 353. The Project area is typically one of the fastest growing areas located in the Company's service territory, with a large portion of this load growth being driven by data center development.

This Project was identified at the January 10, 2019 Transmission Expansion Advisory Committee ("TEAC") meeting, and was approved by the PJM Board as a baseline project in February 2019. See Attachment I.A.2 for relevant slides from the January 2019 TEAC Presentation and Section I.J of this Appendix. Subsequent to PJM's approval of the Project as described in Attachment I.A.2, the Company determined that the need driving the Project had changed based on the analysis discussed below. However, the Project as proposed in Attachment I.A.2 was still needed.

As noted in Attachment I.A.2, original criteria violations were identified between 2013 and 2017. To initially address that need, the Company developed an earlier project that included a new 230 kV underground line between the Company's Glebe Substation and Potomac Electric Power Company's Potomac River substation ("Glebe-Potomac River Project"). The Glebe-Potomac River Project initially was reviewed as a potential solution to identified violations of NERC Reliability Standards at the December 12, 2013 TEAC meeting and was approved by the PJM Board of Directors at its February 2014 meeting (b2443). Subsequently, changes in the PJM Load Forecasts eliminated the NERC violations driving the need for the Glebe-Potomac River Project, as discussed at the December 13, 2018 TEAC meeting, and resulted in a revised project that involved removing the Potomac Yards North Terminal Station, undergrounding portions of Lines #248 and #2023, and converting the Company's Glebe Substation to a Gas Insulated Substation ("GIS") (the "Potomac Yards Undergrounding and Glebe GIS Conversion"), which was approved at the February 2019 PJM Board Meeting as a baseline upgrade (b3090). The Commission approved the Potomac Yards Undergrounding and Glebe GIS Conversion by Final Order dated September 27, 2019 in Case No. PUR-2019-00040.

In 2019, PJM identified drivers for the current Project based on a summer 2023 RTEP model derived, in part, from PJM's 2018 Load Forecast. In order to determine if this Project was still needed in 2020, the Company used PJM's summer 2023 RTEP case based on the PJM 2020 Load Forecast that was provided to the Company earlier that year. This case was developed by PJM as part of their 2020

RTEP process. The Company used PowerGEM's TARA Program to perform a reliability analysis to determine if the proposed Project was still required to meet NERC Reliability Standards. The result of this analysis indicated that while the initial driver for this Project had changed from PJM's initial assessment in 2019, the proposed Project was still needed to resolve NERC Reliability Criteria violations. See Attachment I.A.3.

The results of the foregoing analyses indicated that for a P6 N-1-1 contingency, the Ox 500-230 kV transformers were overloaded. Specifically, the analysis indicated that an outage of 500 kV Line #561 (Clifton-Ox) and the Ox 500-230 kV Transformer #1 resulted in the Ox 500-230 kV Transformer #2 being loaded to 101.3% of its load dump ("LD") rating. Additionally, the analysis indicated that an outage of 500 kV Line #561 (Clifton-Ox) and the Ox 500-230 kV Transformer #2 resulted in the Ox 500-230 kV Transformer #1 being loaded to 100.6% of its LD rating, as discussed in Section I.D.⁶

In 2021, updated PJM Summer 2023 and 2025 RTEP planning models indicated that the drivers for the Project as described above were no longer present. These model updates included significant reductions in flows on the 500 kV system, identified on the Company's facilities as well as the Potomac Electric Power Company ("PEPCO") Burches tie line for the 2024 and 2025 RTEP model years. While the mitigation of the aforementioned harm could not be tied to one single factor, cancellation of the Project was formally submitted to PJM on May 11, 2021 via the monthly PJM TEAC meeting. See Attachment I.A.4.

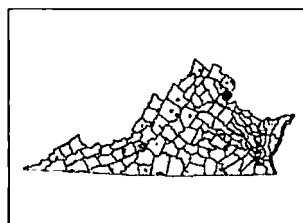
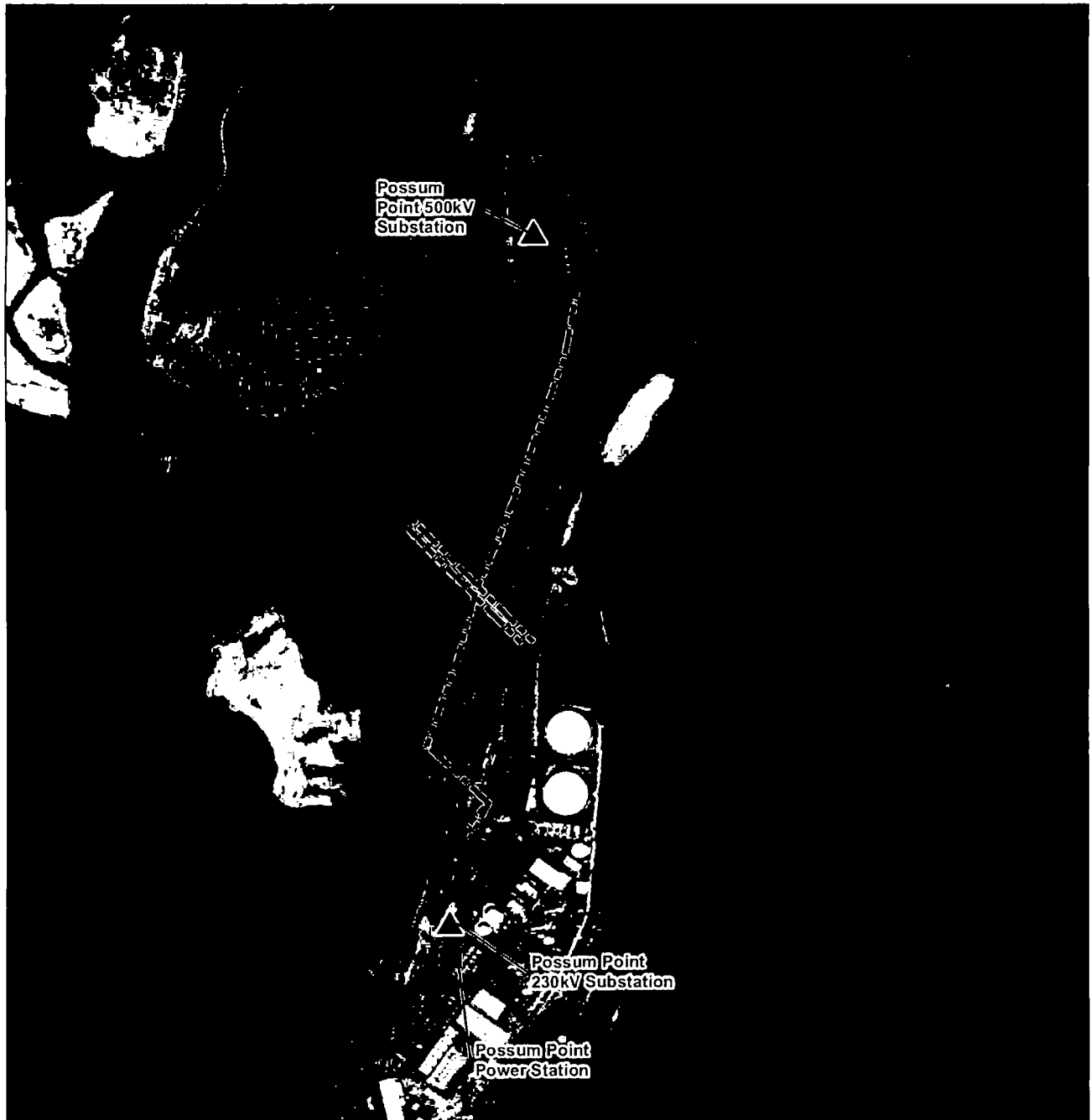
Later that year and upon release of the PJM 2026 summer RTEP model, Ox 500-230 kV Transformers #1 and #2 were identified as becoming overloaded again on the Company's annual FERC Form No. 715 Report, in violation of the Company's Planning Criteria, which was submitted in the Company's annual FERC Form No. 715 report.⁷ Under Section C.2.1.3 of the Company's Planning Criteria, the Company will model an outage on the most critical generators in the area being studied, and the resulting power flow case is considered a critical stress case. Under this critical stress case condition (outage of Possum Point Unit #6 followed by the loss of Ox 500-230 kV Transformer #1 or #2), both Ox 500-230 kV transformers #1 and #2 became thermally overloaded. According to FERC Form 715 regulations, these violations were subject to the 2021 PJM RTEP window for which a solution was necessary. To mitigate these violations, the Company submitted this

⁶ Ratings for single contingency type are based on 94% of the summer emergency rating of the facility. The contingency analysis then identifies load % based on this rating. The Dominion Energy Virginia Criteria for a type P1 single contingency limits thermal loading to 94% of the Short Term Emergency ("STE") Rating of the facility. Ratings for tower and breaker contingency type are based on 100% of the LD rating of the facility. The Dominion Energy Virginia Criteria for a type P6 multiple contingency (N-1-1) limits thermal loading to 100% of the LD rating of the facility, prior to re-dispatch. For a complete listing of Dominion Energy Virginia's Planning Criteria, see FAC-001, which can be found at <https://www.dominionenergy.com/company/moving-energy/electric-transmission-access>.

⁷ For additional information related to FERC Form 715, see <https://www.pjm.com/library/request-access/ferc-form-715>.

Project as a proposal in the 2021 PJM RTEP window which PJM accepted as the winning solution. See Attachment I.A.5.

In summary, the proposed Project will address criteria violations in compliance with the Company's mandatory Planning Criteria, NERC Reliability Standards and FERC Form No. 715 reporting requirements, and is consistent with sound engineering judgment, thereby enabling the Company to maintain the overall long-term reliability of its transmission system, as well as to provide important system reliability benefits to the Company's entire network.



Notes
 1. Coordinate System: NAD 1983 StatePlane
 Virginia North FIPS 4501 Feet
 2. Data Sources: Dominion Energy Virginia
 3. Base Map: © ESRI

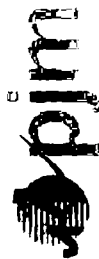
- ▲ Substation
- Existing Power Station
- Proposed Centerline
- Existing Centerline

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 (At original document size of 8.5x11)
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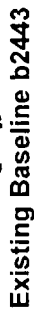


Project Location Prepared by CDC on 2022-12-19
 Prince William County, Virginia TR by RJW on 2022-12-21
Client/Project Dominion Energy Virginia 203401924
 Possum Point Second Transformer and
 New 230kV Tie Line #2216
Figure No.
 I.A.1.
Title

Project Overview Map



Dominion/PEPCO B2443 – Glebe to Station C Project Update



Date Project Last Presented: 12/11/2013, 01/09/2014, 11/11/2014 & 06/08/2017

Problem Statement: Updated NERC Reliability Drivers

- Original criteria violations included overloads of Ox 500/230 kV Tx #1 & #2, 230 kV Line #248 (UG section between Carlyle South – North Potomac Yard) and the Franconia – Van Dorn Section of 230 kV Line #243.
- Updated criteria violation – Based on recent generation retirements (Possum Point Units #3 & #4) and the PJM 2018 Load Forecast updates indicates that for a NERC Category P1 – single contingency that Possum Point 500/230 kV Tx #1 overloads for a loss of the Possum Point – Ox 500 kV Line #571 under Dominion's critical stress case criteria.
- Other previously identified deficiencies in Dominion and PEPCO are no longer present.
- The Glebe – Station C Project (b2443) will be cancelled and replaced with a new baseline to resolve the NERC reliability deficiencies.
 - The previously approved cost for the Glebe – Station C Project: **\$299 M**
 - The new baseline will be discussed on the next slide.

Continued on next slide...





Continued from previous Glebe – Station C Project slide...

Recommended Solution:

- Install a second 500/230 kV transformer at Possum Point substation and replace bus work and associated equipment as needed. (b2443.6)
- Replace 19 - 63 kA 230 kV breakers with 19 – 80 kA 230 kV breakers (b2443.7)
 - 230kV Possum Point breakers: H892, H8T2078, H992, H9T237, 23792, G6BTGT, GT92, 202292, 252T2022, 21592, G5T215, 25292, G492, G592, G6A92, G6B92, G4T2001, 200192, 207892

Estimated Project Cost:

500/230 kV transformer bank,
bus work & associated equipment : \$21 M (b2443.6)
19 – 230 kV 80 kA breakers: \$19 M (b2443.7)
Total: \$40 M

Required IS Date: 06/01/2023

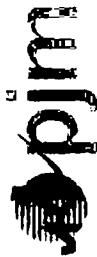
Projected IS Date: 06/01/2023

Project Status: Conceptual

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Dominion Transmission Zone: Baseline Possum Point 500/230 kV Transformer No. 2





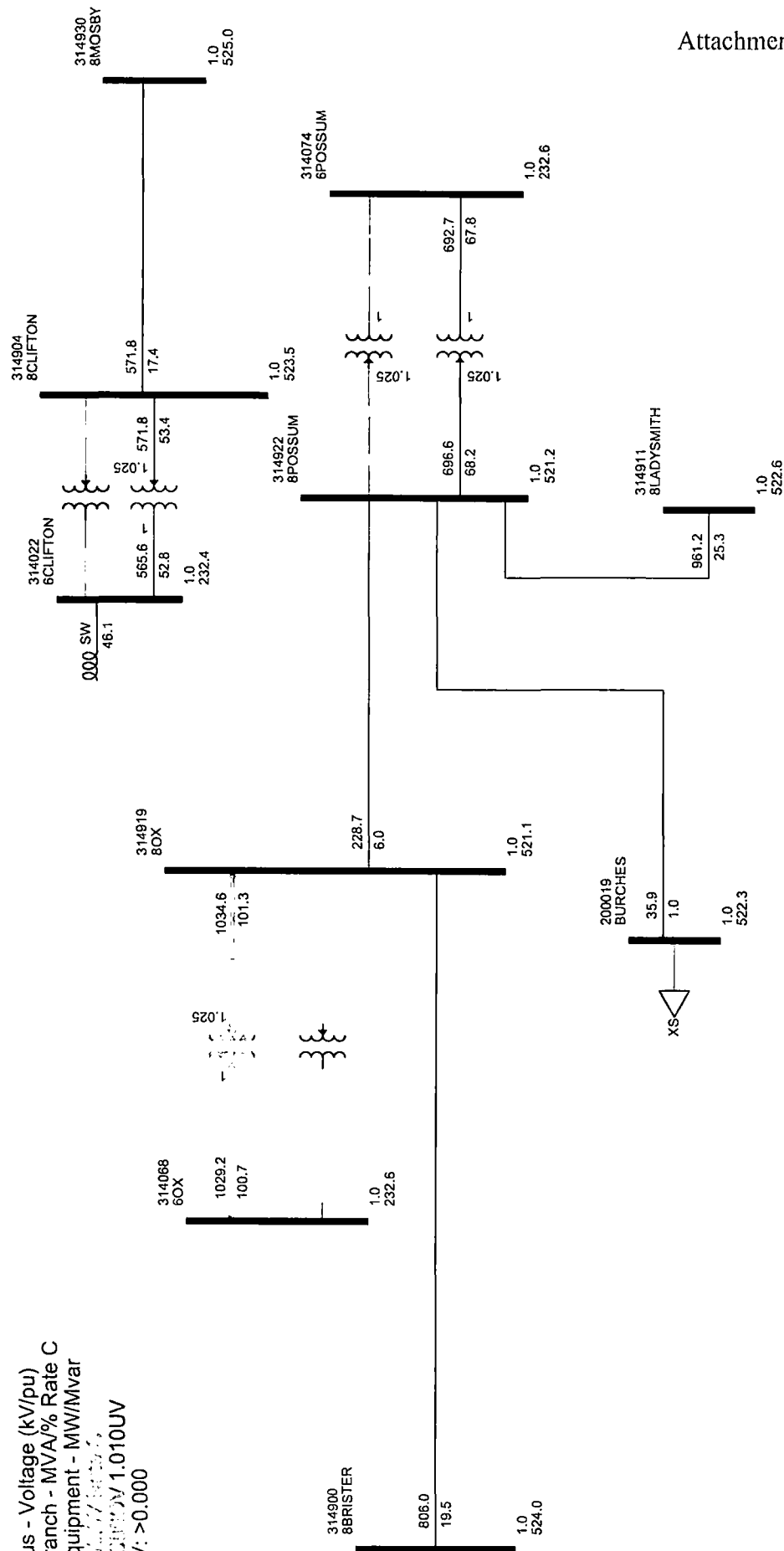
Dominion Transmission Zone: Baseline
Glebe – Station C Project

Glebe – Station C Project

<u>Components</u>	<u>Baseline ID</u>	<u>Estimate</u>	<u>Status</u>
DVP			
Complete new underground 230 kV line from Glebe to Station C	b2443	\$136.5 M	Cancel
Replace the Idylwood 230 kV breaker '203512' with 50kA breaker	b2443.1	\$0.255 M	In-Service
Replace the Ox 230 kV breaker '206342' with 63kA breaker	b2443.2	\$0.27 M	In-Service
Rebuild Glebe Substation	b2443.4	\$65.0 M	Cancel
PEPCO			
New 230kV Potomac River Substation Project (includes PAR)	b2443.3	\$94.8 M	Cancel
Blue Plains Substation Breaker Replacements Project	b2443.5	\$2 M	Cancel
Total Cost		\$299 M	

CEIL NO SECOND TX OUTAGE LINE 561 & OX TX#1
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Bus - Voltage (kV/pu)
Branch - MVA/% Rate C
Equipment - MW/Mvar
Capacity Factor
Voltage 1.010UV
kV: >0.000





Reliability Analysis Update

Aaron Berner, Senior Manager

Transmission Expansion Advisory Committee

May 11, 2021

Attachment I.A.4

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Changes to Existing Projects Baseline Reliability Projects



Date Project Last Presented: 12/11/2013, 01/09/2014, 11/11/2014, 06/08/2017 & 01/10/2019

Problem Statement: Based on recent generation retirements (Possum Point Units #3 & #4) and the PJM 2018 Load Forecast updates indicates that for a NERC Category P1 – single contingency that Possum Point 500/230 kV Tx #1 overloads for a loss of the Possum Point – Ox 500 kV Line #571 under Dominion's critical stress case criteria.

Updated criteria evaluation: Updated Summer 2023 & 2025 RTEP Models indicated deficiencies are no longer present. There were significant reductions in flows on the 500 kV System not only on the Dominion System but also the PEPCO Burches Tie Line for the 2024 and 2025 RTEP Models based on many factors. No single factor can be identified.

Recommended Solution: Cancel the Project.

Project Status: Engineering

Estimated Cost: \$550K to date

Original Estimated Project Cost: \$21M (b2443.6)





Criteria: Over Duty Breaker

Model Used for Analysis: 2025 short circuit model

Proposal Window Exclusion: Station Equipment

Problem Statement:

Nineteen (19) Possum Point 230kV breakers are over duty:

H892, H8T2078, H992, H9T237, 23792, G6BTGT, GT92, 202292, 252T2022, 21592, G5T215, 25292, G492, G592, G6A92, G6B92, G4T2001, 200192, 207892

Significant Driver:

b2443.6: Install 2nd Possum Point 500/230 kV transformer.

Existing Facility Rating: 63kA interrupting rating

Solution Cancellation Driver: Possum Point 5 Retirement

Recommended Solution Cancellation:

b2443.7: Replace the nineteen (19) Possum Point 230kV breakers with 80kA breakers: H892, H8T2078, H992, H9T237, 23792, G6BTGT, GT92, 202292, 252T2022, 21592, G5T1215, 25292, G492, G592, G6A92, G6B92, G4T2001, 200192, 207892

- **Estimated Cost: \$19M** Replace the nineteen breakers with 80kA breakers (\$1M each)

Required In-Service: 6/1/2023

Previously Presented: 1/10/2019

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Reliability Analysis Update

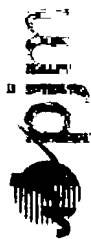
Aaron Berner, Senior Manager

Transmission Expansion Advisory Committee
Tuesday, November 30, 2021

Attachment I.A.5

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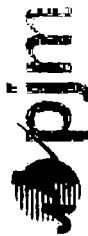
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2021 RTEP Proposal Window



Second Review Baseline Reliability Projects



Process Stage: Second Review

Criteria: FERC Form 715 (C.2.1.3 Critical Stress Case)

Assumption Reference: 2026 RTEP assumption

Model Used for Analysis: 2026 RTEP cases

Proposal Window Exclusion: None

Problem Statement:

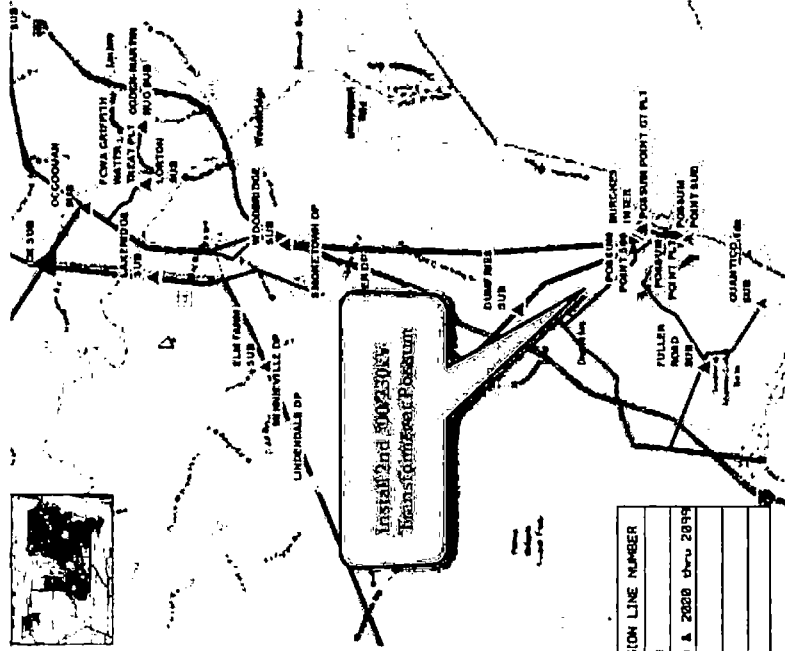
DOM-T3, DOM-T4

In the 2026 RTEP summer case, the Ox 500/230kV transformer #1 & Ox 500/230kV transformer #2 are overloaded under Dominion stress case criteria. (Outage of the most critical generator followed by single contingency: N-1-1).

Existing Facility Rating:

Branch	SN/SE/WN/WE (MVA)
8OX - 6OX #1 500/230kV	931.9/963.8/1198.8/1242.3
8OX - 6OX #2 500/230kV	909.3/951.9/1167.6/1220.4

Continued on next slide....



SN / SE / WN / WE: Summer Normal / Summer Emergency / Winter Normal / Winter Emergency



As part of the 2021 RTEP Window #1, the following projects were proposed to address violations on 500/230kV transformer #1 & #2 at Ox:

Proposal ID	Proposing Entity	Upgrade Description	Upgrade Cost (\$M)
57 ⁽¹⁾	Dominion	Install 2 nd 500/230kV transformer at Possum Point	24.539
319	Dominion	Replace both 500/230kV transformers at Ox	63.768
637	Dominion	Expand Occoquan substation via the installation of a 500kV GIS ring bus, 1-1100MVA 500/230kV transformer and 230kV breaker-and-a-half bus arrangement.	75.389

⁽¹⁾ Proposal 57 corresponds to baseline b2443.6 that was brought to TEAC to be canceled but not taken to Board to cancel due to issue being identified in the 2021 RTEP and potential for project to be brought back if the proposal was provided to mitigate the violation. (Adding 2nd 500/230kV transformer at Possum Point.)

Recommended Solution: Proposal #2021_1-57

- Install a 2nd 500kV-230kV 840MVA transformer bank at Possum Point 500kV yard, a 0.8 mile long 230kV line extension between Possum Point 500kV and Possum Point 230kV substation, and a new 230kV breaker at Possum 230kV yard to terminate the extension. (b2443.6)

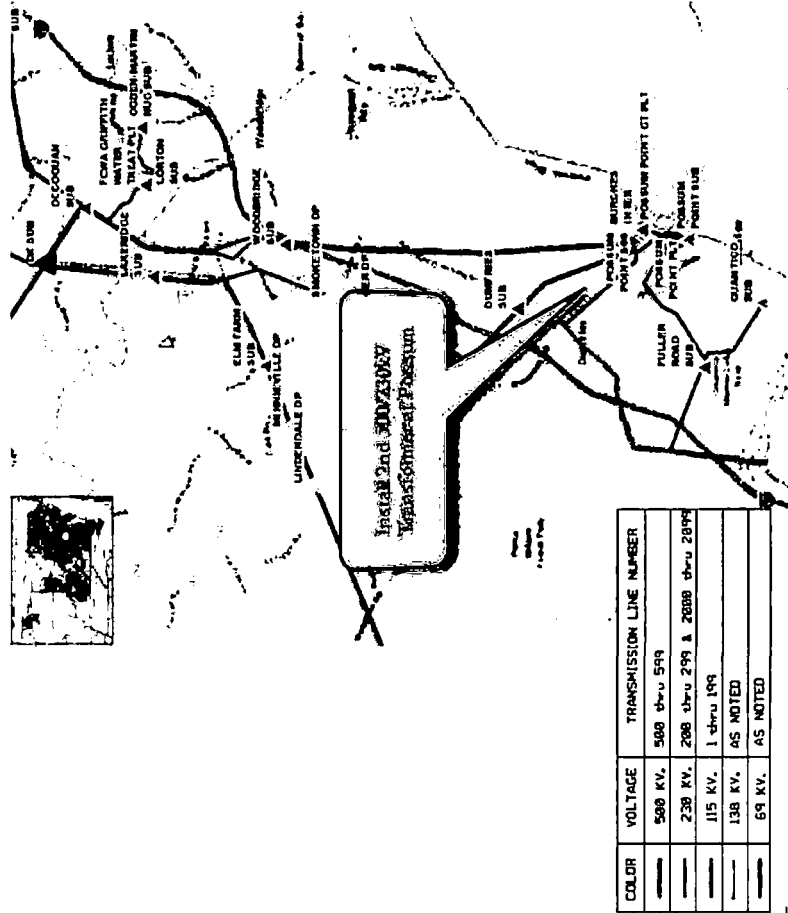
Note: Possum Point 500kV Substation and Possum Point 230kV Substation are separated by approximately 0.85 miles.

Continued on next slide....

Branch	SN/SE/MN/WE (MVA)
8POSSUM – 6POSSUM #2 500/230kV	902.4/945.9/1155.4/1209.9

Previously Presented: 11/2/2021

Dominion Transmission Zone: Baseline Ox 500/230kV Transformers



SN / SE / WN / WE: Summer Normal / Summer Emergency / Winter Normal / Winter Emergency

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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 the Project

Detail the engineering justifications for the proposed project.

For a detailed description of the engineering justification of the proposed Project, see Section I.A.

[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.

None.

[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.

The reliability studies conducted for this Project and the study results are described in Section I.A. See also Attachments I.D.1 through I.D.4.

[4] Facilities List

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

All approved PJM RTEP projects and associated generators are included in the 2026 RTEP model as based on PJM RTEP Protocols.

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: Attachment I.G.1 shows the portion of the Company's transmission system in the area of the proposed Project.

Like most metropolitan areas, the Northern Virginia Load Area is dependent on the bulk electric system for the transportation of capacity and energy from generating resources located outside of load centers. Once transported to these load centers, the capacity and energy is transformed from the Company's 500 kV system to the 230 kV system via 500-230 kV transformers. The majority of the Company's distribution transformers, which provide service to the Company's retail customers, are located on the 230 kV system. In the Project area, three transmission switching stations exist at Clifton, Ox, and Possum Point that each have 500-230 kV transformers. Clifton and Ox Switching Stations each have two 500-230 kV transformers, and Possum Point has one 500-230 kV transformer.

As described in Section I.A, an additional 500-230 kV transformer bank is required at the Possum Point 500 kV Substation in order to continue to adequately serve the needs of the Company and its customers by resolving system reliability criteria violations. As previously described, currently this load area is primarily served by the 500-230 kV transformers which are located at Clifton, Ox, and Possum Point Switching Stations where these transformers support the transfer of capacity and energy from the 500 kV System to the 230 kV system. An additional 500-230 kV transformer is needed at Possum Point Substation to allow the Company to continue to provide reliable service to its customers located in this load area, consistent with NERC Reliability Criteria.

The tables in Attachment I.C.1 provide 10 years of historical summer and winter loads for the Northern Virginia Load Zones in the Dominion Energy Virginia system and 10 years of projected summer and winter peak loads for the Northern Virginia Load Zones. The historical load growth shows a 1349 MW growth in Northern Virginia over the last 10 years, between 2013 and 2022.

Completing the proposed Project will enable the Company to maintain the reliability of its transmission system, as discussed in Section I.A.

Historical load (MW)

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
NOVA - Summer	6733.0	6690.0	6720.0	7204.0	6994.3	7438.5	7038.3	7843.8	7777.6	8082.0
NOVA - Winter	5511.7	6022.7	6453.7	6130.0	6243.3	6602.7	6561.3	6167.0	6192.1	6688.0

Projected load (MW)*

	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
NOVA - Summer	8243.0	8353.0	8483.0	8563.0	8862.0	8962.0	9073.0	9187.0	9467.0	9561.0
NOVA - Winter	6696.0	6702.0	6743.0	6791.0	7019.0	7093.0	7151.0	7228.0	7431.0	7506.0

*Forecasted values are based on the PJM 2023 Load Forecast

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: Using PJM's Summer 2026 RTEP model based on the 2021 Load Forecast, modified to comply with the critical stress case scenario of Possum Point Unit #6 taken out of service, reliability deficiencies in regard to the Company's Planning Criteria and FERC Form No. 715 reporting requirements were identified in the Company's Northern Virginia Load Area, specifically at the Company's Ox Switching Station, without the proposed Project. Under the critical stress case scenario defined above, the Company's Planning Criteria states that facilities reaching over 94% of their emergency rating are in violation and must be mitigated. The below violations would, therefore, also violate FERC Form No. 715 reporting requirements.

An outage of Possum Point Unit #6 and the Ox 500-230 kV Transformer #1 resulted in the Ox 500-230 kV Transformer #2 being loaded to 95.06% of its summer emergency rating. See Attachment I.D.1 for a screenshot of this contingency condition.

With the proposed Project in service, an outage of Possum Point Unit #6 and the Ox 500-230 kV Transformer #1 resulted in the Ox 500-230 kV Transformer #2 being loaded to 86.83% of its summer emergency rating. See Attachment I.D.2 for a screenshot of this contingency condition.

An outage of Possum Point Unit #6 and the Ox 500-230 kV Transformer #2 resulted in the Ox 500-230 kV Transformer #1 being loaded to 94.31% of its summer emergency rating. See Attachment I.D.3 for a screenshot of this contingency condition.

With the proposed Project in service, an outage of Possum Point Unit #6 and the Ox 500-230 kV Transformer #2 resulted in the Ox 500-230 kV Transformer #1 being loaded to 86.15% of its summer emergency rating. See Attachment I.D.4 for a screenshot of this contingency condition.

Attachment I.D.5 has been included as a summary of the identified violations above as received from PJM for the 2021 RTEP Window. The ratings of the monitored facilities in this table have been adjusted to 94% of their emergency rating.

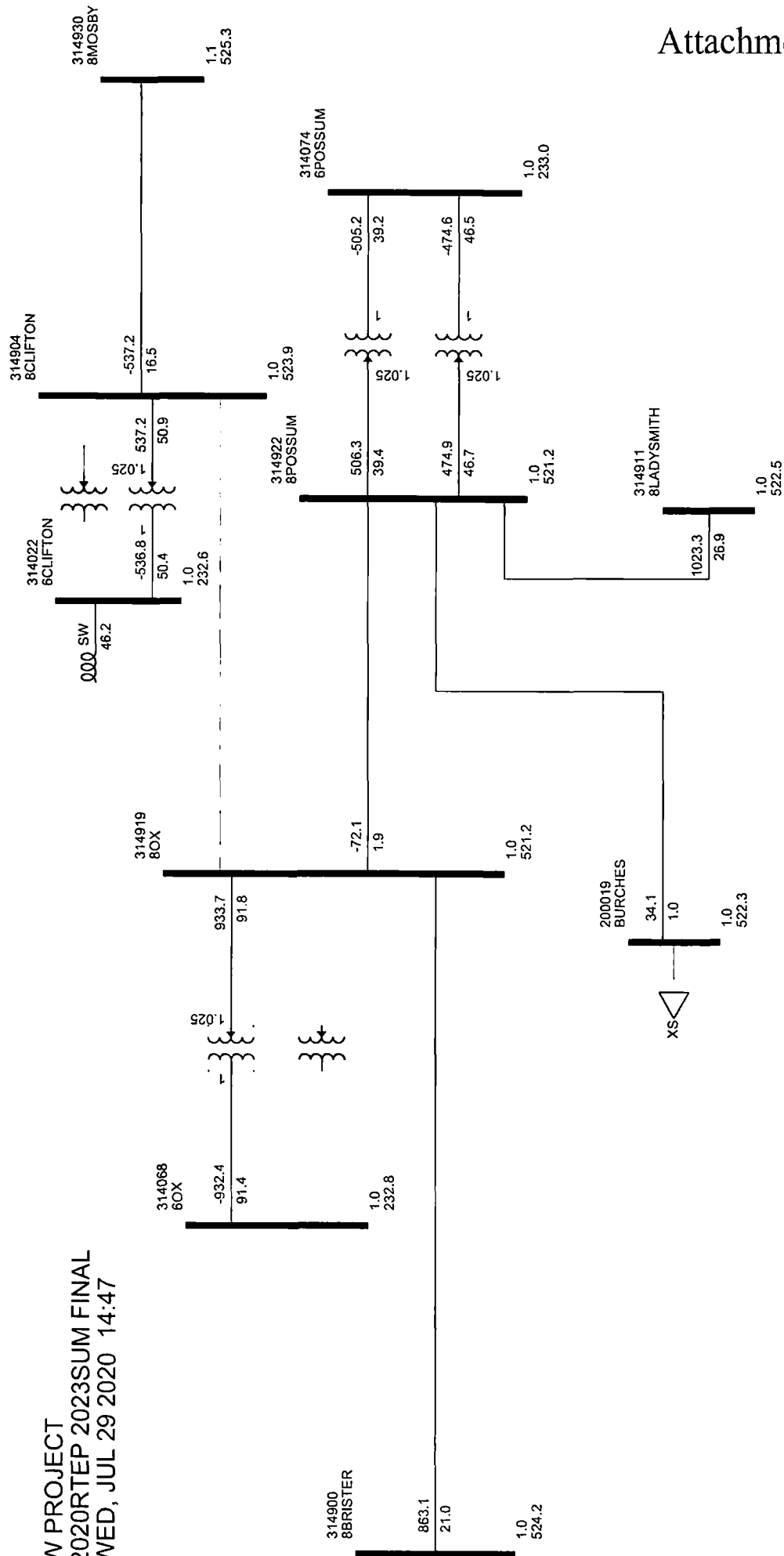




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[illegible]

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: Feasible Project Alternatives (Prior to Project Cancellation)

As an alternative to the Project, the Company considered expanding its existing Occoquan Substation. This expansion included establishing a new three-breaker 500 kV ring bus at Occoquan Substation by splitting the existing Ox-Possum Point 500 kV Line #571 into two separate 500 kV lines and installing a new 500-230 kV transformer bank at the site. This alternative also included rebuilding a 230 kV switching station in a new location on the Occoquan Substation site, which would approximately triple the size of the existing Occoquan Substation site. This alternative was estimated to cost \$69.7 million. PJM initially determined that this proposed solution would not resolve the identified NERC Criteria Violations as identified in Attachment I.A.2.

Following PJM's approval of the Project as shown in Attachment I.A.2, the Company determined that the need for the Project had changed, as discussed in Section I.A. While the rejected alternative discussed above did not resolve the need initially identified (as described in Attachment I.A.2), it would resolve the revised need for the Project. The Company again presented the alternative to PJM on July 28, 2020. PJM again rejected this alternative in favor of the Project due to the alternative's greater cost and its failure to solve the initial reliability deficiency.

Feasible Project Alternatives (Via the 2021 PJM RTEP Window)

The Company considered the following transmission alternatives to the Project as submitted to PJM via the 2021 RTEP Window (see Attachment I.A.5):

Alternative (1): Replacement of Ox 500-230 kV Transformer #1 and #2

Under this alternative scenario, both Ox 500-230 kV transformers that were identified as being in violation of FERC Form 715 and the Company's Planning Criteria would be upgraded to higher-rated 1440 MVA transformer units. While this solution would resolve the violations identified by PJM, PJM rejected this proposal in favor of the Project because the Project is a more cost-effective solution.

Alternative (2): Expansion of Occoquan Substation

Under this transmission alternative scenario, the violations identified for the Ox 500-230 kV transformers would be resolved by expanding the Company's existing Occoquan Substation via the installation of a 500 kV GIS ring bus, one 1100 MVA 500-230 kV transformer, and a 230 kV breaker-and-a-half arrangement. While this solution also would resolve the violations identified by PJM, PJM rejected this

proposal in favor of the Project because the Project is a more cost-effective solution.

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 based on the need to maintain the overall long-term reliability of its transmission system and to comply with mandatory NERC Reliability Standards.⁸ Notwithstanding, when performing an analysis based on PJM's 50/50 load forecast, there is no adjustment in load for DR programs that are considered in PJM's fixed resource requirement ("FRR") plan 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 reliability pricing model ("RPM") 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 Project demonstrated that despite accounting for DSM consistent with PJM's methods, the Project is necessary.

Incremental DSM also will not absolve the need for the Project. As reflected in Attachment I.C.1, the load area for this Project (historic and projected) ranges from 5,512 to 9,561 MW (summer and winter). By way of comparison, statewide, the Company achieved demand savings of 308.4 MW (net) / 396.8 MW (gross) from its DSM programs in 2021.

⁸ 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 PJM'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.**

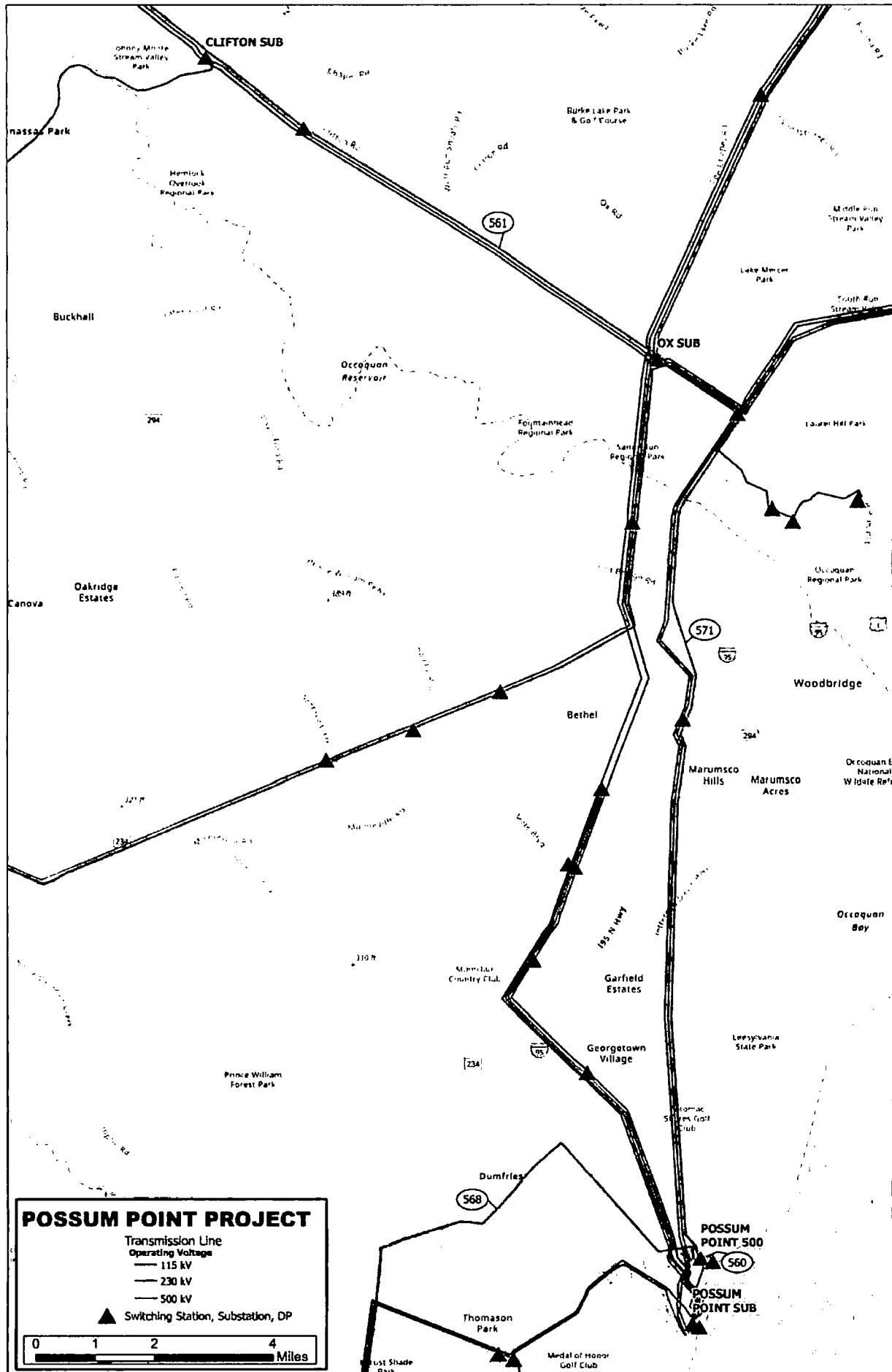
Response: Line #2078, located between the Possum Point 500 kV and 230 kV Substations at Possum Point Power Station, will be replaced. Eight single circuit structures will be replaced with five double circuit and two single circuit structures. The existing backbone structures will remain. In addition to the structure removal, the existing single circuit 3-phase 2-636 ACSR conductors, one 3#6 alumoweld shield wire, and one fiber optic shield wire will be replaced. The 3-phase 2-636 ACSR had a normal/emergency transfer capability of 1047 MVA.⁹

⁹ Apparent power, measured in megavolt amperes ("MVA"), is made up of real power (megawatt or "MW") and reactive power megavolt ampere reactive ("MVAR"). The power factor ("pf") is the ratio of real power to apparent power. For loads with a high pf (approaching unity), real power will approach apparent power and the two can be used interchangeably. Load loss criteria specify real power (MW) units because that represents the real power that will be dropped; however, MVA is used to describe the equipment ratings to handle the apparent power, which includes the real and reactive load components.

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.



I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The Company estimates it will take approximately 18 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 May 1, 2024. Should the Commission issue a final order by May 1, 2024, the Company estimates that substation site prep should begin in May 2024, and construction should begin around July 2024 and be completed by November 2025. This schedule is contingent upon obtaining the necessary permit and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new build scheduled to occur in this load area. While the Company is actively working with appropriate agencies regarding all necessary permitting for the Project, dates may need to be adjusted based on potential delays, including delays associated with scheduling outages, right-of-way acquisition, permitting delays, or design modifications to comply with additional agency requirements identified during the permitting application process, as well as unpredictable delays due to labor shortages or materials/supply issues.

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 estimated conceptual cost of the Project is approximately \$31.5 million (in 2022 dollars), which includes \$8.0 million for transmission-related work and \$23.5 million for substation-related work (\$21.2 million for the 500 kV Substation and \$2.3 million for the 230 kV Substation).

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 Project was approved by the PJM Board as their recommended solution at its November 2021 TEAC meeting as a baseline project (b2443.6). See Attachment I.A.3 and Sections I.A and I.E.

The Project is presently 100% cost allocated to the DOM Zone.

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. The need for the proposed Project is not due to reliability issues. See Sections I.A and I.C.

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. The need for the proposed Project is not due to reliability issues. See Sections I.A and I.C.

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: Not applicable.

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

Response: The length of the proposed corridor for the Project is approximately 0.95 miles, which is located within Company-owned property.

See Section II.A.9 for a description of the Company's route selection process and alternative routes that were considered and rejected.

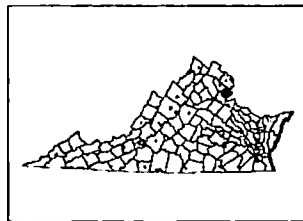
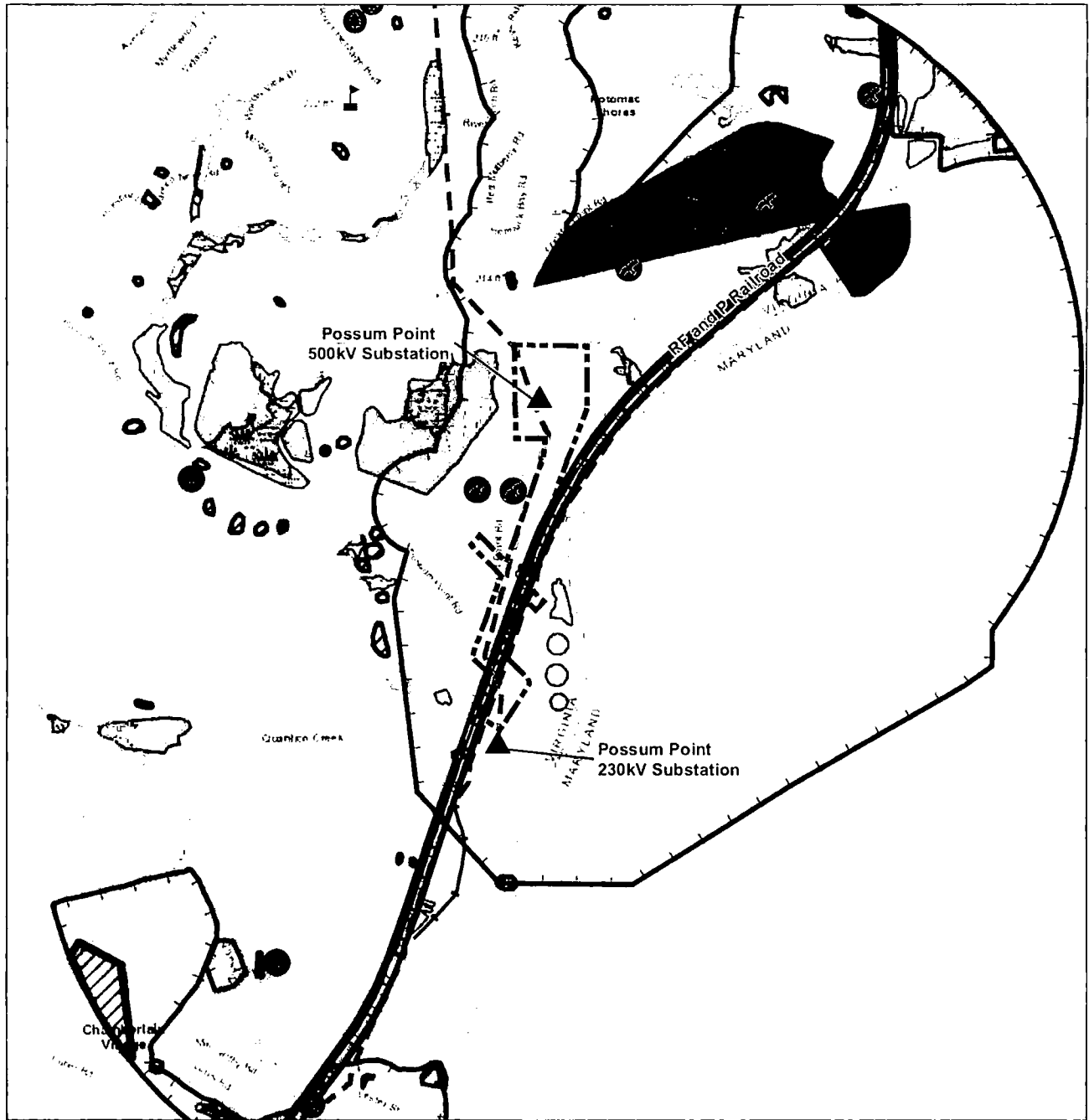
II. DESCRIPTION OF THE PROPOSED PROJECT

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, which includes existing linear utilities paralleled by the existing transmission line corridor. No portion of the corridor is proposed to be quitclaimed or relinquished.

The Company will make a digital Geographic Information Systems shapefile available to interested persons upon request to counsel for the Company.



Notes
 1. Coordinate System: NAD 1983 StatePlane Virginia South FIPS 4502 Feet
 2. Data Sources: Dominion Energy Virginia, NPMS, VCHIS, Google Earth, Pennwell, Prince William County, NWI, NHD, CCB
 3. Base map: ESRI

- Eagle Nest
- School Park
- ▲ School
- ▲ Substation
- Gas Transmission Pipeline
- Hazardous Liquid Pipeline
- Railroad
- Project Limits
- NWI PEM/PSS Wetland
- NWI PFO Wetland
- Park
- NHD Waterbody
- Archaeology Resource
- Architecture Resource

0 1,000 2,000 Feet
 (At original document size of 8.5x11)
 1:24,000



Project Location: Prince William County, Virginia
 Prepared by MGS on 2020-04-09
 TR by TPS on 2020-04-09
 IR by MMJ on 2020-04-09
 203401383

Client/Project: Dominion Energy Virginia
 Possum Point Second Transformer and
 New 230kV Tie Line #2216

Figure No.
 IIA2

Environmental Constraints Map

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: The Project is located entirely within Company-owned property, with the exception of aerial crossings of the RF&P railroad, which traverse the Company's property. Existing Line #2078, Lines #215/#2001, and Lines #237/#2022 already cross the RF&P railroad at three locations pursuant to an existing master license agreement. The Company will pursue an amendment to the existing master license agreement with CSX for the crossing of Line #2216. See Section III.D.

II. DESCRIPTION OF THE PROPOSED PROJECT

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

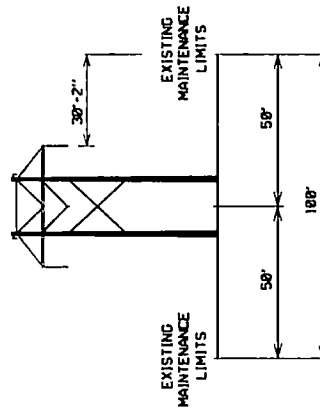
5. Provide drawings of the ROW cross section showing typical transmission line structure placements referenced to the edge of the ROW. These drawings should include:
 - a. ROW width for each cross section drawing;
 - b. Lateral distance between the conductors and edge of ROW;
 - c. Existing utility facilities 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 Attachments II.A.5.a-b.

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

EXISTING STRUCTURE NUMBER 2078/10 TO 1

EXISTING
230KV CIRCUIT
(LINE #2078)

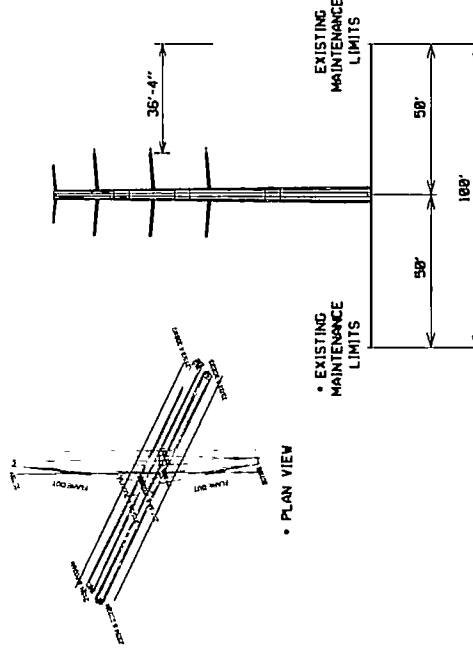


EXISTING CONFIGURATION
TYPICAL CORRIDOR LOOKING TOWARD 500kV STATION

PROPOSED STRUCTURE NUMBER 2078/9 TO 1
PROPOSED STRUCTURE NUMBER 2216/11 TO 5

PROPOSED
230KV CIRCUIT
(LINE #2078)
PROPOSED
230KV CIRCUIT
(LINE #2216)

PRELIMINARY



PROPOSED CONFIGURATION
TYPICAL CORRIDOR LOOKING TOWARD 500kV STATION

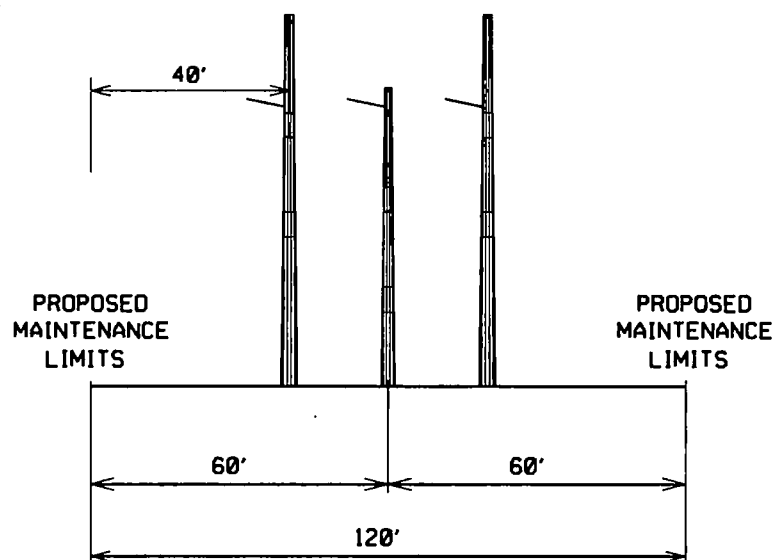
• PROPOSED CORRIDOR FLARES OUT AN ADDITIONAL 85' AT STRUCTURE 2078/5. FLARE OUT STARTS AT PROPOSED STRUCTURE 2078/6 AND ENDS AT STRUCTURE 2078/4. THIS INCLUDES TWO SPANS FOR APPROXIMATELY 1000' WHICH INCLUDES AN APPROXIMATE 200' OVERLAP WITH THE EXISTING LINE 215, 237, 2001, & 2022 CORRIDOR.

NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

PROPOSED STRUCTURE NUMBER 2216/4 TO 1

PROPOSED
230KV CIRCUIT
(LINE #2216)

PRELIMINARY



PROPOSED CONFIGURATION
TYPICAL CORRIDOR LOOKING TOWARD 500KV STATION

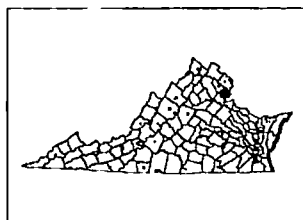
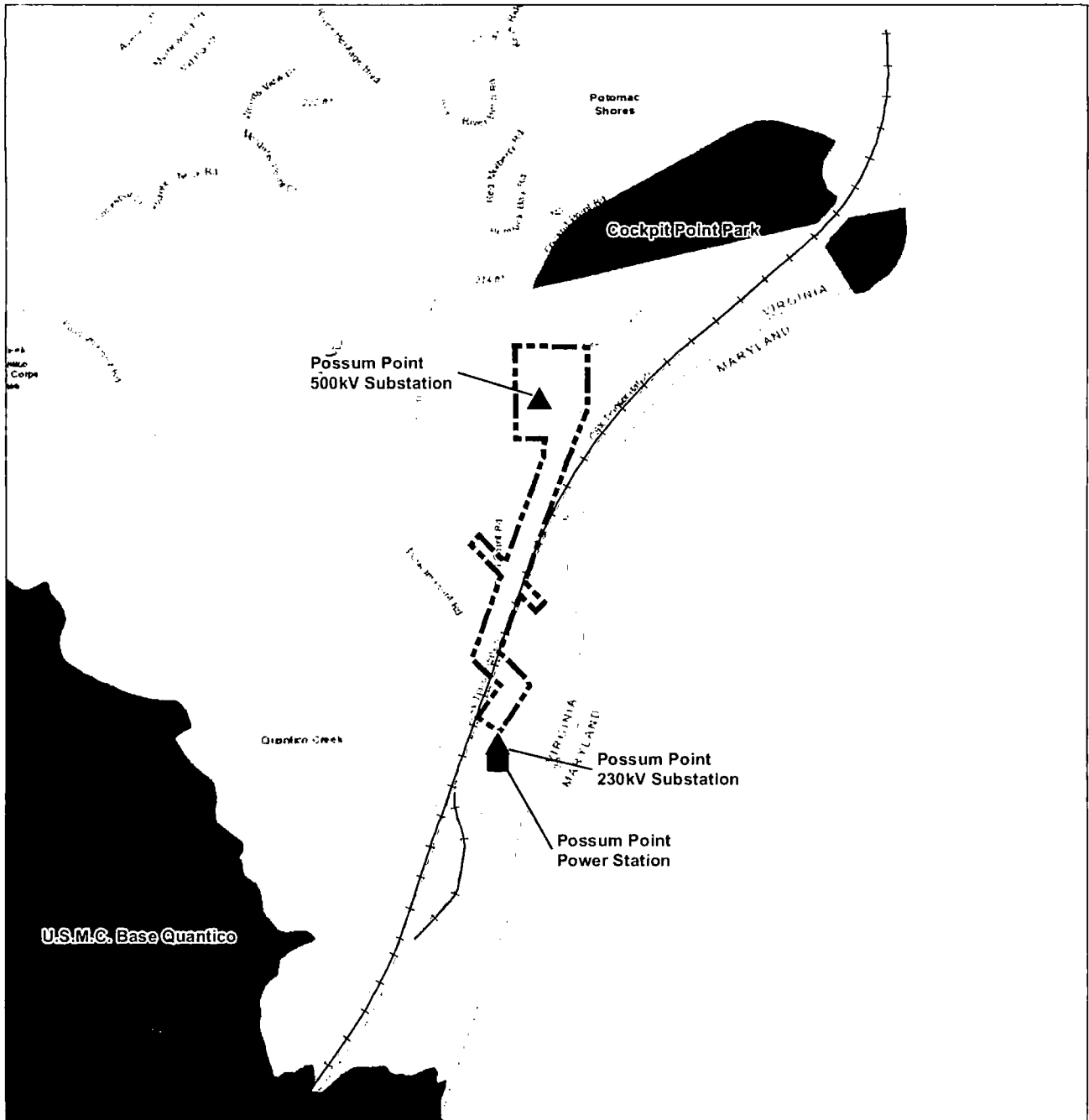
NOTE: Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

II. DESCRIPTION OF THE PROPOSED PROJECT

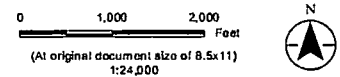
A. Right-of-way ("ROW")

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

Response: The Company initially purchased the property on which the Project corridor is located in 1901. The crossings of the RF&P railroad by the Project corridor are through the listed encroachments on the master license agreement executed between the Company and CSX. Existing Line #2078, Lines #215/#2001, and Lines #237/#2022 already cross the RF&P railroad at three locations, totaling five separate encroachments (one per line). The crossing of Line #2078 is near the Possum Point 230kV Substation and will be collocated with Line #2216. The Company will need a new encroachment listing within the master license agreement for the aerial crossing of Line #2216. There are no conservation easements within the Project corridor. See Attachment II.A.6 for a conservation easement map.



- ▲ Substation
- Existing Power Station
- Project Limits
- Conservation Easement
- RF&P Railroad



Project Location: Prince William County, Virginia
 Prepared by CDC on 2022-12-19
 TR by RJW on 2022-12-21
 IR by CPG on 2022-12-21
 203401824

Client/Project: Dominion Energy Virginia
 Possum Point Second Transformer and
 New 230kV Tie Line #2216

Figure No.
 II.A.6

Title
 Conservation Easement Map

Notes
 1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
 2. Data Sources: Dominion Energy Virginia, PADUS, Prince William County, and DCR
 3. Base map: ESRI

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 entire 100-foot width of the existing transmission line corridor is currently cleared and maintained for operation of the existing transmission facilities. The Project will include the extension of approximately 0.29 miles of new 120-foot-wide corridor, adjacent to the Possum Point 500 kV Substation, which will require approximately 2.88 acres of clearing. The Project will also require expansion of the existing corridor by 85 feet where Lines #2078 and #2216 cross underneath Lines #215/#2001 and Lines #237/2022. Both the extension and expansion of the existing transmission line corridor will occur entirely on Company-owned property.

Trimming of tree limbs along the edge of the corridor may be conducted to support construction activities for the Project. For any such minimal clearing, 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 at or above ground level, limbed, and will remain where felled. No grubbing of roots or stumps will occur. 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 or from equipment placed on mats in wetland areas and within 100 feet of streams, if applicable. Care will be taken not to leave debris in streams or wetland areas that may cause an impediment to the flow of water. No mulching will occur in wetlands. Erosion control devices will be used on an ongoing basis, as appropriate, during all clearing and construction activities.

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 Project, 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.

Limited clearing or limbing may be required to accommodate construction access. Any clearing will be done in accordance with the Company's Integrated Vegetation Management Plan ("IVMP") practice with no grubbing of roots or stump materials. The remainder of the existing right-of-way is currently cleared and maintained.

The right-of-way will continue to be maintained in its current state 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 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: The Project is located within Company-owned property, with the exception of aerial crossings of the RF&P railroad, which traverses the Company's property. Existing Line #2078, Lines #215/#2001, and Lines #237/#2022 already cross the RF&P railroad at three locations pursuant to an existing master license agreement. The Company will pursue an amendment to the existing master license agreement with CSX for the crossing of Line #2216. See Section III.D.

For the portions of the Project located on Company-owned property, any non-transmission use will be permitted that:

- Is in accordance with the terms of any 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; and
- 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 that may be suitable for a transmission line can be identified.

For this Project, the Company requested the services of Stantec Consulting Services, Inc. ("Stantec") to perform a Route Review Study to identify and evaluate potential alternative routes for new Line #2216 within the Company's existing property at the Possum Point Power Station. The route development process is described in more detail in the Routing Review Study provided in Attachment II.A.9.a.¹⁰

Following the data collection effort and field reconnaissance, three alternative routes were developed by Stantec in collaboration with the Company: Routes A-C. The alternative routes were developed to utilize the existing Line #2078 corridor exiting from the Possum Point 230 kV Substation and entering the northern side of the Possum Point 500 kV Substation where improvements to the substation are proposed as part of the Project, while also avoiding an active coal ash pond to the west and the Potomac River to the east.

Alternative Route A would construct a new approximately 0.94-mile 230 kV line within Company-owned property. Located approximately 750 feet west of the existing Line #2078 alignment, Route A was the westernmost route. Route A would follow the existing 230 kV Line #2078 exit from the Possum Point 230 kV

¹⁰ Stantec provided a memorandum to the Company dated February 17, 2023, updating the Route Review Study ("Routing Update Memo"). The Routing Update Memo is provided as Attachment II.A.9.b.

Substation, paralleling Possum Point Road for approximately 0.2 miles before turning north to head to the Possum Point 500 kV Substation from the west.

Alternative Route B would construct a new approximately 0.89-mile 230 kV line within Company-owned property. Route B was located approximately 400 feet east of Route A (i.e., between Routes A and C). Like Route A, Route B would follow the existing 230 kV Line #2078 exit from the Possum Point 230 kV Substation, and travel parallel to Cockpit Point Road before entering the Possum Point 500 kV Substation from the west at the same entry point as Route A.

Proposed Route C would construct a new approximately 0.95-mile 230 kV line primarily within the existing overhead Line #2078 corridor located within Company-owned property. Route C would follow the existing 230 kV Line #2078 exit from the Possum Point 230 kV Substation for the majority of the existing corridor, but then would extend further north approximately 0.29 miles of new corridor within Company-owned property in order to enter the Possum Point 500 kV Substation at an eastern entry point.

The three alternative routes are depicted below and in Appendix A, Figure 2, of the Routing Review Study:



This approach generally avoids or minimizes impacts on natural and human environments. This approach is also consistent with Attachment 1 of these Guidelines, which provides a tool routinely used by the Company in routing its transmission line projects. Specifically, this approach is consistent with Guideline #1, which states that existing rights-of-way should be given priority when adding new transmission facilities, and Va. Code §§ 56-46.1 and 56-259, which promote the use of existing rights-of-way for new transmission facilities. The Routing Review Study in Attachment II.A.9.a provides a more detailed overview of the information collected within the study area, explains the development of the alternative routes, and performs a routing analysis comparing the route alternatives.



**Possum Point 2nd Transformer and
New 230 kV Tie Line #2216**

Route Review Study

July 29, 2020

Prepared for:

Dominion Energy Virginia
10900 Nuckols Rd, 4th Floor
Glen Allen, Virginia 23060

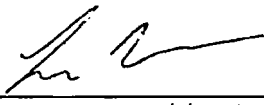
Prepared by:

Stantec Consulting Services, Inc.
5209 Center Street
Williamsburg, Virginia 23188

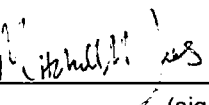


POSSUM POINT 2ND TRANSFORMER AND NEW 230 KV TIE LINE #2216


This document entitled Possum Point 2nd Transformer and New 230 kV Tie Line #2216 was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Virginia Electric and Power Company (Dominion Energy Virginia or the Company). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and Dominion. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 
(signature)

Lauren Pudvah

Reviewed by 
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Mitchell Jabs

Approved by 
(signature)

Curt Bjurlin



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- Appendix B- Project Tables
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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

As part of a larger Project that includes the installation of a new 500-230 kV transformer bank at Dominion Energy Virginia's Possum Point 500 kV Substation, the Company is planning to install 0.95-mile of new 230 kV transmission line, Line #2216, between the Company's existing Possum Point 500 kV and 230 kV Substations in Prince William County, Virginia (Figure 1, Appendix A). Dominion Energy Virginia retained Stantec Consulting Services, Inc (Stantec) to perform a route review study to identify and evaluate potential alternative routes for new Line #2216 within the Company's existing property. This process included the review of three alternative routes and culminated in a Preferred Route. A multi-disciplinary siting team performed the route review. Members of the siting team have experience in transmission line siting, impact assessment for a wide variety of natural resources and the human environment, impact mitigation, engineering, right-of-way, and construction management.

The Study Area is characterized by industrial land uses and consisted of land owned by the Company, with the exception of a single crossing of the Richmond, Fredericksburg and Potomac (RF&P) railroad, which traverses the Company's property. Multiple transmission lines and related infrastructure are present within the Study Area (Figure 1, Study Area, Appendix A). It is anticipated that the new transmission structures will range from 55 feet to 120 feet tall. The complete route review process is described in more detail in the sections to follow.

1.2 ROUTING PROCESS AND METHODOLOGY REVIEW

Routing is an iterative process in which information is compiled, analyzed, and communicated to identify a preferred route. The route review study included the identification of a Study Area, development of Alternative Routes, comparative analysis, and selection of a Preferred Route. In collaboration with Dominion Energy Virginia, three Alternative Routes were developed, and a quantitative and qualitative analysis was performed in which environmental, land use, social and engineering constraints were identified for each route and compared against one another to select a Preferred Route. The Routing Team was multidisciplinary, consisting of members experienced in transmission line routing, engineering, permitting, land services, and agency and public relations. Many factors were considered during the routing process including safety, potential environmental and social impacts, engineering, and existing land uses. This report provides a summary of:

- The opportunities and constraints in the project Study Area that shaped the development of Alternative Routes;
- The decision-making process that led to the selection of the Preferred Route; and
- The potential impacts of the Preferred Route on the natural and human environment



2.0 ALTERNATIVE ROUTE DEVELOPMENT

2.1 STUDY AREA DESCRIPTION

The Study Area is located in Prince William County, Virginia (Figure 1, Study Area). The 0.47 square-mile Study Area was developed to include property owned by the Company between the Possum Point 500 kV Substation and Possum Point 230 kV Substation, while also avoiding a coal ash pond to the west and the Potomac River to the east. The Study Area encompassed the Possum Point 500 kV Substation, the Possum Point 230 kV Substation, and multiple existing transmission lines owned by Dominion Energy Virginia. The Study Area was established to allow for a reasonable set of alternatives between the two substations that would maximize use of land owned by Dominion Energy Virginia.

Multiple linear features were documented within the Study Area, including a network of Company-owned transmission lines, a gas transmission pipeline, a hazardous liquid pipeline, and the RF&P Railroad, which is operated by CSX. The majority of the Study Area consisted of industrial land, with the Possum Point 500 kV Substation to the north, a coal ash pond to the west, the Potomac River to the east, and the Possum Point 230 kV Substation to the south. The Study Area contained few environmental features. The U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) database indicated streams, wetlands, and other jurisdictional features as largely absent, with the exception of one small open water feature north of the Possum Point 230 kV Substation and a large open water feature associated with coal ash disposal on the northwest corner of the Study Area.

2.2 SITING GUIDELINES

The siting team, in collaboration with the Company, developed the siting guidelines below to be applied throughout the routing process.

System Planning Requirements

- Meet the electrical need and requirements in an economic and reliable way
- Project starting point is the Possum Point 230 kV Substation
- Project terminus is the Possum Point 500 kV Substation

Engineering Requirements/ Planning Considerations

- Approximate width of transmission line corridor 100 feet to 120 feet
- Evaluate paralleling or co-location of existing transmission
- Utilize Company-owned property

Impacts to the Natural Environment and Land Use

Where possible:

- Minimize the removal or substantial interference with the use of existing residences.



POSSUM POINT 2ND TRANSFORMER AND NEW 230 KV TIE LINE #2216

- Minimize the removal of existing barns, garages, commercial buildings, and other non-residential structures.
- Minimize interference with the use and operation of existing schools, recognized places of worship, cemeteries, and facilities used for cultural, historical, and recreational purposes.
- Maximize distance from residences, schools, cemeteries, known historical resources, recreation sites, and other important cultural sites.
- Maximize the sharing or paralleling of existing rights-of-way.
- Minimize interference with economic activities, including agricultural and silvicultural activities.
- Minimize the crossing of environmentally and culturally sensitive lands, such as recreation lands, designated battlefields and other designated historic sites, national and state forests and parks, nature preserves, conservation lands and easements, large lakes and large wetland complexes, critical habitat, and other unique or distinct natural resources.
- Where crossings of sensitive lands are unavoidable, maximize the use of existing crossings.
- Minimize substantial visual impact on residential areas and public resources.
Minimize route length, circuitry, cost, and special design requirements.

The siting team developed opportunities and constraints criteria to reflect these guidelines for use in a comparative analysis of the Alternative Routes. Opportunities and constraints criteria were grouped into four criteria groups: environmental, land use, social, and engineering criteria (Table 1. Evaluation Criteria).

Table 1. Evaluation Criteria

Environmental Criteria	Forested wetlands in corridor (acres)
	Herbaceous wetlands in corridor (acres)
	Forested land in corridor (acres)
	Water crossings by centerline (count)
	Floodplain crossed by centerline (feet)
	Protected species (flora & fauna) known locations within 1,000 feet of centerline (count)
	Protected habitat within corridor (acres)
	Potential environmental contamination sites within 1,000 feet of centerline (count)
	Geological features within corridor (count)
Land Use Criteria	Length of route paralleling federal and state roads (percent of total length)
	Length of route paralleling local roads (percent of total length)
	Length of route paralleling non-Dominion transmission lines (percent of total length)
	Length of route paralleling Dominion-owned transmission (percent of total length)
	Length of route paralleling distribution lines (percent of total length)
	Length of route paralleling railroad right-of-way (percent of total length)
	Conservation lands within 1,000 feet of corridor (acres)
	Federal and/or state lands within 1,000 feet of corridor (acres)
	Agricultural land within corridor (acres)
	Commercial and service land within corridor (acres)
	Industrial and extractive land within corridor (acres)
	Municipal lands crossed by corridor (acres)
	Recreational areas within 1,000 feet of corridor (count)



POSSUM POINT 2ND TRANSFORMER AND NEW 230 KV TIE LINE #2216

Social Criteria	Residential buildings within 250 feet of corridor (count)
	Residential buildings within 250-500 feet of corridor (count)
	Property owners crossed by corridor (count)
	Parcels crossed by corridor (count)
	Schools within 1,000 feet of corridor (count)
	Community facilities within 1,000 feet of corridor (count)
	NRHP listed cultural resources within 1,000 feet of centerline (count)
	State listed known resources within 1,000 feet of centerline (count)
	Known archaeological sites within corridor (count)
	Historic districts within 1,000 feet of centerline (count)
	Cemeteries within or adjacent to corridor (count)
	Historic Battlefields within corridor (acres)
Engineering Criteria	Transmission line crossings (count)
	Gas pipeline crossing (count)
	Highway, interstate, local road, or railroad crossings (count)
	Turn angles >20 degrees (count)
	Span length in excess of 400 feet (feet)
	Airports and heliports within 20,000 feet of corridor (count)
	Total route length (miles)

2.3 DATA SOURCES

The route review process included the collection of information from public and agency databases on natural resource features and existing land uses within the Study Area. The study made extensive use of information in existing GIS datasets obtained from many sources, including federal, state, and local governments. No public engagement activities occurred as part of this route review.

Table 2, below, includes the data that was collected as part of this review. Following the desktop data collection, the siting team moved into alternative route development.



POSSUM POINT 2ND TRANSFORMER AND NEW 230 KV TIE LINE #2216

Table 2. Data Sources

Sub-Category	Source	Date of Data
Aerial imagery	Virginia Geographic Information Network	2017
Agricultural land cover	Prince William County GIS, NLCD	2016
Airports and helipads	Federal Aviation Authority	2020
Cemeteries	Prince William County GIS, Parcel Data	2018
Cultural & historic resources	Virginia Department of Historic Resources, Virginia Cultural Resource Information System (VCRIS)	2020
Existing electric infrastructure	Dominion Energy and PennWell	2020, 2018
Flood zones	FEMA	2020
Forested land cover	Prince William County, NLCD	2017, 2016
Hospitals	Prince William County	2019
Potential Contaminated Lands	US EPA, Virginia DEQ	2020
Land cover	National Land Cover Database (NLCD)	2016
Other existing utilities	Dominion Energy Virginia & PennWell	2020, 2018
Parcel data	Prince William County	2018
Protected lands	PADUS, Prince William County	2018, 2020
Railroads	Prince William County GIS	2020
Recreation	Prince William County and Google Earth	2017
Religious facilities	Prince William County	2016
Residences	Prince William County	2018
Roads	North American Detailed Streets and Prince William County	2005, 2020
Schools	Prince William County	2019
Slope	Digital Elevation Model Contours (LiDAR)	2011
Streams	USGS National Hydrography Dataset	2019
Threatened & endangered species	Virginia Department of Conservation and Recreation, Virginia Department of Wildlife Resources, US Fish and Wildlife Service Information, Planning, and Consultation Service	IPaC-2020
Topographic map	USGS	1994
Wetlands	USFWS National Wetland Inventory	2019
Zoning	Prince William County	2020



3.0 ROUTE EVALUATION

Following the data collection effort and field reconnaissance, three Alternative Routes were developed by Stantec in collaboration with the Company: Routes A-C (Figure 2. Alternative Routes, Appendix A). The Alternative Routes were developed to utilize the existing Line #2078 corridor exiting from the Possum Point 230 kV Substation and entering the northern side of the Possum Point 500 kV Substation where improvements to the substation are proposed, while also avoiding a coal ash pond to the west and the Potomac River to the east.

- Route A would construct a new approximately 0.94-mile 230 kV line entirely within Company-owned property. Located approximately 750-feet west of the existing Line #2078 alignment, Route A was the westernmost route. Route A would follow the existing 230 kV Line #2078 exit from the Possum Point 230 kV Substation, paralleling Possum Point Road for approximately 0.2 miles before turning north to the head to the Possum Point 500 kV Substation from the west.
- Route B would construct a new approximately 0.89-mile 230 kV line entirely within Company-owned property. Route B was located approximately 400-feet east of Route A (i.e., between Routes A and C). Like Route A, Route B would follow the existing 230 kV Line #2078 exist from the Possum Point 230 kV Substation, and then traveled parallel to the Cockpit Point Road before entering the Possum Point 500 kV Substation from the west at the same entry point as Route A.
- Route C would construct a new approximately 0.95-mile 230 kV line primarily within the existing overhead Line #2078 corridor located entirely within Company-owned property. Route C would follow the existing 230 kV Line #2078 exit from the Possum Point 230 kV Substation for the majority of the existing corridor, but then would extend further north approximately 0.29 mile of the new corridor within Company-owned property to enter the Possum Point 500 kV Substation at an eastern entry point.

Following the development of the Alternative Routes, a field review was conducted by Stantec on March 24, 2020. At this time, Stantec personnel completed a windshield survey of the Study Area and Alternative Routes from public vantage points. The purpose of the field review was to confirm existing land uses, verify sensitive receptors, and note any additional constraints that were not identified through public datasets. No additional constraints were documented.

Following field reconnaissance, the Alternative Routes were carried forward for quantitative and qualitative review. A comparative analysis was conducted using the evaluation criteria outlined in Section 2.2. Routes were evaluated based on environmental, land use, social, and engineering criteria groups to identify a preferred route that could be safely constructed and maintained, while minimizing impacts to human and natural resources (Table 3. Alternative Route Comparison, Appendix B).



3.1 ENVIRONMENTAL AND ENGINEERING CONSIDERATIONS

3.1.1 Environmental Considerations

Distinguishing factors within this criteria group are acreage of forested land and proximity to protected species occurrences. Routes A and B would require new corridor through forested land; therefore, these routes would require more forested clearing than Route C, the majority of which was located within existing corridor. All three routes were located within 1,000 feet of three documented bald eagle (*Haliaeetus leucocephalus*) nests. USFWS guidelines restrict all clearing, external construction, and landscaping activities within 660 feet of the nest to occur only outside the nesting season. Additionally, standard National Bald Eagle Guidelines recommend maintaining a 330-foot vegetated buffer and a time-of-year restriction on construction within 660-feet of a nest during the breeding season, which occurs between December 15 and July 15 in Virginia. Routes A and B would be located within the 330-foot buffer. Route C is the only route that would not intersect the 330-foot buffer; however, Route C would be located within the 660-foot eagle nest buffer.

None of the routes crossed wetlands, waterbodies, or 100-year floodplain features. Four environmental contamination sites were documented within the Study Area: three petroleum release sites and one registered tank facility. These sites were associated with the existing Possum Point Substation and were not located within 1,000 feet of any of the Alternative Routes. In addition to the documented occurrences noted above, Stantec completed a review of online databases for federal and state threatened and endangered species potentially occurring in the vicinity of the Project. The following databases were reviewed:

- USFWS Information, Planning, and Conservation (IPaC) Database
- USFWS Critical Habitat for Threatened and Endangered Species Mapper
- USFWS Bald Eagle Concentration Area Map
- Department of Game and Inland Fisheries (DGIF) Virginia Fish and Wildlife Information Service (VAFWIS)
- DGIF Northern Long-eared Bat (NLEB) Winter Habitat and Roost Trees Map
- Virginia Department of Conservation and Recreation (DCR) Natural Heritage Data Explorer (NHDE)
- Center for Conservation Biology (CCB) Bald Eagle Nest Locator for Virginia

According to these databases, a total of seven plant and animal species listed as federally or state threatened or endangered were identified as potentially occurring near the Study Area; however, four of these species inhabit aquatic or damp habitats that are not found within any of the Alternative Route ROWs. Table 3 presents the list of these protected species and their state or federal protection status.

Table 3. Threatened and Endangered Species that may occur within Study Area

Species	Habitat	Designated Status
Mammal		
Northern long-eared bat (<i>Myotis septentrionalis</i>)	Prefers old-growth forests with hibernation occurring primarily in caves.	FT, ST



Avian		
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Prefers large open water bodies, saltwater marshes, dry prairies, mixed pine, hardwood forests, wet prairies, marshes, and pine flatwoods.	(1)
Peregrine falcon (<i>Falco peregrinus</i>)	Species prefers undisturbed areas with a wide view, near water, and close to plentiful prey.	ST
Insect		
Virginia piedmont water boatman (<i>Sigara depressa</i>)	Occupies a wide range of aquatic habitats, including pools, ponds, backwaters of streams, and occasionally slow-flowing stream.	SE
Plants		
Harperella (<i>Ptilimnium nodosum</i>)	Grows along rocky shoals of clear swift-flowing streams. Requires a very narrow range of hydrologic conditions to survive.	FE
Sensitive joint-vetch (<i>Aeschynomene virginica</i>)	This species is generally found in the intertidal zone of coastal marshes in bare to sparsely vegetated substrates. It is typically found in the outer fringe of slightly brackish to freshwater marshes.	FT, ST
Small whorled pogonia (<i>Isotria medeoloides</i>)	Species requires mixed damp woods of acidic soils of dry to mesic second-growth, deciduous or deciduous-coniferous forests with an open herb layer, although occasionally dense ferns, moderate to light shrub layer, and a relatively open canopy.	FT, SE

FE – Listed as Endangered Species by the USFWS; FT- Listed as a Threatened Species by the USFWS; ST-State population listed as Threatened by the Virginia DGIF; SE- State population listed as Endangered by the Virginia DGIF.

(1) While not listed under the ESA, the Bald Eagle is federally protected under the Bald and Golden Eagle Protection Act.

The Study Area was also evaluated for the occurrence of Critical Habitat as defined by the *Endangered Species Act of 1973*, as amended and 50 CFR part 424. No Critical for any federally listed species was identified within the Study Area.

3.1.2 Engineering Considerations

Distinguishing factors within the engineering criteria group are electric and gas transmission features, transportation corridors, total route length, and proximity to airports. All routes would cross existing electric and gas transmission lines. Routes A and B both would cross electric transmission lines four times, while Route C crossed these features three times. All routes would cross a gas transmission pipeline at two locations and a hazardous liquid pipeline at one location. All routes would cross a railway operated by CSX at their exit from the Possum Point 230 kV Substation. Routes A and B would also require crossing Cockpit Point Road.

The nearest public airport to any of the Alternative Routes, the Maryland Airport, was located approximately 12 miles away. One private airport, within Marine Corps Base Quantico, was documented approximately 13,450 feet from all three routes. Additionally, one private landing strip, Buds Ferry Landing Strip, was located approximately 11,200 feet from all three routes.

3.2 LAND USE AND SOCIAL CONSIDERATIONS

3.2.1 Land Use Considerations

Differentiators within the land use criteria group include roadway paralleling, railroad paralleling, acreage of industrial and extractive land uses, and recreational areas within 1,000 feet. All the Alternative Routes were located entirely within property zoned as "Heavy Industrial." Route C paralleled the RF&P railroad



POSSUM POINT 2ND TRANSFORMER AND NEW 230 KV TIE LINE #2216

for the greatest percentage of its total length and would also parallel a gas transmission pipeline for the greatest percentage of its length. Routes A and C would parallel state roadway for comparable percentages of their total route lengths: 21% and 28%, respectively. All Alternative Routes were located within 1,000 feet of one recreational feature: Medal of Honor Golf Course, located on the western side of Quantico Creek.

No residences were located within or directly adjacent to the Study Area at the time of the study. Additionally, no community facilities were identified within the Study Area. The entire Study Area was owned by the Company, with the exception of the RF&P railroad, which traverses the property. According to the *Prince William County Comprehensive Plan*, the Study Area is classified as a Suburban Area, Industrial Employment. There are no planned roadway widening or realignment projects or improvements to bicycle or pedestrian paths within the Study Area.

3.2.2 Social Considerations

Within the social criteria group, property ownership, parcels crossed, and battlefields crossed are the only criteria with recordable values. All the Alternative Routes would be located within one parcel owned by the Company. There were no architectural or archaeological resources noted within or adjacent to any of the Alternative Routes; however, one historic battlefield was noted: the Cockpit Point Battlefield. The Alternative Routes would be located entirely within the battlefield boundary, and all routes were located almost entirely within the core battlefield boundary. No cemeteries were identified within the Study Area.

Although not within any of the Alternative Routes, three known archaeological sites were identified along the western periphery of the Study Area, west of Possum Point Road. The northern most site (DHR ID# 44PW0442) is a prehistoric domestic temporary camp, the larger resource just to the south (DHR# 44PW0385) is a terrestrial, open air site, and the southernmost site (DHR ID# 44PW2029) is a pre-contact temporary camp.

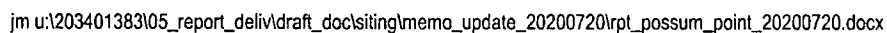
3.3 RESULTS AND DISCUSSION

Quantitative results for the three Alternative Routes varied most between the land use and environmental groups. Route A would intersect the 330-foot buffer of one of the eagle nests and the 660-foot buffer of all three nests. Route B would intersect both the 330-foot buffer and the 660-foot buffer of all three nests. Route C would intersect the 660-foot buffer of two of the nests. Route C would require the least amount of forested clearing, due to primarily being located within an existing corridor. Total route lengths were comparable among the three Alternative Routes; however, Routes B and C would both require one less turn angle greater than 20 degrees than Route A.

Route A had the greatest percentage of its total route length paralleling state roadways due to the portion of its alignment paralleling Possum Point Road. Route C would cross two less roadways than Routes A and B. All Routes are completely contained within land owned by Dominion Energy Virginia on the same parcel and would avoid wetland or water features.



In addition to the land use and environmental results discussed above, the Company identified constraints to the construction of Routes A and B. Specifically, Routes A and B would have to be routed around an existing 500 kV tower. Attempting to route around this existing tower within Company-owned property created conflicts with an existing road, two 500 kV lines, and the Possum Point 500 kV Substation to the east, and conflicts with the coal ash pond and two 500 kV lines to the west, which would most likely need to be raised to allow for the crossings. As such, the Company rejected Routes A and B as not viable.



POSSUM POINT 2ND TRANSFORMER AND NEW 230 KV TIE LINE #2216

4.0 PREFERRED ROUTE DESCRIPTION

Route C would exit the Possum Point 230 kV Substation to the west, and would be co-located with the existing transmission corridor, Line #2078, for approximately 0.7 mile before deviating to the east of the Possum Point 500 kV Substation. Route C would then tie into the northern side of the substation, where substation improvements are proposed. Route C is approximately 0.95 mile in length, is located within Company-owned property, and would be built almost entirely within the existing 100-foot wide transmission corridor.

4.1 LAND USE AND SOCIAL CONSIDERATIONS

The Preferred Route would not be located within 1,000 feet of any known historic structures or cemeteries and did not have any known archaeological resources within its corridor; however, the Preferred Route is within the core boundary of the Cockpit Point Battlefield. The majority of the Preferred Route is within the existing transmission corridor and the entire corridor is zoned as heavy industrial. Land immediately adjacent to Route C consists of the RF&P railroad to the east and an undeveloped, forested area to the west.

4.2 ENVIRONMENTAL AND ENGINEERING CONSIDERATIONS

Route C crosses the 660-foot buffer of a known eagle nest. Work to rebuild Line #2078 and construct Line #2216 will be required to adhere to USFWS guidelines restricting all clearing, external construction, and landscaping activities within 660 feet of the nest to occur only outside the nesting season. Additionally, standard National Bald Eagle Guidelines recommend maintaining a 330-foot vegetated buffer and a 660-foot time-of-year restriction on construction during the breeding season, which occurs between December 15 and July 15 in Virginia. No water, wetland, or geological features were identified within the corridor for Route C. Route C crosses electric transmission lines at three locations, a gas transmission pipeline at two locations, and a hazardous liquid pipeline at one location.



5.0 CONCLUSION

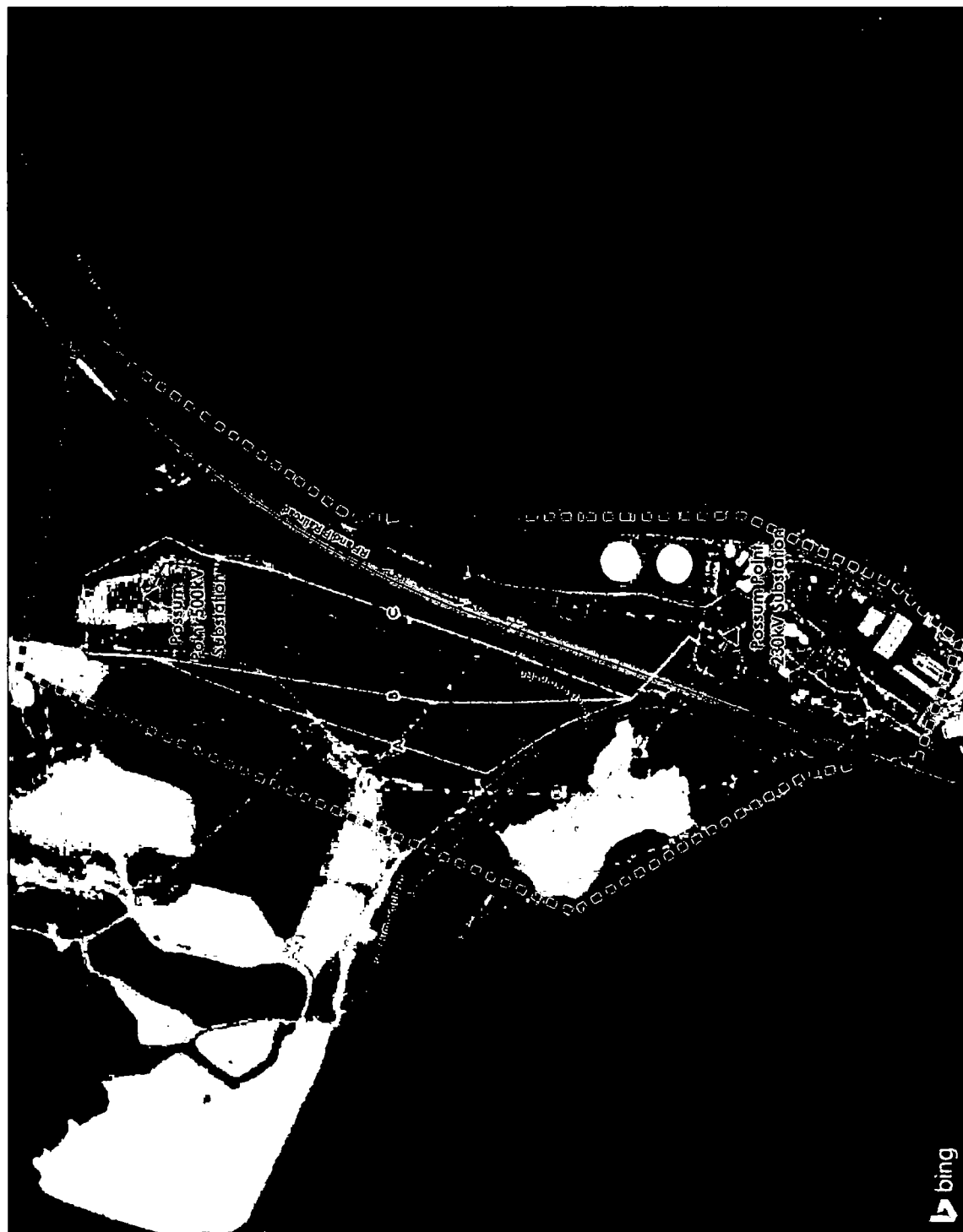
Route C was recommended as the Preferred Route because it minimizes clearing of forested lands, would be located almost entirely within the existing transmission corridor, and would be located furthest from existing bald eagle nests. Route C accommodates design characteristics that are safe, reliable, permissible, and can be constructed to maintain safely and reliably.

Route C would be located within 660-feet of multiple bald eagle nests, which may require additional field review and additional coordination with regulatory agencies prior to construction. It is recommended that the Company conduct further environmental review and consultation as soon as possible to allow sufficient time to secure any necessary environmental approvals. Additional coordination with CSX will also be required prior to construction for the crossing of the RF and P railroad. Based on the surrounding land uses, distance from bald eagle nests, and location within the existing transmission corridor, Route C was determined to be the most practicable location for the construction of new Line #2216.



APPENDIX A

Project Graphics

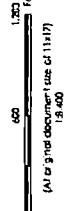









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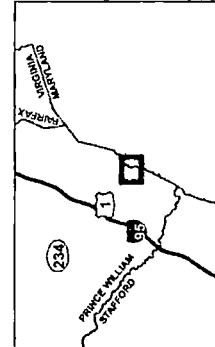
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Alternative Routes

[illegible]

-  Substation
 Alternative Routes
 Existing Line #2078
 Existing Dominion Transmission Line
 Railroad
 Study Area
 Dominion Energy Virginia Parcel



© 2003
1. Coordinates System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Data Sources: Dominion Energy Virginia, Starrett, Parshall, DCP, ESRI, NAD93
3. Ownership: © Bing Maps
4. Microsoft earth 7.1 version should not been used from Microsoft Connect



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