

November 18, 2021

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

Application of Virginia Electric and Power Company For approval and certification of electric transmission facilities: 500 kV Line #514 Partial Rebuild Project

Case No. PUR-2021-00276

Dear Mr. Logan:

Please find enclosed for electronic filing in the above-captioned proceeding the application for approval of electric transmission facilities on behalf of Virginia Electric and Power Company (the “Company”). This filing contains the Application, Appendix, Direct Testimony, 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 Loudoun County, as well as the digital geographic information system (“GIS”) map required by § 56-46.1 of the Code of Virginia, which is Attachment II.A.2 to the Appendix, were provided via an e-room to the Commission’s Division of Energy Regulation on November 17, 2021.

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

Very truly yours,



Vishwa B. Link

Enclosures

cc: William H. Chambliss, Esq.
Mr. David Essah (without enclosures)
Mr. Neil Joshipura (without enclosures)
Mr. Michael A. Cizenski (without enclosures)

Mr. Bernard Logan, Clerk
November 18, 2021
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April M. Jones, Esq.



**Dominion
Energy[®]**

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

**Before the State Corporation
Commission of Virginia**

**500 kV Line #514 Partial Rebuild
Project**

Application No. 310

Case No. PUR-2021-00276

Filed: November 18, 2021

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

500 kV Line #514 Partial Rebuild Project

Application No. 310

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COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2021-00276
	)	
For approval and certification of electric	)	
transmission facilities: 500 kV Line # 514	)	
Partial Rebuild Project	)	

**APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY
FOR APPROVAL AND CERTIFICATION OF
ELECTRIC TRANSMISSION FACILITIES:
500 KV LINE #514 PARTIAL REBUILD PROJECT**

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.

2. In order to perform its legal duty to furnish adequate and reliable electric service, Dominion Energy Virginia must, from time to time, replace existing transmission facilities or construct new transmission facilities in its system.

3. In this Application, in order to maintain the structural integrity and reliability of its transmission system in compliance with mandatory North American Reliability Corporation (“NERC”) Reliability Standards, the Company proposes in Loudoun County, Virginia, the following (collectively, the “Partial Rebuild Project”):

- (i) Rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-Goose Creek Line #514 from existing Structure #514/1854, which is not being replaced, located two spans outside of the Company’s existing Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border.¹ Specifically, replace 12 single circuit 500 kV weathering steel lattice towers and 1 single circuit 500 kV galvanized H-frame structure supporting the existing Line #514 with 13 single circuit 500 kV chemically dulled, galvanized steel lattice towers, and the existing 3-phase twin-bundled 2049.5 AAAC conductors with 3-phase triple-bundled 1351.5 ACSR conductors; and
- (ii) Perform related work at the Company’s existing Goose Creek Switching Station to support the new line rating for rebuilt Line #514.

4. The Company has developed a proactive plan to rebuild transmission lines that are comprised of weathering steel towers (COR-TEN^{®2}). The proposed Partial Rebuild Project will

¹ The existing overhead 500 kV Doubs-Goose Creek Line #514 extends a total of approximately 18.4 miles between the Company’s existing Goose Creek Substation in Loudoun County, Virginia, to the Potomac Edison Company’s (“Potomac Edison”) existing Doubs Substation in Frederick County, Maryland. Specifically, the Company’s portion of Line #514 extends approximately 3.1 miles from its Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border, with approximately 2.8 miles proposed for rebuild between Structure #514/1854 and Structure #514/1841 as part of the proposed Partial Rebuild Project. Potomac Edison’s portion of Line #514 extends approximately 15.3 miles from the Virginia-Maryland border to Potomac Edison’s Doubs Substation located in Frederick County, Maryland (“Potomac Edison’s Line #514 Rebuild”). For purposes of this Application filing, the Company is seeking Virginia State Corporation Commission (“Commission”) approval of the Partial Rebuild Project as described herein, with a targeted in-service date of June 1, 2024. Potomac Edison is separately seeking Maryland Public Service Commission approval to rebuild its approximately 15.3-mile portion of Line #514 located in Maryland, with a targeted in-service date of June 2025. *See In the Matter of the Application of The Potomac Edison Company for a Certificate of Public Convenience and Necessity (“CPCN”) to Rebuild the Doubs-Goose Creek 500 kV Transmission Line in Frederick and Montgomery Counties, Maryland*, Case No. 9669, Application (Aug. 3, 2021) at the following link: https://webapp.psc.state.md.us/newIntranet/casenum/CaseAction_new.cfm?CaseNumber=9669.

² Registered trademark of the United States Steel Corporation.

replace aging infrastructure that is at the end of its service life in order to comply with the Company's mandatory transmission planning criteria (the "Planning Criteria"), thereby enabling the Company to maintain the overall long-term reliability of its transmission system.

5. Specifically, an approximately 2.8-mile section of Line #514 has been identified for rebuild as part of the Partial Rebuild Project. This 2.8-mile section of Line #514 was constructed in 1966 primarily on COR-TEN steel lattice towers. These COR-TEN® towers have been identified for rebuild based on the Company's assessment in accordance with the Company's mandatory Planning Criteria. The Company hired a third-party company, Quanta Technology, LLC ("Quanta"), to evaluate the condition of its COR-TEN towers on Line #514. In its June 1, 2020 report entitled "Doubs-Goose Creek 500-kV Health Assessment Project" (the "Doubs-Goose Creek Report"), Quanta confirmed the need to rebuild the Line #514 COR-TEN® towers, including those identified as part of the Partial Rebuild Project. As Line #514 was constructed in 1966, its structures are currently 55 years old—approaching their expected life span—and therefore have been identified for rebuild based on the Company's end-of-life criteria.

6. In summary, the proposed Partial Rebuild Project will replace aging infrastructure at the end of its service life in order to comply with the Company's mandatory Planning Criteria, thereby enabling the Company to maintain the overall long-term reliability of its transmission system.

7. The desired in-service target date for the Partial Rebuild Project is June 1, 2024. The Company estimates that it will take approximately 20 months for detailed engineering, materials procurement, permitting, 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 September 30, 2022. Should the Commission issue a final

order by September 30, 2022, the Company estimates that construction should begin by October 1, 2023, and be completed by June 1, 2024.³ This construction timeline will enable the Company to meet the targeted in-service date for the Partial Rebuild Project. This schedule is contingent upon obtaining the necessary permits. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process.

8. The estimated conceptual cost of the proposed Partial Rebuild Project is approximately \$8.9 million, which includes approximately \$7.3 million for transmission-related work and approximately \$1.6 million for substation-related work (2021 dollars). The description of the proposed Partial Rebuild Project is described in detail in Sections I and II of the Appendix attached to this Application.

9. Because the existing right-of-way and Company-owned property is adequate to construct the proposed Partial Rebuild Project, no new right-of-way is necessary. Given the availability of existing right-of-way and the statutory preference given to the use of existing rights-of-way, and because additional costs and environmental impacts would be associated with the acquisition and construction of new right-of-way, the Company did not consider any alternate routes requiring new right-of-way for the Partial Rebuild Project. Section II of the Appendix addresses routing issues. The impact of the proposed Partial Rebuild Project on scenic, environmental, and historical features is described in detail in Section III of the Appendix.

³ The transmission-related work described in Section II.B of the Company's Appendix, which is attached to this Application, will be completed, and the approximately 2.8-mile rebuilt section of Line #514 will be energized by June 1, 2024. The substation-related work described in Section II.C of the Appendix, which is necessary to support the new line rating for rebuilt Line #514, will be completed upon energization of the Potomac Edison Line #514 Rebuild in June 2025. Until that time, the Company's approximately 2.8-mile rebuilt section of Line #514 will be operated at its current line rating. *See supra* n. 1.

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 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 Peter Nedwick, Matthew Vinson, Santosh Bhattarai, and Charles H. Weil 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 § 56-46.1 of the Code of Virginia;
- (b) approve pursuant to § 56-46.1 of the Code of Virginia the construction of the Partial Rebuild Project; and,
- (c) grant a certificate of public convenience and necessity for the Partial Rebuild Project under the Utility Facilities Act, § 56-265.1 *et seq.* of the Code of Virginia.

VIRGINIA ELECTRIC AND POWER COMPANY

By: /s/ Vishwa B. Link
Counsel for Applicant

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November 18, 2021

COMMONWEALTH OF VIRGINIA
BEFORE THE
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APPLICATION OF
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FOR APPROVAL AND CERTIFICATION
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500 kV Line #514 Partial Rebuild Project

Application No. 310

Appendix

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

Case No. PUR-2021-00276

Filed: November 18, 2021

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EXECUTIVE SUMMARY

In order to maintain the structural integrity and reliability of its transmission system in compliance with mandatory North American Reliability Corporation (“NERC”) Reliability Standards, Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”) proposes in Loudoun County, Virginia, the following (collectively, the “Partial Rebuild Project”):

- (i) Rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-Goose Creek Line #514 from existing Structure #514/1854, which is not being replaced, located two spans outside of the Company’s existing Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border.¹ Specifically, replace 12 single circuit 500 kV weathering steel lattice towers and 1 single circuit 500 kV galvanized H-frame structure supporting the existing Line #514 with 13 single circuit 500 kV chemically dilled, galvanized steel lattice towers, and the existing 3-phase twin-bundled 2049.5 AAAC conductors with 3-phase triple-bundled 1351.5 ACSR conductors; and
- (ii) Perform related work at the Company’s existing Goose Creek Switching Station to support the new line rating for rebuilt Line #514.

The Company has developed a proactive plan to rebuild transmission lines that are comprised of weathering steel towers (COR-TEN^{®2}). The proposed Partial Rebuild Project will replace aging infrastructure that is at the end of its service life in order to comply with Dominion Energy Virginia’s electric transmission planning criteria (the “Planning Criteria”), thereby enabling the Company to maintain the overall long-term reliability of its transmission system. Specifically, an approximately 2.8-mile section of Line #514 has been identified for rebuild as part of the Partial Rebuild Project. This 2.8-mile section of Line #514 was constructed in 1966 primarily on COR-TEN[®] steel lattice towers. These COR-TEN[®] towers have been identified for rebuild based on the Company’s assessment in accordance with the Company’s mandatory Planning Criteria. The Company hired a third-party company, Quanta Technology, LLC (“Quanta”), to evaluate the condition of its COR-TEN towers on Line #514. In its June 1, 2020 report entitled “Doubs-Goose Creek 500-kV Health Assessment Project” (the “Doubs-Goose Creek Report”), Quanta confirmed

¹ The existing overhead 500 kV Doubs-Goose Creek Line #514 extends a total of approximately 18.4 miles between the Company’s existing Goose Creek Substation in Loudoun County, Virginia, to the Potomac Edison Company’s (“Potomac Edison”) existing Doubs Substation in Frederick County, Maryland. Specifically, the Company’s portion of Line #514 extends approximately 3.1 miles from its Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border, with approximately 2.8 miles proposed for rebuild between Structure #514/1854 and Structure #514/1841 as part of the proposed Partial Rebuild Project. Potomac Edison’s portion of Line #514 extends approximately 15.3 miles from the Virginia-Maryland border to Potomac Edison’s Doubs Substation located in Frederick County, Maryland (“Potomac Edison’s Line #514 Rebuild”). For purposes of this Application filing, the Company is seeking Virginia State Corporation Commission (“Commission”) approval of the Partial Rebuild Project as described herein, with a targeted in-service date of June 1, 2024. Potomac Edison is separately seeking Maryland Public Service Commission approval to rebuild its approximately 15.3-mile portion of Line #514 located in Maryland, with a targeted in-service date of June 2025. *See In the Matter of the Application of The Potomac Edison Company for a Certificate of Public Convenience and Necessity (“CPCN”) to Rebuild the Doubs-Goose Creek 500 kV Transmission Line in Frederick and Montgomery Counties, Maryland*, Case No. 9669, Application (Aug. 3, 2021) at the following link: https://webapp.psc.state.md.us/newIntranet/casenum/CaseAction_new.cfm?CaseNumber=9669.

² Registered trademark of the United States Steel Corporation.

the need to rebuild the Line #514 COR-TEN[®] towers, including those identified as part of the Partial Rebuild Project. As Line #514 was constructed in 1966, its structures are currently 55 years old—approaching their expected life span—and therefore have been identified for rebuild based on the Company’s end-of-life criteria.

In summary, the proposed Partial Rebuild Project will replace aging infrastructure at the end of its service life in order to comply with the Company’s mandatory Planning Criteria, thereby enabling the Company to maintain the overall long-term reliability of its transmission system.

Because the existing right-of-way and Company-owned property is adequate to construct the proposed Partial Rebuild Project, no new right-of-way is necessary. Given the availability of existing right-of-way and the statutory preference given to the use of existing rights-of-way, and because additional costs and environmental impacts would be associated with the acquisition and construction of new right-of-way, the Company did not consider any alternate routes requiring new right-of-way for the Partial Rebuild Project.

The estimated conceptual cost of the proposed Partial Rebuild Project is approximately \$8.9 million, which includes approximately \$7.3 million for transmission-related work and approximately \$1.6 million for substation-related work (2021 dollars).

The desired in-service target date for the Partial Rebuild Project is June 1, 2024. The Company estimates that it will take approximately 20 months for detailed engineering, materials procurement, permitting, 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 September 30, 2022. Should the Commission issue a final order by September 30, 2022, the Company estimates that construction should begin by October 1, 2023, and be completed by June 1, 2024.³ This construction timeline will enable the Company to meet the targeted in-service date for the Partial Rebuild Project. This schedule is contingent upon obtaining the necessary permits. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process.

³ The transmission-related work described in Section II.B of this Appendix will be completed, and the approximately 2.8-mile rebuilt section of Line #514 will be energized by June 1, 2024. The substation-related work described in Section II.C of this Appendix, which is necessary to support the new line rating for rebuilt Line #514, will be completed upon energization of the Potomac Edison Line #514 Rebuild in June 2025. Until that time, the Company’s approximately 2.8-mile rebuilt section of Line #514 will be operated at its current line rating. *See supra* n. 1.

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 Partial Rebuild Project is necessary to rebuild approximately 2.8 miles of existing 500 kV Line #514, since it is nearing its end of life. See [Attachment I.A.1](#) for a Partial Rebuild 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”), and the regional transmission organization that provides service to a large portion of the eastern United States. PJM is currently 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 6, 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 July 20, 2020, the Company set a record high of 20,087 MW for summer peak demand. On February 20, 2015, the Company set a winter peak and all-time record demand of 21,651 MW. Based on the 2021 PJM Load Forecast, the Dominion Energy Zone is expected to grow with average growth rates of 0.5% summer and 0.9% winter over the next 10 years compared to the PJM average of 0.3% and 0.3% 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 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 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.⁴

Mandatory 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 an annual transmission planning process, approved by the FERC, which includes extensive analysis of the electric transmission system to determine any needed improvements.⁵ The PJM Board of Managers (the "PJM Board") approve projects prior to inclusion in the RTEP. 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.⁶ PJM's generation deliverability test for reliability analysis ensures the transmission system is capable of delivering the aggregate system generating capacity at peak load with all firm transmission service modeled. Generation deliverability is a critical system condition test that is part of the PJM reliability standards and, thus, also is required to be satisfied by NERC Reliability Standards.

The Company has developed a proactive plan to rebuild transmission towers that are comprised of COR-TEN[®] weathering steel. The proposed Partial Rebuild Project will replace aging infrastructure that is at the end of its service life in order to comply with the Company's mandatory Planning Criteria,⁷ thereby enabling the Company to maintain the overall long-term reliability of its transmission system.

⁴ This NERC requirement, FAC-001-3 - Facility Interconnection Requirements, can be found at <https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/global/facility-connection-requirements.pdf?la=en&rev=ff8198e6b20a4688a13b2b7777ccb4f5> (effective April 1, 2021).

⁵ PJM Manual 14B focuses on the RTEP process and can be found at <https://www.pjm.com/-/media/documents/manuals/m14b.ashx>.

⁶ See PJM Manual 14B, Attachment D: PJM Reliability Planning Criteria.

⁷ The Company's Transmission Planning Criteria (effective April 1, 2021) can be found in Attachment 1 of the Company's Facility Interconnection Requirements document, which is available online at <https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/virginia/parallel-generation/facility-connection-requirements.pdf?la=en&rev=f280781e90cf47f69ea526c944c9c347&hash=82DD2567D0B033C47536134B8C4D5C5E>. The Company's Planning Criteria regarding infrastructure to be evaluated under end-of-life ("EOL") criteria was updated effective March 24, 2020. However, the process for determining that an asset has reached its EOL remains the same; therefore, the Company continues to use the criteria evaluation process outlined in Section C.2.9 of the Planning Criteria. See <http://www.pjm.com/-/media/committees-groups/committees/srrtep-s/2020/20200616/20200616-dominion-local-planning-assumptions-2020.ashx>.

Specifically, an approximately 2.8-mile section of Line #514 has been identified for rebuild as part of the Partial Rebuild Project. This 2.8-mile section of Line #514 was constructed in 1966 primarily on COR-TEN® steel lattice towers. These COR-TEN® towers have been identified for rebuild based on the Company's assessment in accordance with the Company's mandatory Planning Criteria. The Company hired a third-party company, Quanta, to evaluate the condition of its COR-TEN towers on Line #514. In its Doubs-Goose Creek Report, Quanta confirmed the need to rebuild the Line #514 COR-TEN® towers, including those identified as part of the Partial Rebuild Project. As Line #514 was constructed in 1966, its structures are currently 55 years old—approaching their expected life span—and therefore have been identified for rebuild based on the Company's end-of-life criteria.

Section C.2.9 of the Company's Planning Criteria addresses electric transmission infrastructure approaching its end of life:⁸

Electric transmission infrastructure reaches its end of life as a result of many factors. Some factors such as extreme weather and environmental conditions can shorten infrastructure life, while others such as maintenance activities can lengthen its life. Once end of life is recognized, in order to ensure continued reliability of the transmission grid, a decision must be made regarding the best way to address this end-of-life asset.

For this criterion, "end of life" is defined as the point at which infrastructure is at risk of failure, and continued maintenance and/or refurbishment of the infrastructure is no longer a valid option to extend the life of the facilities consistent with Good Utility Practice and Dominion Energy Transmission Planning Criteria. The infrastructure to be evaluated under this end-of-life criteria are all regional transmission lines operated at 500 kV and above.

The decision point of this criterion is based on satisfying two metrics:

- 1) Facility is nearing, or has already passed, its end of life, and*
- 2) Continued operation risks negatively impacting reliability of the transmission system.*

For facilities that satisfy both of these metrics, this criterion mandates either replacing these facilities with in-kind infrastructure that meets current Dominion Energy standards or employing an alternative solution to ensure the Dominion Energy transmission system satisfies all applicable reliability criteria.

⁸ See *supra* n. 7.

Dominion Energy will determine whether the two metrics are satisfied based on the following assessment:

1. End of Life

Factors that support a determination that a facility has reached its end of life include, but are not limited to,

- **Condition** of the facility, taking into consideration:
 - Industry recommendations on service life for the particular type of facility
 - The facility's performance history
 - Documented evidence indicating that the facility has reached the end of its useful life
 - The facility's maintenance and expense history
- **Third-party assessment** – While not required, Dominion Energy has the option of seeking a third-party assessment of a facility to determine if industry specialists agree the facility has reached the end of its useful service life.

2. Reliability and System Impact

The reliability impact of continued operation of a facility will be determined based on a planning power flow assessment and operational performance considerations. The end-of-life determination for a facility to be tested for reliability impact will be assessed by evaluating the impact on short- and long-term reliability with and without the facility in service in the power flow model. The existing system with the facility removed will become the base case system for which all reliability tests will be performed.

The primary four (4) reliability tests to be considered are:

1. NERC Reliability Standards
2. PJM Planning Criteria – As documented in PJM Manual 14B – PJM Region Transmission Planning Process
3. Dominion Energy Transmission Planning Criteria contained in this document
4. Operational Performance – This test will be based on input from PJM and/or Dominion Energy System Operations as to the impact on reliably operating the system without the facility.

Additional factors to be evaluated under system impact may include but not be limited to:

1. Market efficiency
2. Stage 1A [Auction Revenue Rights] sufficiency
3. Public policy
4. [SERC Reliability Corporation] reliability criteria.

Failure of any of these reliability tests, along with the end-of-life assessment discussed herein, will indicate a violation of the End-of-Life Criteria and necessitate replacement as mandated earlier in this document.

The Company submitted the Partial Rebuild Project proposal to the PJM RTEP process as part of PJM's 2020 Open Window Analysis to address the end-of-life criteria. Attachment I.A.2 contains the relevant slides from the October 6, 2020 PJM Transmission Expansion Advisory Committee ("TEAC") meeting. The Company's proposed Partial Rebuild Project was approved by PJM at its December 2020 Board Meeting and assigned a baseline number (b3247). Although PJM recommended an in-service date of June 1, 2025, the in-service date for the proposed Partial Rebuild Project is June 1, 2024, based on outage scheduling.⁹

1) Facility is nearing, or has already passed, its end of life

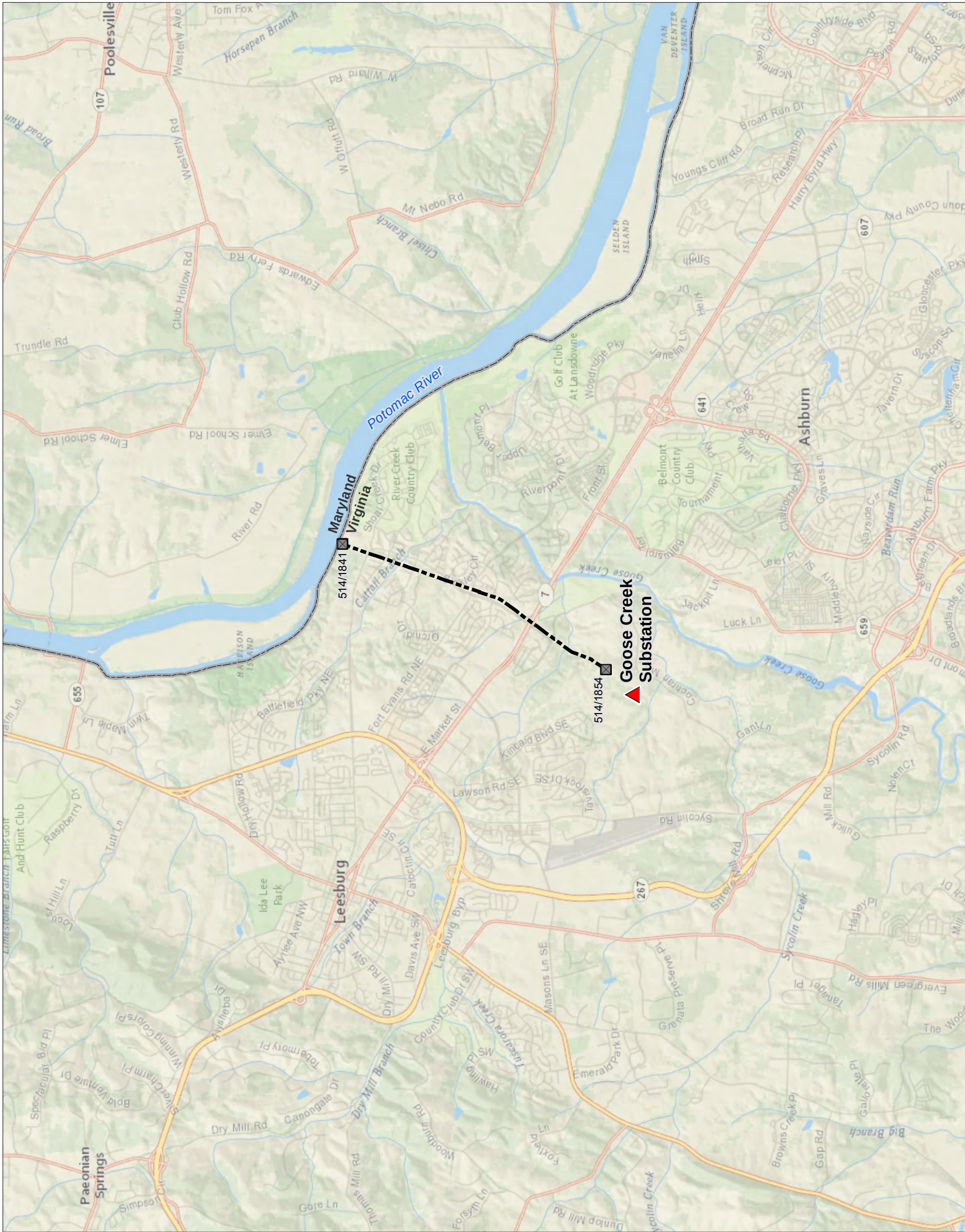
Regarding to the first metric of the Company's Planning Criteria addressing end of life, the structures supporting the approximately 2.8-mile section of Line #514 proposed for rebuild are primarily single circuit 500 kV COR-TEN[®] lattice towers that were erected in 1966. COR-TEN[®] steel is now known to be problematic when used for lattice-type structures. Utility companies have been monitoring the material since the 1970s, and the problems are well documented. As noted in Quanta's Doubs-Goose Creek Report, the weathering steel lattice towers supporting Line #514 have design features that enable significant deterioration in the connections of these towers.

2) Continued operation risks negatively impacting reliability of the transmission system

PJM presented at its October 6, 2020 TEAC Meeting based on Metric #1 (Facility is already nearing, or has already passed, its useful life) that, if Line #514 were removed from service and not replaced with rebuilt a 500 kV line, it would negatively impact the operation of the transmission system since a third-party assessment had determined the towers were at the end of their useful life and therefore subject to failure. Accordingly, PJM did not require any additional reliability studies in support of the need for the proposed Partial Rebuild Project.

⁹ See, *supra* n. 1 and 3.

In summary, the proposed Partial Rebuild Project will replace aging infrastructure that is at the end of its service life in order to comply with the Company's mandatory Planning Criteria, thereby enabling the Company to maintain the overall long-term reliability of its transmission system and its interconnection with neighboring utilities.





Reliability Analysis Update

Aaron Berner, Manager

Transmission Expansion Advisory Committee
October 6, 2020

Recommended Solution Baseline Reliability Projects

Dominion Transmission Zone: Baseline 500kV Line #514 Rebuild (End of Life Criteria)

Process Stage: Second Review

Criteria: Dominion's FERC 715 Planning Criteria (C.2.9 – End of Life Criteria)

Assumption Reference: FERC 715 Planning Criteria

Model Used for Analysis: 2020 Series 2025 RTEP

Problem Statement:

- The Doubs(FE) - Goose Creek(DEV) 500kV transmission Line #514 is an approximately 18-mile long line(3-miles is DEV owned) primarily constructed on weathering (COR-TEN®) steel lattice structures.
- Third party assessment has determined that the towers have corroded to a point where they exhibit pre-mature thinning of structure members and packout at joints. If left unaddressed these issues could result in failure of structures and potentially the collapse for the line. (DOM-O5)

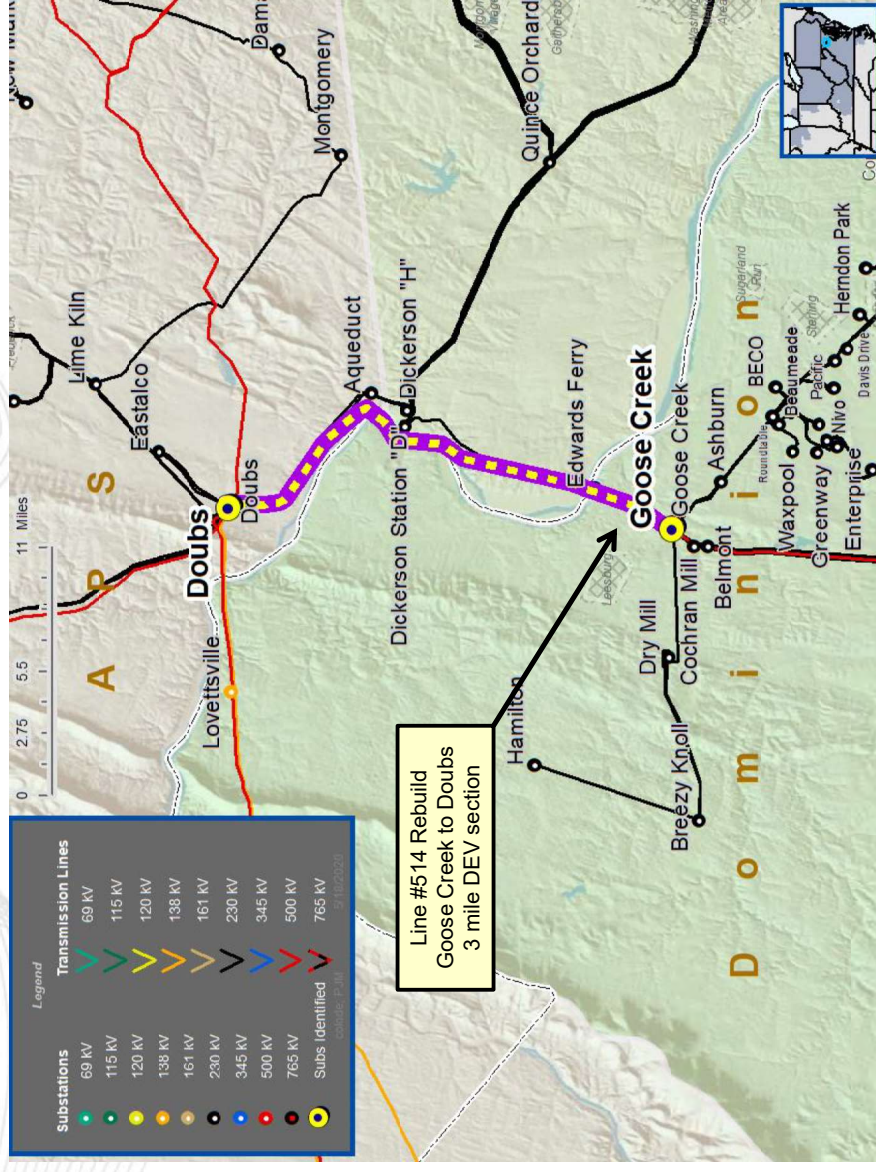
Existing Facility Rating: 2323/2323/2671 MVA

Proposed Facility Rating: 4330/4330/4979 MVA Summer

4980/5023/5928 MVA Winter

Note: The End of Life issue identified for Line #514 is linked to the M-3 need identified as APS-2020-011

Continued on next slide....



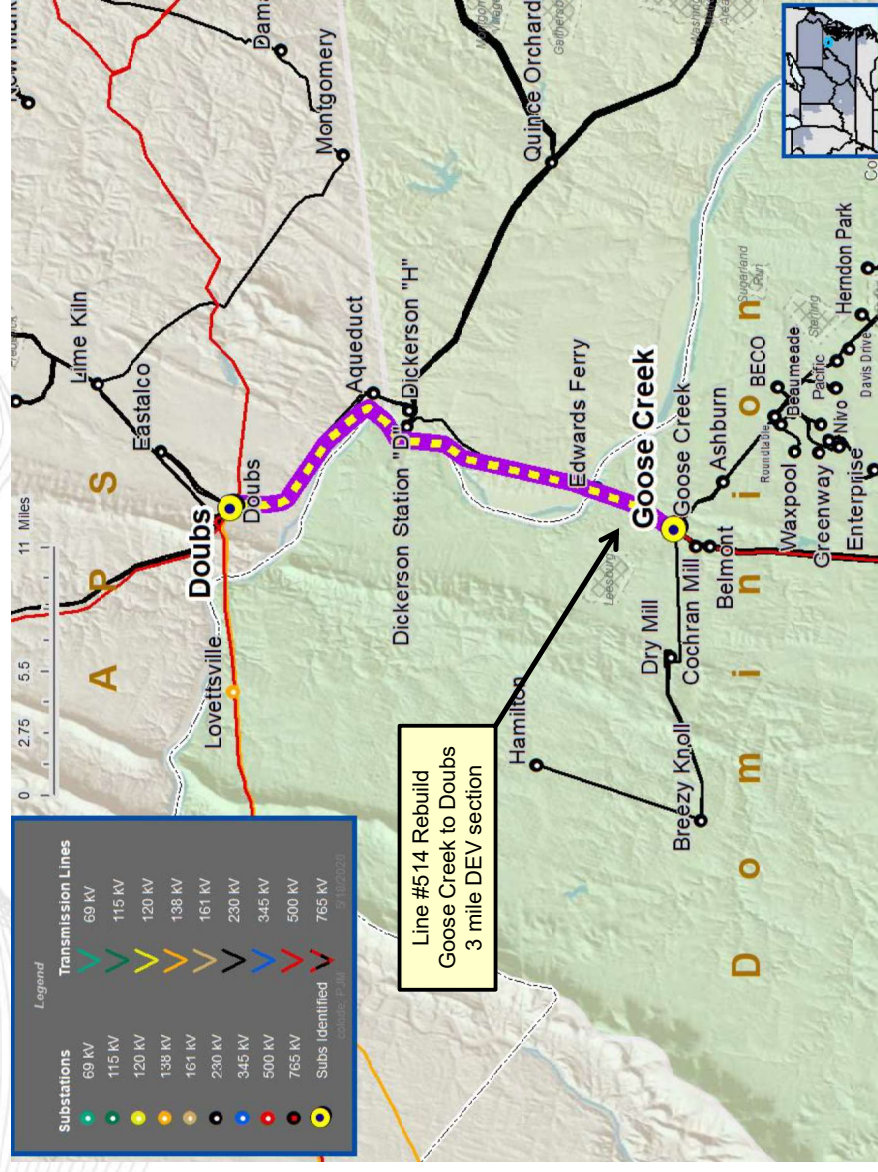
Dominion Transmission Zone: Baseline 500kV Line #514 Rebuild (End of Life Criteria)

Recommended Solution:

Proposal 2020-W2-441: DEV's portion of Line #514 consists of 16 structures and 3 of these structures were replaced in 2014 with galvanized structures. Replace the remaining 13 COR-TEN® towers with galvanized steel towers. Reconduct 3 mile section with 3-1351.5 ACSR 45/7. Upgrade line terminal equipment at Goose Creek substation to support the Line #514 rebuild. (b3247)

- **Estimated Cost:** \$7.6M

Required In-Service: 6/1/2025



I. NECESSITY FOR THE PROPOSED PROJECT

- B. [1] 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.). [2] 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. [3] 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. [4] Provide a list of those facilities that are not yet in service.**

Response: [1] For a detailed description of the engineering justification of the proposed Partial Rebuild Project, see Section I.A.

[2] Not applicable.

[3] See Section I.A.

[4] Not applicable.

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 Partial Rebuild Project. The existing Line #514 is part of the Company's 500 kV system, which supports the transfer of bulk power from generating resources to major load centers and is a tie line between the Dominion Energy Virginia and Potomac Edison transmission systems.¹⁰

The tables in Attachment I.C.1 provide 10 years of historical summer and winter loads for the Dominion Energy Virginia system and 10 years of projected summer and winter peak loads for the Dominion Energy Virginia system.

The existing Line #514 cannot continue to adequately serve the needs of the Company and its customers due to aging infrastructure, as discussed in Section I.A. The Company has created a plan to address its end-of-life facilities, setting target completion dates for end-of-life projects based on the condition of the facilities, the Company's resources, and the need to schedule outages. The in-service date for the proposed Partial Rebuild Project (June 1, 2024) also supports the conclusions reflected in Quanta's Doubs-Goose Creek Report balanced against the timeline for permitting, construction, and obtaining necessary outages.

Completing the proposed Partial Rebuild Project will support Dominion Energy Virginia's continued reliable electric service to retail and wholesale customers and will support the future overall growth and system generation capability in the area. See Section I.A.

¹⁰ See *supra* n. 1.

ATTACHMENT I.C.1

Historical Loads (MW)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dominion Zone - Summer	19,249	18,763	18,692	18,980	19,538	18,902	18,924	19,607	20,087	20,406
Growth (%)		(2.52%)	(0.38%)	1.54%	2.94%	(3.25%)	0.1%	3.6%	2.4%	1.6%
Date	6/29/2012	7/18/2013	7/02/2014	6/23/2015	7/25/2016	7/14/2017	08/29/2018	07/20/2019	07/20/2020	08/12/2021
Dominion Zone - Winter	16,881	17,623	19,785	21,651	18,948	19,661	21,232	19,930	17,544	17,869
Growth (%)		4.39%	12.27%	9.43%	(12.48)%	3.76%	8.0%	(6.1%)	(12.0%)	1.8%
Date	1/4/2012	1/23/2013	1/30/2014	2/20/2015	1/19/2016	1/9/2017	1/7/2018	1/31/2019	1/21/2020	1/29/2021

Projected Loads (MW)*

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Dominion Zone - Summer	20,248	20,491	20,694	20,902	20,962	21,034	21,109	21,154	21,194	21,269
Growth (%)		1.2%	1.0%	1.0%	0.3%	0.3%	0.4%	0.2%	0.2%	0.4%
Dominion Zone - Winter	20,499	20,663	20,896	21,113	21,332	21,526	21,720	21,910	22,079	22,269
Growth (%)		0.8.%	1.1%	1.0%	1.0%	0.9%	0.9%	0.9%	0.8%	0.9%

* PJM 2021 Load Forecast (includes losses)

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: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: No feasible alternatives have been submitted to PJM since the driver of the Partial Rebuild Project is the need to replace aging infrastructure at the end of its service life in compliance with the Company's mandatory Planning Criteria. See Section I.A. Alternatives that would require acquisitions of new right-of-way or new lines to be built were not considered because the existing corridor is adequate to construct the proposed Partial Rebuild Project. PJM did not require the Company to consider alternatives that would require new right-of-way to be built. See Attachment I.A.2.

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 Partial Rebuild Project based on aging infrastructure that is at the end of its service life to maintain the overall long-term reliability of its transmission system and to resolve potential violations of Dominion Energy Virginia's Planning Criteria.¹¹ Notwithstanding, when performing an analysis based on PJM's 50/50 load forecast, there is no adjustment in load for DR programs that are bid into the PJM reliability pricing model ("RPM") auction 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 into PJM's RPM market is not a factor in this particular application because of the identified need for the Partial Rebuild Project. Based on these considerations, the evaluation of the Partial Rebuild Project demonstrated that despite accounting for DSM consistent with PJM's methods, the Partial Rebuild Project is necessary.

Incremental DSM also will not absolve the need for the Partial Rebuild Project. As reflected in Attachment I.C.1, the load area for this Partial Rebuild Project (historic and projected) ranges from 16,881 to 22,269 MW (summer and winter peak loads). By way of comparison, statewide, the Company achieved demand savings of 120.4 MW from its DSM Programs in 2020.

¹¹ 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: The proposed Partial Rebuild Project includes the removal of 12 single circuit 500 kV weathering steel lattice towers and 1 single circuit 500 kV galvanized H-frame structure supporting the existing Line #514. These structures will be preplaced with 13 single circuit 500 kV chemically dulled, galvanized steel lattice towers.

The existing Line #514 3-phase twin-bundled 2049.5 AAAC conductors will be replaced with 3-phase triple-bundled 1351.5 ACSR conductors. The existing Line #514 3-phase twin-bundled 2049.5 AAAC conductor has a normal/emergency transfer capability of 2324 MVA. The two 7#7 alumoweld shield wires will be replaced with two fiber optic shield wires.

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.**

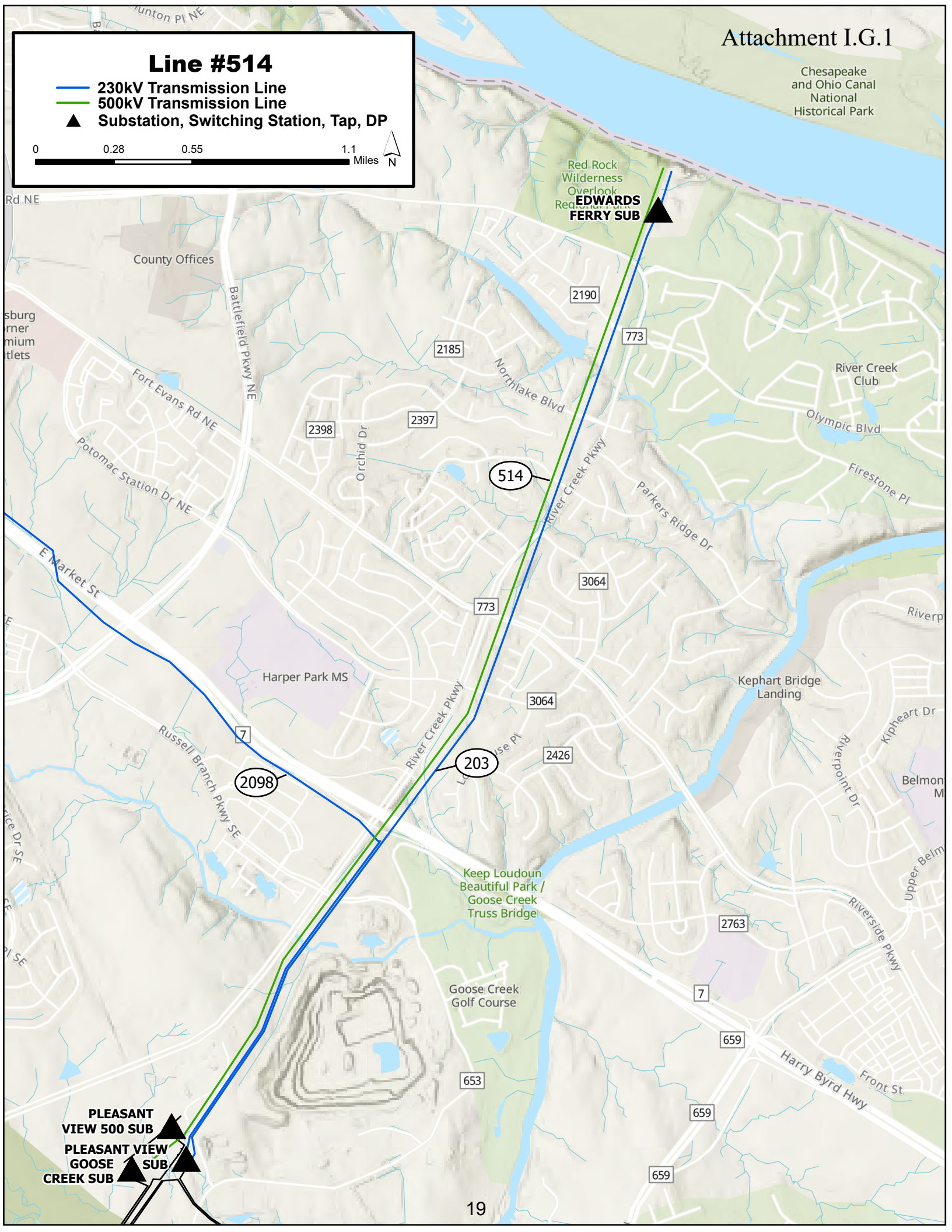
Response: See Attachment I.G.1.

Chesapeake
and Ohio Canal
National
Historical Park

Line #514

- 230kV Transmission Line
- 500kV Transmission Line
- ▲ Substation, Switching Station, Tap, DP

0 0.28 0.55 1.1 Miles



I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The desired in-service target date for the Partial Rebuild Project is June 1, 2024.

The Company estimates that it will take approximately 20 months for detailed engineering, materials procurement, permitting, 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 September 30, 2022. Should the Commission issue a final order by September 30, 2022, the Company estimates that construction should begin by October 1, 2023, and be completed by June 1, 2024.¹² This construction timeline will enable the Company to meet the targeted in-service date for the Partial Rebuild Project. This schedule is contingent upon obtaining the necessary permits. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process.

¹² See *supra* n. 1 and 3.

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 proposed Partial Rebuild Project is approximately \$8.9 million, which includes approximately \$7.3 million for transmission-related work and approximately \$1.6 million for substation-related work (2021 dollars).

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 proposed Partial Rebuild Project was approved by the PJM Board at its December 2020 meeting as a baseline project (b3247). See Section I.A. The Partial Rebuild Project is presently allocated 100% to the Dom Zone. On August 3, 2018, however, the U.S. Court of Appeals for the District of Columbia held that FERC's approval of PJM's cost allocation method as applied to two other 500 kV rebuild projects, which are similar to the proposed Partial Rebuild Project, was arbitrary and capricious. Specifically, the decision set aside the two FERC orders that approved PJM's cost allocation method and remanded them to FERC for further proceedings. Since PJM's current cost allocation for the proposed Partial Rebuild Project was based on this now set aside allocation method, the Company would expect that the cost allocation for the proposed Partial Rebuild Project likely will change.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: Not applicable.

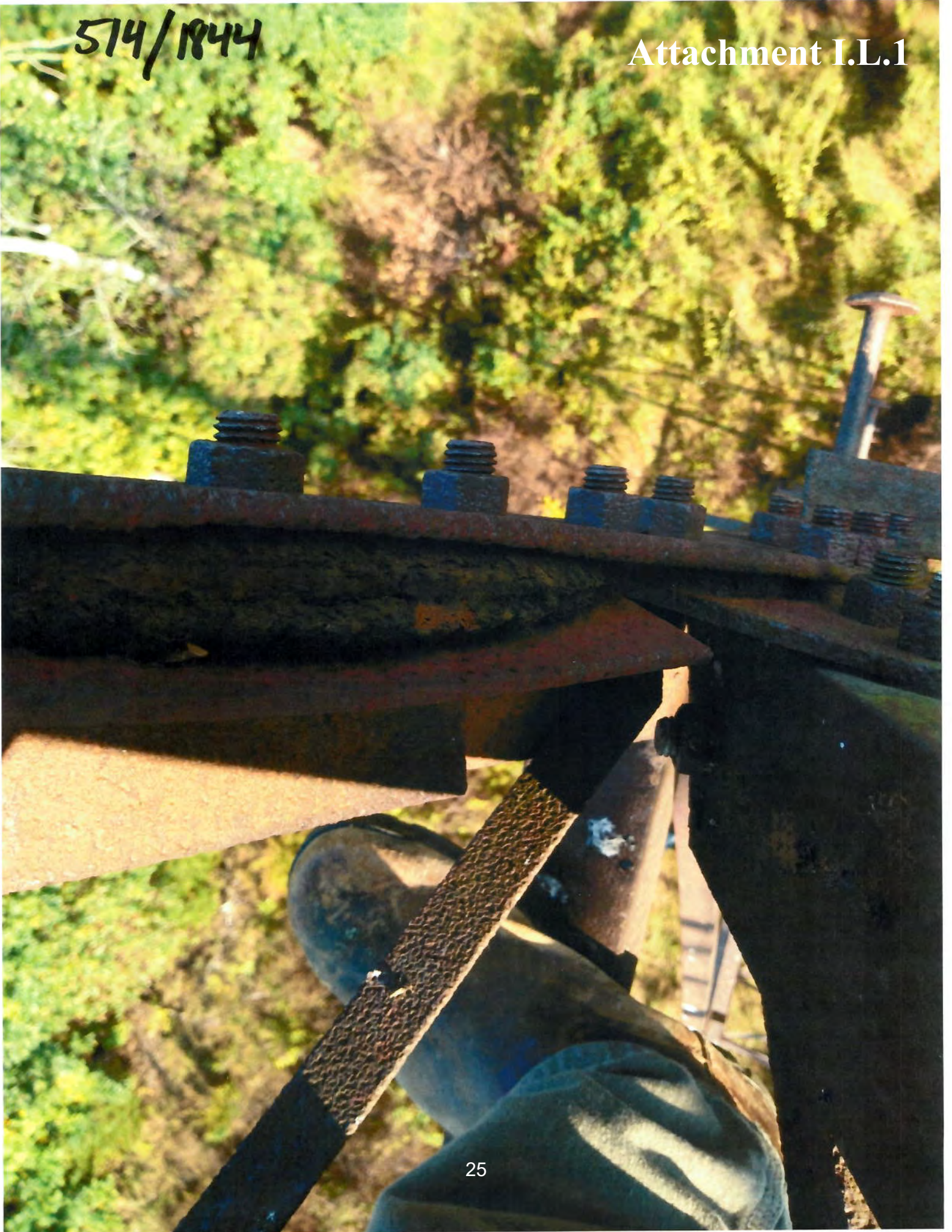
I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: See Attachment I.L.1 for pictures of the deterioration of structures on the approximately 2.8-mile section of Line #514 proposed for rebuild. Quanta's Doubs-Goose Creek Report, discussed in Section I.A, details the condition of these deteriorating structures. See also Attachment I.L.2 for maintenance history of Line #514, including outstanding notifications, completed notifications, and general maintenance history of Line #514.

514/1844

Attachment I.L.1



514/1844



514/1844



514/1844



514/1844



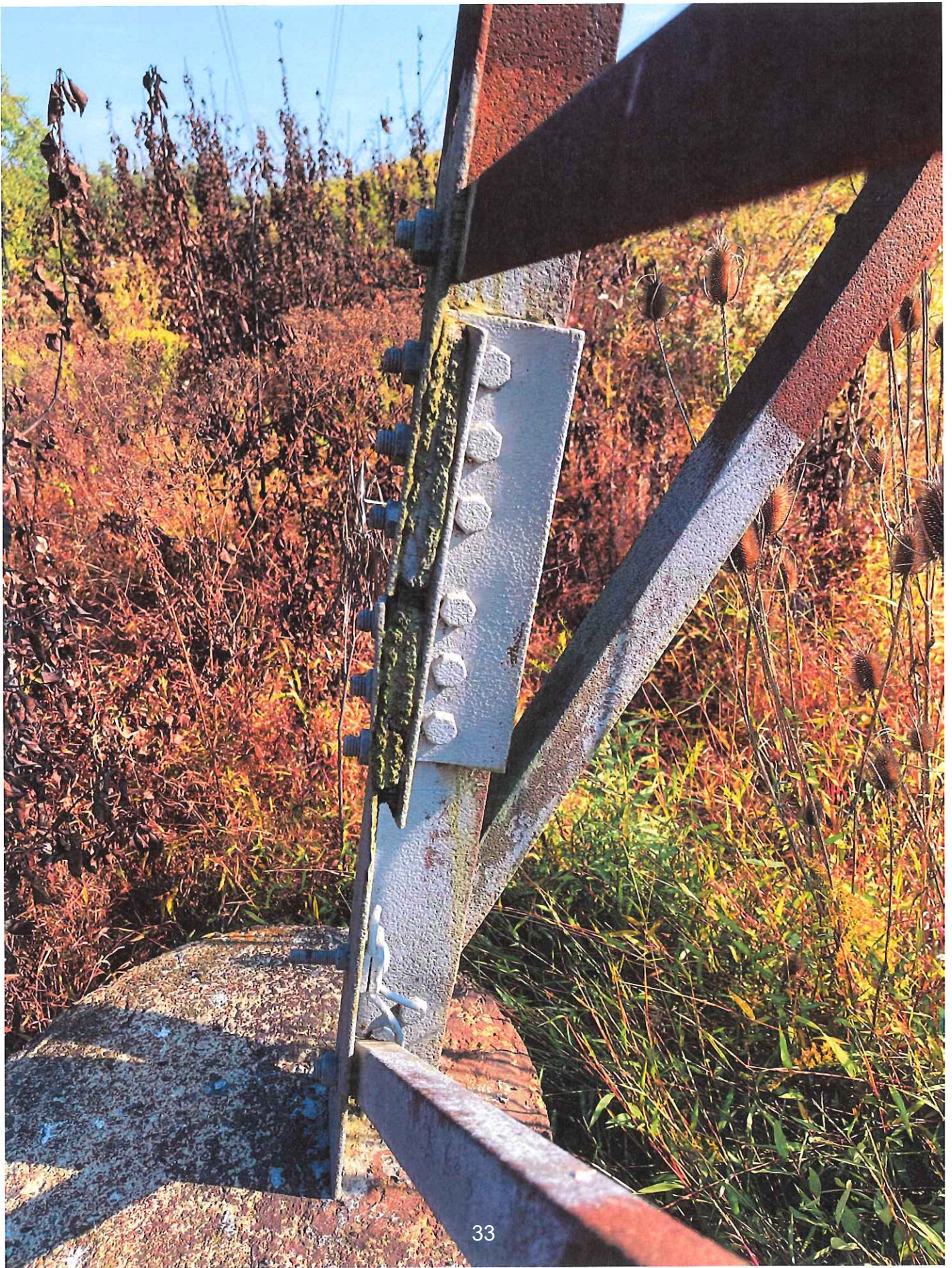
514/1845

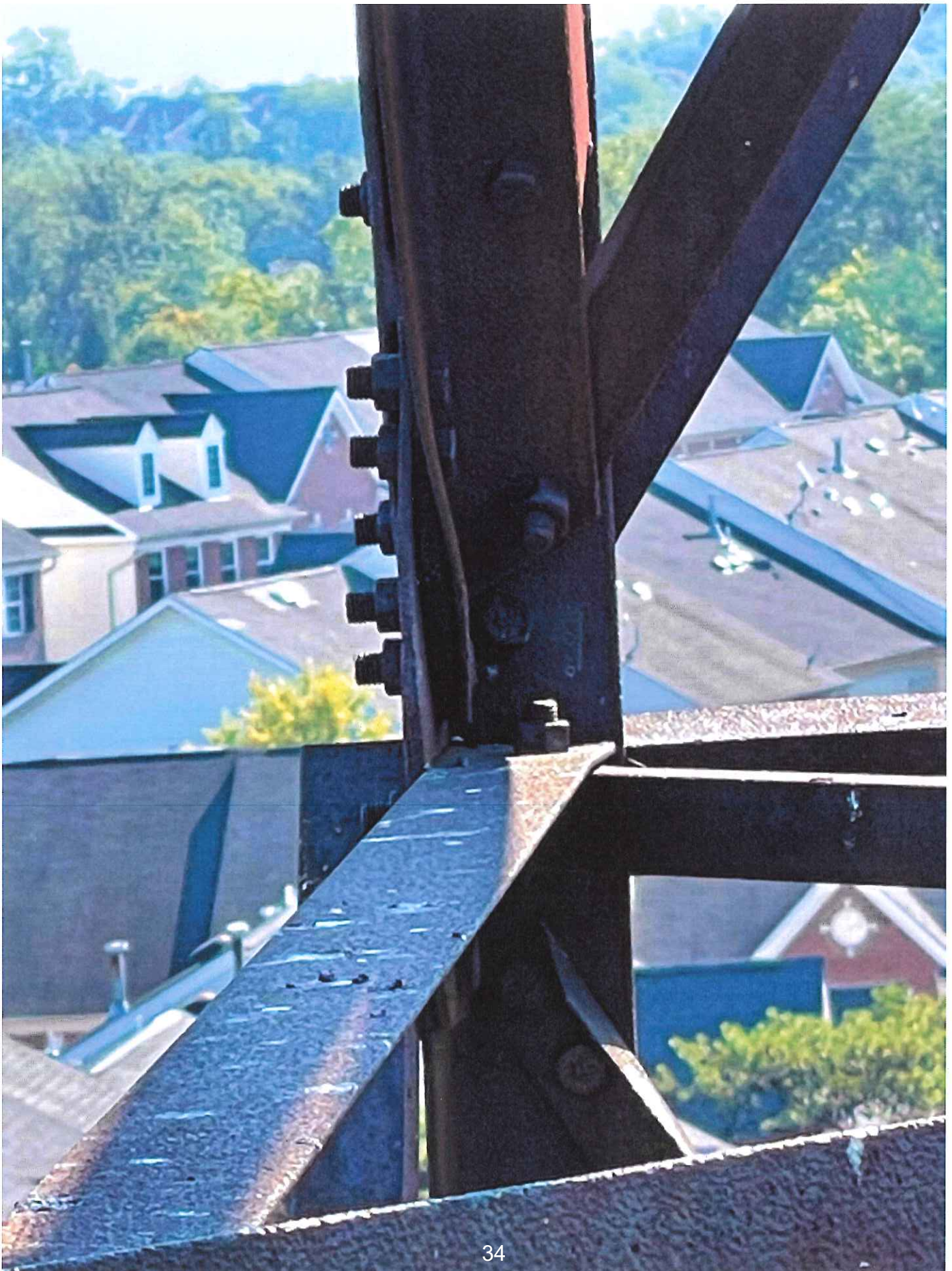


514/1845

514/1845





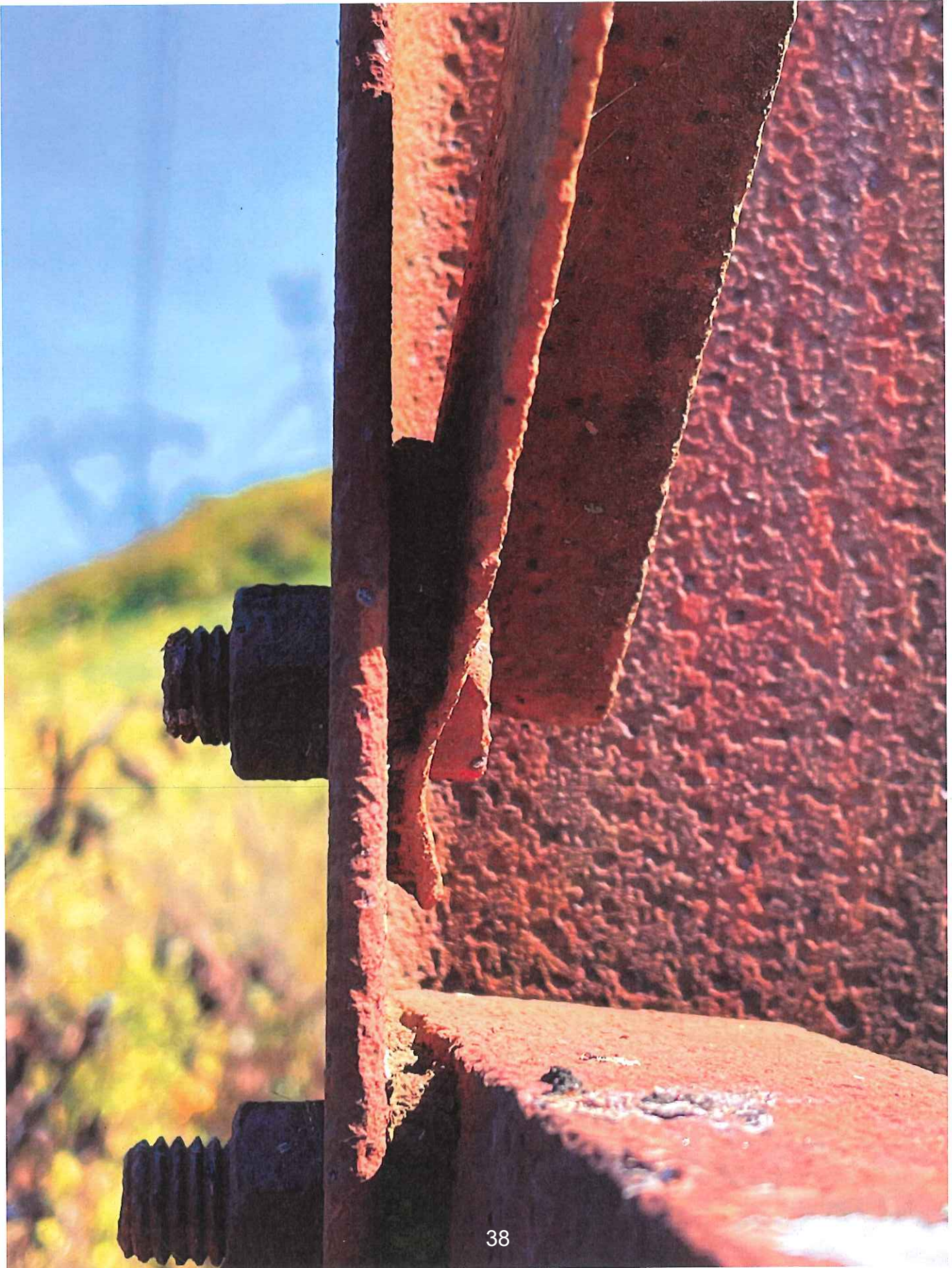


514/1847



574/1849





OUTSTANDING NOTIFICATIONS - LINE #514						
LINE/STR	CAUSE GROUP	CAUSE CODE	CAUSE TEXT	NOTIF - DATE	REPORTED BY	Notification
514/1841	Packout- >3/4"- Leg Splice	Structure		10/18/2018	GARY040	
514/1842	Packout- >3/4"- other loc	Structure	Other splice plates	10/18/2018	GARY040	11886363
	Damper(s)-L=Loose, M=Missing	Conductor	Concrete	10/15/2019	TROY002	12103508
514/1842	Corona-Punct N=Noisy,VV= Ver V	Insulator Conductor	Mid & outside cut	10/15/2019	TROY002	12103509
514/1842	DO NOT USE -17-Packout- >3/4"- Location=	Structure	Splice plates at legs...1st and 2nd walk	10/15/2019	TROY002	12103510
514/1849	Cond Insulator- Other=	Insulator Conductor	corona insp showed uv at middle ph	10/21/2019	HELOAIR	12107163

COMPLETED NOTIFICATIONS - LINE #514						
LINE/STR	CAUSE GROUP	CAUSE CODE	CAUSE TEXT	NOTIF. DATE	REPORTED BY	NOTIFICATION
514/1842	Str Number-M=Missing,F=Faded,A=Aerial	Structure	Faded	4/9/2020	CHAR454	12225762
514/1847	Corona-Punct N=Noisy,VV= Ver V	Insulator Conductor	N - Cutting	4/10/2017	WARRENTON	11630218
	Wire Position L,M,R,T,B	Insulator Conductor	M	4/10/2017	WARRENTON	
514/1847	Corona-Punct N=Noisy,VV= Ver V	Insulator Conductor	N	4/6/2017		11629468
514/1853	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621970
514/1852	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621969
514/1851	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621968
514/1850	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621967
514/1849	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621966
514/1848	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621965
514/1847	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621964
514/1846	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621963
514/1845	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621902
514/1844	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621901
514/1843	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621900
514/1842	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621899
514/1841	Needs Anti-Corrosive Treatment	Anchor		3/16/2017	ARKELO1	11621898
514/1847	Cond Insulator- Other=	Insulator Conductor	Right insulator cap heavy corrosion/rust	8/18/2015	HAVERFIELD	11433116
	Wire Position L,M,R,T,B	Insulator Conductor	M	8/18/2015	HAVERFIELD	
514/1846	Corona-Punct N=Noisy,VV= Ver V	Insulator Conductor	N	11/30/2015		11428145
514/1850	Pole Other=	Steel Pole	balloons at top	10/16/2014		11242464
514/1845	Leg Number= 1,2,3,or4	Structure	f	9/27/2012	CHAR454	10936364
514/1853	Encroachment - Other	Encroachment	Problem Found 04/23/2010	11/3/2010	CBH	10675488
514/1846				6/21/2010	MASTEC	10645961
514/1846	Base Shoe - Corroded-Thin / Necking	Structure - Base Shoe		6/21/2010	MASTEC	10645960
514/1846	Numbers - Faded	Structure - Numbers		6/21/2010	MASTEC	10645959
514/1846	Steel - Excess Packout	Structure - Steel		6/21/2010	MASTEC	10645958
514/1842			Middle phase, west string	5/18/2009	CBH	10494024
514/1845	ATV	Equipment Needed for Repair		2/17/2009	ALAN006	10466562
	Aerial Number Missing	Structure - Numbers	COMP FLIGHT, Found 5/18/09	2/17/2009	ALAN006	
	Aerial Number Missing	Structure - Numbers	#8 missing off aerial plate (1845)	2/17/2009	ALAN006	
514/1851	Work as a result of a PM Order	Work found during a routine PM	66667451	2/1/2007	WILL165	10293057
	Left	Phase Position	corona cut bells	2/1/2007	WILL165	
			buzzing loudly	2/1/2007	WILL165	
	Power Wagon	Equipment Needed for Repair		2/1/2007	WILL165	
	ATV	Equipment Needed for Repair		2/1/2007	WILL165	
514/1849	Middle	Phase Position	corona cut bells	2/17/2009	ALAN006	10293056
			buzzing loudly - 02/01/2007 will165	2/17/2009	ALAN006	
			cut bells 02/17/09 alan006	2/17/2009	ALAN006	
	Power Wagon	Equipment Needed for Repair	bucket condor	2/17/2009	ALAN006	
	Work as a result of a PM Order	Work found during a routine PM	66667451	2/17/2009	ALAN006	
514/1847	Middle	Phase Position	corona cut bells	2/1/2007	WILL165	10293055
	ATV	Equipment Needed for Repair		2/1/2007	WILL165	
			buzzing loudly	2/1/2007	WILL165	
	Work as a result of a PM Order	Work found during a routine PM	66667451	2/1/2007	WILL165	
514/1846			buzzing loudly	2/1/2007	WILL165	10293054
	Middle	Phase Position	corona cut bells	2/1/2007	WILL165	
	Power Wagon	Equipment Needed for Repair		2/1/2007	WILL165	
	ATV	Equipment Needed for Repair	road xing	2/1/2007	WILL165	
	Work as a result of a PM Order	Work found during a routine PM	66667451	2/1/2007	WILL165	
514/1847	Encroachment - Ditching	Encroachment		1/25/1995		10126184
514/1846	Stub Angle - Needs Anti-Corrosive Trtmnt	Structure - Stub Angle		2/26/2001		10126183

MAINTENANCE HISTORY - LINE #514

01 DATE OF LAST ROUTINE AIR PATROL	LINE-514	20191003
02 DATE OF LAST COMPREHENSIVE AIR PATROL	LINE-514	20200217
04 DATE OF LAST ROUTINE LINE FOOT PATROL	LINE-514	20201006
05 DATE OF LAST ** EMERGENCY** LINE PATROL	LINE-514	20201027
06 DATE OF LAST ROUTINE VEGETATION PATROL	LINE-514	20210611
07 DATE OF LAST CLIMBING INSP	LINE-514	20201028
11 DATE OF LAST MAINTENANCE TREE WORK	LINE-514	20200211
12 DATE OF LAST HERBICIDE APP WORK	LINE-514	20181220
13 DATE OF LAST INSULATOR MAINTENANCE	LINE-514	20170914
14 DATE OF LAST TWR POLE CORTEN REHAB CREW WORK	LINE-514	20100324

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 total length of the existing transmission corridor containing the Partial Rebuild Project extends approximately 2.8 miles from Structure #514/1854¹³ located two spans outside of the Company’s Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border. The right-of-way is located within Loudoun County, Virginia.

The Partial Rebuild Project will be constructed entirely within existing transmission line right-of-way or on Company-owned property, with no additional right-of-way required. Because alternatives to the Partial Rebuild Project that would require acquisitions of new rights-of-way were not considered, no alternative routes are proposed. See Section II.A.9 for an explanation of the Company’s route selection.

¹³ The first new tower being rebuilt is Structure #514/1853, and the new conductor will start at the existing Structure #514/1854.

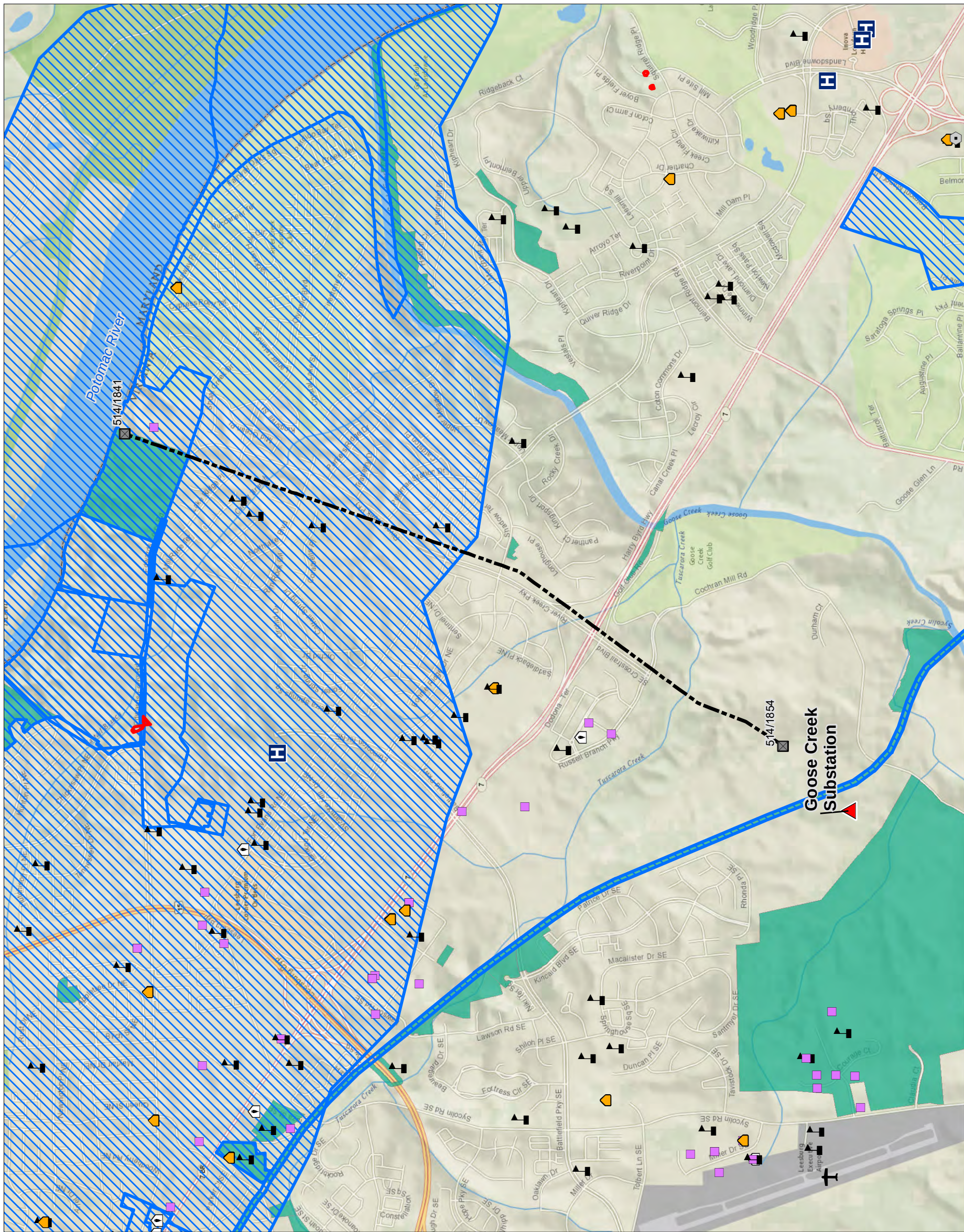
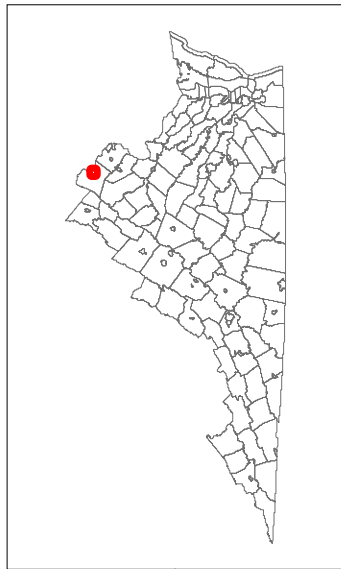
II. DESCRIPTION OF THE PROPOSED PROJECT

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. The approximately 2.8-mile section of existing Line #514 being rebuilt is located on single circuit structures that run parallel to 230 kV Dickerson-Pleasant View Line #203 within the existing transmission line right-of-way , as well as parallel to 230 kV Hamilton-Pleasant View Line #2098 for a portion of the corridor. No portion of the right-of-way is proposed to be quitclaimed or relinquished.

The Company will make the digital Geographic Information Systems (“GIS”) shape file available to interested persons upon request to counsel for the Company as listed in the Partial Rebuild Project Application.



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: Not applicable.

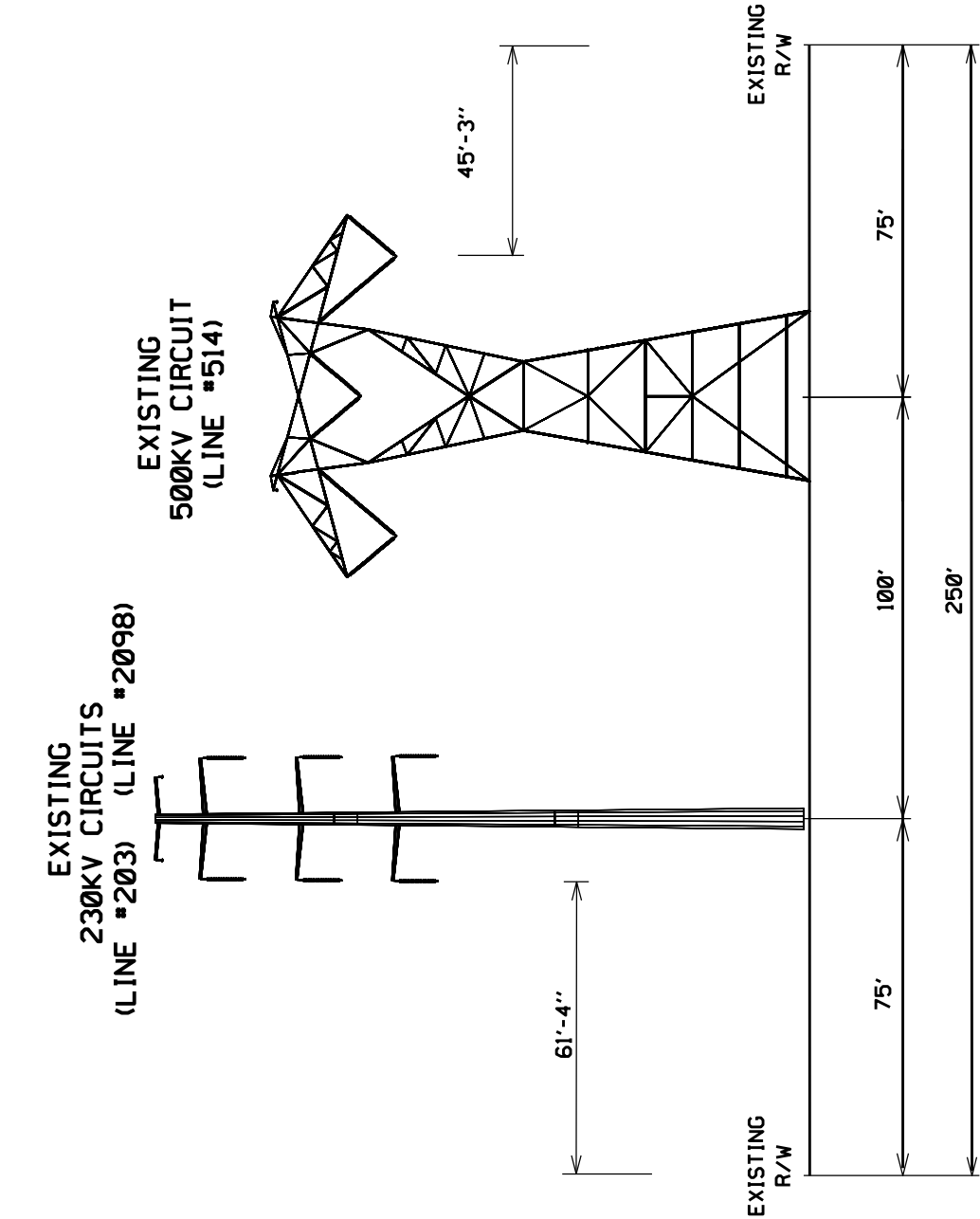
II. DESCRIPTION OF THE PROPOSED PROJECT

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 and II.A.5.b.

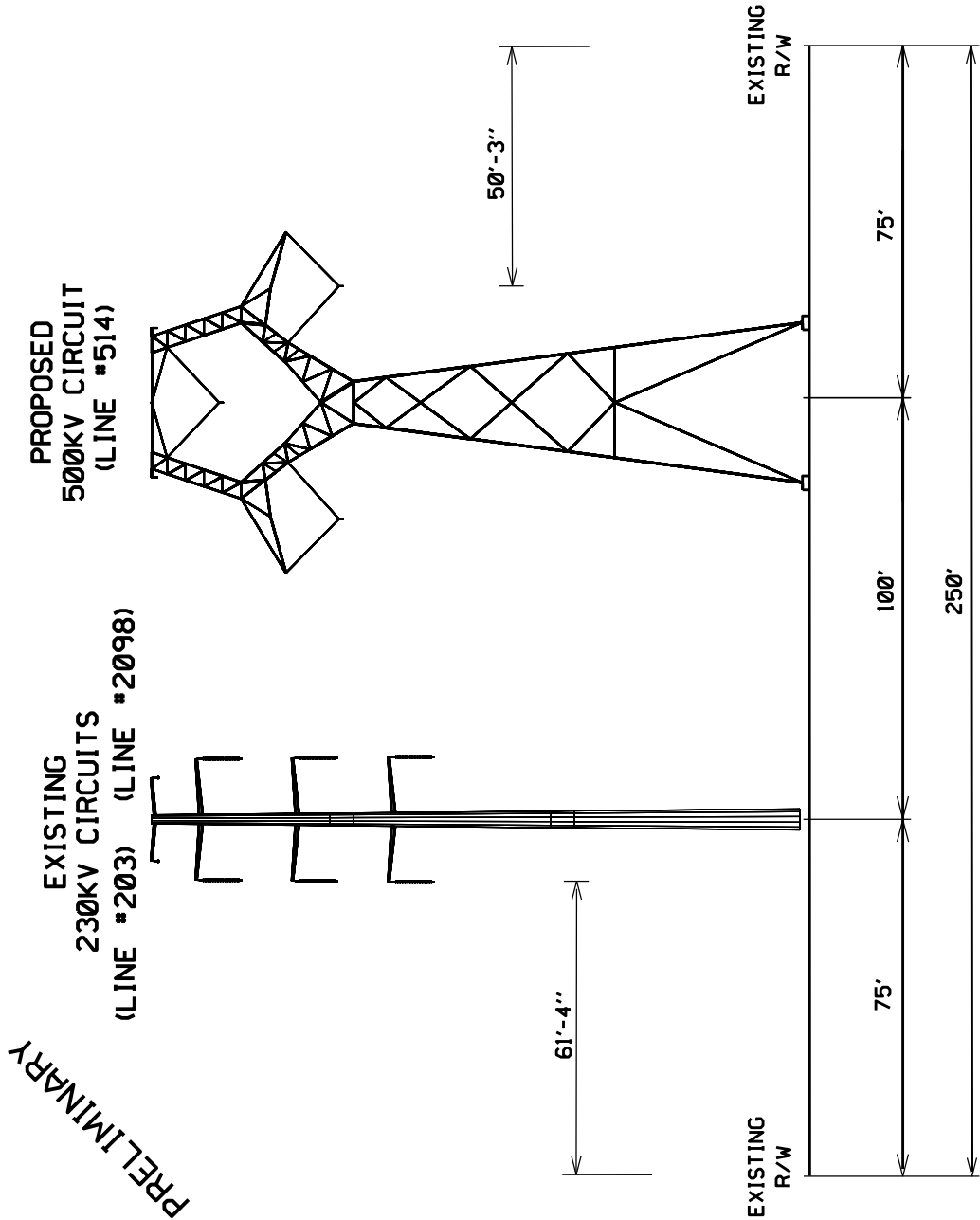
DOUBS - GOOSE CREEK STRUCTURES #514/1841 - #514/1853



EXISTING CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD GOOSE CREEK

- NOTE:
- 1.Existing structure shown with approximate average height of 112' and does not include foundation reveal.
 - 2.Approximate average height is measured from groundline at structure centerline.

DOUBS - GOOSE CREEK STRUCTURES #514/1841 - #514/1853



PROPOSED CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD GOOSE CREEK

- NOTE:
- 1.Proposed structure shown with approximate average height of 135' and does not include foundation reveal.
 - 2.Approximate average height is measured from groundline at structure centerline.
 - 3.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 2.8-mile Partial Rebuild Project is located within an existing transmission line corridor right-of-way currently containing the Doubs-Goose Creek 500 kV Line #514. The existing right-of-way for the 2.8-mile segment of Line #514 being rebuilt has a width of 250 feet, which includes structures supporting Lines #203 and #2098 at various points. The easements for this right-of-way were acquired in the 1960s. The new structures will be located entirely within the existing right-of-way. The Company does not anticipate that new easements will be required for this Partial Rebuild Project. See Attachment II.A.6 for a conservation easement map of the Partial Rebuild Project.

Figure No.
II.A.6
Title

Conservation Easement Map

Client/Project
Dominion Energy Virginia
500 kV Line # 514 Partial Rebuild Project
203401646

Project Location
Loudoun County, Virginia
Prepared by MGS on 2021-07-09
TR by TPS on 2021-09-03
R by CPQ on 2021-09-02

N

0

2,000

4,000

Feet
(At original document size of 11x17)
1:24,000

Substation

Beginning/Endpoint Structures

500 kV Line # 514 Partial Rebuild Project

Centerline

Loudoun County Easement

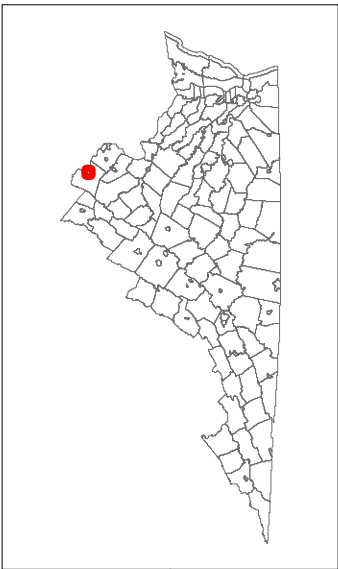
Northern Virginia Regional Park Authority Easement

Town of Leesburg Easement

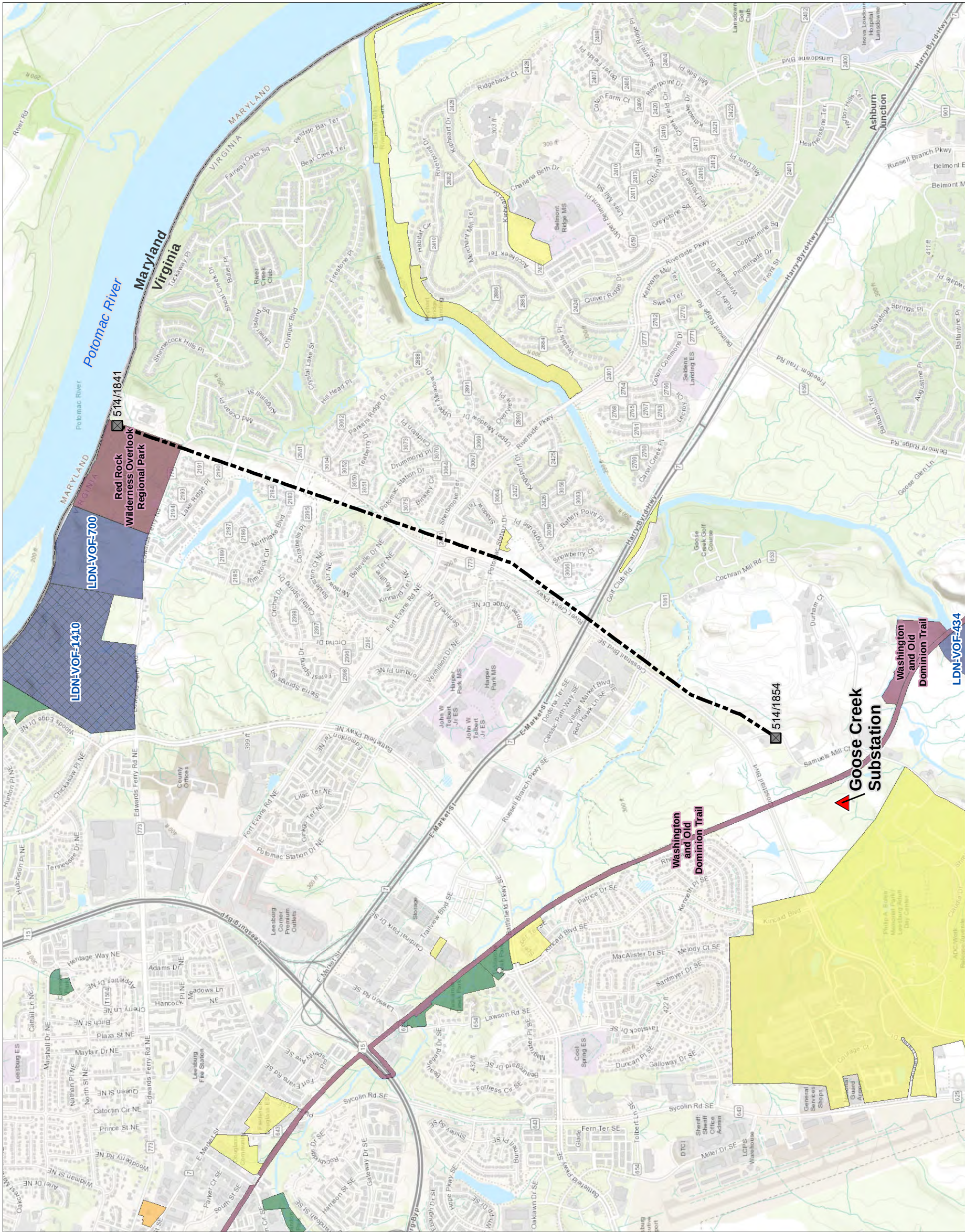
DHR Conservation Easement

Virginia Outdoors Foundation Easement

Loudoun County Easement



Notes
1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Data Sources: Dominion Energy Virginia, Stantec, PADUS, 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 width of the existing transmission line right-of-way for the approximately 2.8-mile Partial Rebuild Project, which has a width of 250 feet as shown in Attachments II.A.5.a-b, is currently maintained for operation of the existing transmission facilities. Trimming of tree limbs along the edge of the right-of-way may be conducted to support construction activities for the Partial Rebuild Project. For any such minimal clearing within the right-of-way, trees will be cut to no more than three inches above ground level. Trees located outside of the right-of-way that are tall enough to potentially impact the transmission facilities, commonly referred to as “danger trees,” may also need to be cut. Danger trees will be cut to be no more than three inches above ground level, limbed, and will remain where felled. Debris that is adjacent to homes will be disposed of by chipping or removal. In other areas, debris may be mulched or chipped as practicable. Danger tree removal will be accomplished by hand in wetland areas and within 100 feet of streams, if applicable. Care will be taken not to leave debris in streams or wetland areas. Matting will be used for heavy equipment in these areas. Erosion control devices will be used on an ongoing basis during all clearing and construction activities accompanied by weekly Virginia Stormwater Management Program inspections.

Erosion control will be maintained and temporary stabilization for all soil disturbing activities will be used until the right-of-way has been restored. Upon completion of the Partial Rebuild 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 (TE VEP 8000)* that was approved by the Virginia Department of Environmental Quality (“DEQ”). Time of year and weather conditions may affect when permanent stabilization takes place.

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

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

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

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

Examples of typical permitted uses include, subject to the terms of the easement, but are not limited to:

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

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

Response: The Company’s route selection for transmission line rebuild projects begins with a review of existing rights-of-way. This approach generally minimizes impacts on the natural and human environments. This approach is also consistent with Attachment 1 to these Guidelines, which states that existing rights-of-way should be given priority when adding new transmission facilities, and §§ 56-46.1 and 56-259 of the Code of Virginia (“Va. Code”), which promote the use of existing rights-of-way for new transmission facilities. For the proposed Partial Rebuild Project, the existing right-of-way that currently contains Line #514 is adequate.

Because the existing right-of-way is adequate to construct the proposed Partial Rebuild Project, new right-of-way is not necessary. Given the availability of existing right-of-way and the statutory preference given to the use of existing rights-of-way, and 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 for this Partial Rebuild Project.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

Response: To limit service disruption to the affected load area, the Company plans to take only the 2.8-mile section of Line #514 proposed for rebuild out of service for one outage. The outage is scheduled to allow the adjacent infrastructure to adequately provide service to connected customers while certain lines and equipment are out of service. The work will be done during non-peak load times. This strategy will allow the grid to be in normal and optimal configuration during peak load times and available to respond to contingency issues should they arise. Assuming a final order by September 30, 2022, as requested in Section I.H, the current plan is to start construction by October 1, 2023, and to complete construction of the Partial Rebuild Project by June 1, 2024.

The Company has requested one outage from PJM for Line #514 during the Spring/Summer of 2024. The eDart Number for this outage is 912057. It is customary for PJM to not grant approval of the outages until shortly before the outages are expected to occur and, therefore, they may be subject to change.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

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

The Company utilized Guideline #1 (existing rights-of-way should be given priority when adding additional facilities) by siting the proposed Partial Rebuild Project within the existing transmission corridor.

By utilizing the existing transmission corridor, the proposed Partial Rebuild Project will minimize impact to any site listed on the National Register of Historic Places (“NRHP”). Thus, it is consistent with Guideline #2 (where practical, rights-of-way should avoid sites listed on the NRHP). See Section III.A for a description of the resources identified in the Stage I Pre-Application Analysis prepared by Stantec Consulting Services, Inc. (“Stantec”) on behalf of the Company, which is included with the DEQ Supplement as Attachment 2.H.1. Consistent with its customary practice, the Company will coordinate with the Virginia Department of Historic Resources (“VDHR”) regarding the findings of the Stage I Analysis.

The Company has communicated with a number of local, state, and federal agencies prior to filing this application consistent with Guideline #4 (where government land is involved the Company should contact the agencies early in the planning process). See Sections III.B, III.J, and V.D of this Appendix, and the DEQ Supplement.

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

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

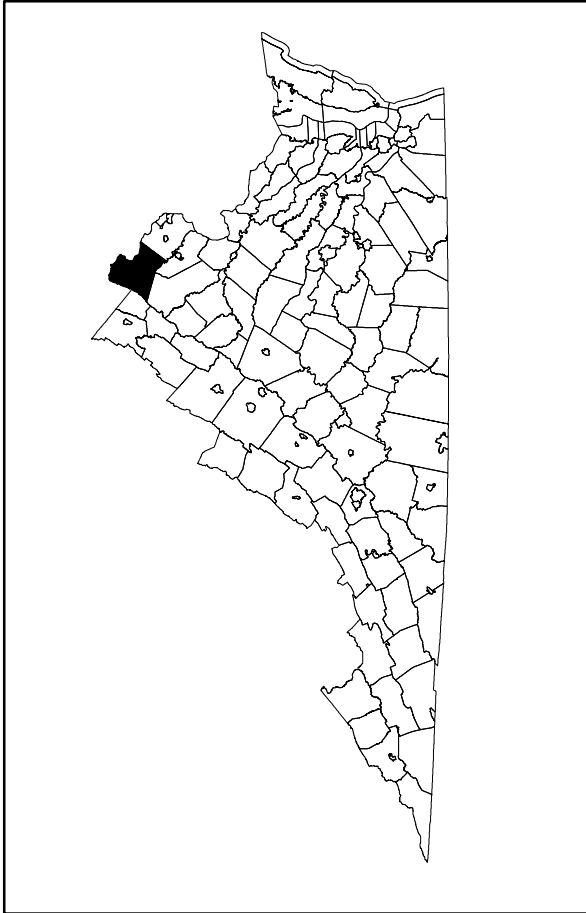
II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

- 12. a. Detail counties and localities through which the line will pass. If any portion of the line will be located outside of the Applicant’s certificated service area: (1) identify each electric utility affected; (2) state whether any affected electric utility objects to such construction; and (3) identify the length of line(s) proposed to be located in the service area of an electric utility other than the Applicant; and**
- b. Provide three (3) color copies of the Virginia Department of Transportation “General Highway Map” for each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the Applicant. Also, where the line will be located outside of the Applicant’s certificated service area, show the boundaries between the Applicant and each affected electric utility. On each map where the proposed line would be outside of the Applicant’s certificated service area, the map must include a signature of an appropriate representative of the affected electric utility indicating that the affected utility is not opposed to the proposed construction within its service area.**

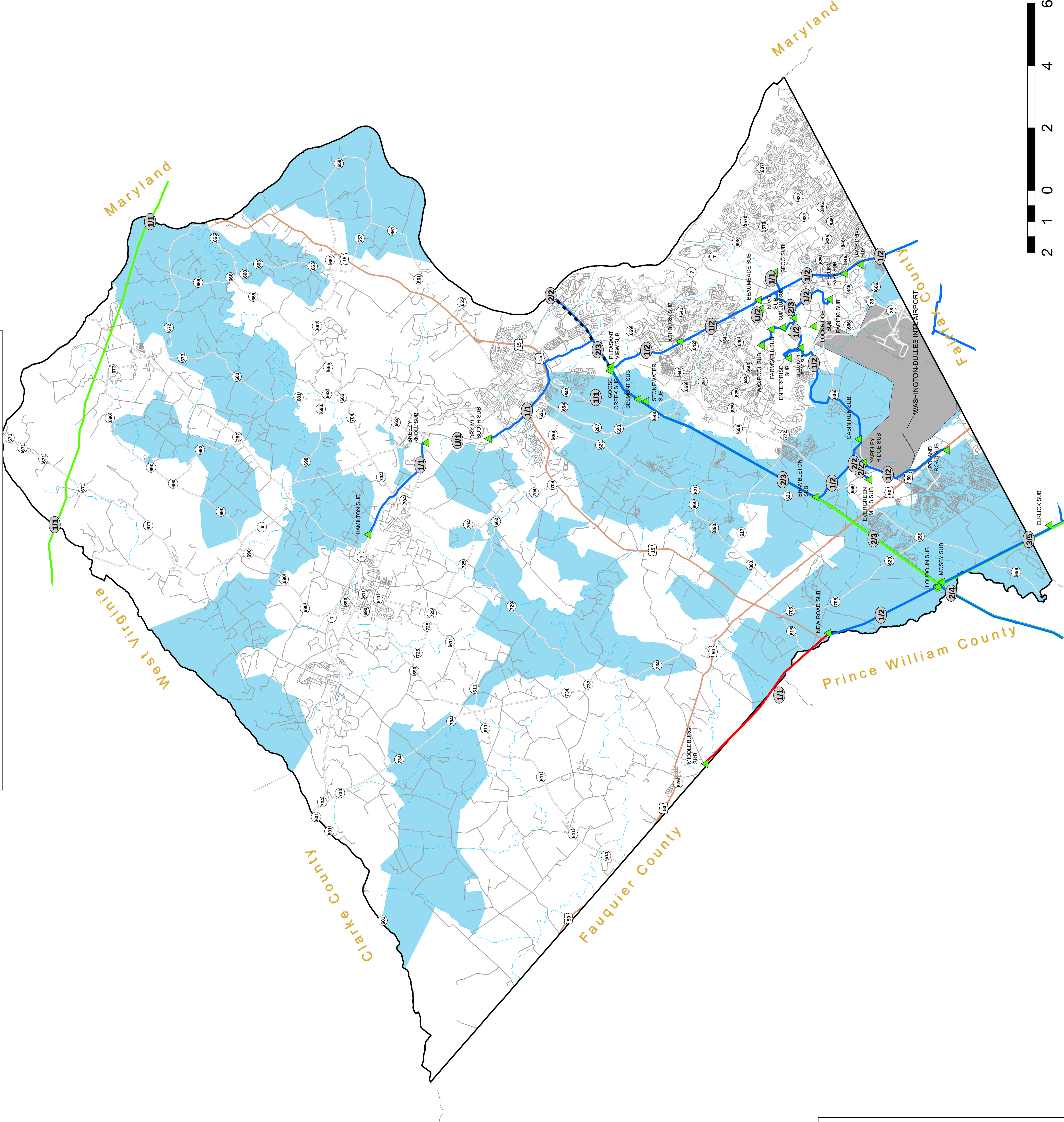
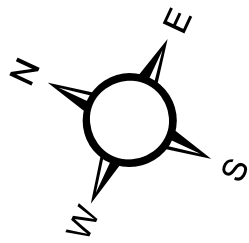
Response:

- a. The Partial Rebuild Project traverses Loudoun County, Virginia, for a total of approximately 2.8 miles along Line #514 and is located entirely within Dominion Energy Virginia’s service territory.
- b. An electronic copy of the map of the Virginia Department of Transportation “General Highway Map” for Loudoun County has been marked as required and submitted with the Application. A reduced copy of the map is provided as Attachment II.A.12.b.



This digital map depicts the Virginia Electric and Power Company ("Company") transmission facilities in this county as approved by the Virginia State Corporation Commission ("SCC"), as of 10/26/21. Other Company facilities previously authorized by the SCC may be depicted on prior SCC approved county maps.

Loudoun County Road Map



VIRGINIA ELECTRIC AND POWER COMPANY
PLANS TO BUILD TRANSMISSION LINES AND
SUBSTATIONS AS SHOWN IN BLACK DASHES
ON THIS MAP.

NORTHERN VIRGINIA ELECTRIC COOPERATIVE
IS NOT OPPOSED TO SUCH CONSTRUCTION IN
ITS SERVICE TERRITORY.

SIGNATURE N/A

DATE

TITLE

Legend

- Proposed Project
- (11) Number of Lines of Structures/Number of Circuits
- △ Proposed Substation
- ▲ Existing Substation
- 115 kV
- 230 kV
- 500 kV

Provider Service Territory

- NOVEC
- VEPCO



*VDOT and other road data
obtained from Navteq and
County data, current as of
June 2016.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: Single circuit 500 kV Line #514 will be designed and operated at 500 kV with no anticipated voltage upgrade. The 3-phase triple-bundled 1351.5 ACSR conductors will have a transfer capability of 4330 MVA.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: The single circuit 500 kV Line #514 will have 3-phase triple-bundled 1351.5 ACSR conductors arranged as shown in Attachments II.B.3.i-iv with two fiber optic shield wires. The triple-bundled 1351.5 ACSR conductors are the Company's standard conductors for new 500 kV construction.

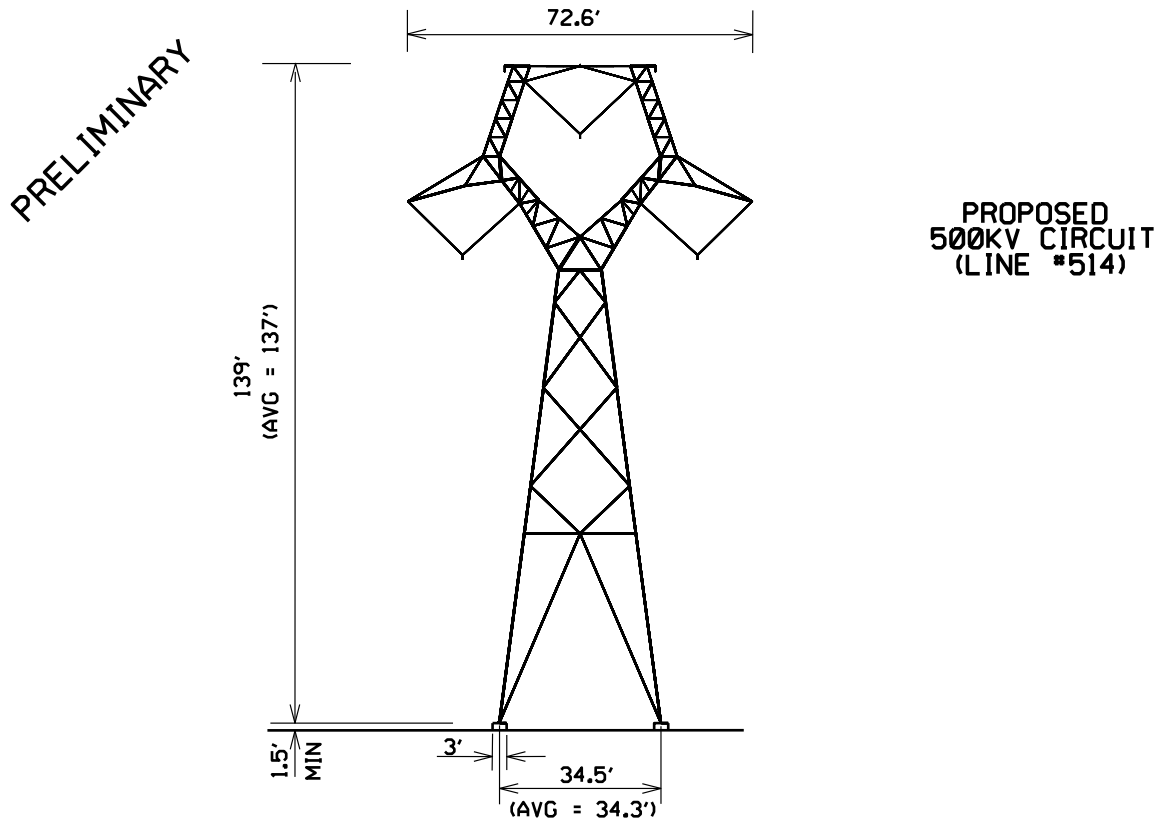
II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

- 3. With regard to the proposed supporting structures over each portion of the ROW for the preferred route, provide diagrams (including foundation reveal) and descriptions of all the structure types, to include:**
 - a. mapping that identifies each portion of the preferred route;**
 - b. the rationale for the selection of the structure type;**
 - c. the number of each type of structure and the length of each portion of the ROW;**
 - d. the structure material and rationale for the selection of such material;**
 - e. the foundation material;**
 - f. the average width at cross arms;**
 - g. the average width at the base;**
 - h. the maximum, minimum and average structure heights;**
 - i. the average span length; and**
 - j. the minimum conductor-to-ground clearances under maximum operating conditions.**

Response: See Attachments II.B.3.i-iv.

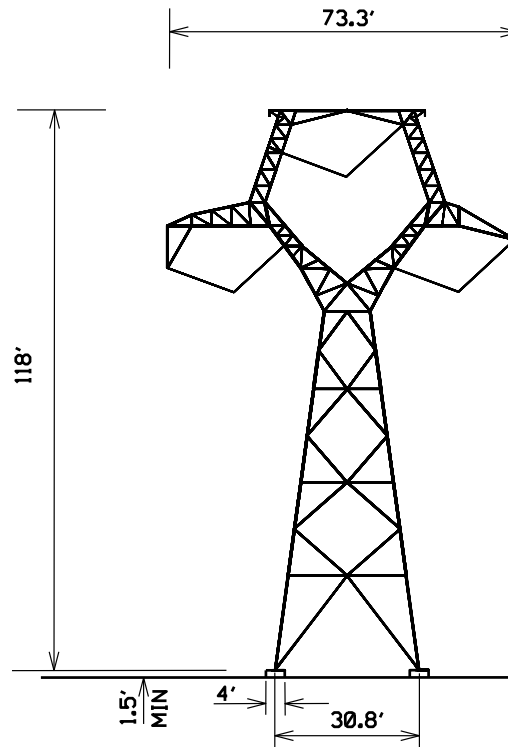
SINGLE CIRCUIT SUSPENSION TOWER



- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.5
 - b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
ALLOWS STRUCTURE FOR STRUCTURE REPLACEMENT IN EXISTING RIGHT-OF-WAY
 - c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
9 AND 2.77 MILES
 - d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL IS THE COMPANYS STANDARD FOR LATTICE STRUCTURES
 - e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
 - f. AVERAGE WIDTH AT CROSSARM: 72.6 FEET
 - g. AVERAGE WIDTH AT BASE: 34.30 FEET (RANGE 27.59 - 38.14 FEET)
 - h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 154 FEET, 114 FEET, AND 137 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
 - i. AVERAGE SPAN LENGTH: 1124 FEET (RANGE 867 - 1395 FEET)
 - j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 27.9'
AND 46' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE
- NOTE: Information contained on drawing is to be considered preliminary
in nature and subject to change based on final design.

SINGLE CIRCUIT RUNNING ANGLE TOWER (SMALL ANGLE)

PRELIMINARY

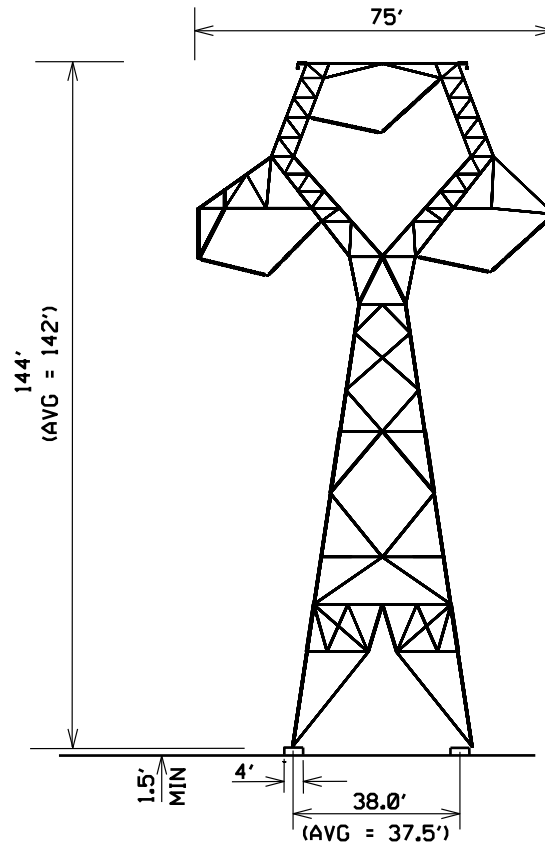


PROPOSED
500KV CIRCUIT
(LINE #514)

- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.5
 - b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
ALLOWS STRUCTURE FOR STRUCTURE REPLACEMENT IN EXISTING RIGHT-OF-WAY
 - c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 2.77 MILES
 - d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL IS THE COMPANY'S STANDARD FOR LATTICE STRUCTURES
 - e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
 - f. AVERAGE WIDTH AT CROSSARM: 73.3 FEET
 - g. AVERAGE WIDTH AT BASE: 30.8 FEET
 - h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 118 FEET, 118 FEET, AND 118 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
 - i. AVERAGE SPAN LENGTH: 1124 FEET (RANGE 867 - 1395 FEET)
 - j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 27.9'
AND 46' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE
- NOTE: Information contained on drawing is to be considered preliminary
in nature and subject to change based on final design.

SINGLE CIRCUIT RUNNING ANGLE TOWER (MEDIUM ANGLE)

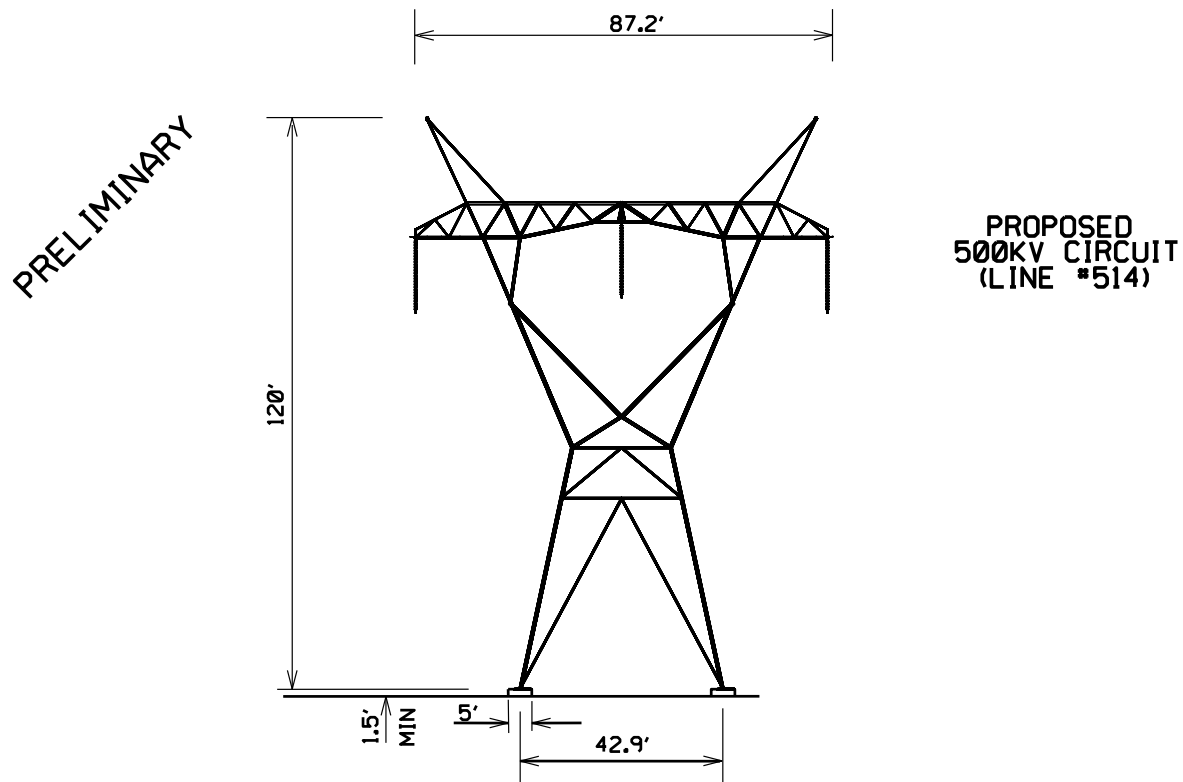
PRELIMINARY

PROPOSED
500KV CIRCUIT
(LINE #514)

- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.5
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
ALLOWS STRUCTURE FOR STRUCTURE REPLACEMENT IN EXISTING RIGHT-OF-WAY
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
2 AND 2.77 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL IS THE COMPANYS STANDARD FOR LATTICE STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 75.0 FEET
- g. AVERAGE WIDTH AT BASE: 37.5 FEET (RANGE 35.23 - 39.77)
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 149 FEET, 134 FEET, AND 142 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 1124 FEET (RANGE 867 - 1395 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 27.9'
AND 46' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE
NOTE: Information contained on drawing is to be considered preliminary
in nature and subject to change based on final design.

\$DONSPEC\$

SINGLE CIRCUIT DOUBLE DEADEND TOWER



- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT 11.B.5
 - b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
ALLOWS STRUCTURE FOR STRUCTURE REPLACEMENT IN EXISTING RIGHT-OF-WAY
 - c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 2.77 MILES
 - d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL IS THE COMPANYS STANDARD FOR LATTICE STRUCTURES
 - e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
 - f. AVERAGE WIDTH AT CROSSARM: 87.2 FEET
 - g. AVERAGE WIDTH AT BASE: 42.9 FEET
 - h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 120 FEET, 120 FEET, AND 120 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
 - i. AVERAGE SPAN LENGTH: 1124 FEET (RANGE 867 - 1395 FEET)
 - j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 27.9'
AND 46' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE
- 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

B. Line Design and Operational Features

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

Response: Not applicable.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: See [Attachment II.B.5](#) for a map of existing structure locations.

The proposed approximate structure heights are from the conceptual design created to estimate the cost of the proposed Partial Rebuild Project and are subject to change based on final engineering design. The approximate structure heights do not include foundation reveal and assume equal leg lengths based on the centerline ground elevation. Note that Structures #514/1854-1856 are not being rebuilt as part of the Partial Rebuild Project and, therefore, are not identified on the chart below.

Structure Number	Existing Structure Height (ft)	Proposed Structure Height (ft)	Attachment II.B.3 Structure Type
514/1841	122	120	iv
514/1842	114	134	i
514/1843	109	144	i
514/1844	119	144	i
514/1845	109	134	i
514/1846	114	139	i
514/1847	119	154	i
514/1848	117	149	iii
514/1849	104	134	i
514/1850	126	139	i
514/1851	99	114	i
514/1852	102	134	iii
514/1853	102	118	ii
Min	99	114	
Max	126	154	
Average	112	135	

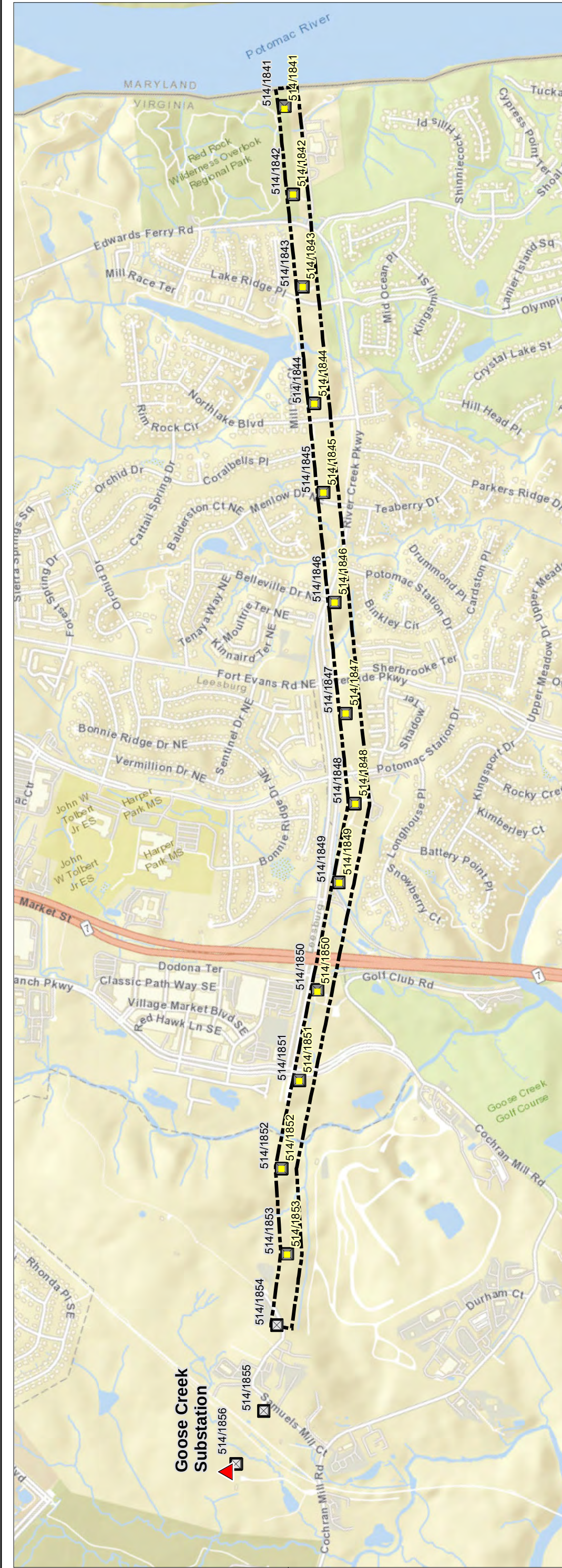
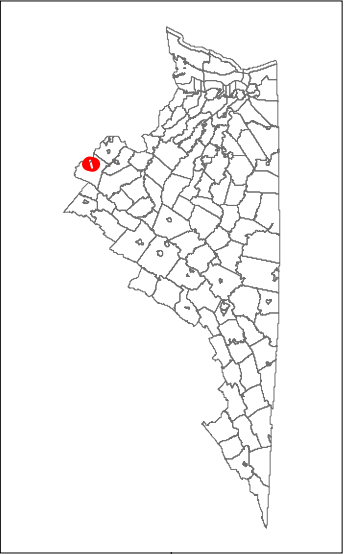


Table II. B.5

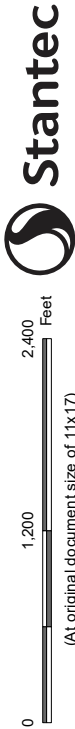
Existing Structure Number	514/1853	514/1852	514/1851	514/1850	514/1849	514/1848	514/1847	514/1846	514/1845	514/1844	514/1843	514/1842	514/1841
Existing Structure Height (Feet)	102	102	99	126	104	117	119	114	109	119	109	114	122
Proposed Structure Number	514/1853	514/1852	514/1851	514/1850	514/1849	514/1848	514/1847	514/1846	514/1845	514/1844	514/1843	514/1842	514/1841
Proposed Structure Height (Feet)	118	134	114	139	134	149	154	139	134	144	144	134	120

*Structure heights do not include foundation reveal. Proposed heights based on preliminary engineering



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

- Substation
- Proposed Structure
 - Existing Structure to Remain
 - Existing Structure to be Replaced
 - Project Limits
- Existing Structures to Remain were omitted from this model.



Project Location

Loudoun County, Virginia

Client/Project

Dominion Energy Virginia

500 kV Line # 514 Partial Rebuild Project

203401646

Figure No.

II.B.5

Title

Existing and Proposed Structures

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: *(a) Photographs for typical existing facilities to be removed*

A representative photograph of a typical existing structure is provided as Attachment II.B.6.a.

(b) Comparable photographs or representations for proposed structures

A representative photograph of a typical proposed structure for the Partial Rebuild Project is provided in Attachment II.B.6.b.

(c) Visual simulations from historic and other key locations

Visual simulations showing the appearance of proposed transmission structures are provided for historic properties where the Partial Rebuild Project will be visible. See Attachments II.B.6.c.i-ii, which include a viewshed map and visual simulations of proposed structures at identified historic locations within 1.0 mile of the proposed centerline of the Partial Rebuild Project. Attachment II.B.6.c.i was created using GIS modeling to depict whether the existing and proposed structures are or will be visible from historic properties. Observation Points (“OPs”) used for the simulations are indicated on the map. Attachment II.B.6.c.ii includes existing photographs and simulations of the proposed structures from the selected OPs. The below table identifies historic properties.

Historic Property	OP	Comments
Ball’s Bluff Battlefield & National Cemetery Historic District Boundary Increase (VDHR #253-5182)	4	Existing and proposed structures visible
Alexandria, Loudoun and Hampshire Railroad/Washington & Old Dominion Railroad Historic District (VDHR #053-0276)	1	Proposed structures visible in background
Ball’s Bluff Battlefield/Harrison’s Landing (VDHR #053-5058)	2/3	Existing and proposed structures visible

Sage Hill Farm ¹ (VDHR #053-5248)	N/A	N/A
Murray Hill (VDHR #053-5783)	5	No visibility of replacement structures
Edwards Ferry Road (VDHR #053-6078)	6	No visibility of replacement structures

1. This property is eligible for listing on the NRHP and between 0.5 and 1.0 mile from the Rebuild centerline. Therefore, this property was not included in the Stage 1 Pre-Application Analysis per VDHR guidance. Note 1 only applies to Sage Hill Farm.

Simulations of the Partial Rebuild Project from key locations are provided in Attachment III.B.4.



Photograph provided by Dominion Energy

Existing Single Circuit Suspension Tower



Attachment II.B.6.a.i



Photograph provided by Dominion Energy

Existing Single Circuit Running Angle Tower

Attachment II.B.6.a.ii



Photograph provided by Dominion Energy

Existing Single Circuit Suspension H-frame

Attachment II.B.6.a.iii



Photograph provided by Dominion Energy

Proposed Single Circuit Running Angle Tower

Attachment II.B.6.b.i



Photograph provided by Dominion Energy

Proposed Single Circuit Suspension Tower

Attachment II.B.6.b.ii

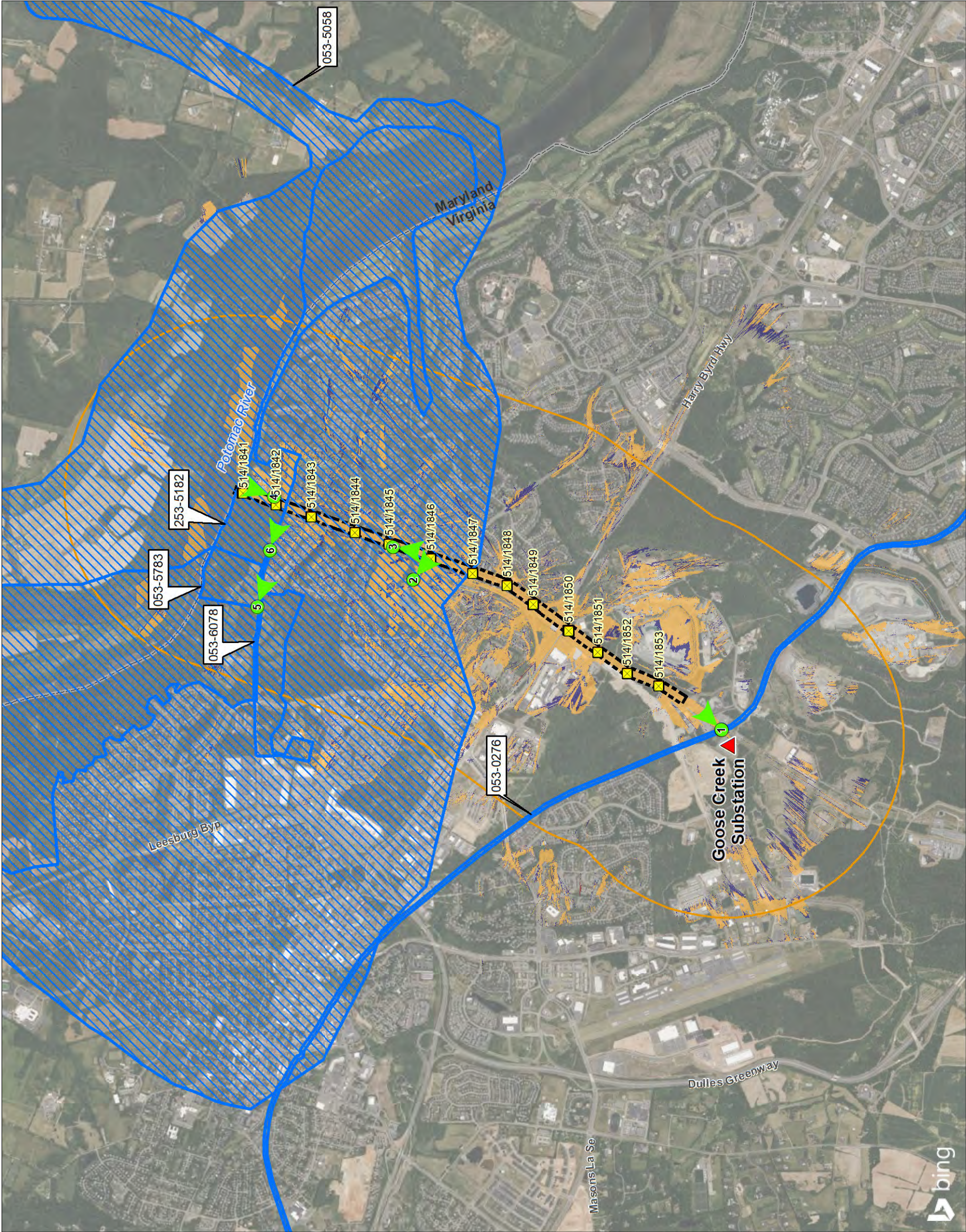


Photograph provided by Dominion Energy

Proposed Single Circuit DDE Tower

Attachment II.B.6.b.iii







Photograph provided by Stantec

OP 1 Existing

From Alexandria, Loudoun and Hampshire Railroad (VDHR #053-0276) looking northeast

Attachment II.B.6.c.2



Photograph provided by Stantec

OP 1 Proposed
From Alexandria, Loudoun and Hampshire Railroad (VDHR #053-0276) looking northeast



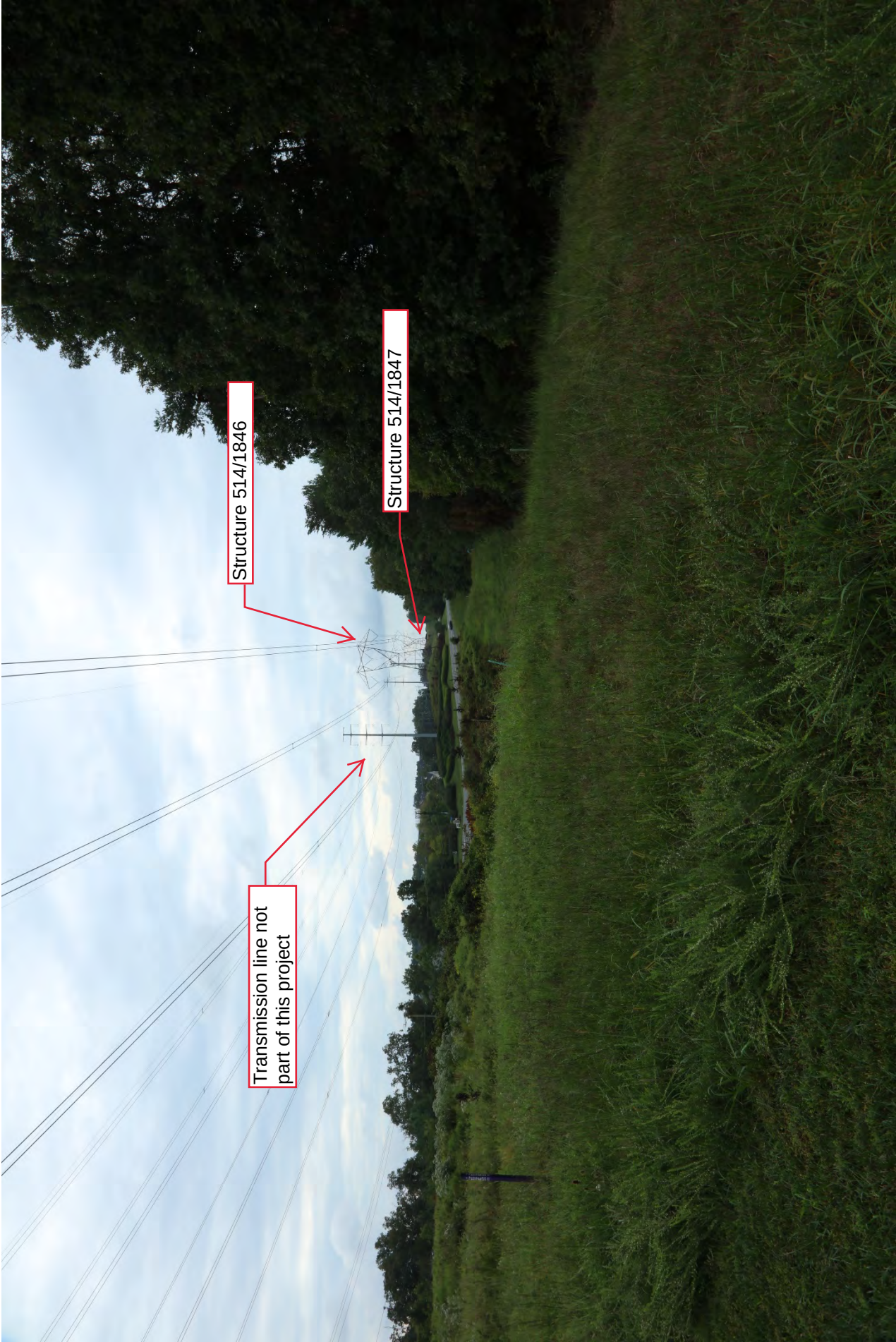


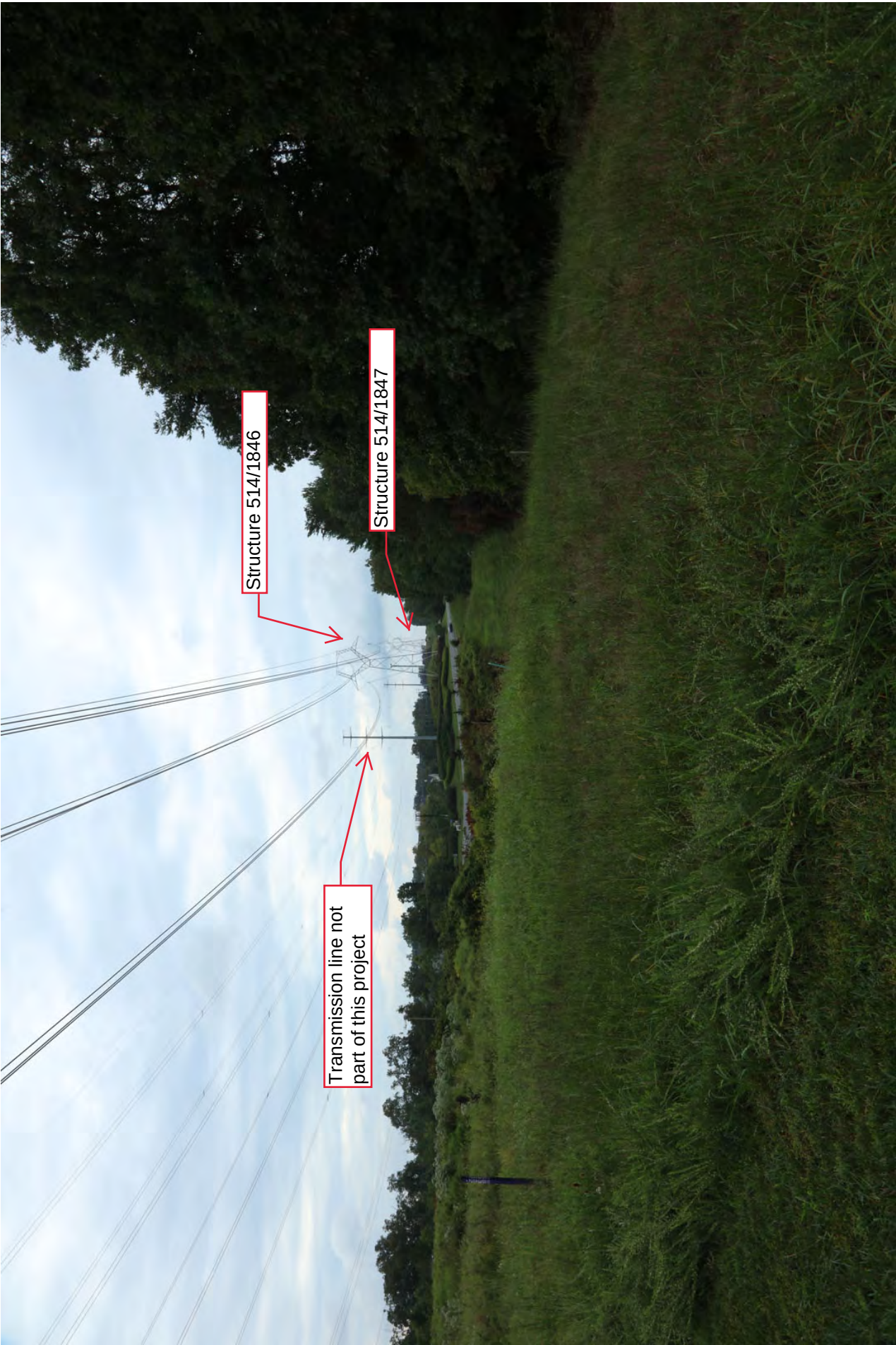




Photograph provided by Stantec

OP 3a Proposed
From Ball’s Bluff Battlefield (VDHR #053-5058) looking north
Attachment II.B.6.c.2





Photograph provided by Stantec

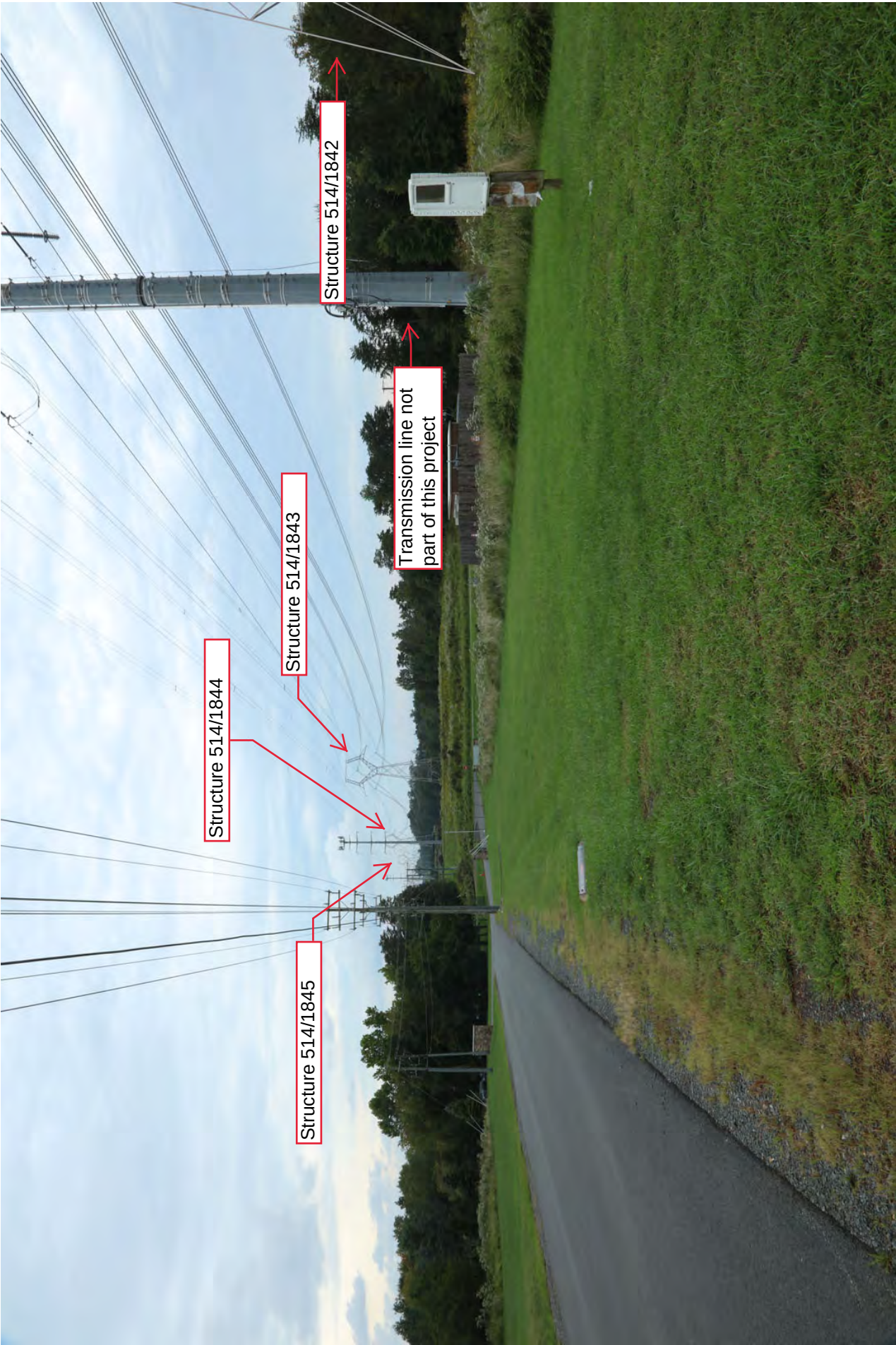
OP 3b Proposed
From Ball's Bluff Battlefield (VDHR #053-5058) looking south

Attachment II.B.6.c.2



Photograph provided by Stantec

OP 4a Existing
 From Ball's Bluff Battlefield & National Cemetery Historic District Boundary Increase (VDHR
 #253-5182) looking south



Photograph provided by Stantec

OP 4a Proposed
From Ball's Bluff Battlefield & National Cemetery Historic District Boundary Increase (VDHR #253-5182) looking south



Photograph provided by Stantec

OP 4b Existing
From Ball's Bluff Battlefield & National Cemetery Historic District Boundary Increase (VDHR #253-5182) looking north



Photograph provided by Stantec

OP 4b Proposed
From Ball's Bluff Battlefield & National Cemetery Historic District Boundary Increase (VDHR #253-5182) looking north



Photograph provided by Stantec

OP 4c Existing
 From Ball's Bluff Battlefield & National Cemetery Historic District Boundary Increase (VDHR
 #253-5182) looking west



Photograph provided by Stantec

OP 4c Proposed
 From Ball's Bluff Battlefield & National Cemetery Historic District Boundary Increase (VDHR
 #253-5182) looking west



Photograph provided by Stantec

OP 5 Existing
From Murray Hill (VDHR #053-5783) looking east

Attachment II.B.6.c.2



Photograph provided by Stantec

OP 5 Proposed
From Murray Hill (VDHR #053-5783) looking east
Attachment II.B.6.c.2



Photograph provided by Stantec

OP 6 Existing
From Edwards Ferry Road (VDHR #053-6078) looking east

Attachment II.B.6.c.2

\\op6_e_24mm_417A8968\\Standard\\Wireframe



Photograph provided by Stantec

II. DESCRIPTION OF THE PROPOSED PROJECT

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

Response: There are no new substations, switching stations, or other ground facilities associated with the proposed Partial Rebuild Project, nor are any of the impacted stations being expanded. The Partial Rebuild Project will require the following station work:

As part of the line Partial Rebuild Project, the Company will upgrade the line terminal equipment and protection at the existing Goose Creek Substation. Specifically, the bus, riser conductors and disconnect switches will be replaced to support the new line ratings. The wave traps will be removed, and optical ground wire (“OPGW”) fiber will be used for the line protection. The fibers on the OPGW will be brought from the backbone to the control enclosure.¹⁴

¹⁴ See *supra* n. 1 and 3.

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

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

Response: **Land Use**

The Partial Rebuild Project area is contained within Loudoun County for a total project length of approximately 2.8 miles. The vicinity of the Partial Rebuild Project is characterized as suburban.

Farmland/Forests

A total of 19.59 acres of prime farmland occurs within the Partial Rebuild Project right-of-way. A total of 29.97 acres of farmland of statewide importance is located within the Partial Rebuild Project right-of-way. See [Attachment III.A.1](#). Loudoun County has 23 Agricultural and Forestal Districts (“AFDs”) containing over 43,000 acres throughout the County. No portion of the existing right-of-way for the Partial Rebuild Project is currently in or available for agricultural use or falls within any AFD. Therefore, the Partial Rebuild Project is not expected to affect agricultural land.

The transmission line right-of-way is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. Since the proposed Partial Rebuild Project is to take place within the existing right-of-way, no impact to forestland is expected.

Loudoun County has not designated important farmlands under Va. Code § 3.2-205 B. The *Loudoun County 2019 Comprehensive Plan* identifies 23 AFDs, which are authorized by Va. Code § 15.2-4312; however, the Partial Rebuild Project does not pass through any of these districts. [Attachment III.A.1](#) displays prime farmland and farmlands of statewide importance in relation to the Partial Rebuild Project.

Wetlands

According to the U.S. Geological Survey (“USGS”) topographic quadrangle (Leesburg [1988]), the 2.8-mile section of Line #514 proposed for rebuild crosses Tuscarora Creek, Cattail Branch, and several perennial and intermittent streams.

The Company delineated wetlands and other waters of the United States within the right-of-way using the *Routine Determination Method* as outlined in the 1987 *Corps of Engineers Wetland Delineation Manual* and methods described in the 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual*:

Eastern Mountain and Piedmont Region (Version 2.0). The Company submitted the results of this delineation to the U.S. Army Corps of Engineers (the “Corps”) on October 18, 2021, for confirmation. Total jurisdictional resources within the proposed Partial Rebuild Project right-of-way are provided in the table below.

Jurisdictional Resources Within Partial Rebuild Project Right-of-Way

Resource	Acreage (±)
Palustrine Forested Wetlands	0.01
Palustrine Emergent Wetlands	0.98
Lower Perennial Stream Channels (R2)	0.32 (250 Linear Feet)
Upper Perennial Stream Channels (R3)	0.45 (546 Linear Feet)
Intermittent Stream Channels (R4)	0.02 (235 Linear Feet)

Prior to construction, the Company will obtain any necessary permits to impact jurisdictional resources.

Historic Features

In accordance with the *Guidelines for Assessing Impacts of Proposed Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia (2008)*, a Stage I Pre-Application Analysis was conducted by Stantec. This analysis, which is included as Attachment 2.H.1 to the DEQ Supplement, has been submitted to VDHR.

No NHLs are located within the 1.5-mile radius of the Partial Rebuild Project centerline. One NRHP-listed resource is located within 1.0-mile and two NRHP-eligible resources are located within 0.5-miles of the centerline. Additionally, one NRHP-eligible and one potentially eligible battlefield are also present within 1.0-mile of the transmission line. The battlefield resources also cross the transmission line right-of-way corridor.

Based upon the proposed changes to structure heights, it is anticipated that the Partial Rebuild Project will have a minimal impact to those historic properties that will view the Partial Rebuild Project, as shown in the table below. Consistent with its customary practice, the Company will coordinate with VDHR regarding the findings of the Stage I Pre-Application Analysis.

**Previously Recorded Architectural Resources Considered under the
Stage I Pre-Application Guidelines**

VDHR #	Resource Name	VDHR/NRHP Status	Distance to Centerline (Feet)	Impact
053-0276	Alexandria, Loudoun and Hampshire Railroad	NRHP-Eligible	1,156	Minimal
053-5058	Ball's Bluff Battlefield	NRHP-Potentially Eligible	0	Minimal
053-5783	Murray Hill, 42910 Edwards Ferry Road NE	NRHP-Listed	1,783	Minimal
053-6078	Edwards Ferry Road	NRHP-Eligible	1,340	Minimal
253-5182	Ball's Bluff Battlefield & National Cemetery Historic District Boundary Increase	NRHP-Eligible	0	Minimal

One recorded archaeological resource was identified within the Partial Rebuild Project right-of-way.

**Previously Recorded Archeological Resources Considered under the
Stage I Pre-Application Guidelines**

VDHR #	Resource Name	VDHR/NRHP Status	Distance to ROW (Feet)	Impact
44LD1341	Prehistoric Temporary Camp	NRHP-Potentially Eligible	0	Investigate During Archaeological Survey

Wildlife

A search of the Department of Wildlife Resources ("DWR") public database identified several federal and state listed species that have the potential to occur within the Partial Rebuild Project area. These resources are identified in the report included as Attachment 2.F.1 to the DEQ Supplement. The Company intends to reasonably minimize any impact on these resources and coordinate with DWR as appropriate.

Dwellings

According to Loudoun County GIS data, for purposes of the Partial Rebuild Project, there are 174 dwellings located within 500 feet of the centerline of Line #514, 38 dwellings located within 250 feet of the centerline, zero dwellings located within 100 feet of the centerline, and zero dwellings located within the right-of-way.

Figure No.
III.A.1

Title
Prime Farmland Map

Client/Project
Dominion Energy Virginia
500 kV Line # 514 Partial Rebuild Project
203401646

Project Location
Loudoun County, Virginia
Prepared by MGS on 2021-07-09
TR by TPS on 2021-09-03
R by CPG on 2021-09-02

N

0

2,000

4,000

Feet

(At original document size of 11x17)

1:24,000

Substation

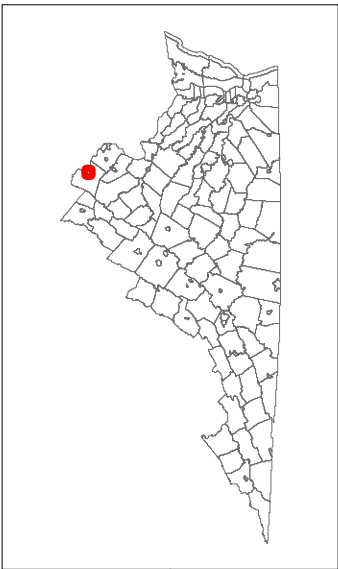
Beginning/Endpoint Structures

Project Limits

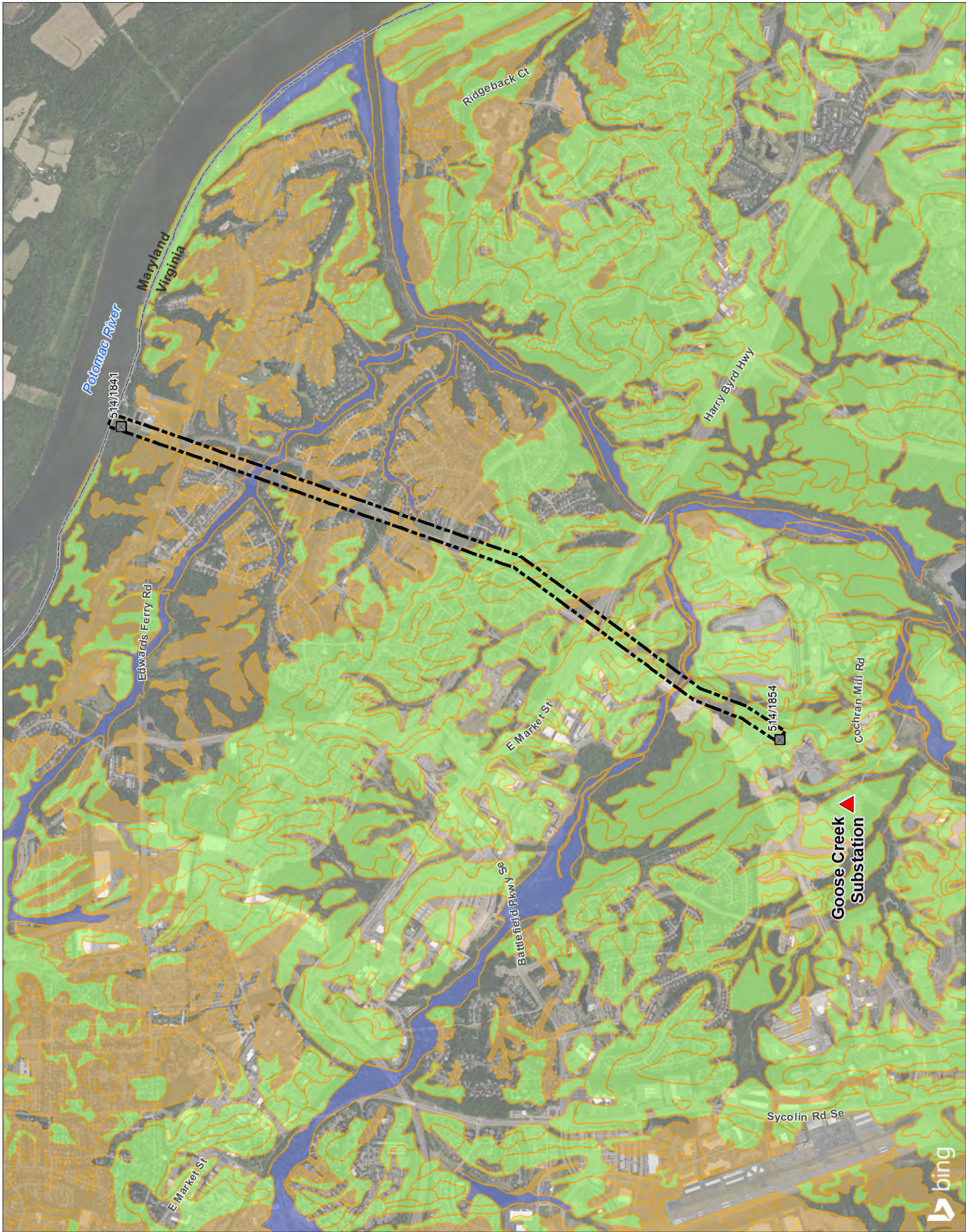
All areas are prime farmland (19.59 Acres±)

Farmland of statewide importance (29.97 Acres±)

Prime farmland if protected from flooding or not frequently flooded during the growing season (2.49 Acres±)



Notes
1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Data Sources: Dominion Energy Virginia, Stantec, DCR, USDA NRCS SSURGO Soil Survey, ESRI, NAD83
3. Orthomimagery © Bing Maps
4. Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation



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

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

Response: Save the date postcards were sent to more than 630 property owners inviting them to attend a Virtual Community Meeting event to hear specific details relating to the Partial Rebuild Project and to provide any feedback on the scope and potential impacts of the project. Exemplars of the postcard are included as Attachment III.B.1. The postcard outlined the scope of the Partial Rebuild Project, provided an overview map, and invited recipients to visit the website for more information regarding the Partial Rebuild Project. The postcard also offered a dedicated phone number and email address for community members to provide comment on or to ask any questions about the Partial Rebuild Project. The Virtual Community Meeting was held on October 14, 2021, from 5 p.m. to 6 p.m. utilizing WebEx Events software. At the Virtual Community Meeting, the Company provided details about construction, project timing, and the State Corporation Commission approval process. There were 5 people who attended the Virtual Community Meeting.

Information is provided to the public through an internet website dedicated to the Partial Rebuild Project: www.dominionenergy.com/line514. The website includes route maps, an explanation of need, a description of the Partial Rebuild Project and its benefits, information on the Commission review process, structure diagrams and answers to frequently asked questions.

In addition to the postcard, advertisements for the Virtual Community Meeting were placed in the Loudoun Times Mirror, Loudoun Now and Loudoun Local Living newspapers prior to the event. A copy of the advertisement placed in the Loudoun papers is included as Attachment III.B.2. From October 7, 2021, to October 21, 2021, paid digital and social media campaigns were also used to drive awareness of the Virtual Community Meeting. An example of those digital advertisements is included as Attachment III.B.3. The event campaigns ran within Google AdWords, Google Display, Google Video, Facebook and Twitter, and provided a link to the website to learn more about the meeting and how to participate virtually. Campaign results include 1.5 million Impressions Delivered, 1.1% Click Thru Rate, and 16,884 Link Clicks.

All of the open house materials, including visual simulations from key locations within the communities, have been posted on the website for the Partial Rebuild Project. The visual simulations from the website are included as Attachment III.B.4.

In addition, the Company researched the demographics of the surrounding communities using the 2020/2025 Esri Updated Demographics data to determine that there are 14 Census Block Groups within the Partial Rebuild Project area that fall within a mile of the existing transmission line. A review of minority, income, and education census data identified populations within the study area that meet the U.S. Environmental Protection Agency defined threshold for Environmental Justice protections (“EJ Communities”).

Pursuant to Va. Code §§ 56-46.1 C and 56-259 C, as well as Attachment 1 of these Guidelines, there is a strong preference for the use of existing utility right-of-way whenever feasible. The Partial Rebuild Project is within existing right-of-way and will not require any of the following: (1) additional permanent or temporary right-of-way, (2) the construction of a temporary line, or (3) an increase in operating voltage. Based on the analysis of the Partial Rebuild Project, the Company does not anticipate disproportionately high or adverse impacts to the surrounding community and the EJ Communities located within the study area, consistent with the Partial Rebuild Project design to reasonably minimize such impacts.

In addition to its evaluation of impacts, the Company has and will continue to engage the EJ Communities in a manner that allows them to meaningfully participate in the Partial Rebuild Project development and approval process so that the Company can take their views and input into consideration. See Attachment III.B.5 for a copy of the Company’s Environmental Justice Policy.



Dominion Energy image. Not project specific.

Electric Transmission
P.O. Box 26666
Richmond, VA 23261



**Dominion
Energy®**

Actions Speak Louder

**YOU'RE INVITED TO
A VIRTUAL COMMUNITY MEETING
DETAILS ENCLOSED**

IMPORTANT

Local Power Line Project Information

Line 514 Goose Creek – Doubts 500 kV Electric Transmission Line Rebuild Project

AT DOMINION ENERGY, we are committed to staying connected with our customers and providing the latest information on work being done in the communities we serve. You are receiving this postcard because we are currently planning to rebuild a 3-mile section of an electric transmission line from Goose Creek Substation to the Potomac River in Loudoun County, Virginia.

After nearly five decades of service, the structures, and related components are at the end of their service life and need to be replaced to maintain reliability for our customers. We plan to replace existing lattice structures and overhead conductor. Construction is scheduled to begin in September 2023 with an anticipated completion date of June 2024.

To learn more about this project, we invite you to participate in a virtual community meeting on Oct. 14, 2021 to learn more about the project, the construction process, and meet our team.

We are dedicated to working safely and courteously in your community and will continue to keep you updated on our progress.

CONTACT US

Visit our website at DominionEnergy.com/goosecreek for project updates. Or contact us by calling 888-291-0190 or sending an email to powerline@dominionenergy.com.

At Dominion Energy, we know many of our customers are facing challenges due to the COVID-19 pandemic. We're here to help. In accordance with the law recently passed in Virginia, we're offering flexible payment arrangements up to 24 months. To set up a payment plan, or view additional assistance options, please visit DominionEnergy.com or call 1-866-366-4357.

VIRTUAL COMMUNITY MEETING

Live Via Webex Events

Thursday, Oct. 14, 2021 • 5–6 p.m.

Join the meeting by visiting our website, DominionEnergy.com/goosecreek.

A recording will be available on the project website after the meeting.

Use your iPhone camera or the QR reader app on other smartphones to visit the project page on our website.



This map is intended to serve as a representation of the project area and is not intended for detailed engineering purposes.

You are invited to our Virtual Community Meeting

Hear from project experts about the Goose Creek-Edwards Ferry Electric Transmission Rebuild Project to replace aging infrastructure in Loudoun County. This project will improve electric reliability for all customers in the region.

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Use your phone's
camera or QR
reader app to visit
the project page
directly.

Join us live online on Thursday, October 14 at 5 p.m.
You can find event details at DominionEnergy.com/line514



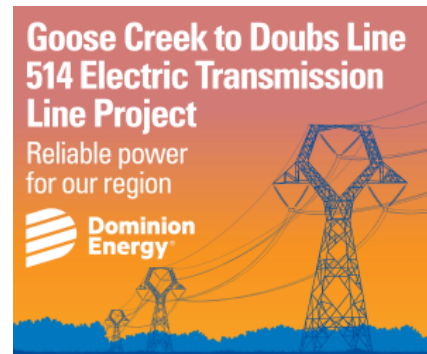
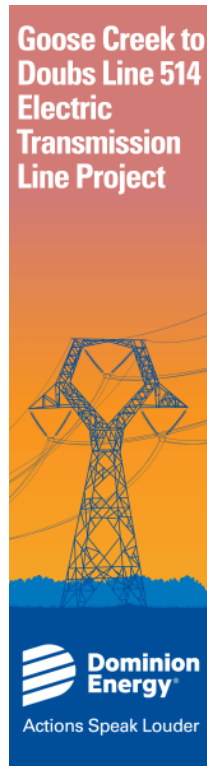
**Dominion
Energy®**

Actions Speak Louder

Dominion Energy Electric Transmission

Line 514 Doubs -
Goose Creek
Digital Creative

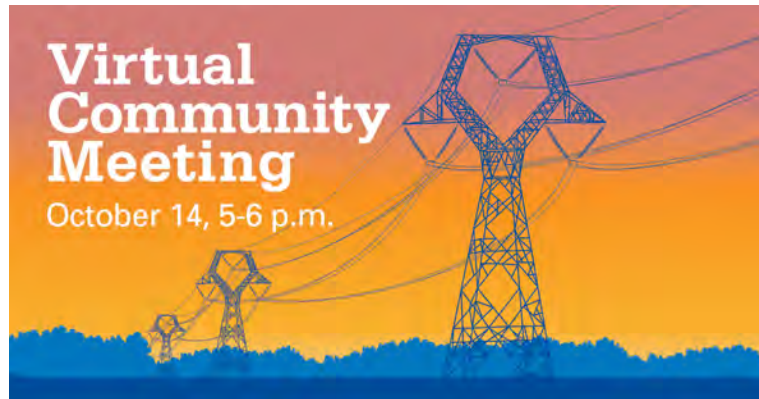
Display Ads



**Dominion Energy
Electric Transmission**

Line 514 Doubs -
Goose Creek
Digital Creative

NextDoor Pre-Event



NextDoor Post-Event



LINE 514

Rebuild Project

 SUBSTATION

 PHOTO LOCATION

 TRANSMISSION LINE TO BE REBUILT

 COUNTY BOUNDARY



LEESBURG

773

Edwards Ferry Rd NE

Market St

Leesburg Bypass

Battlefield Pkwy SE

John W.
Tolbert Jr.
Elementary
School

Sycolin Rd

Leesburg
Executive
Airport

Potomac River

MARYLAND
VIRGINIA

MARYLAND
VIRGINIA

LANSDOWNE

7

653



Belmont Ridge Rd

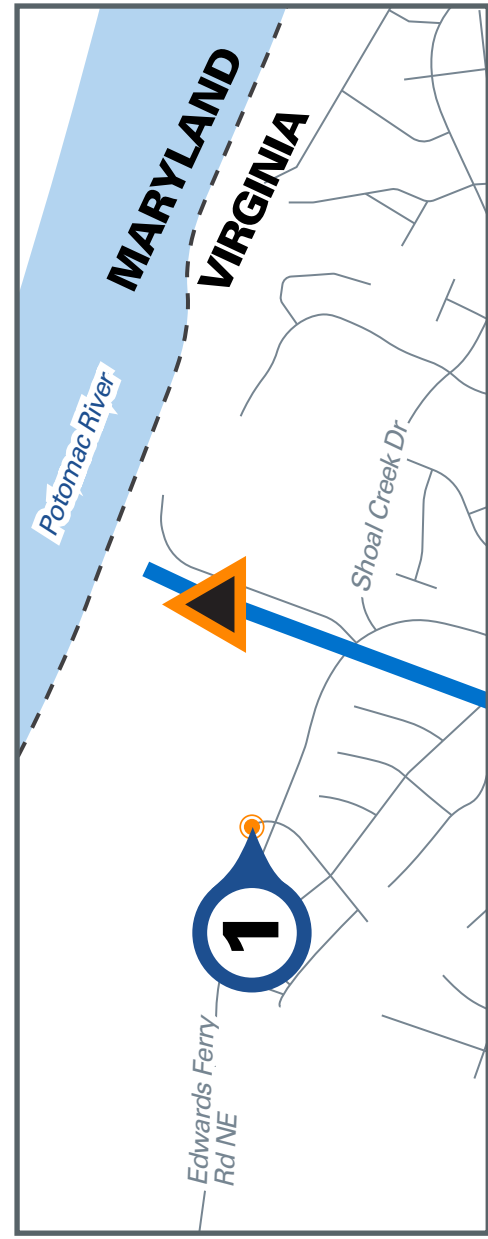
LINE 514

Rebuild Project

SIMULATION 1

Looking Southeast from an elevation of 446 feet on Edwards Ferry Road NE.

9/7/21 • 11:53 am



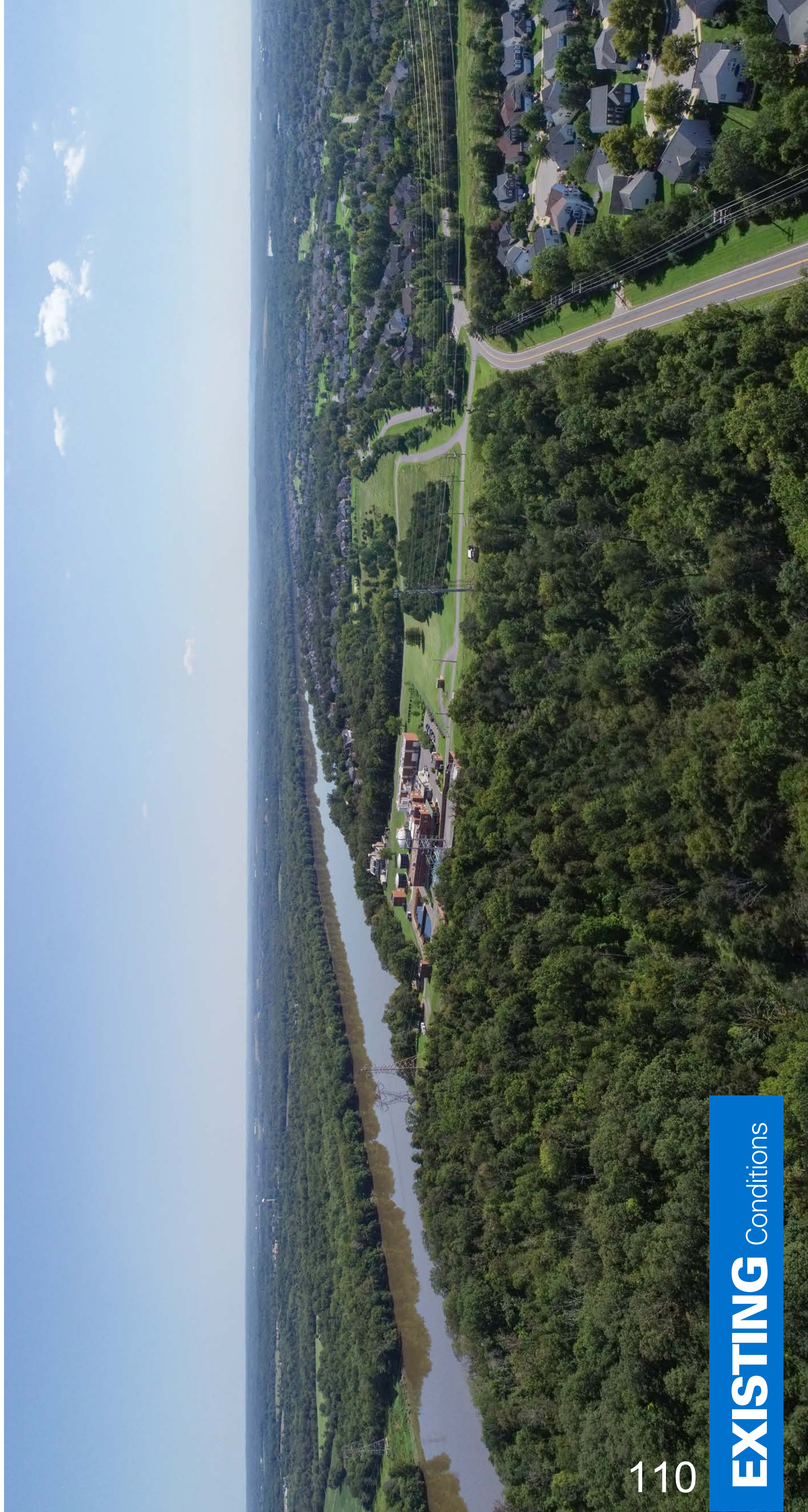
 **SUBSTATION**

 **TRANSMISSION LINE TO BE REBUILT**

 **PHOTO LOCATION**

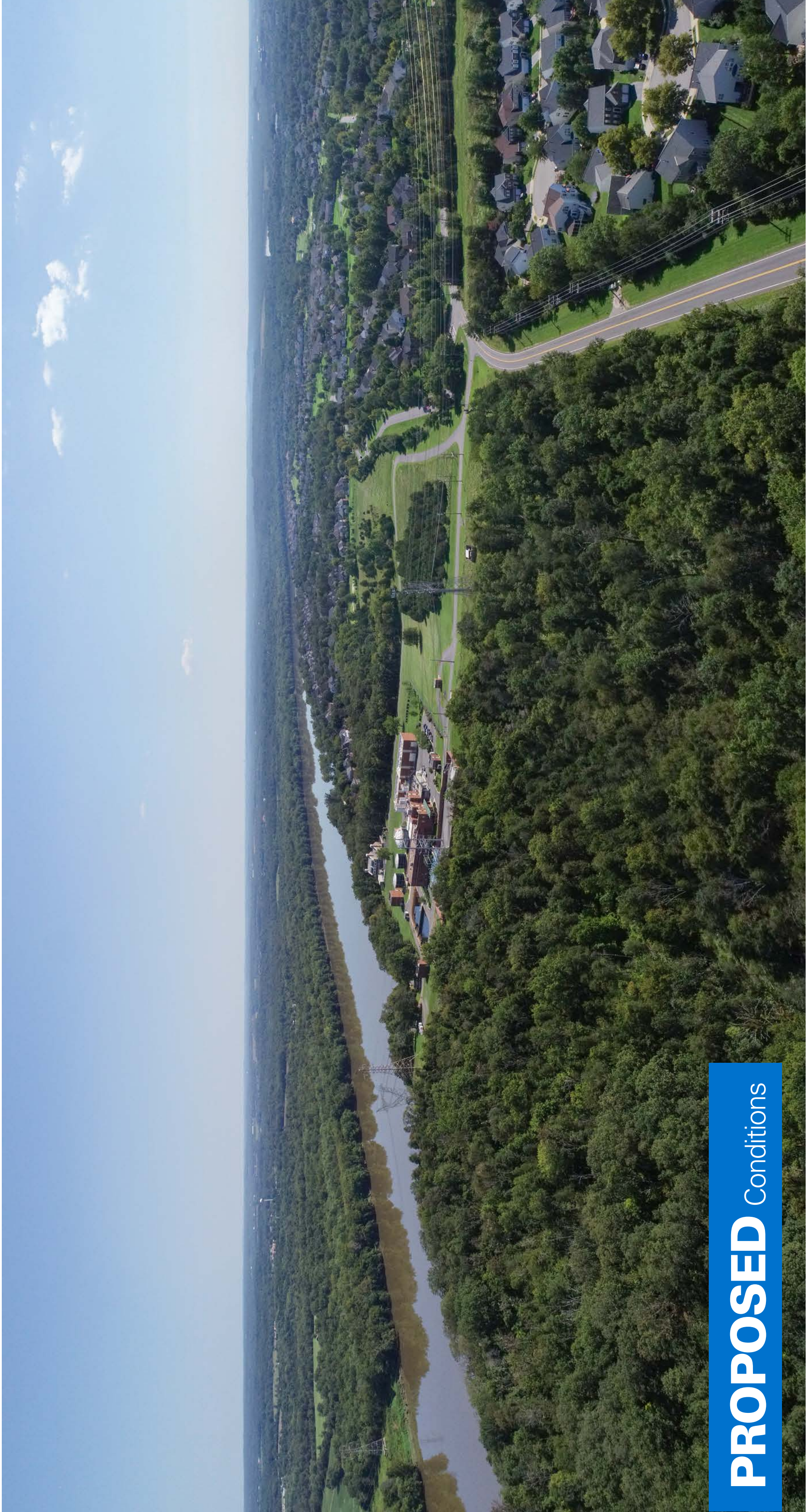


Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

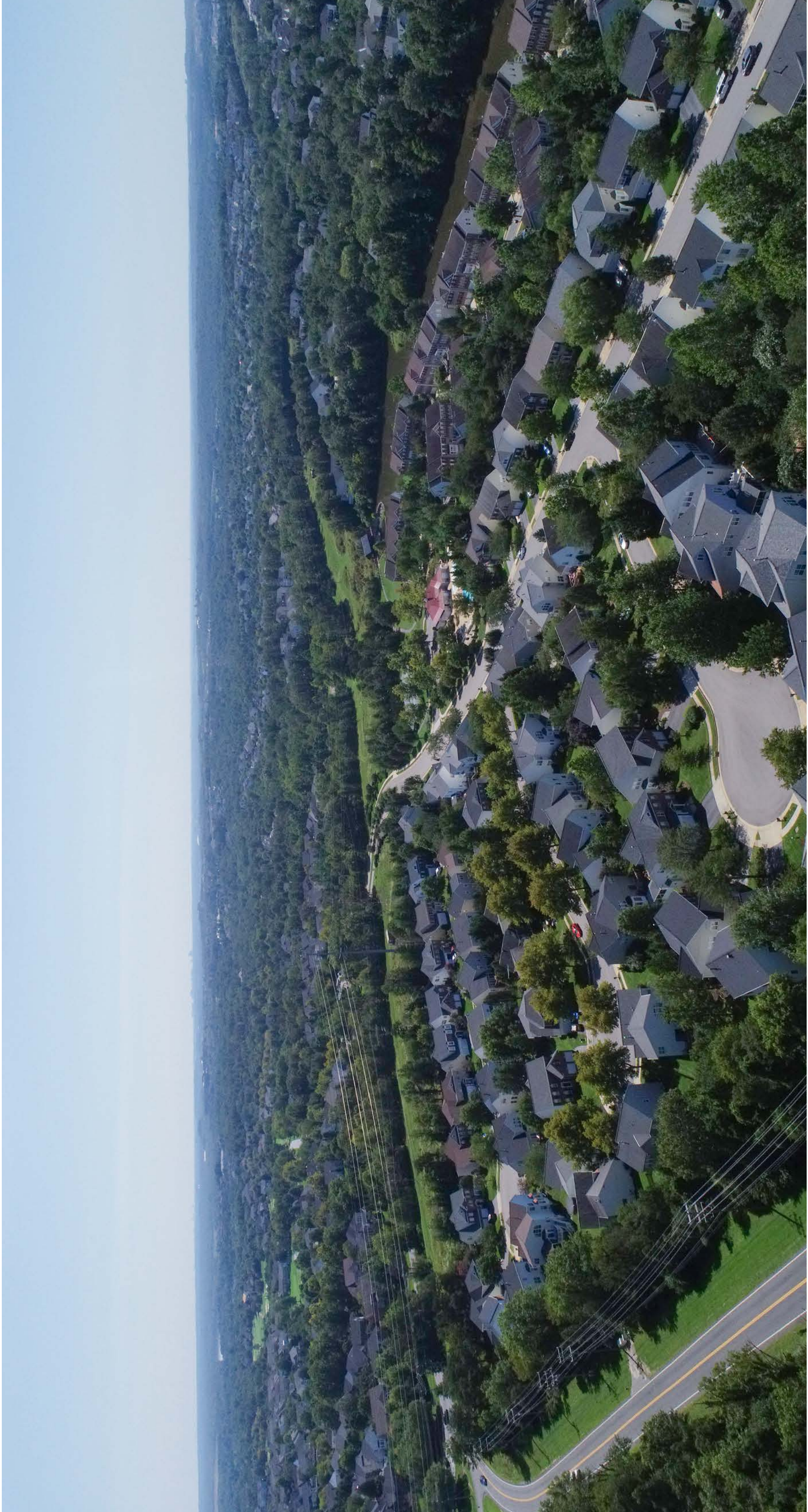


110

EXISTING Conditions



PROPOSED Conditions



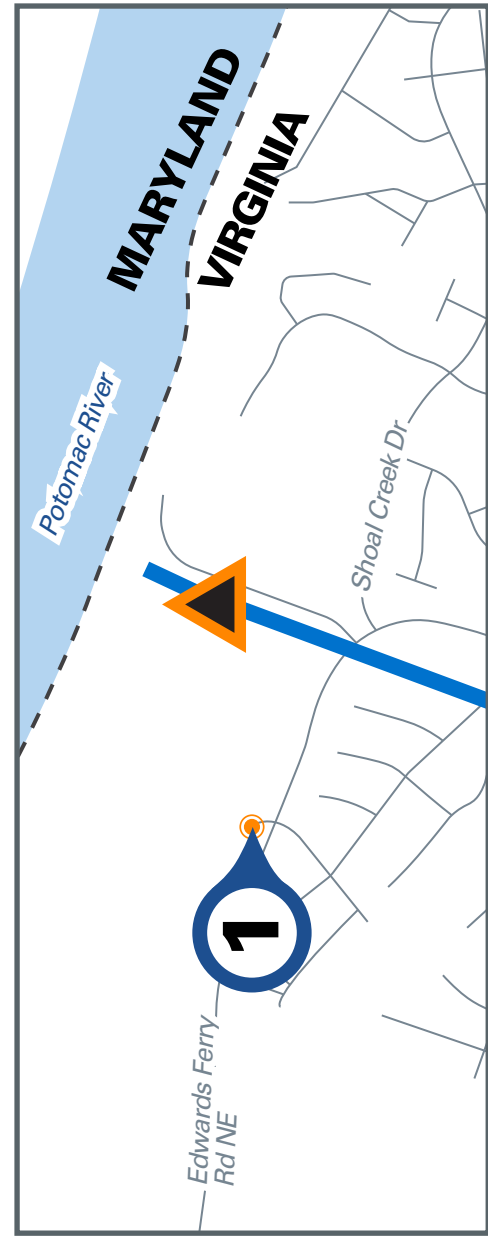
LINE 514

Rebuild Project

SIMULATION 1

Looking Southeast from an elevation of 446 feet on Edwards Ferry Road NE.

9/7/21 • 11:53 am



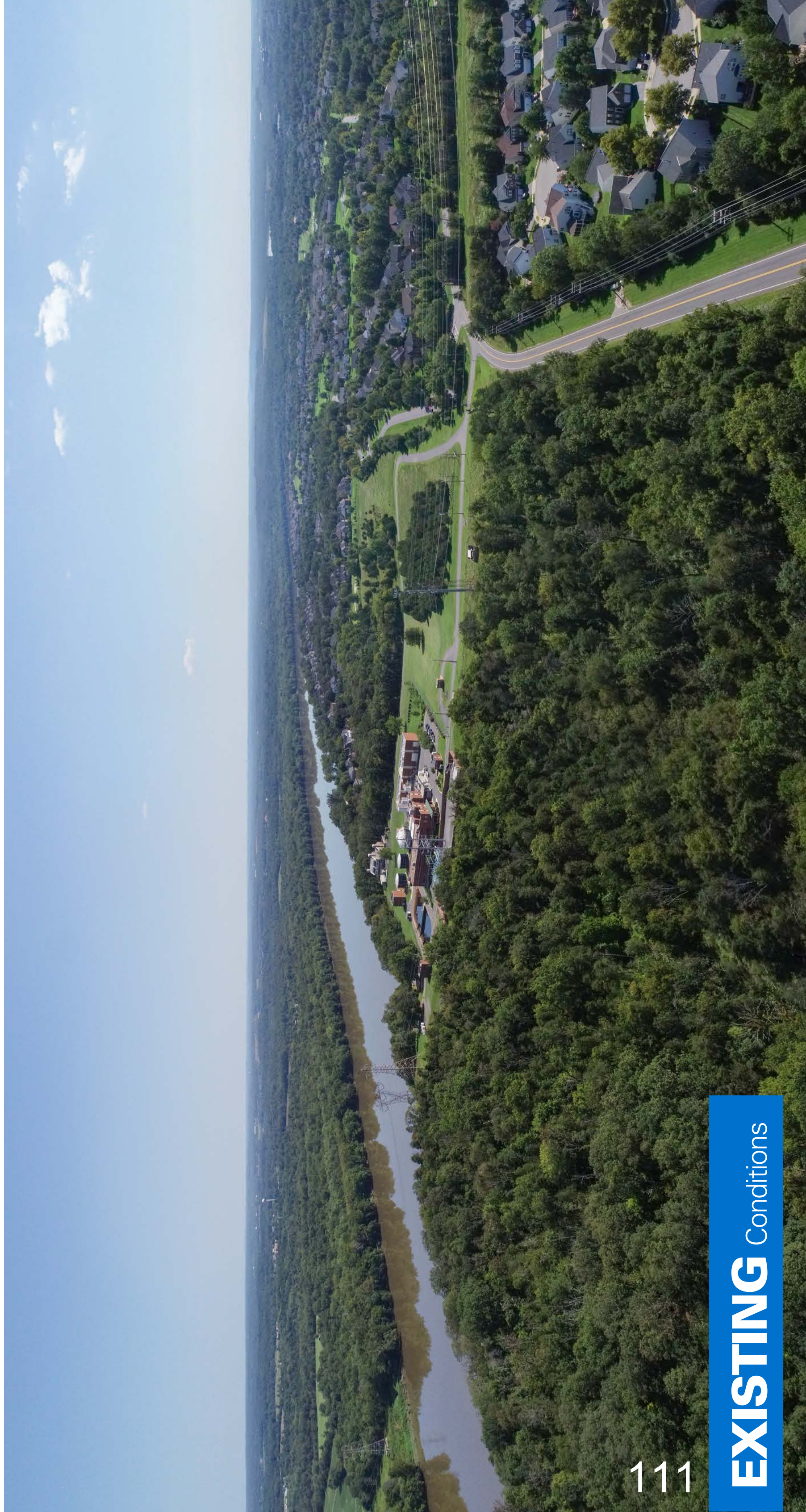
 **SUBSTATION**

 **TRANSMISSION LINE TO BE REBUILT**

 **PHOTO LOCATION**

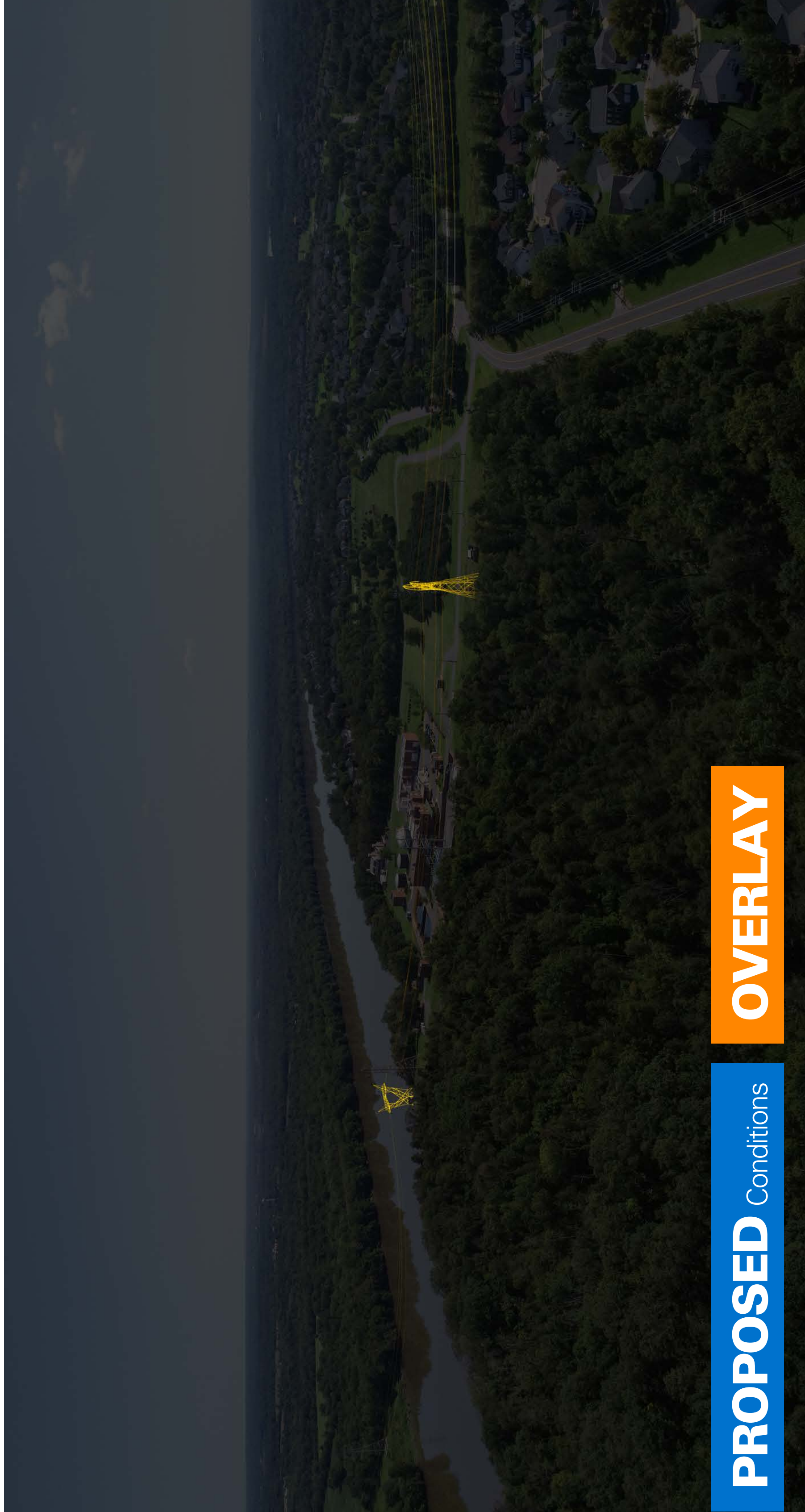


Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.



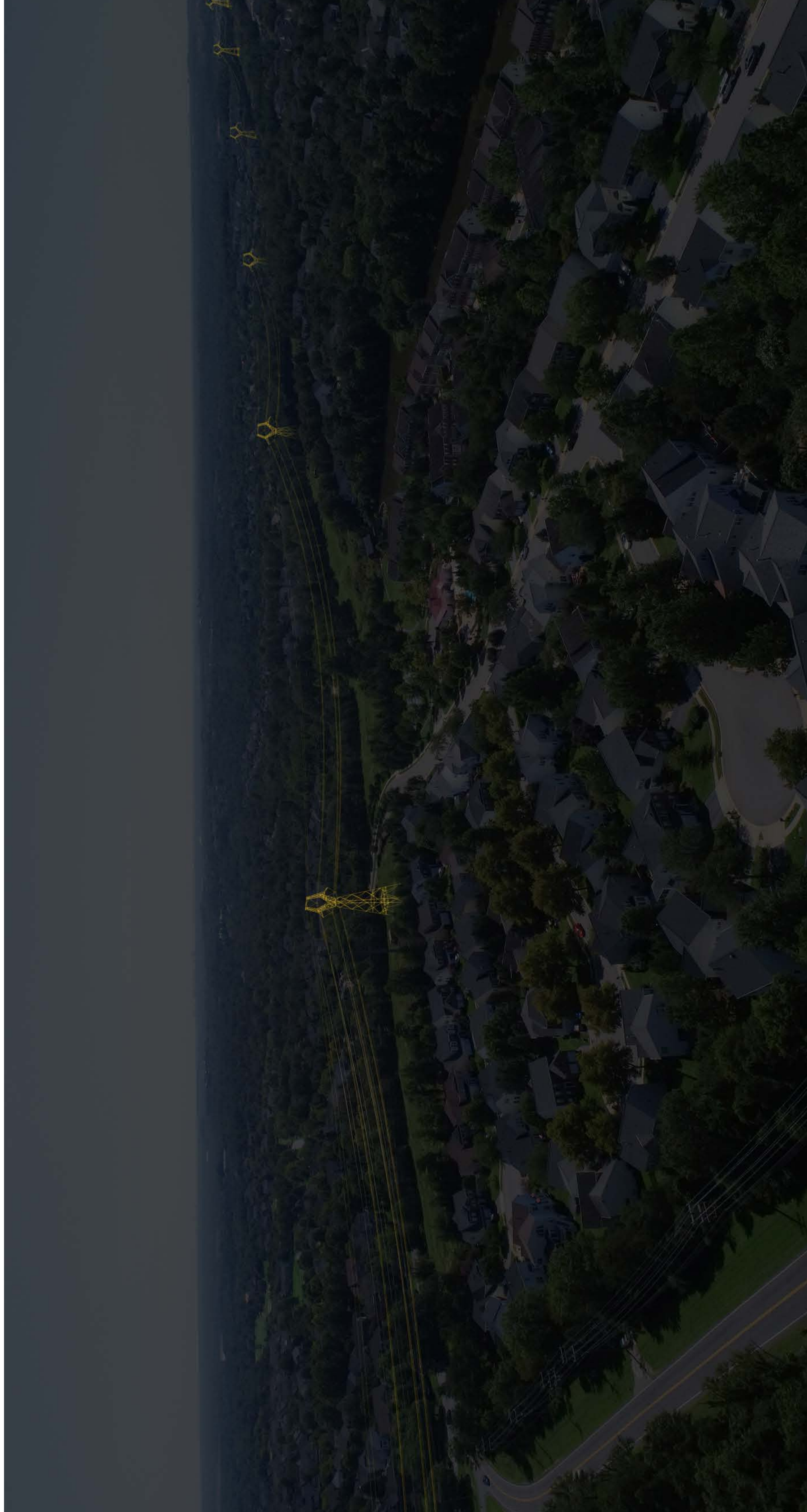
111

EXISTING Conditions



PROPOSED Conditions

OVERLAY



LINE 514

Rebuild Project

SIMULATION 2

Looking Northwest from the corner of Teaberry Drive and Colston Court.

9/7/21 • 12:59 pm

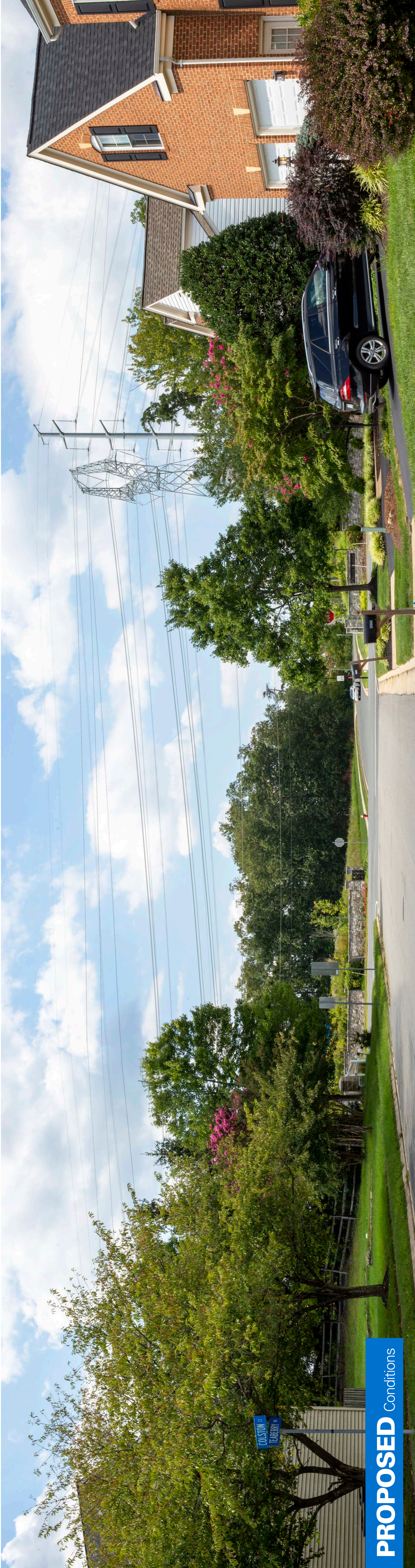


TRANSMISSION
LINE TO BE
REBUILT

PHOTO
LOCATION



Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.



LINE 514

Rebuild Project

SIMULATION 3

Looking Southeast from Potomac Station Drive
near John W. Tolbert Jr. Elementary School.
9/8/21 • 11:09 am



TRANSMISSION
LINE TO BE
REBUILT

PHOTO
LOCATION



Photo simulations are for discussion
purposes only. Final design is subject
to change pending public, engineering,
and regulatory review.



LINE 514

Rebuild Project

SIMULATION 4

Looking East from Invermere Drive NE.

9/7/21 • 1:31 pm

TRANSMISSION
LINE TO BE
REBUILT

PHOTO
LOCATION

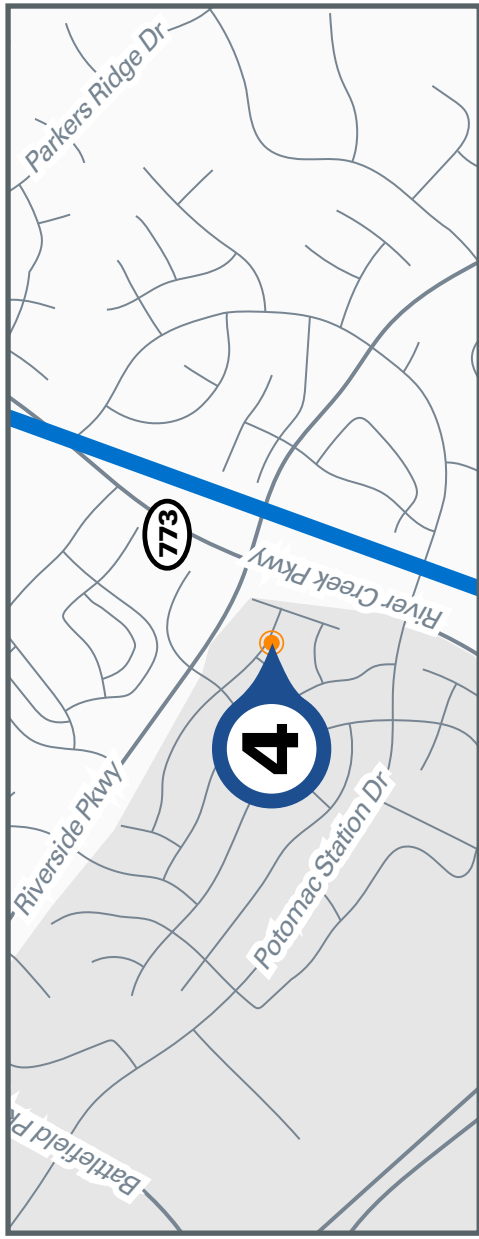


Photo simulations are for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.



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EXISTING Conditions



PROPOSED Conditions

LINE 514

Rebuild Project

SIMULATION 5

Looking Northeast from the corner of
Rivercreek Parkway and Market Street.
9/7/21 • 2:22 pm

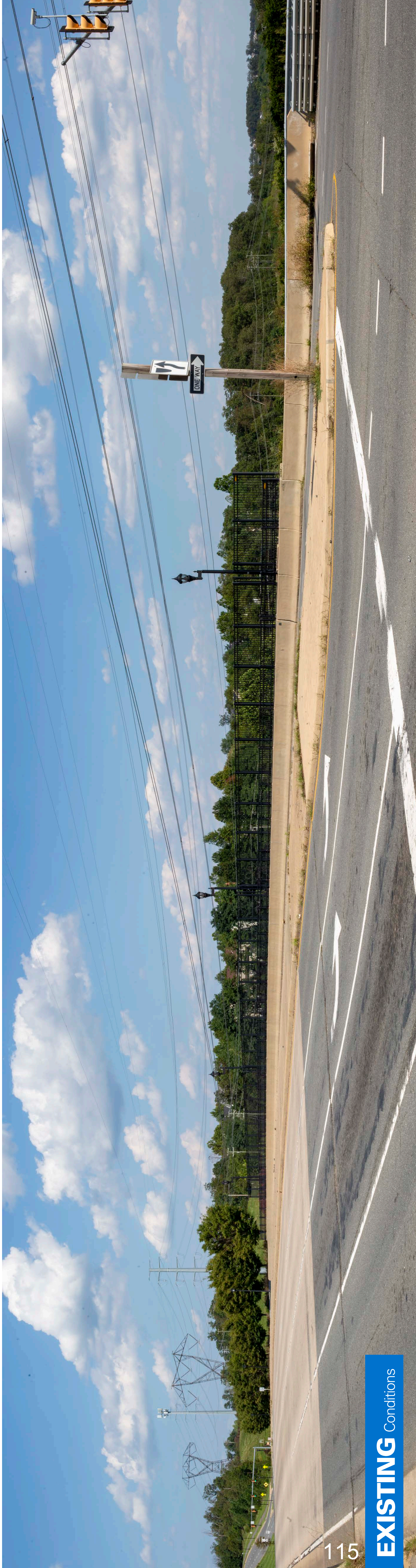


TRANSMISSION
LINE TO BE
REBUILT

PHOTO
LOCATION

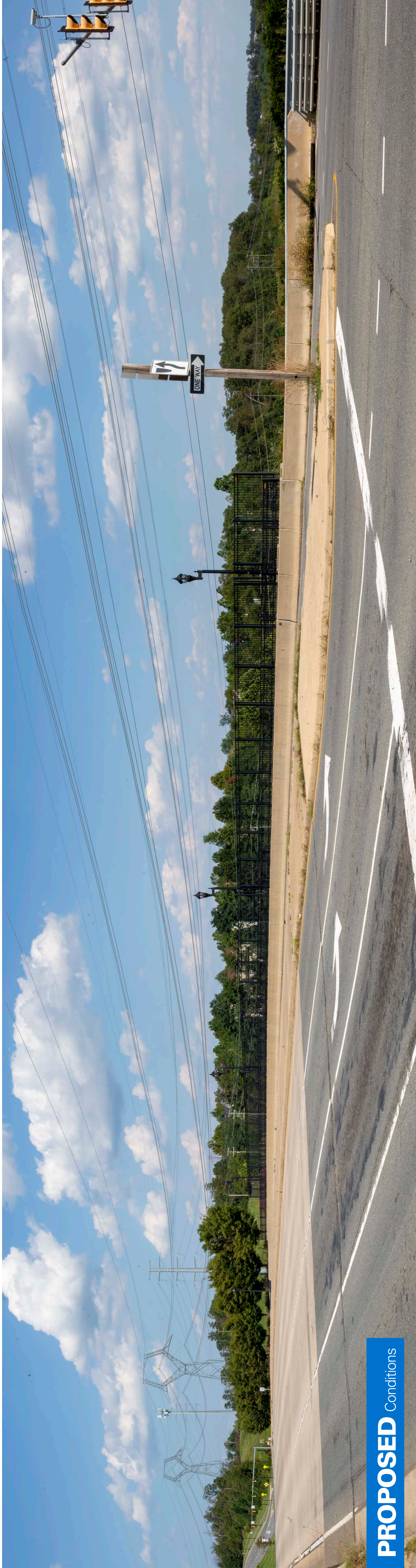


Photo simulations are for discussion
purposes only. Final design is subject
to change pending public, engineering,
and regulatory review.



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EXISTING Conditions



PROPOSED Conditions



Environmental Justice: Ongoing Commitment to Our Communities

At Dominion Energy, we are committed to providing reliable, affordable, clean energy in accordance with our values of safety, ethics, excellence, embrace change and team work. This includes listening to and learning all we can from the communities we are privileged to serve.

Our values also recognize that environmental justice considerations must be part of our everyday decisions, community outreach and evaluations as we move forward with projects to modernize the generation and delivery of energy.

To that end, communities should have a meaningful voice in our planning and development process, regardless of race, color, national origin, or income. Our neighbors should have early and continuing opportunities to work with us. We pledge to undertake collaborative efforts to work to resolve issues. We will advance purposeful inclusion to ensure a diversity of views in our public engagement processes.

Dominion Energy will be guided in meeting environmental justice expectations of fair treatment and sincere involvement by being inclusive, understanding, dedicated to finding solutions, and effectively communicating with our customers and our neighbors. We pledge to be a positive catalyst in our communities.

November 2018

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

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

Response: During the Company's review of the existing corridor, it identified approximately two unauthorized encroachments within the Partial Rebuild Project right-of-way. Both of these encroachments are debris in the easement. The encroachments will need to be addressed with the respective property owners as the Company continues to investigate the right-of-way.

In support of the Partial Rebuild Project, the Company will be reviewing the entire corridor width prior to construction and plans to address unauthorized encroachments and easement violations, as appropriate.

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

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

Response: For purposes of the proposed Partial Rebuild Project, the existing Line #514 is located on single circuit structures running parallel to Line #203, as well as parallel to Line #2098 for a portion of the route, within existing transmission line right-of-way extending approximately 2.8 miles between Structure #514/1854 (located two spans outside of the Company's existing Goose Creek Substation) and Structure #514/1841 (located at the Virginia-Maryland border), which is all within Loudoun County, Virginia. Construction of this section of Line #514 was completed in the 1960s and the easements for the transmission right-of-way have been in use since that time.

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

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

Response: The Company reviewed the *Loudoun County 2019 Comprehensive Plan* to evaluate the potential effect the Partial Rebuild Project could have on future development. The plans indicate that electric transmission lines should be located in areas that will minimize impacts on key travel corridors, sensitive cultural resources, and existing residential communities while existing transmission corridors should be used where possible to expand capacity. The Partial Rebuild Project is entirely within existing easement and would not affect land use. The Partial Rebuild Project is not expected to impact the character of this locality as the transmission corridor has been in use for at least 50 years and the structure heights are only increasing incrementally.

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

F. Government Bodies

- 1. Indicate if the Applicant determined from the governing bodies of each county, city and town in which the proposed facilities will be located whether those bodies have designated the important farmlands within their jurisdictions, as required by § 3.2-205 B of the Code.**
- 2. If so, and if any portion of the proposed facilities will be located on any such important farmland:**
 - a. Include maps and other evidence showing the nature and extent of the impact on such farmlands;**
 - b. Describe what alternatives exist to locating the proposed facilities on the affected farmlands, and why those alternatives are not suitable; and**
 - c. Describe the Applicant's proposals to minimize the impact of the facilities on the affected farmland.**

Response: 1. Loudoun County has not designated important farmlands under Va. Code § 3.2-205 B.

2. Not applicable.

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

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

- 1. Any district, site, building, structure, or other object included in the National Register of Historic Places maintained by the U.S. Secretary of the Interior;**
- 2. Any historic architectural, archeological, and cultural resources, such as historic landmarks, battlefields, sites, buildings, structures, districts or objects listed or determined eligible by the Virginia Department of Historic Resources (“DHR”);**
- 3. Any historic district designated by the governing body of any city or county;**
- 4. Any state archaeological site or zone designated by the Director of the DHR, or its predecessor, and any site designated by a local archaeological commission, or similar body;**
- 5. Any underwater historic assets designated by the DHR, or predecessor agency or board;**
- 6. Any National Natural Landmark designated by the U.S. Secretary of the Interior;**
- 7. Any area or feature included in the Virginia Registry of Natural Areas maintained by the Virginia Department of Conservation and Recreation (“DCR”);**
- 8. Any area accepted by the Director of the DCR for the Virginia Natural Area Preserves System;**
- 9. Any conservation easement or open space easement qualifying under §§ 10.1-1009 – 1016, or §§ 10.1-1700 – 1705, of the Code (or a comparable prior or subsequent provision of the Code);**
- 10. Any state scenic river;**
- 11. Any lands owned by a municipality or school district; and**
- 12. Any federal, state or local battlefield, park, forest, game or wildlife preserve, recreational area, or similar facility. Features, sites, and the like listed in 1 through 11 above need not be identified again.**

- Response:
1. There are no NRHP-listed resources within 500 feet of the centerline of the existing right-of-way for the Partial Rebuild Project.
 2. There are two NRHP-eligible resources crossed by the existing right-of-way:
 - 053-0276 Alexandria, Loudoun and Hampshire Railroad, and
 - 253-5182 Ball's Bluff Battlefield and National Cemetery Historic District Boundary Expansion.
 3. Loudoun County has designated six Historic and Cultural Conservation Districts (Aldie, Bluemont, Goose Creek, Oatlands, Taylorstown, and Waterford) and two County-administered Historic Site Districts (Welbourne and the Broad Run Toll House properties). None of these lie within or adjacent to the right-of-way.
 4. One archaeological site has been identified within the existing right-of-way and is potentially eligible for listing on the NRHP:
 - 44LD1341 Prehistoric Temporary Camp.
 5. None.
 6. None.
 7. None.
 8. None.
 9. There are two Northern Virginia Regional Park Authority conservation easements crossed by the existing right-of-way for the proposed Partial Rebuild Project, as shown in Attachment II.A.6.
 10. Scenic River Goose Creek is in close proximity to the right-of-way but does not lie within or adjacent to the Partial Rebuild Project right-of-way.
 11. None.
 12. The Partial Rebuild Project crosses through one park, Red Rock Wilderness Overlook Regional Park, and there is one additional park, Keep Loudoun Beautiful Park, within one half-mile. Other than those identified herein or listed in items 1 through 11, the existing right-of-way does not cross any federal or state parks or forests, game preserves, Wildlife Management Areas, Conservation Sites, or Managed Conservation Lands.

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

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

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

The FAA’s website (<https://oeaaa.faa.gov/oeaaa/external/portal.jsp>) was reviewed to identify airports within 10 nautical miles of the proposed Partial Rebuild Project. The following airports were identified:

- Leesburg Executive, approximately 1.25 miles west of Goose Creek Substation, and
- Washington Dulles International Airport, approximately 9.12 miles southeast of Goose Creek Substation.

Based on a preliminary review, impacts to air navigation are not anticipated but FAA filings are required for some of the proposed structures and construction cranes. The Company has filed for obstruction evaluation determinations for these structures.

The Company emailed the Virginia Department of Aviation (“DOAv”) on October 14, 2021, to advise the DOAv of the Partial Rebuild Project. Following its review of the proposed 500 kV Partial Rebuild Project, the DOAv determined that the proposed project area is within 20,000 linear feet of the Leesburg Executive Airport. Due to the proximity of the proposed Partial Rebuild Project to that airport, the DOAv indicated that an Airspace Study must be conducted by the FAA, and directed the Company to submit a 7460 form to the FAA. Provided a “Determination of No Hazard” is issued by the FAA, the DOAv indicated it had no objection to the Partial Rebuild Project as presented in the Company’s October 14, 2021 email. See Section 2.N of the DEQ Supplement.

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

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

Response: The existing right-of-way to be used for the Partial Rebuild Project does not cross any or is in close proximity to scenic Virginia byways. Use of the existing right-of-way minimizes or eliminates permanent incremental impacts at road crossings.

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

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

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

- Coordination with the Corps, DEQ, and the Virginia Department of Transportation (“VDOT”) will take place as appropriate to obtain necessary approvals for the Partial Rebuild Project.
- A letter dated October 14, 2021, was submitted to the County Administrator Loudoun County to describe the Partial Rebuild Project and request comment. See Section V.D. Additionally, the Company sent letters dated October 14, 2021, to the Supervisors in the Ashburn, Broad Run, and Catoctin Districts. See Attachment III.J.1
- A letter was submitted to the agencies listed in Section V.C on October 14, 2021, describing the Partial Rebuild Project and requesting comment. See Attachment 2 to the DEQ Supplement.
- A Stage I Pre-Application Analysis has been prepared and was submitted to VDHR. See Attachment 2.H.1 to the DEQ Supplement.
- In early October 2021, the Company solicited comments via letter from several federally recognized Native American tribes, including the Chickahominy, Eastern Chickahominy, Nansemond, Pamunkey, Rappahannock, and Upper Mattaponi, and several state recognized Native American tribes, including the Cheroenhaka, Mattaponi, Nottoway of Virginia, and Patawomeck. A copy of the letter template is included as Attachment III.J.2.

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

Dominion Energy Services, Inc.
120 Tredegar Street
Richmond, VA 23219
DominionEnergy.com



October 14, 2021

BY EMAIL

Mr. Michael R. Turner
Ashburn District Supervisor
P.O. Box 7000
Leesburg, VA 20177-7000

**RE: Dominion Energy Virginia's 500 kV Line #514 Partial Rebuild Project
Loudoun County, Virginia**

Dear Mr. Turner,

Dominion Energy Virginia (the "Company") is proposing the 500 kV Line #514 Partial Rebuild Project (the "Project") within Loudoun County, Virginia. The Project will replace aging infrastructure that is at the end of its service life in order to maintain the overall long-term reliability of its transmission system.

Specifically, the Company is proposing to rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-Goose Creek Line #514 from existing Structure #514/1854, which is not being replaced, located two spans outside of the Company's existing Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border.

The Company is in the process of preparing an application for a Certificate of Public Convenience and Necessity ("CPCN") from the State Corporation Commission ("SCC"). At this time, in advance of the SCC filing, the Company respectfully requests that you submit any comments or additional information on the proposed Project within 30 days of the date of this letter. If you would like to receive a GIS shapefile of the transmission line routes to assist in the project review or if there are any questions, please do not hesitate to contact me at (804) 239-6450 or charles.h.weil@dominionenergy.com.

We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Sincerely,

Dominion Energy Virginia

A handwritten signature in blue ink, appearing to read "Charles H. Weil".

Charles H. Weil, PE
Siting & Permitting Engineer, Electric Transmission

Attachment: Project Notice Map



October 14, 2021

BY EMAIL

Ms. Sylvia R. Glass
Broad Run District Supervisor
P.O Box 7000
Leesburg, VA 20177-7000

**RE: Dominion Energy Virginia's 500 kV Line #514 Partial Rebuild Project
Loudoun County, Virginia**

Dear Ms. Glass,

Dominion Energy Virginia (the "Company") is proposing the 500 kV Line #514 Partial Rebuild Project (the "Project") within Loudoun County, Virginia. The Project will replace aging infrastructure that is at the end of its service life in order to maintain the overall long-term reliability of its transmission system.

Specifically, the Company is proposing to rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-Goose Creek Line #514 from existing Structure #514/1854, which is not being replaced, located two spans outside of the Company's existing Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border.

The Company is in the process of preparing an application for a Certificate of Public Convenience and Necessity ("CPCN") from the State Corporation Commission ("SCC"). At this time, in advance of the SCC filing, the Company respectfully requests that you submit any comments or additional information on the proposed Project within 30 days of the date of this letter. If you would like to receive a GIS shapefile of the transmission line routes to assist in the project review or if there are any questions, please do not hesitate to contact me at (804) 239-6450 or charles.h.weil@dominionenergy.com.

We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Sincerely,

Dominion Energy Virginia

A handwritten signature in black ink, appearing to read "Charles H. Weil", written in a cursive style.

Charles H. Weil, PE
Siting & Permitting Engineer, Electric Transmission

Attachment: Project Notice Map



October 14, 2021

BY EMAIL

Mr. Caleb A. Kershner
Broad Run District Supervisor
P.O Box 7000
Leesburg, VA 20177-7000

**RE: Dominion Energy Virginia's 500 kV Line #514 Partial Rebuild Project
Loudoun County, Virginia**

Dear Mr. Kershner,

Dominion Energy Virginia (the "Company") is proposing the 500 kV Line #514 Partial Rebuild Project (the "Project") within Loudoun County, Virginia. The Project will replace aging infrastructure that is at the end of its service life in order to maintain the overall long-term reliability of its transmission system.

Specifically, the Company is proposing to rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-Goose Creek Line #514 from existing Structure #514/1854, which is not being replaced, located two spans outside of the Company's existing Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border.

The Company is in the process of preparing an application for a Certificate of Public Convenience and Necessity ("CPCN") from the State Corporation Commission ("SCC"). At this time, in advance of the SCC filing, the Company respectfully requests that you submit any comments or additional information on the proposed Project within 30 days of the date of this letter. If you would like to receive a GIS shapefile of the transmission line routes to assist in the project review or if there are any questions, please do not hesitate to contact me at (804) 239-6450 or charles.h.weil@dominionenergy.com.

We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Sincerely,

Dominion Energy Virginia

A handwritten signature in black ink, appearing to read "Charles H. Weil".

Charles H. Weil, PE
Siting & Permitting Engineer, Electric Transmission

Attachment: Project Notice Map

Figure No.
V.A.

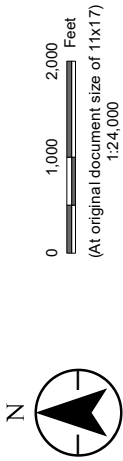
Title
Notification Map

Client/Project
Dominion Energy Virginia
500 kV Line # 514 Partial Rebuild Project

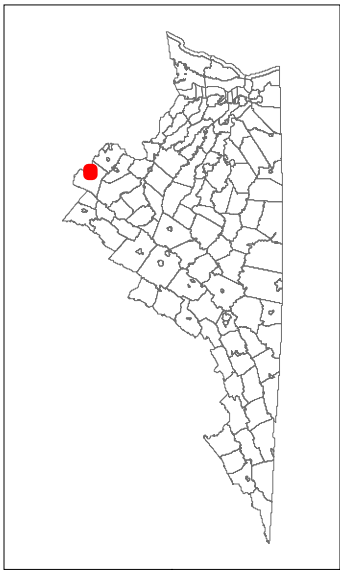
203401646

Project Location
Loudoun County, Virginia

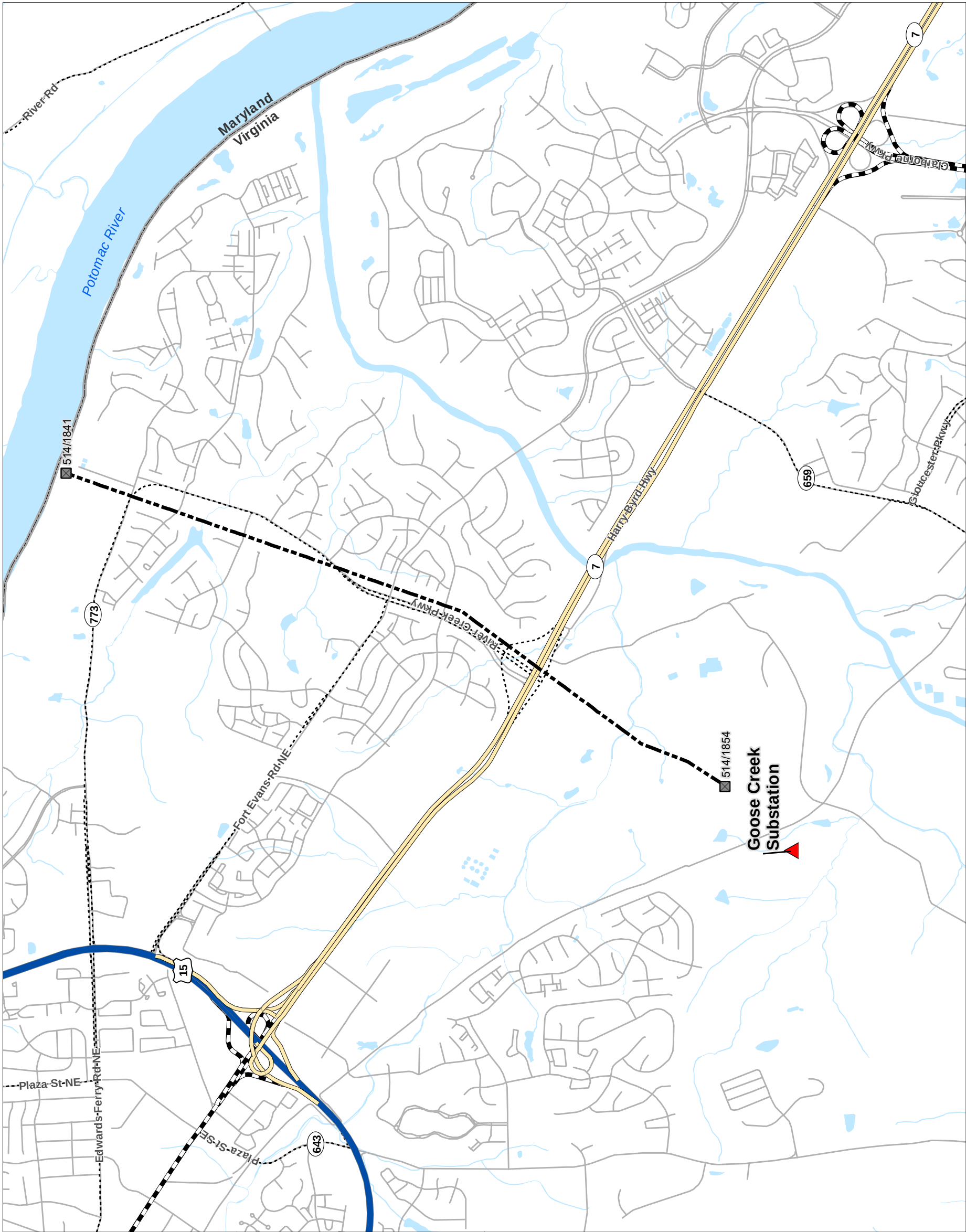
Prepared by MGS on 2021-07-09
TR by TPS on 2021-09-03
IR by CPQ on 2021-09-02



- Substation
- Beginning/Endpoint Structures
- 500 kV Line # 514 Partial Rebuild Project Centerline
- Other Major Road
- Secondary Road
- Local Connecting Road
- Important Local Road
- Street



Notes
1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Data Sources: Dominion Energy Virginia, Stantec, ESRI, DCR, NADS, USFWS National Wetlands Inventory (NWI) and USGS National Hydrography Dataset (NHD)



Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261-6666
DominionEnergy.com



Oct. 5, 2021

Line 514 Goose Creek – Doubs 500 kV Electric Transmission Line Rebuild Project

Dear _____:

At Dominion Energy, we are dedicated to finding the best solution for our long-term needs in the communities we serve. As a valued stakeholder with a vested interest in the community, we invite you to participate in the development of a 3-mile 500 kilovolt (kV) electric transmission line project in Loudoun County, Virginia.

After nearly five decades of service, the structures and related components are at the end of their service life and need to be replaced to maintain reliability for our customers. We plan to replace existing lattice structures and overhead conductor for an approximately 3.1-mile section from Goose Creek Substation north to the Potomac River.

Construction is scheduled to begin in September 2023 with an anticipated completion date of June 2024.

We are currently in the conceptual phase and are seeking input as we prepare to submit an application with the Virginia State Corporation Commission (SCC) later this year. Doing so allows us to hear any concerns you may have as we work to meet the needs of the project. To see a project overview map and photo simulations of the project, please visit our webpage at DominionEnergy.com/goosecreek.

Due to the ongoing public health concerns resulting from the spread of the coronavirus, we do not plan to host formal community open house events at this time. In lieu of our traditional in-person meetings, we will hold a virtual community meeting Oct. 14, 2021 from 5-6 p.m. You can find meeting details as well as project information on our project webpage.

If you would like any additional information, have questions, or would like to set up a meeting to discuss the project, please do not hesitate to contact Ken Custalow, our Tribal Liaison. He can be reached by email at ken.custalow@dominionenergy.com. Thank you for your willingness to join us in our commitment to serving the community.

Sincerely,

A handwritten signature in black ink that reads "Robert E. Richardson".

Robert Richardson
Communications Consultant
The Electric Transmission Project Team
Robert.E.Richardson@DominionEnergy.com
(804) 248-1698

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

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

Response: In early October 2021, the Company solicited comments via letter from the community leaders, environmental groups, business groups identified below. A copy of the letter template is included as Attachment III.K.1.

Name	Organization
Ms. Elizabeth S. Kostelny	Preservation Virginia
Mr. Jack Gary	Council of Virginia Archaeologists
Ms. Leighton Powell	Scenic Virginia
Ms. Sharee Williamson	National Trust for Historic Preservation
Mr. Dan Holmes	Piedmont Environmental Council
Mr. Thomas Gilmore	Civil War Trust
Mr. Jim Campri	Civil War Trust
Mr. Adam Gillenwater	Civil War Trust
Ms. Kym Hall	Colonial National Historical Park
Mr. Alexander Macaulay	Attorney, Macaulay and Jamerson
Dr. Newby Alexander	Professor of History – Norfolk State University
Mary Frances Wilkerson	Cheroenhaka (Nottoway) India Tribe
Mr. Dave Dutton	Dutton and Associates, LLC

Dominion Energy Virginia
Electric Transmission
P.O. Box 26666, Richmond, VA 23261-6666
DominionEnergy.com



Oct. 5, 2021

Line 514 Goose Creek – Doubs 500 kV Electric Transmission Line Rebuild Project

Dear _____:

At Dominion Energy, we are dedicated to finding the best solution for our long-term needs in the communities we serve. As a valued stakeholder with a vested interest in the community, we invite you to participate in the development of a 3-mile 500 kilovolt (kV) electric transmission line project in Loudoun County, Virginia.

After nearly five decades of service, the structures and related components are at the end of their service life and need to be replaced to maintain reliability for our customers. We plan to replace existing lattice structures and overhead conductor from Goose Creek Substation north to the Potomac River.

Construction is scheduled to begin in September 2023 with an anticipated completion date of June 2024.

We are currently in the conceptual phase and are seeking input as we prepare to submit an application with the Virginia State Corporation Commission (SCC) later this year. Doing so allows us to hear any concerns you may have as we work to meet the needs of the project. To see a project overview map and photo simulations, please visit our webpage at DominionEnergy.com/goosecreek.

Please feel free to notify other relevant organizations that may have an interest in the project area. For reference, recipients of this letter include other county and statewide historic, cultural and scenic organizations and Native American Tribes.

Due to the ongoing public health concerns resulting from the spread of the coronavirus, we do not plan to host formal community open house events at this time. In lieu of our traditional in-person meetings, we will hold a virtual community meeting Oct. 14, 2021 from 5-6 p.m. You can find meeting details, as well as project information, on our project webpage.

If you would like any additional information, have questions, or would like to set up a meeting to discuss the project, please contact me by sending an email to Robert.E.Richardson@dominionenergy.com or calling 888-291-0190.

Thank you for your willingness to join in our commitment to serving the community.

Sincerely,

A handwritten signature in black ink that reads "Robert E. Richardson".

Rob Richardson
Communications Consultant
The Electric Transmission Project Team

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

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

Response: See table below for potential permits anticipated for the proposed Partial Rebuild Project.

Potential Permits

Activity	Permit	Agency
Impacts to wetlands and waters of the U.S.	Nationwide Permit 57	U.S. Army Corps of Engineers
Impacts to wetlands and waters of the state	Virginia Water Protection Permit	Virginia Department of Environmental Quality
Encroachment over subaqueous bottom	VMRC	Virginia Marine Resources Commission
Discharge of Stormwater from Construction	Construction General Permit	Virginia Department of Environmental Quality
Work within VDOT right-of-way	Land Use Permit	Virginia Department of Transportation
Construction near an airport	Form 7460-1	Federal Aviation Administration

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS (“EMF”)

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

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

This section describes the levels of EMF associated with the existing transmission line. EMF levels are provided for both historical (2020) and future (2024) annual average and maximum (peak) loading conditions.

Existing lines – Historical average loading

EMF levels were calculated for the existing lines at the **historical average** load condition (576 amps for Line #203, 125 amps for Line #2098, and 412 amps for Line #514) and at an operating voltage of 242, 242 and 525 kV when supported on the existing structures – see [Attachment II.A.5.a](#).

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at an historical average load operating temperature.

EMF levels at the edge of the rights-of-way for the existing lines at the historical average loading:

	Left Edge Looking Towards Goose Creek		Right Edge Looking Towards Goose Creek	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
Attachment II.A.5.a	0.099	16.718	2.845	23.350

Existing lines – Historical peak loading

EMF levels were calculated for the existing line at the **historical peak** load condition (2294 amps for Line #203, 177 amps for Line #2098, and 1233 amps for

Line #514) and at an operating voltage of 242, 242 and 525 kV when supported on the existing structures – see [Attachment II.A.5. a.](#)

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a historical peak load operating temperature.

EMF levels at the edge of the rights-of-way for the existing lines at the historical peak loading:

Attachment	Left Edge Looking Towards Goose Creek		Right Edge Looking Towards Goose Creek	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
II.A.5.a	0.077	78.685	2.841	70.053

Proposed Project – Historical average loading

EMF levels were calculated for the proposed Partial Rebuild Project at the **historical average** load condition (576 amps for Line #203, 125 amps for Line #2098, and 412 amps for Line #514) and at an operating voltage of 242, 242 and 525 kV when supported on the proposed Partial Rebuild Project structures – see [Attachment II.A.5.b.](#)

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a historical average load operating temperature.

EMF levels at the edge of the rights-of-way for the proposed Partial Rebuild Project at the historical average loading:

Attachment	Left Edge Looking Towards Goose Creek		Right Edge Looking Towards Goose Creek	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
II.A.5.b	0.132	16.504	2.481	15.896

Proposed Project – Historical peak loading

EMF levels were calculated for the proposed Partial Rebuild Project at the **historical peak** load condition (2294 amps for Line #203, 177 amps for Line #2098,

and 1233 amps for Line #514) and at an operating voltage of 242, 242 and 525 kV when supported on the proposed Partial Rebuild Project structures – see [Attachment II.A.5.b](#).

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a historical peak load operating temperature.

EMF levels at the edge of the rights-of-way for the proposed Partial Rebuild Project at the historical peak loading:

Attachment	Left Edge Looking Towards Goose Creek		Right Edge Looking Towards Goose Creek	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
II.A.5.b	0.112	77.846	2.485	46.418

Proposed Project – Projected average loading in 2024

EMF levels were calculated for the proposed Partial Rebuild Project at the **projected average** load condition (603 amps for Line #203, 131 amps for Line #2098, and 480 amps for Line #514) and at an operating voltage of 242, 242, and 525 kV when supported on the proposed Partial Rebuild Project structures – see [Attachment II.A.5. b](#).

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a projected average load operating temperature.

EMF levels at the edge of the rights-of-way for the proposed Partial Rebuild Project at the projected average loading:

Attachment	Left Edge Looking Towards Goose Creek		Right Edge Looking Towards Goose Creek	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
II.A.5.b	0.131	17.078	2.482	18.658

Proposed Project – Projected Peak loading in 2024

EMF levels were calculated for the proposed Partial Rebuild Project at the **projected peak** load condition (2400 amps for Line #203, 185 amps for Line #2098, and 1287 amps for Line #514) and at an operating voltage of 242, 242 and 525 kV

when supported on the proposed Partial Rebuild Project structures – see Attachments II.A.5.b.

These field levels were calculated at mid-span where the conductors are closest to the ground and the conductors are at a projected peak load operating temperature.

EMF levels at the edge of the rights-of-way for the proposed Partial Rebuild Project at the projected peak loading:

Attachment	Left Edge Looking Towards Goose Creek		Right Edge Looking Towards Goose Creek	
	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)	<u>Electric Field</u> (kV/m)	<u>Magnetic Field</u> (mG)
<u>II.A.5.b</u>	0.111	81.940	2.485	48.439

IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS (“EMF”)

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

Response: The conclusions of multidisciplinary scientific review panels assembled by national and international scientific agencies during the past two decades are the foundation of the Company’s opinion that no adverse health effects will result from the operation of the proposed Partial Rebuild Project. Each of these panels has evaluated the scientific research related to health and power-frequency EMF and provided conclusions that form the basis of guidance to governments and industries. The Company regularly monitors the recommendations of these expert panels to guide their approach to EMF.

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

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

The most recent reviews on this topic include the 2015 report by SCENIHR and annual reviews published by SSM (*e.g.*, for the years 2015 through 2021). These reports, similar to previous reviews, found that the scientific evidence does not

confirm the existence of any adverse health effects caused by environmental or community exposure to EMF.

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

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

References

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IV. HEALTH ASPECTS OF ELECTROMAGNETIC FIELDS (“EMF”)

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

- 1. Became available for consideration since the completion of the Virginia Department of Health’s most recent review of studies on EMF and its subsequent report to the Virginia General Assembly in compliance with 1985 Senate Joint Resolution No. 126;**
- 2. Include findings regarding EMF that have not been reported previously and/or provide substantial additional insight into findings; and**
- 3. Have been subjected to peer review.**

Response: The Virginia Department of Health (“VDH”) conducted its most recent review and issued its report on the scientific evidence on potential health effects of extremely low frequency (“ELF”) EMF in 2000: “[T]he Virginia Department of Health is of the opinion that there is no conclusive and convincing evidence that exposure to extremely low frequency EMF emanated from nearby high voltage transmission lines is causally associated with an increased incidence of cancer or other detrimental health effects in humans.”¹⁵

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

- The WHO, which published one of the most comprehensive and detailed reviews of the relevant scientific peer-reviewed literature in 2007;
- SCENIHR, a committee of the European Commission, which published its assessments in 2009 and 2015;
- The SSM, which has published annual reviews of the relevant peer-reviewed scientific literature since 2003, with its most recent review published in 2021; and,
- EFHRAN, which published its reviews in 2010 and 2012.

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

¹⁵ See <http://www.vdh.virginia.gov/content/uploads/sites/12/2016/02/highfinal.pdf>.

comprehensive review of the literature by SCENIHR, published in 2015, concluded that “no mechanisms have been identified and no support is existing [*sic*] from experimental studies that could explain these findings, which, together with shortcomings of the epidemiological studies prevent a causal interpretation” (SCENIHR, 2015, p. 16).

While research is continuing on multiple aspects of EMF exposure and health, many of the recent publications have focused on an epidemiologic assessment of the relationship between EMF exposure and childhood leukemia and EMF exposure and neurodegenerative diseases. Of these, the following recent publications, published following the inclusion date (June 2014) for the SCENIHR (2015) report through May 2021, provided additional evidence and contributed to clarification of previous findings. Overall, new research studies have not provided evidence to alter the previous conclusions of scientific and health organizations, including the WHO and SCENIHR.

Recent epidemiologic studies of EMF and childhood leukemia include:

- Bunch et al. (2015) assessed the potential association between residential proximity to high-voltage underground cables and development of childhood cancer in the United Kingdom largely using the same epidemiologic data as in a previously published study on overhead transmission lines (Bunch et al., 2014). No statistically significant associations or trends were reported with either distance to underground cables or calculated magnetic fields from underground cables for any type of childhood cancers.
- Pedersen et al. (2015) published a case-control study that investigated the potential association between residential proximity to power lines and childhood cancer in Denmark. The study included all cases of leukemia (n=1,536), central nervous system tumor, and malignant lymphoma (n=417) diagnosed before the age of 15 between 1968 and 2003 in Denmark, along with 9,129 healthy control children matched on sex and year of birth. Considering the entire study period, no statistically significant increases were reported for any of the childhood cancer types.
- Salvan et al. (2015) compared measured magnetic-field levels in the bedroom for 412 cases of childhood leukemia under the age of 10 and 587 healthy control children in Italy. Although the statistical power of the study was limited because of the small number of highly exposed subjects, no consistent statistical associations or trends were reported between measured magnetic-field levels and the occurrence of leukemia among children in the study.
- Bunch et al. (2016) and Swanson and Bunch (2018) published additional analyses using data from an earlier study (Bunch et al., 2014). Bunch et al. (2016) reported that the association with distance to power lines observed in earlier years was linked to calendar year of birth or year of cancer diagnosis, rather than the age of the power lines. Swanson and Bunch (2018) re-analyzed

data using finer exposure categories (e.g., cut-points of every 50-meter distance) and broader groupings of diagnosis date (e.g., 1960-1979, 1980-1999, and 2000-on) and reported no overall associations between exposure categories and childhood leukemia for the later periods (1980 and on), and consistent pattern for the periods prior to 1980.

- Crespi et al. (2016) conducted a case-control epidemiologic study of childhood cancers and residential proximity to high-voltage power lines (60 kilovolts [“kV”] to 500 kV) in California. Childhood cancer cases, including 5,788 cases of leukemia and 3,308 cases of brain tumor, diagnosed under the age of 16 between 1986 and 2008, were identified from the California Cancer Registry. Controls, matched on age and sex, were selected from the California Birth Registry. Overall, no consistent statistically significant associations for leukemia or brain tumor and residential distance to power lines were reported.
- Kheifets et al. (2017) assessed the relationship between calculated magnetic-field levels from power lines and development of childhood leukemia within the same study population evaluated in Crespi et al. (2016). In the main analyses, which included 4,824 cases of leukemia and 4,782 controls matched on age and sex, the authors reported no consistent patterns, or statistically significant associations between calculated magnetic-field levels and childhood leukemia development. Similar results were reported in subgroup and sensitivity analyses. In two subsequent studies, Amoon et al. (2018a, 2019) examined the potential impact of residential mobility (i.e., moving residences between birth and diagnosis) on the associations reported in Crespi et al. (2016) and Kheifets et al. (2017). Amoon et al. (2018a) concluded that changing residences was not associated with either calculated magnetic-field levels or proximity to the power lines, while Amoon et al. (2019) concluded that while uncontrolled confounding by residential mobility had some impact on the association between EMF exposure and childhood leukemia, it was unlikely to be the primary driving force behind the previously reported associations in Crespi et al. (2016) and Kheifets et al. (2017).
- Amoon et al. (2018b) conducted a pooled analysis of 29,049 cases and 68,231 controls from 11 epidemiologic studies of childhood leukemia and residential distance from high-voltage power lines. The authors reported no statistically-significant association between childhood leukemia and proximity to transmission lines of any voltage. Among subgroup analyses, the reported associations were slightly stronger for leukemia cases diagnosed before 5 years of age and in study periods prior to 1980. Adjustment for various potential confounders (e.g., socioeconomic status, dwelling type, residential mobility) had little effect on the estimated associations.
- Kyriakopoulou et al. (2018) assessed the association between childhood acute leukemia and parental occupational exposure to social contacts, chemicals, and electromagnetic fields. The study was conducted at a major pediatric hospital in Greece and included 108 cases and 108 controls matched for age, gender,

and ethnicity. Statistically non-significant associations were observed between paternal exposure to magnetic fields and childhood acute leukemia for any of the exposure periods examined (1 year before conception; during pregnancy; during breastfeeding; and from birth until diagnosis); maternal exposure was not assessed due to the limited sample size. No associations were observed between childhood acute leukemia and exposure to social contacts or chemicals.

- Auger et al. (2019) examined the relationship between exposure to EMF during pregnancy and risk of childhood cancer in a cohort of 784,000 children born in Québec. Exposure was defined using residential distance to the nearest high-voltage transmission line or transformer station. The authors reported statistically non-significant associations between proximity to transformer stations and any cancer, hematopoietic cancer, or solid tumors. No associations were reported with distance to transmission lines.
- Crespi et al. (2019) investigated the relationship between childhood leukemia and distance from high-voltage lines and calculated magnetic-field exposure, separately and combined, within the California study population previously analyzed in Crespi et al. (2016) and Kheifets et al. (2017). The authors reported that neither close proximity to high-voltage lines nor exposure to calculated magnetic fields alone were associated with childhood leukemia; an association was observed only for those participants who were both close to high-voltage lines (< 50 meters) and had high calculated magnetic fields (≥ 0.4 microtesla [i.e., ≥ 4 milligauss]). No associations were observed with low-voltage power lines (< 200 kV). In a subsequent study, Amoon et al. (2020) examined the potential impact of dwelling type on the associations reported in Crespi et al. (2019). Amoon et al. (2020) concluded that while the type of dwelling at which a child resides (e.g., single-family home, apartment, duplex, mobile home) was associated with socioeconomic status and race or ethnicity, it was not associated with childhood leukemia and did not appear to be a potential confounder in the relationship between childhood leukemia and magnetic-field exposure in this study population.
- Swanson et al. (2019) conducted a meta-analysis of 41 epidemiologic studies of childhood leukemia and magnetic-field exposure published between 1979 and 2017 to examine trends in childhood leukemia development over time. The authors reported that while the estimated risk of childhood leukemia initially increased during the earlier period, a statistically non-significant decline in estimated risk has been observed from the mid-1990s until the present (i.e., 2019).
- Talibov et al. (2019) conducted a pooled analysis of 9,723 cases and 17,099 controls from 11 epidemiologic studies to examine the relationship between parental occupational exposure to magnetic fields and childhood leukemia. No statistically significant association was found between either paternal or maternal exposure and leukemia (overall or by subtype). No associations were observed in the meta-analyses.

- Núñez-Enríquez et al. (2020) assessed the relationship between residential magnetic-field exposure and B-lineage acute lymphoblastic leukemia (“B-ALL”) in children under 16 years of age in Mexico. The study included 290 cases and 407 controls matched on age, gender, and health institution; magnetic-field exposure was assessed through the collection of 24-hour measurements in the participants’ bedrooms. While the authors reported some statistically significant associations between elevated magnetic-field levels and development of B-ALL, the results were dependent on the chosen cut-points.
- Seomun et al. (2021) performed a meta-analysis based on 33 previously published epidemiologic studies investigating the potential relationship between magnetic-field exposure and childhood cancers, including leukemia and brain cancer. For childhood leukemia, the authors reported statistically significant associations with some, but not all, of the chosen cut-points for magnetic-field exposure. The associations between magnetic-field exposure and childhood brain cancer were statistically non-significant. The study provided limited new insight as most of the studies included in the current meta-analysis, were included in previously conducted meta- and pooled analyses.

Recent epidemiologic studies of EMF and neurodegenerative diseases include:

- Seelen et al. (2014) conducted a population-based case-control study in the Netherlands and included 1,139 cases diagnosed with amyotrophic lateral sclerosis (“ALS”) between 2006 and 2013 and 2,864 frequency-matched controls. The shortest distance from the case and control residences to the nearest high-voltage power line (50 to 380 kilovolts [kV]) was determined by geocoding. No statistically significant associations between residential proximity to power lines with voltages of either 50 to 150 kV or 220 to 380 kV and ALS were reported.
- Sorahan and Mohammed (2014) analyzed mortality from neurodegenerative diseases in a cohort of approximately 73,000 electricity supply workers in the United Kingdom. Cumulative occupational exposure to magnetic-fields was calculated for each worker in the cohort based on their job titles and job locations. Death certificates were used to identify deaths from neurodegenerative diseases. No associations or trends for any of the included neurodegenerative diseases (Alzheimer’s disease, Parkinson’s disease, and ALS) were observed with various measures of calculated magnetic fields.
- Koeman et al. (2015, 2017) analyzed data from the Netherlands Cohort Study of approximately 120,000 men and women who were enrolled in the cohort in 1986 and followed up until 2003. Lifetime occupational history, obtained through questionnaires, and job-exposure matrices on ELF magnetic fields and other occupational exposures were used to assign exposure to study subjects. Based on 1,552 deaths from vascular dementia, the researchers reported a statistically not significant association of vascular dementia with estimated exposure to metals, chlorinated solvents, and ELF magnetic fields. However,

because no exposure-response relationship for cumulative exposure was observed and because magnetic fields and solvent exposures were highly correlated with exposure to metals, the authors attributed the association with ELF magnetic fields and solvents to confounding by exposure to metals (Koeman et al., 2015). Based on a total of 136 deaths from ALS among the cohort members, the authors reported a statistically significant, approximately two-fold association with ELF magnetic fields in the highest exposure category. This association, however, was no longer statistically significant when adjusted for exposure to insecticides (Koeman et al., 2017).

- Fischer et al. (2015) conducted a population-based case-control study that included 4,709 cases of ALS diagnosed between 1990 and 2010 in Sweden and 23,335 controls matched to cases on year of birth and sex. The study subjects' occupational exposures to ELF magnetic fields and electric shocks were classified based on their occupations, as recorded in the censuses and corresponding job-exposure matrices. Overall, neither magnetic fields nor electric shocks were related to ALS.
- Vergara et al. (2015) conducted a mortality case-control study of occupational exposure to electric shock and magnetic fields and ALS. They analyzed data on 5,886 deaths due to ALS and over 58,000 deaths from other causes in the United States between 1991 and 1999. Information on occupation was obtained from death certificates and job-exposure matrices were used to categorize exposure to electric shocks and magnetic fields. Occupations classified as "electric occupations" were moderately associated with ALS. The authors reported no consistent associations for ALS, however, with either electric shocks or magnetic fields, and they concluded that their findings did not support the hypothesis that exposure to either electric shocks or magnetic fields explained the observed association of ALS with "electric occupations."
- Pedersen et al. (2017) investigated the occurrence of central nervous system diseases among approximately 32,000 male Danish electric power company workers. Cases were identified through the national patient registry between 1982 and 2010. Exposure to ELF magnetic fields was determined for each worker based on their job titles and area of work. A statistically significant increase was reported for dementia in the high exposure category when compared to the general population, but no exposure-response pattern was identified, and no similar increase was reported in the internal comparisons among the workers. No other statistically significant increases among workers were reported for the incidence of Alzheimer's disease, Parkinson's disease, motor neuron disease, multiple sclerosis, or epilepsy, when compared to the general population, or when incidence among workers was analyzed across estimated exposure levels.
- Vinceti et al. (2017) examined the association between ALS and calculated magnetic-field levels from high-voltage power lines in Italy. The authors included 703 ALS cases and 2,737 controls; exposure was assessed based on

residential proximity to high-voltage power lines. No statistically significant associations were reported, and no exposure-response trend was observed. Similar results were reported in subgroup analyses by age, calendar period of disease diagnosis, and study area.

- Checkoway et al. (2018) investigated the association between Parkinsonism¹⁶ and occupational exposure to magnetic fields and several other agents (endotoxins, solvents, shift work) among 800 female textile workers in Shanghai. Exposure to magnetic fields was assessed based on the participants' work histories. The authors reported no statistically significant associations between Parkinsonism and occupational exposure to any of the agents under study, including magnetic fields.
- Gunnarsson and Bodin (2018) conducted a meta-analysis of occupational risk factors for ALS. The authors reported a statistically significant association between occupational exposures to EMF, estimated using a job-exposure matrix, and ALS among the 11 studies included. Statistically significant associations were also reported between ALS and jobs that involve working with electricity, heavy physical work, exposure to metals (including lead) and chemicals (including pesticides), and working as a nurse or physician. The authors reported some evidence for publication bias. In a subsequent publication, Gunnarsson and Bodin (2019) updated their previous meta-analysis to also include Parkinson's disease and Alzheimer's disease. A slight, statistically significant association was reported between occupational exposure to EMF and Alzheimer's disease; no association was observed for Parkinson's disease.
- Huss et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of ALS and occupational exposure to magnetic fields. The authors reported a weak overall association; a slightly stronger association was observed in a subset analysis of six studies with full occupational histories available. The authors noted substantial heterogeneity among studies, evidence for publication bias, and a lack of a clear exposure-response relationship between exposure and ALS.
- Jalilian et al. (2018) conducted a meta-analysis of 20 epidemiologic studies of occupational exposure to magnetic fields and Alzheimer's disease. The authors reported a moderate, statistically significant overall association; however, they noted substantial heterogeneity among studies and evidence for publication bias.
- Rösli and Jalilian (2018) performed a meta-analysis using data from five epidemiologic studies examining residential exposure to magnetic fields and

¹⁶ Parkinsonism is defined by Checkoway et al. (2018) as “a syndrome whose cardinal clinical features are bradykinesia, rest tremor, muscle rigidity, and postural instability. Parkinson disease is the most common neurodegenerative form of [parkinsonism]” (p. 887).

ALS. A statistically non-significant negative association was reported between ALS and the highest exposed group, where exposure was defined based on distance from power lines or calculated magnetic-field level.

- Gervasi et al. (2019) assessed the relationship between residential distance to overhead power lines in Italy and risk of Alzheimer's dementia and Parkinson's disease. The authors included 9,835 cases of Alzheimer's dementia and 6,810 cases of Parkinson's disease; controls were matched by sex, year of birth, and municipality of residence. A weak, statistically non-significant association was observed between residences within 50 meters of overhead power lines and both Alzheimer's dementia and Parkinson's disease, compared to distances of over 600 meters.
- Peters et al. (2019) examined the relationship between ALS and occupational exposure to both magnetic fields and electric shock in a pooled study of data from three European countries. The study included 1,323 ALS cases and 2,704 controls matched for sex, age, and geographic location; exposure was assessed based on occupational title and defined as low (background), medium, or high. Statistically significant associations were observed between ALS and ever having been exposed above background levels to either magnetic fields or electric shocks; however, no clear exposure-response trends were observed with exposure duration or cumulative exposure. The authors also noted significant heterogeneity in risk by study location.
- Filippini et al. (2020) investigated the associations between ALS and several environmental and occupational exposures, including electromagnetic fields, within a case-control study in Italy. The study included 95 cases and 135 controls matched on age, gender, and residential province; exposure to electromagnetic fields was assessed using the participants' responses to questions related to occupational use of electric and electronic equipment, occupational EMF exposure, and residential distance to overhead power lines. The authors reported a statistically significant association between ALS and residential proximity to overhead power lines and a statistically non-significant association between ALS and occupational exposure to EMF; occupational use of electric and electronic equipment was associated with a statistically non-significant decrease in ALS development.
- Huang et al. (2020) conducted a meta-analysis of 43 epidemiologic studies examining potential occupational risk factors for dementia or mild cognitive impairment. The authors included five cohort studies and seven case-control studies related to magnetic-field exposure. For both study types, the authors reported positive associations between dementia and work-related magnetic-field exposures. The paper, however, provided no information on the occupations held by the study participants, their magnetic-field exposure levels, or how magnetic-field levels were assessed; therefore, the results are difficult to interpret. The authors also reported a high level of heterogeneity among

studies. Thus, this analysis adds little, if any, to the overall weight of evidence on a potential association between dementia and magnetic fields.

- Jalilian et al. (2020) conducted a meta-analysis of ALS and occupational exposure to both magnetic fields and electric shocks within 27 studies from Europe, the United States, and New Zealand. A weak, statistically significant association was reported between magnetic-field exposure and ALS; however, the authors noted evidence of study heterogeneity and publication bias. No association was observed between ALS and electric shocks.
- Chen et al. (2021) conducted a case-control study to examine the association between occupational exposure to electric shocks, magnetic fields, and motor neuron disease (“MND”) in New Zealand. The study included 319 cases with a MND diagnosis (including ALS) and 604 controls, matched on age and gender; exposure was assessed using the participants’ occupational history questionnaire responses and previously developed job-exposure matrices for electric shocks and magnetic fields. The authors reported no associations between MND and exposure to magnetic fields; positive associations were reported between MND and working at a job with the potential for electric shock exposure.

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Sorahan T and Mohammed N. Neurodegenerative disease and magnetic field exposure in UK electricity supply workers. *Occup Med (Lond)* 64: 454-460, 2014.

Swanson J and Bunch KJ. Reanalysis of risks of childhood leukaemia with distance from overhead power lines in the UK. *J Radiol Prot* 38: N30-N35, 2018.

Swanson J, Kheifets L, and Vergara X. Changes over time in the reported risk for childhood leukaemia and magnetic fields. *J Radiol Prot* 39:470-488, 2019.

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

Talibov M, Olsson A, Bailey H, Erdmann F, Metayer C, Magnani C, Petridou E, Auvinen A, Spector L, Clavel J, Roman E, Dockerty J, Nikkila A, Lohi O, Kang A, Psaltopoulou T, Miligi L, Vila J, Cardis E, Schüz J. Parental occupational exposure to low-frequency magnetic fields and risk of leukaemia in the offspring: findings from the Childhood Leukaemia International Consortium (CLIC). *Occup Environ Med* 76:746-753, 2019.

Vergara X, Mezei G, Kheifets L. Case-control study of occupational exposure to electric shocks and magnetic fields and mortality from amyotrophic lateral sclerosis in the US, 1991-1999. *J Expo Sci Environ Epidemiol* 25: 65-71, 2015.

Vinceti M, Malagoli C, Fabbi S, Kheifets L, Violi F, Poli M, Caldara S, Sesti D, Violanti S, Zanichelli P, Notari B, Fava R, Arena A, Calzolari R, Filippini T, Iacuzio L, Arcolin E, Mandrioli J, Fini N, Odone A, Signorelli C, Patti F, Zappia M, Pietrini V, Oleari P, Teggi S, Ghermandi G, Dimartino A, Ledda C, Mauceri C, Sciacca S, Fiore M, Ferrante M. Magnetic fields exposure from high-voltage power lines and risk of amyotrophic lateral sclerosis in two Italian populations. *Amyotroph Lateral Scler Frontotemporal Degener* 18: 583-589, 2017.

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

V. NOTICE

- A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project. For all routes that the Applicant proposed to be noticed, provide minimum, maximum and average structure heights.**

Response: A map showing the existing route to be used for the Partial Rebuild Project is provided as Attachment V.A. A written description of the route is as follows:

The proposed route of the 500 kV Line #514 Partial Rebuild Project is located within an existing approximately 2.8-mile right-of-way currently occupied at various portions of the route by two overhead 230 kV transmission lines, and one existing 500 kV overhead transmission line. The existing transmission line right-of-way for the proposed route of the Partial Rebuild Project, which is 250 feet wide, originates at existing Structure #514/1854 (which is not being replaced) located two spans outside of the Company's Goose Creek Substation in Loudoun County, Virginia, on the south side of East Market Street, and continues approximately 2.8 miles in a northern direction along the existing right-of-way, concluding at Structure #514/1841, located at the Virginia-Maryland border in Loudoun County, Virginia, on the northeast side of Edwards Ferry Road NE.

For the proposed Partial Rebuild Project, 12 single circuit 500 kV weathering steel lattice towers and 1 single circuit 500 kV galvanized H-frame structure supporting the existing Line #514 are proposed to be replaced with 13 single circuit 500 kV chemically dulled, galvanized steel lattice towers. The minimum proposed structure height is approximately 114 feet, the maximum proposed structure height is approximately 154 feet, and the average proposed structure height is approximately 135 feet, based on preliminary conceptual design, excluding foundation reveal and subject to change based on final engineering design.

Figure No.
V.A.

Title
Notification Map

Client/Project
Dominion Energy Virginia
500 kV Line # 514 Partial Rebuild Project

203-01646

Project Location
Loudoun County, Virginia

Prepared by MGS on 2021-07-09
TR by TPS on 2021-09-03
IR by CPG on 2021-09-02

N

0 1,000 2,000 Feet
(At original document size of 11x17)
1:24,000

Substation

Beginning/Endpoint Structures

500 kV Line # 514 Partial Rebuild Project Centerline

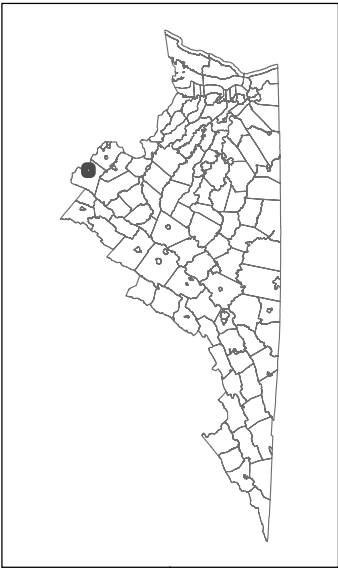
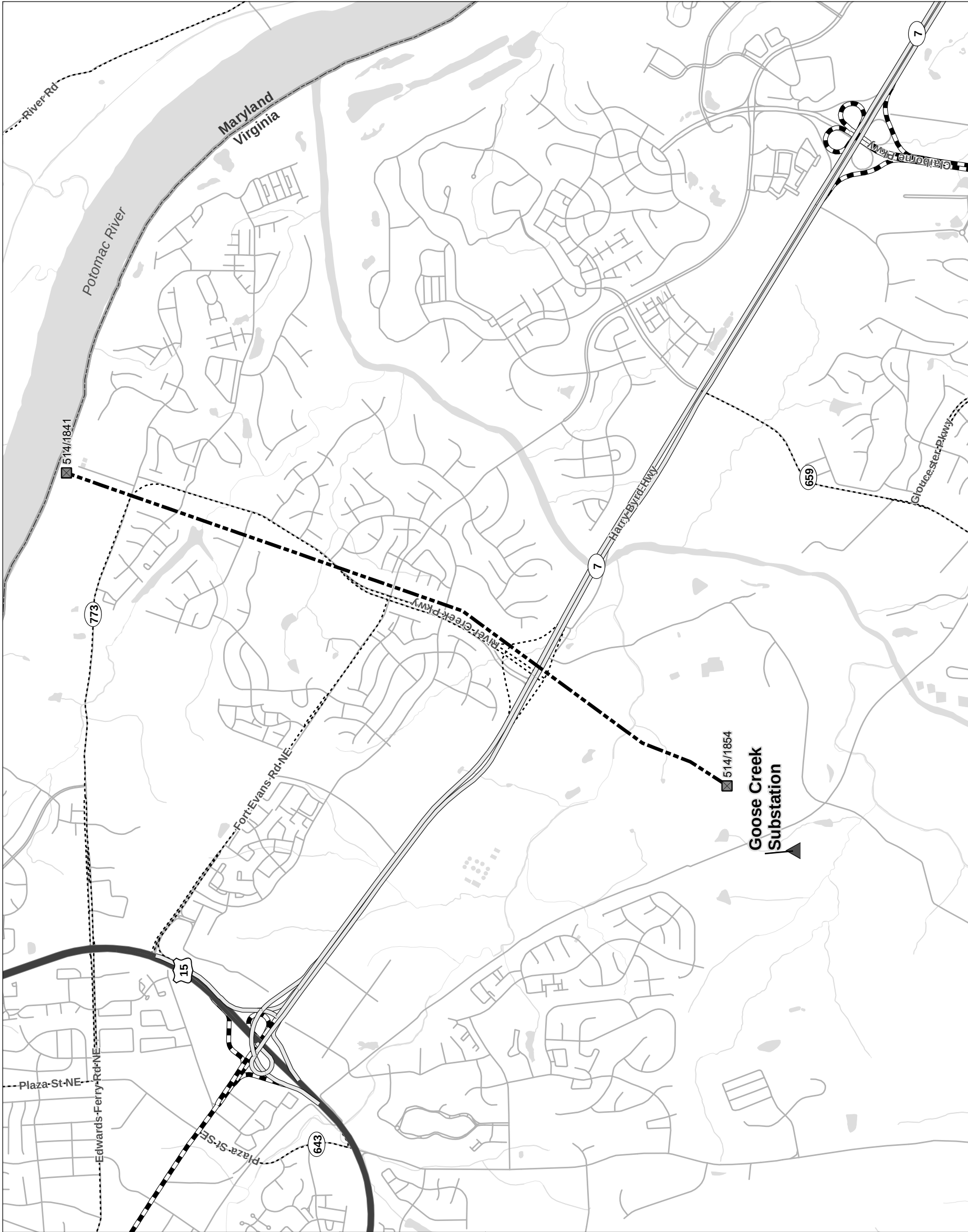
Other Major Road

Secondary Road

Local Connecting Road

Important Local Road

Street



Notes
1. Data Source: MGS
2. Data Source: USFWS National Wetlands Inventory (NWI) and USGS National Hydrography Dataset (NHD)



V. NOTICE

- B. List Applicant offices where members of the public may inspect the application. If applicable, provide a link to website(s) where the application may be found.**

Response: Due to COVID-19, the Application will be made available electronically for public inspection at <https://www.dominionenergy.com/line514>.

V. NOTICE

- C. List all federal, state, and local agencies and/or officials that may reasonably be expected to have an interest in the proposed construction and to whom the Applicant has furnished or will furnish a copy of the application.**

Response: Ms. Bettina Rayfield
Department of Environmental Quality
Office of Environmental Impact Review
P.O. Box 1105
Richmond, Virginia 23218

Ms. S. Rene Hypes
Virginia Department of Conservation and Recreation
Division of Natural Heritage
600 East Main Street, Suite 1400
Richmond, Virginia 23219

Ms. Robbie Rhur
Department of Conservation and Recreation, Planning Bureau
600 East Main Street, 17th Floor
Richmond, Virginia 23219

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

Ms. Amy M. Ewing
Virginia Department of Wildlife Resources
P.O. Box 90778
Henrico, Virginia 23228

Mr. Keith Tignor
Endangered Plant and Insect Species Program
Virginia Department of Agriculture and Consumer Affairs
102 Governor Street
Richmond, Virginia 23219

Mr. Terry Lasher
Virginia Department of Forestry, Forestland Conservation Division
900 Natural Resources Drive, Suite 800
Charlottesville, Virginia 22903

Mr. Mark Eversole
Virginia Marine Resources Commission
Habitat Management Division
Building 96, 380 Fenwick Road
Ft. Monroe, Virginia 23651

Mr. Troy Andersen
US Fish and Wildlife Service
Virginia Field Office, Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Mr. Brian Nolan
Planning & Development Director
Northern Virginia Regional Park Authority
5400 Ox Road
Fairfax Station, Virginia 22039

Regulator of the Day
US Army Corps of Engineers
Norfolk District – Western Section
803 Front Street
Norfolk, Virginia 23510

Ms. Martha Little
Deputy Director
Virginia Outdoor Foundation
600 East Main Street, Suite 402
Richmond, Virginia 23219

Mr. Mike Helvey
Federal Aviation Administration
FAA Eastern Regional Office
800 Independence Avenue, SW
Room 400 East
Washington D.C. 20591

Mr. Scott Denny
Virginia Department of Aviation
Airport Services Division
5702 Gulfstream Road
Richmond, Virginia 23250

Mr. Kumal Suliman
Regional Operations Director
Virginia Department of Transportation
Northern Virginia District Office
4975 Alliance Drive
Fairfax, Virginia 22030

Ms. Helen Cuervo
Northern Virginia District Engineer
Virginia Department of Transportation
Northern Virginia District Office
4975 Alliance Drive
Fairfax, Virginia 22030

Mr. Tim Hemstreet
Loudoun County Administrator
P.O. Box 7000
Leesburg, Virginia 20177

V. NOTICE

- D. If the application is for a transmission line with a voltage of 138 kV or greater, provide a statement and any associated correspondence indicating that prior to the filing of the application with the SCC the Applicant has notified the chief administrative officer of every locality in which it plans to undertake construction of the proposed line of its intention to file such an application, and that the Applicant gave the locality a reasonable opportunity for consultation about the proposed line (similar to the requirements of § 15.2-2202 of the Code for electric transmission lines of 150 kV or more).**

Response: In accordance with Va. Code §15.2-2202 E, a letter dated October 14, 2021, was delivered to Mr. Tim Hemstreet, Administrator of Loudoun County, where the Partial Rebuild Project is located. The letter stated the Company's intention to file this Application and invited the County to consult with the Company about the Partial Rebuild Project. This letter is included as Attachment V.D.1. The Company received a response letter from Loudoun County dated November 15, 2021. This response letter is included as Attachment V.D.2.

Dominion Energy Services, Inc.
120 Tredegar Street
Richmond, VA 23219
DominionEnergy.com



October 14, 2021

Mr. Tim Hemstreet
Loudoun County Administrator
1 Harrison Street SE
5th Floor
Leesburg, VA 20175

**RE: Dominion Energy Virginia's 500 kV Line #514 Partial Rebuild Project
Loudoun County, Virginia**

Dear Mr. Hemstreet,

Dominion Energy Virginia (the "Company") is proposing the 500 kV Line #514 Partial Rebuild Project (the "Project") within Loudoun County, Virginia. The Project will replace aging infrastructure that is at the end of its service life in order to maintain the overall long-term reliability of its transmission system.

Specifically, the Company is proposing to rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-Goose Creek Line #514 from existing Structure #514/1854, which is not being replaced, located two spans outside of the Company's existing Goose Creek Substation to Structure #514/1841 located at the Virginia-Maryland border.

The Company is in the process of preparing an application for a Certificate of Public Convenience and Necessity ("CPCN") from the State Corporation Commission ("SCC"). At this time, in advance of the SCC filing, the Company respectfully requests that you submit any comments or additional information on the proposed Project within 30 days of the date of this letter. If you would like to receive a GIS shapefile of the transmission line routes to assist in the project review or if there are any questions, please do not hesitate to contact me at (804) 239-6450 or charles.h.weil@dominionenergy.com.

We appreciate your assistance with this project review and look forward to any additional information you may have to offer.

Sincerely,

Dominion Energy Virginia

A handwritten signature in black ink, appearing to read 'Charles H. Weil', written in a cursive style.

Charles H. Weil, PE
Siting & Permitting Engineer, Electric Transmission

Attachment: Project Notice Map

Figure No.
V.A.

Title
Notification Map

Client/Project
Dominion Energy Virginia
500 kV Line # 514 Partial Rebuild Project

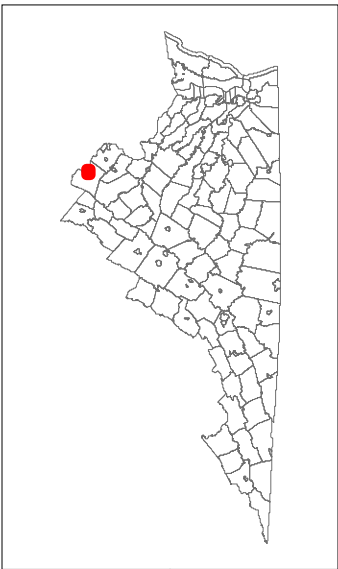
203.401.646

Project Location
Loudoun County, Virginia

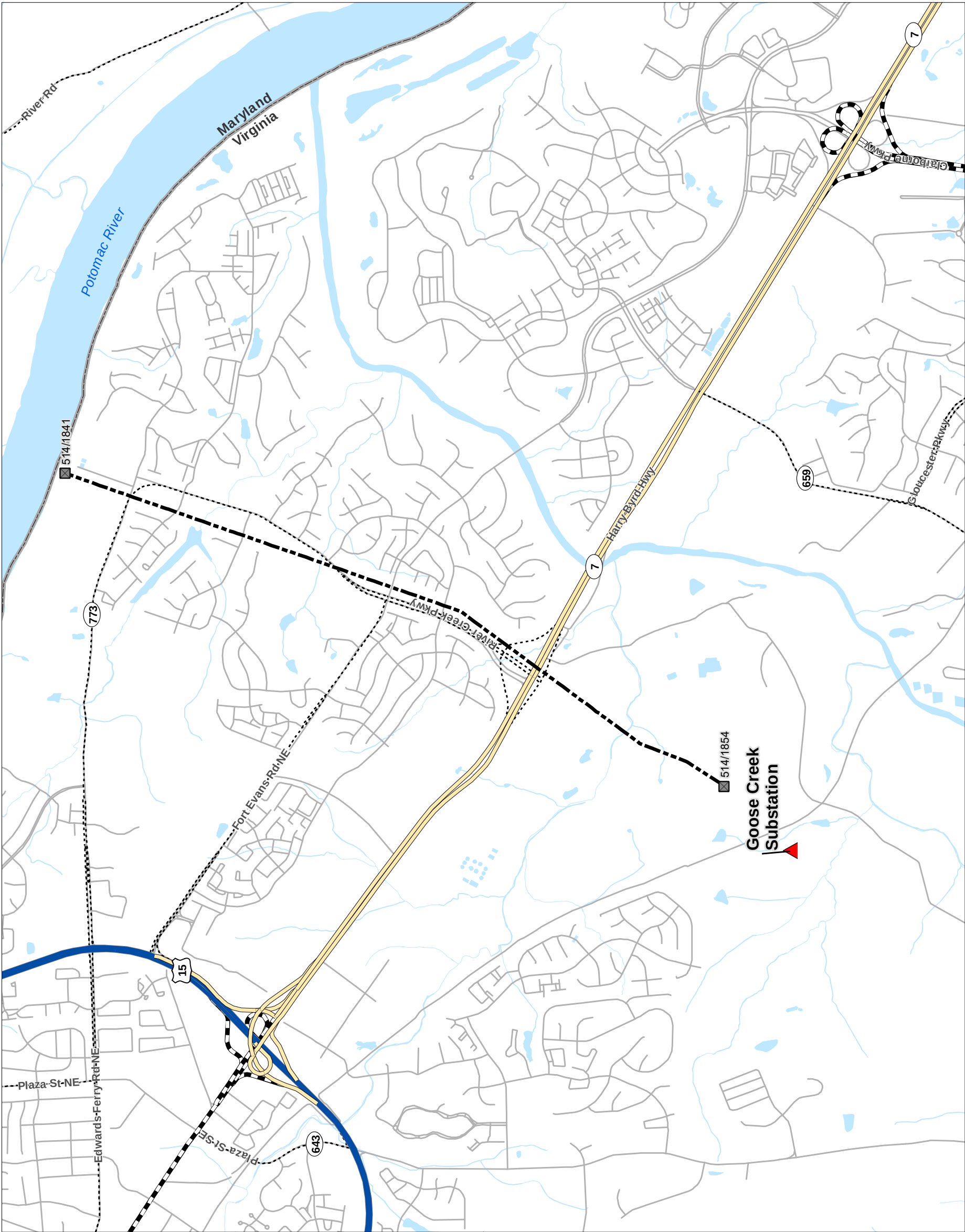
Prepared by MGS on 2021-07-09
TR by TPS on 2021-09-03
IR by CPQ on 2021-09-02



- Substation
- Beginning/Endpoint Structures
- 500 kV Line # 514 Partial Rebuild Project Centerline
- Other Major Road
- Secondary Road
- Local Connecting Road
- Important Local Road
- Street



Notes
1. Coordinate System: NAD 1983 StatePlane Virginia North FIPS 4501 Feet
2. Data Sources: Dominion Energy Virginia, Stantec, ESRI, DCR, NADS, USFWS National Wetlands Inventory (NWI) and USGS National Hydrography Dataset (NHD)





Loudoun County

VIRGINIA

Office of the County Administrator

1 Harrison Street, SE, PO Box 7000, Leesburg, VA 20177-7000
 703-777-0200 O | 703-777-0421 F | coadmin@loudoun.gov
loudoun.gov/coadmin

November 15, 2021

Charles H. Weil, PE
 Siting & Permitting Engineer, Electric Transmission
 Dominion Energy Virginia
 120 Tredegar Street
 Richmond, VA 23219

Re: Dominion Energy Virginia 500 kV Line #514 Partial Rebuild Project

Dear Mr. Weil:

Thank you for the opportunity to provide comments regarding the Dominion Energy Virginia 500 kV Line #514 Partial Rebuild Project in advance of the application for a Certificate of Public Convenience and Necessity (CPCN) from the Virginia State Corporation Commission (SCC). The project proposes to rebuild approximately 2.8 miles of existing overhead 500 kV transmission line and replace aging infrastructure at the end of its service life. The project site is located within the Town of Leesburg and the Leesburg Joint Land Management Area (JLMA) as defined by the *Loudoun County 2019 General Plan (2019 GP) (2019 GP, Chapter 2, Policy Areas Map)*.

Loudoun County notes that the removal and replacement of aging infrastructure could result in new environmental impacts. The County recommends Dominion Energy Virginia coordinate with the Town of Leesburg and the Loudoun County Department of Building and Development regarding any potential environmental impacts associated with the rebuild project. It is important to ensure proper erosion and sediment control measures are in place, especially where the project crosses streams. We kindly request to be kept informed as the project moves forward. If you have any questions, please contact Marie Genovese, Planner in the Department of Planning and Zoning at (703) 777-0246.

Sincerely,

Tim Hemstreet
 County Administrator

cc: Alaina Ray, AICP, Director, Planning and Zoning
 Randall Farren, AICP, Community Planning Program Manager (via email)
 Anna Dougherty, PWD, Natural Resources Team Leader (via email)
 Joe Ohler, Erosion and Sediment Program Manager (via email)
 Marie Genovese, AICP, Planner III, Community Planning (via email)

COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2021-00276
	)	
For approval and certification of electric	)	
transmission facilities: 500 kV Line # 514	)	
Partial Rebuild Project	)	

**IDENTIFICATION, SUMMARIES, AND TESTIMONY OF DIRECT WITNESSES
OF VIRGINIA ELECTRIC AND POWER COMPANY**

Peter Nedwick

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Matthew B. Vinson

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Santosh Bhattacharai

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

Charles H. Weil

Witness Direct Testimony Summary
Direct Testimony
Appendix A: Background and Qualifications

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Peter Nedwick

Title: Principal Engineer – Electric Transmission Planning

Summary:

Company Witness Peter Nedwick sponsors those sections of the Appendix describing the Company's electric transmission system and the need for, and benefits of, the proposed Partial Rebuild Project, as follows:

- Section I.B: This section details the engineering justifications for the proposed project.
- Section I.C: This section describes the present system and details how the proposed project will effectively satisfy present and projected future load demand requirements.
- Section I.D: This section, when applicable, describes critical contingencies and associated violations due to the inadequacy of the existing system.
- Section I.E: This section explains feasible project alternatives.
- Section I.G: This section provides a system map for the affected area.
- Section I.H: This section provides the desired in-service date of the proposed project and the estimated construction time.
- Section I.J: This section provides information about the project if approved by the RTO.
- Section I.K: This section, when applicable, provides outage history and maintenance history for existing transmission lines if the proposed project is a rebuild and is due in part to reliability issues.
- Section I.M: This section, when applicable, contains information for transmission lines interconnecting a non-utility generator.
- Section I.N: This section, when applicable, provides the proposed and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations, and other ground facilities associated with the proposed project.
- Section II.A.10: This section provides details of the construction plans for the proposed project, including requested line outage schedules.

Additionally, Company Witness Nedwick co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Matthew B. Vinson): This section details the primary justifications for the proposed project.
- Section I.I. (co-sponsored with Company Witnesses Matthew B. Vinson and Santosh Bhattarai): This section provides the estimated total cost of the proposed project.
- Section II.A.3 (co-sponsored with Company Witness Charles H. Weil): This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed project.

A statement of Mr. Nedwick's background and qualifications is attached to his testimony as Appendix A.

**DIRECT TESTIMONY
OF
PETER NEDWICK
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2021-00276**

1 **Q. Please state your name, business address and position with Virginia Electric and**
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Peter Nedwick, and I am a Principal Engineer in Electric Transmission
4 Planning for the Company. My business address is 10900 Nuckols Road, Glen Allen,
5 Virginia 23060. A statement of my qualifications and background is provided as
6 Appendix A.

7 **Q. Please describe your areas of responsibility with the Company.**

8 A. I am responsible for planning the Company’s electric transmission system for voltages of
9 69 kilovolt (“kV”) through 500 kV.

10 **Q. What is the purpose of your testimony in this proceeding?**

11 A. In order to maintain the structural integrity and reliability of its transmission system in
12 compliance with mandatory North American Reliability Corporation (“NERC”)
13 Reliability Standards, the Company proposes in Loudoun County, Virginia, the following
14 (collectively, the “Partial Rebuild Project”):

15 (i) Rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-
16 Goose Creek Line #514 from existing Structure #514/1854, which is not being
17 replaced, located two spans outside of the Company’s existing Goose Creek
18 Substation to Structure #514/1841 located at the Virginia-Maryland border.
19 Specifically, replace 12 single circuit 500 kV weathering steel lattice towers
20 and 1 single circuit 500 kV galvanized H-frame structure supporting the
21 existing Line #514 with 13 single circuit 500 kV chemically dulled,

1 galvanized steel lattice towers, and the existing 3-phase twin-bundled 2049.5
2 AAAC conductors with 3-phase triple-bundled 1351.5 ACSR conductors; and

3 (ii) Perform related work at the Company's existing Goose Creek Switching
4 Station to support the new line rating for rebuilt Line #514.

5 The purpose of my testimony is to describe the Company's electric transmission system
6 and the need for, and benefits of, the proposed Partial Rebuild Project. I am sponsoring
7 Sections I.B, I.C, I.D, I.E, I.G, I.H, .I.J, I.K, I.M, I.N, and II.A.10 of the Appendix.

8 Additionally, I co-sponsor the Executive Summary with Company Witnesses Matthew B.
9 Vinson, Santosh Bhattarai, and Charles H. Weil; Section I.A with Company Witness
10 Matthew B. Vinson; Section I.I with Company Witnesses Matthew B. Vinson and
11 Santosh Bhattarai; and Section II.A.3 with Company Witness Charles H. Weil.

12 **Q. Does this conclude your pre-filed direct testimony?**

13 **A. Yes, it does.**

**BACKGROUND AND QUALIFICATIONS
OF
PETER NEDWICK**

Peter Nedwick graduated from the Pennsylvania State University with a Bachelor's Degree in Electrical Engineering. He is also Registered Professional Engineer with the Commonwealth of Virginia (No. 0402 019479).

Mr. Nedwick's experience with the Company includes System Protection, Distribution Planning, and Transmission Planning. He joined the Company in 1984 as an Associate Engineer in the System Protection Group. In 1986, he joined the Company's Transmission Planning Group, where he was promoted to Engineer in 1987 and to Senior Engineer in 1991. While in the Transmission Planning Group, Mr. Nedwick was responsible for special operating studies and for planning the Company's electric transmission system for eastern Virginia and North Carolina.

In 1997, Mr. Nedwick was promoted to Staff Engineer and joined the Company's Distribution Planning Department, where he served as that department's technical expert. While in the Distribution Planning Department, Mr. Nedwick was promoted to Consulting Engineer in 2000. In 2002, Mr. Nedwick joined the Company's Electric Transmission Planning Group and was promoted to Principal Engineer in 2017.

Mr. Nedwick has previously testified before the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Matthew B. Vinson

Title: Engineer III – Electric Transmission Line Engineering

Summary:

Company Witness Matthew B. Vinson sponsors those sections of the Appendix providing an overview of the design characteristics of the transmission facilities for the proposed Partial Rebuild Project, and discussing electric and magnetic field levels, as follows:

- Section I.F: This section describes any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project.
- Section I.L: This section provides details on the deterioration of structures and associated equipment.
- Section II.A.5: This section provides drawings of the right-of-way cross section showing typical transmission lines structure placements.
- Sections II.B.1 to II.B.2: These sections provide the line design and operational features of the proposed project, as applicable.
- Section IV: This section provides analysis on the health aspects of electric and magnetic field levels.

Additionally, Company Witness Vinson co-sponsors the following sections of the Appendix:

- Section I.A (co-sponsored with Company Witness Peter Nedwick): This section details the primary justifications for the proposed project.
- Section I.I. (co-sponsored with Company Witnesses Peter Nedwick and Santosh Bhattarai): This section provides the estimated total cost of the proposed project.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Charles H. Weil): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witness Charles H. Weil): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.

A statement of Mr. Vinson's background and qualifications is attached to his testimony as Appendix A.

**DIRECT TESTIMONY
OF
MATTHEW B. VINSON
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2021-00276**

1 **Q. Please state your name, business address and position with Virginia Electric and**
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Matthew B. Vinson, and I am an Engineer III in the Electric Transmission
4 Line Engineering Department of the Company. My business address is 10900 Nuckols
5 Road, Glen Allen, Virginia 23060. A statement of my qualifications and background is
6 provided as Appendix A.

7 **Q. Please describe your areas of responsibility with the Company.**

8 A. I am responsible for the estimating, conceptual, and final design of high voltage
9 transmission line projects from 69 kilovolt (“kV”) to 500 kV.

10 **Q. What is the purpose of your testimony in this proceeding?**

11 A. In order to maintain the structural integrity and reliability of its transmission system in
12 compliance with mandatory North American Reliability Corporation (“NERC”)
13 Reliability Standards, the Company proposes in Loudoun County, Virginia, the following
14 (collectively, the “Partial Rebuild Project”):

15 (i) Rebuild approximately 2.8 miles of the existing overhead 500 kV Doubts-
16 Goose Creek Line #514 from existing Structure #514/1854, which is not being
17 replaced, located two spans outside of the Company’s existing Goose Creek
18 Substation to Structure #514/1841 located at the Virginia-Maryland border.
19 Specifically, replace 12 single circuit 500 kV weathering steel lattice towers
20 and 1 single circuit 500 kV galvanized H-frame structure supporting the
21 existing Line #514 with 13 single circuit 500 kV chemically dulled,

1 galvanized steel lattice towers, and the existing 3-phase twin-bundled 2049.5
2 AAAC conductors with 3-phase triple-bundled 1351.5 ACSR conductors; and

3 (ii) Perform related work at the Company's existing Goose Creek Switching
4 Station to support the new line rating for rebuilt Line #514.

5 The purpose of my testimony is to describe the design characteristics of the transmission
6 facilities for the proposed Partial Rebuild Project, and also to discuss electric and
7 magnetic field ("EMF") levels. I am sponsoring Sections I.F, I.L, II.A.5, II.B.1, II.B.2,
8 and IV of the Appendix. Additionally, I co-sponsor the Executive Summary with
9 Company Witnesses Peter Nedwick, Santosh Bhattarai, and Charles H. Weil; Section I.A
10 with Company Witness Peter Nedwick; Section I.I with Company Witnesses Peter
11 Nedwick and Santosh Bhattarai; Sections II.B.3 to II.B.5 with Company Witness Charles
12 H. Weil; and Sections II.B.6 with Company Witness Charles H. Weil.

13 **Q. Does this conclude your pre-filed direct testimony?**

14 A. Yes, it does.

**BACKGROUND AND QUALIFICATIONS
OF
MATTHEW B. VINSON**

Matthew B Vinson graduated from the University of Virginia in 2010 with a Bachelor of Science in Civil Engineering. In the fall of 2011, he was hired as a contractor at the Company in the Operation and Maintenance Department of Electric Transmission. After a year, he was hired fulltime by the Company in the Line Engineering Department of Electric Transmission as an Engineer I. In September of 2015, he was promoted to Engineer II; and in July of 2019, he was promoted to Engineer III. He is now the senior Project Engineer in his group.

Mr. Vinson has previously submitted pre-filed testimony to the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Santosh Bhattarai

Title: Consulting Engineer – Substation Engineering

Summary:

Company Witness Santosh Bhattarai sponsors or co-sponsors the following sections of the Appendix describing the substation work to be performed for the proposed Partial Rebuild Project as follows:

- Section I.I (co-sponsored with Company Witnesses Peter Nedwick and Matthew B. Vinson): This section provides the estimated total cost of the proposed project.
- Section II.C: This section describes and furnishes a one-line diagram of the substation associated with the proposed project.

A statement of Mr. Bhattarai's background and qualifications is attached to his testimony as Appendix A.

**DIRECT TESTIMONY
OF
SANTOSH BHATTARAI
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2021-00276**

1 **Q. Please state your name, business address and position with Virginia Electric and**
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Santosh Bhattarai, and I am a Consulting Engineer in the Substation
4 Engineering section of the Electric Transmission group of the Company. My business
5 address is 2400 Grayland Avenue, Richmond, Virginia 23220. A statement of my
6 qualifications and background is provided as Appendix A.

7 **Q. What are your responsibilities as a Consulting Engineer?**

8 A. I am responsible for evaluation of the substation project requirements, feasibility studies,
9 conceptual physical design, scope development, preliminary engineering and cost
10 estimating for high voltage transmission and distribution substations.

11 **Q. What is the purpose of your testimony in this proceeding?**

12 A. In order to maintain the structural integrity and reliability of its transmission system in
13 compliance with mandatory North American Reliability Corporation (“NERC”)
14 Reliability Standards, the Company proposes in Loudoun County, Virginia, the following
15 (collectively, the “Partial Rebuild Project”):

16 (i) Rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-
17 Goose Creek Line #514 from existing Structure #514/1854, which is not being
18 replaced, located two spans outside of the Company’s existing Goose Creek
19 Substation to Structure #514/1841 located at the Virginia-Maryland border.
20 Specifically, replace 12 single circuit 500 kV weathering steel lattice towers
21 and 1 single circuit 500 kV galvanized H-frame structure supporting the

1 existing Line #514 with 13 single circuit 500 kV chemically dulled,
2 galvanized steel lattice towers, and the existing 3-phase twin-bundled 2049.5
3 AAAC conductors with 3-phase triple-bundled 1351.5 ACSR conductors; and

4 (ii) Perform related work at the Company's existing Goose Creek Switching
5 Station to support the new line rating for rebuilt Line #514.

6 The purpose of my testimony is to describe the station work to be performed as part of
7 the Partial Rebuild Project at the Company's existing Goose Creek Switching Station. As
8 it pertains to station work, I sponsor Section II.C of the Appendix. Additionally, I co-
9 sponsor the Executive Summary with Company Witnesses Peter Nedwick, Matthew B.
10 Vinson, and Charles H. Weil; and Section I.I of the Appendix with Company Witnesses
11 Peter Nedwick and Matthew B. Vinson.

12 **Q. Does this conclude your pre-filed direct testimony?**

13 A. Yes, it does.

**BACKGROUND AND QUALIFICATIONS
OF
SANTOSH BHATTARAI**

Santosh Bhattarai received a Master of Science degree in Electrical Engineering from South Dakota State University in 2006. Before working for the Company, Mr. Bhattarai worked at Electrical Consultants, Inc. from 2006 to 2009 in Billings, Montana as a Substation Design Engineer. Then, from 2010 to 2013, he worked at Electrical Consultants, Inc. in Madison, Wisconsin as a Substation Project Engineer. Mr. Bhattarai's responsibilities included the evaluation of the substation project requirements, development of project scope documents, estimates and schedules, preparation of specifications and bid documents, material procurement, develop detailed physical drawings, bill of materials, electrical schematics and wiring diagrams. Mr. Bhattarai joined the Dominion Energy Virginia Substation Engineering department in November 2013 as an Engineer III. He was promoted to Consulting Engineer in July 2019. He has been licensed as a Professional Engineer in the Commonwealth of Virginia since 2015. In recognition of his professional standing, the Institute of Electrical and Electronics Engineers ("IEEE") board has elected him to the grade of Senior Member in 2017.

Mr. Bhattarai has previously testified before the Virginia State Corporation Commission.

WITNESS DIRECT TESTIMONY SUMMARY

Witness: Charles H. Weil

Title: Engineer II – Siting and Permitting Group

Summary:

Company Witness Charles H. Weil sponsors those portions of the Appendix providing an overview of the design of the route for the proposed Partial Rebuild Project, and related permitting, as follows:

- Section II.A.1: This section provides the length of the proposed corridor and viable alternatives to the proposed project.
- Section II.A.2: This section provides a map showing the route of the proposed project in relation to notable points close to the proposed project.
- Section II.A.4: This section, when applicable, explains why the existing right-of-way is not adequate to serve the need, to the extent applicable.
- Sections II.A.6 to II.A.8: These sections provide detail regarding the right-of-way for the proposed project.
- Section II.A.9: This section describes the proposed route selection procedures and details alternative routes considered.
- Section II.A.11: This section details how the construction of the proposed project follows the provisions discussed in Attachment 1 of the Transmission Appendix Guidelines.
- Section II.A.12: This section identifies the counties and localities through which the proposed project will pass and provides General Highway Maps for these localities.
- Section III: This section details the impact of the proposed project on scenic, environmental, and historic features.
- Section V: This section provides information related to public notice of the proposed project.

Additionally, Mr. Weil co-sponsors the following portions of the Appendix:

- Section II.A.3 (co-sponsored with Company Witness Peter Nedwick): This section provides color maps of existing or proposed rights-of-way in the vicinity of the proposed project.
- Sections II.B.3 to II.B.5 (co-sponsored with Company Witness Matthew B. Vinson): These sections, when applicable, provide supporting structure details along the proposed and alternative routes.
- Section II.B.6 (co-sponsored with Company Witness Matthew B. Vinson): This section provides photographs of existing facilities, representations of proposed facilities, and visual simulations.

Finally, Mr. Weil sponsors the DEQ Supplement filed with the Application.

A statement of Mr. Weil's background and qualifications is attached to his testimony as Appendix A.

**DIRECT TESTIMONY
OF
CHARLES H. WEIL
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2021-00276**

1 **Q. Please state your name, business address and position with Virginia Electric and**
2 **Power Company (“Dominion Energy Virginia” or the “Company”).**

3 A. My name is Charles H. Weil, and I serve as an Engineer II in the Siting and Permitting
4 Group for the Company. My business address is 10900 Nuckols Road, Glen Allen,
5 Virginia 23060. A statement of my qualifications and background is provided as
6 Appendix A.

7 **Q. Please describe your areas of responsibility with the Company.**

8 A. I am responsible for identifying appropriate routes for transmission lines and obtaining
9 necessary federal, state, and local approvals and environmental permits for those
10 facilities. In this position, I work closely with government officials, permitting agencies,
11 property owners, and other interested parties, as well as with other Company personnel,
12 to develop facilities needed by the public so as to reasonably minimize environmental
13 and other impacts on the public in a reliable, cost-effective manner.

14 **Q. What is the purpose of your testimony in this proceeding?**

15 A. In order to maintain the structural integrity and reliability of its transmission system in
16 compliance with mandatory North American Reliability Corporation (“NERC”)
17 Reliability Standards, the Company proposes in Loudoun County, Virginia, the following
18 (collectively, the “Partial Rebuild Project”):

- 1 (i) Rebuild approximately 2.8 miles of the existing overhead 500 kV Doubs-
2 Goose Creek Line #514 from existing Structure #514/1854, which is not being
3 replaced, located two spans outside of the Company's existing Goose Creek
4 Substation to Structure #514/1841 located at the Virginia-Maryland border.
5 Specifically, replace 12 single circuit 500 kV weathering steel lattice towers
6 and 1 single circuit 500 kV galvanized H-frame structure supporting the
7 existing Line #514 with 13 single circuit 500 kV chemically dulled,
8 galvanized steel lattice towers, and the existing 3-phase twin-bundled 2049.5
9 AAAC conductors with 3-phase triple-bundled 1351.5 ACSR conductors; and
- 10 (ii) Perform related work at the Company's existing Goose Creek Switching
11 Station to support the new line rating for rebuilt Line #514.

12 The purpose of my testimony is to provide an overview of the route and permitting for
13 the proposed Partial Rebuild Project. I sponsor Sections II.A.1, II.A.2, II.A.4, II.A.6 to
14 II.A.8, II.A.9, II.A.11, II.A.12, III, and V of the Appendix. Additionally, I co-sponsor the
15 Executive Summary with Company Witnesses Peter Nedwick, Matthew B. Vinson, and
16 Santosh Bhattarai; Section II.A.3 with Company Witness Peter Nedwick; and Sections
17 II.B.3 to II.B.5 and II.B.6 with Company Witness Matthew B. Vinson. Finally, I sponsor
18 the DEQ Supplement.

19 **Q. Has the Company complied with Va. Code § 15.2-2202 E?**

20 A. Yes. In accordance with Va. Code §15.2-2202 E, a letter dated October 14, 2021, was
21 delivered to Mr. Tim Hemstreet, Administrator of Loudoun County, where the Partial
22 Rebuild Project is located. The letter stated the Company's intention to file this
23 Application and invited the County to consult with the Company about the Partial
24 Rebuild Project. This letter is included as Attachment V.D.1 of the Appendix.

25 **Q. Does this conclude your pre-filed direct testimony?**

26 A. Yes, it does.

**BACKGROUND AND QUALIFICATIONS
OF
CHARLES H. WEIL**

Charles H. Weil graduated from Virginia Tech in 2012 with a Bachelor of Science in Civil and Environmental Engineering. He has a professional license in Civil Engineering. He was previously a transportation engineer with various consulting firms and the City of Suffolk, Virginia before joining Dominion Energy Virginia as an Engineer II in the Siting and Permitting Group in 2019.

Mr. Weil has previously submitted pre-filed testimony to the Virginia State Corporation Commission.