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April 27, 2021

BY ELECTRONIC FILING

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

Application of Virginia Electric and Power Company for Approval and Certification of Electric Facilities Elmont-Ladysmith 500 kV Transmission Line #574 Rebuild Related Projects
Case No. PUR-2021-00082

Dear Mr. Logan:

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

As indicated in Section II.A.12.b of the Appendix, three (3) color copies of the map of the Virginia Department of Transportation "General Highway Map" for Hanover County and Caroline County will be provided to Staff.

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.
David J. DePippo, Esq.

Dominion Energy®

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

Before the State Corporation Commission of Virginia

Elmont-Ladysmith 500 kV Transmission Line #574 Rebuild and Related Projects

Application No. 304

Case No. PUR-2021-00082

Filed: April 27, 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 FACILITIES

Elmont-Ladysmith 500 kV Transmission Line #574 Rebuild and Related Projects

Application No. 304

Case No. PUR-2021-00082

Filed: April 27, 2021

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2021-00082
	)	
For approval and certification of electric transmission facilities: Elmont-Ladysmith 500 kV Transmission Line #574 Rebuild and Related Projects	)	

APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY FOR APPROVAL AND CERTIFICATION OF ELECTRIC TRANSMISSION FACILITIES: ELMONT-LADYSMITH LINE #574 500 kV TRANSMISSION LINE REBUILD AND RELATED PROJECTS

Pursuant to § 56-46.1 of the Code of Virginia ("Va. Code") and the Utility Facilities Act, Va. Code § 56-265.1 *et seq.*, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company"), by counsel, files with the State Corporation Commission of Virginia (the "Commission") this application for approval and certification of electric 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 Electric Reliability Corporation ("NERC") Reliability Standards, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes to rebuild existing 500 kV transmission Line #574 and perform related projects in an existing 26.2-mile transmission corridor between the Elmont Switching Station and Ladysmith Switching Station, located in the Counties of Hanover and Caroline, Virginia, (collectively, the "Rebuild Project" or "Project") since they are nearing their end of life.

4. Specifically, the Company proposes to:

(i) Rebuild approximately 26.2 miles of 500 kV Line #574 on single circuit steel structures between Elmont Switching Station and Ladysmith Switching Station with dulled galvanized steel structures that can support a 500 kV circuit with an underbuild that permits a future 230kV circuit[1];

(ii) The removal of one single circuit 500 kV galvanized steel lattice tower supporting existing Line #568 (Ladysmith – Possum Point) at Ladysmith which will be replaced with two single circuit 500 kV dulled galvanized steel lattice towers; and

(iii) To complete work at Elmont and Ladysmith Switching Stations to support the new line rating.

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

[1] The Company will seek Commission approval to build the 230kV circuit through a certificate of public convenience and necessity application when the need arises.

6. As of February 2021, the Company owns approximately 6,841 miles of overhead transmission lines, approximately 3,258 miles of which were built prior to 1980. The Company has developed a proactive plan to rebuild transmission towers that are comprised of COR-TEN® weathering steel. The 500 kV system accounts for approximately 1,314 miles of the Company's total overhead transmission line system.

7. The lines identified above for rebuild run a total length of approximately 26.2 miles in the Elmont-Ladysmith transmission corridor. This line 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. Quanta provided the 2013 Quanta Report confirming the need to rebuild certain COR-TEN towers, including those on the lines identified above.

8. The desired in-service target date for the Line # 574 Rebuild Project is December 31, 2025. The Company estimates that it will take approximately 39 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 January 3, 2023 and be completed by December 31, 2025. 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.

9. The estimated conceptual cost of the Rebuild Project is approximately $92.2 million, which includes approximately $80.8 million for transmission–related work and

approximately $11.4 million for substation-related work (2021 dollars). The description of the proposed Rebuild Project is provided in detail in Sections I and II of the Appendix attached to this Application.

10. 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 Rebuild Project. The impact of the proposed Rebuild Project on scenic, environmental, and historical features is described in detail in Section III of the Appendix.

11. 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.

12. 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.

13. 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.

14. In addition to the information provided in the Appendix and the DEQ Supplement, this Application is supported by the prefiled direct testimony of Company Witnesses Peter

Nedwick, Robert J. Shevenock II, Santosh Bhattarai, and Greg R. Baka 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 Rebuild Project; and,

(c) Grant a certificate of public convenience and necessity for the 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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Counsel for Applicant Virginia Electric and Power Company

April 27, 2021

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY

FOR APPROVAL AND CERTIFICATION
OF ELECTRIC FACILITIES

Elmont-Ladysmith 500 kV Transmission Line #574 Rebuild and Related Projects

Application No. 304

Appendix

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

Case No. PUR-2021-00082

Filed: April 27, 2021

TABLE OF CONTENTS

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 Hanover and Caroline Counties, Virginia, the following:

(i) Rebuild approximately 26.2 miles of 500 kV Line #574 on single circuit steel structures between Elmont Switching Station and Ladysmith Switching Station with dulled galvanized steel structures that can support a 500 kV circuit with an underbuild that permits a future 230kV circuit.[1]
(ii) The removal of one single circuit 500 kV galvanized steel lattice tower supporting existing Line #568 (Ladysmith – Possum Point) at Ladysmith which will be replaced with two single circuit 500 kV dulled galvanized steel lattice towers.
(iii) To complete work at Elmont and Ladysmith Switching Stations to support the new line rating.

(collectively, the "Rebuild Project" or "Project").

The proposed 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, the approximately 26.2 mile line identified above has been identified for rebuild as a 5-2 Tower Design. Line #574 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. Quanta confirmed the need to rebuild certain COR-TEN towers, including those on Line #574.

The proposed 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.

The tower design with the ability to install a future 230 kV circuit when the need is shown is being pursued to preserve the option to address future stability issues that may impact the Ladysmith Power Station and the generating units located at Four Rivers. Any generation units located within 5 buses of the Elmont or Ladysmith Switching Stations (the "Stability Study Area") could reasonably impact the stability of those stations. Recently constructed generation facilities in the Stability Study Area have twice in the last five years required operating and infrastructure solutions to address stability issues. Therefore, given its history and the number of projects currently in the PJM Generation Queue in the Stability Study Area, the proposed Rebuild Project, with a 5-2 Tower Design provides flexibility to resolve future stability issues

[1] The Company will seek Commission approval to build the 230kV circuit through a certificate of public convenience and necessity application when the need arises.

likely to occur from the addition of new generation in this area and is consistent with prudent utility planning for the future. Adding a new 230 kV circuit on new towers in this corridor with new right-of-way is not a preferable or practical solution to address future stability issues.

Because the existing right-of-way and Company-owned property is adequate to construct the proposed 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 Rebuild Project.

The estimated conceptual cost of the proposed Rebuild Project is approximately $92.2 million, which includes approximately $80.8 million for transmission–related work and approximately $11.4 million for substation-related work (2021 dollars).

The desired in-service target date for the Rebuild Project is December 31, 2025. The Company estimates that it will take approximately 39 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 in January 2023 and be completed by December 31, 2025. This construction timeline will enable the Company to meet the targeted in-service date for the 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.

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 Rebuild Project is necessary to rebuild existing 500 kV Line #574, since it is nearing its end of life. See Attachment I.A.1 for a 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.

PJM's Regional Transmission Expansion Plan ("RTEP") is the culmination of an annual transmission planning process, approved by the Federal Energy Regulatory Commission ("FERC"), which includes extensive analysis of the electric transmission system to determine any needed improvements.[2] 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.[3] 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.

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.

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]

As of February 2021, the Company owns approximately 6,841 miles of overhead transmission lines, approximately 3,258 miles of which were built prior to 1980. The Company has developed a proactive plan to rebuild transmission towers that are comprised of COR-TEN® weathering steel. The 500 kV system accounts for approximately 1,314 miles of the Company's total overhead transmission line system.

The proposed 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,[5] thereby enabling the Company to maintain the overall long-term

[2] PJM Manual 14B focuses on the RTEP process and can be found at http://www.pjm.comldocuments/manuals.aspx.
[3] See PJM Manual 14B, Attachment D: PJM Reliability Planning Criteria.
[4] This NERC requirement, FAC-OO 1-2 - Facility Interconnection Requirements, can be found at http://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-001-2.pdf (effective Jan. 1, 2016).
[5] The Company's Transmission Planning Criteria can be found in Exhibit A of the Company's Facility Interconnection Requirements document, available online at https://www.pjm.com/-/media/planning/planning-criteria/dominion-planning-criteria.ashx.

reliability of its transmission system. Specifically, the approximately 26.2 mile long 500 kV Elmont-Ladysmith Line #574 has been identified for rebuild as a 5-2 Tower Design. This line 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. Quanta provided the 2013 Quanta Report confirming the need to rebuild certain COR-TEN towers, including those on Line #574.

Section C.2.9 of the Company's Planning Criteria addresses electric transmission infrastructure approaching its end of life:[6]

> 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 criterion are all transmission lines at 69 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.

The Company submitted the Rebuild Project proposal to the PJM RTEP process in June 2018 to address the end-of-life criteria. Attachment I.A.2 contains the relevant slides from the June 2018 PJM Transmission Expansion Advisory

[6] *See* n. 5.

Committee ("TEAC") meeting. The proposed Rebuild Project was approved by PJM at its July 2018 Board Meeting and assigned baseline number b3020 (Line #574 Segment). Although PJM recommended and in-service date of December 2022, the in-service date for the proposed Rebuild Project is December 31, 2025, which reflects the need confirmed by the 2013 Quanta Report balanced against the timeline for permitting, construction, and obtaining necessary outages.

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 on Lines #574 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 the 2013 Quanta Report, the Line #574 weathering steel lattice towers have design features that enable significant deterioration in the connections of these towers.

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

With regard to the second metric of the end-of-life criteria, the Company relied on one of the reliability tests identified in the Company's Planning Criteria. The relevant section of the Planning Criteria states in part:[7]

> *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

[7] *See* n. 5.

> 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.

PJM presented at its June 2018 TEAC Meeting that should Line #574 be removed from service and not replaced with rebuilt 500 kV lines, it would negatively impact the ability of multiple generation queue projects to be deliverable. Projects entering the PJM generation queue are studied with all existing and approved PJM RTEP Projects in-service. Multiple PJM generation queue projects are dependent on Line #574 being in-service and/or rebuilt to a higher capacity. Several of these projects have received a certificate of public convenience and necessity ("CPCN") from the Commission (e.g., PUR-2017-00162 and PUR-2019-00073).

The Company relied on the Operational Performance reliability test. Existing Line #574 is an integrated component of the Company's 500 kV network. This line is located near the Company's Ladysmith Switching Station. Located on the 230 kV network emanating from the Ladysmith Switching Station is the Company's Ladysmith Power Station and a third party-owned LS Power generating facility at the Company's Four Rivers 230 kV and 115 kV Substations. The configuration of the transmission system in this area with the large amount of generation located on the 230 kV system has resulted in system stability issues over the years.

Power system stability is the ability of an electric power system, for a given initial operating condition, to regain a state of operating equilibrium after being subjected to a physical disturbance, with most system variables bounded so that practically the entire system remains intact. The stability analysis of a generator or a set of generators is trying to identify whether, when subjected to disturbances such as faults or other contingencies, the generator or the set of generators under study remain operating at a stable operating point. The stable operating point is based on measurements such as generator angle, generator speed, output power, excitation field voltage, and terminal voltage, such that the generator or the set of

generators under study can keep synchronism with the rest of the power system. The ability of a generating unit to maintain synchronism with the transmission system and support the transmission system under fault conditions, while not damaging the generating units themselves, is very important in system operations and is periodically studied by PJM.

The Stability Study Area has been impacted twice in the last five years by stability issues. The first time these stability issues were identified, it resulted in the reduction of the capacity injection rights of one proposed generation project (AA1-145), which has since been built. The Stability Study conducted for AA1-145 indicated that several different contingency conditions resulted in system instability, such as units tripping offline due to rotor angle deviation or contingencies exhibiting insufficient damping. The solution chosen by the developer to address the stability issues was to reduce the Maximum Facility Output ("MFO") of their proposed interconnection by approximately 20 MW.

The second time a stability issue was identified in the Stability Study Area occurred in 2018 when a routine stability review conducted by PJM identified issues in this area that were impacting the Ladysmith Power Station and the generating units located at Four Rivers, which included the AA1-145 Unit at its reduced MFO. The solution to this identified stability issue was the installation of a second 500-230 kV Transformer at Ladysmith Switching Station and the uprate of 230 kV Line #2089 (Ladysmith–Ladysmith CT) to a higher capacity (lower impedance) circuit. This project was approved by PJM as baseline project b3027 (Ladysmith 2nd 500-230 kV Transformer and Line #2089 Uprate).

There are limited options available to address system stability issues once they are identified. Prior to a generator interconnecting, there are three industry standard solutions for identified stability issues. First, reduce the MFO of the generation unit under study to resolve the identified stability issue, like AA1-145 as discussed above. Second, build new transmission facilities or modify existing transmission facilities to resolve the identified stability issue, such as baseline project b3027 as discussed above. Third, implement technologies like STATCOMs which require extensive and costly studies that may only temporarily mitigate any identified stability issues. Once a generator interconnects, the options become further limited: a generation owner has no obligations to reduce the MFO of its units even if a stability issue is identified, therefore reducing the available industry standard solutions to either adding new or modifying existing transmission facilities or implementing technologies like STATCOMs.

While a generating unit's stability impact is analyzed as part of the PJM Generation Queue process (prior to a generator interconnecting), this does not preclude stability issues from occurring once a unit interconnects. This is why stability is studied periodically in addition to the analysis required as part of the PJM Generation Queue process, and it can, as discussed above, uncover new stability issues.

The PJM Generation Queue currently has 62 active projects, including many renewables, totaling a potential 3,435 MW addition of generation (MFO) that could impact the existing generation units located in the Stability Study Area. See Attachment I.A.3 for the list of these 62 projects. The 62 queue projects are electrically close enough to the generating units located at Four Rivers and Ladysmith Power Stations to impact their dynamic performance.

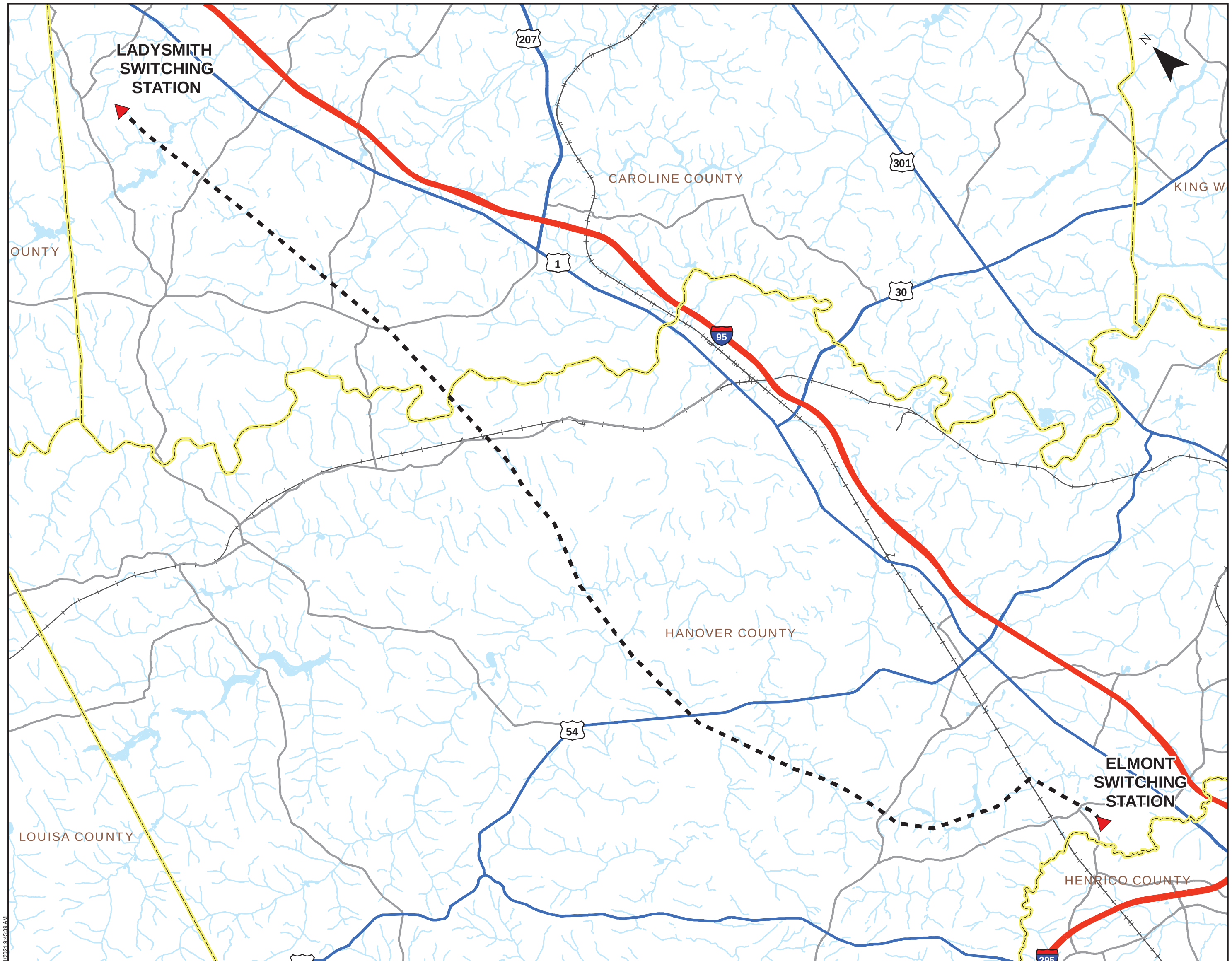
Given the history of stability issues in this Stability Study Area, if a combination of these generation projects are built and interconnected, it is likely another stability issue will arise. And in the instant case, if such stability issue is identified outside of the PJM Generation Queue process, like in 2018, the Company is likely left with one solution: build additional transmission facilities, because STATCOMs are unlikely to be cost-effective or be a viable permanent solution in a dynamic electrical area like the Stability Study Area. Thus, the Company believes prudent utility practice is to construct the Rebuild Project such that it provides the future flexibility to address stability issues in this area. Without the option to add an underbuilt line, the Company would not practically be able to add a new transmission line within the existing Elmont-Ladysmith corridor absent a wreck and rebuild.

For these reasons, the Company proposed—and PJM approved—the Rebuild Project using a 5-2 Tower Design, which would support the construction of a future 230 kV circuit on the underbuild.[8]

In addition, to accommodate Dominion's "hybrid backbone" restoration strategy, the interconnection locations of Line #568 and #574 at Ladysmith Substation will be swapped for reliability purposes. Line #568 will be re-connected at the original breaker bay of Line #574, and Line #574 will be reconnected at the original breaker bay of Line #568 as part of this Project. This line swap is being conducted to facilitate reliability for North Anna Power Station. This line swap is the reason for the removal of one single circuit 500 kV galvanized steel lattice tower supporting existing Line #568 at Ladysmith and its replacement with two single circuit 500 kV dulled galvanized steel lattice towers. An additional structure was necessary to relocate the line.

In summary, the proposed 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, while also accommodating the new generation expected from the PJM queue and to maintain the overall generating capabilities of the system.

[8] *See* n. 1.



ATTACHMENT I.A.1
PROJECT OVERVIEW MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

0 1 2 4 Miles
Scale is 1 IN = 2 MI when printed at original size of 11x17

SITE DATA

- Existing Line #574 Centerline
- Existing Switching Station
- Limited Access Highways
- US and VA Primary Highways
- Local and Main Roads
- Railroad
- County Boundary
- StreamRiver
- NHD Waterbody

Notes:
1. Basemap from ESRI Topographic Map
2. Project centerline provided by Dominion Energy
3. Roads and railroads from VGIN
4. Flowlines and waterbodies from USGS National Hydrography Dataset

Dominion End of Life Criteria

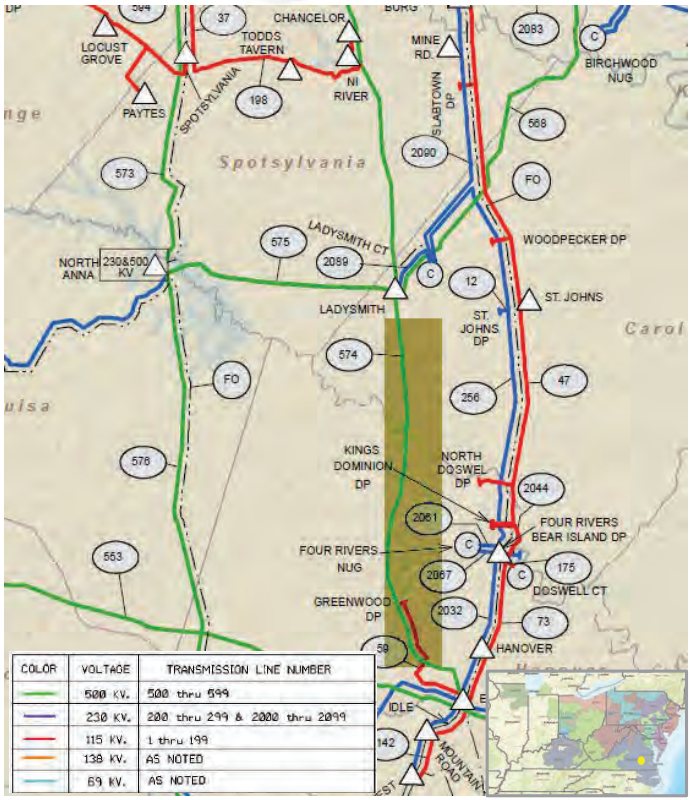
Dominion Transmission Zone: Baseline
Line #574 Ladysmith to Elmont 500 kV line Rebuild

Baseline Reliability: TO Criteria Violation

Problem Statement: Dominion "End of Life Criteria" (Immediate Need)

- Reliability assessments continue to demonstrate that the removal of Line #574 from service adversely impacts system reliability
  - Generation Interconnection Studies have identified this facility as a reliability deficiency
  - Previous generation additions in this area have been reduced in size due to system stability issues. Removal of Ladysmith-Elmont 500 kV Line would only increase damping issues for existing generation in this area

Continued on next slide…



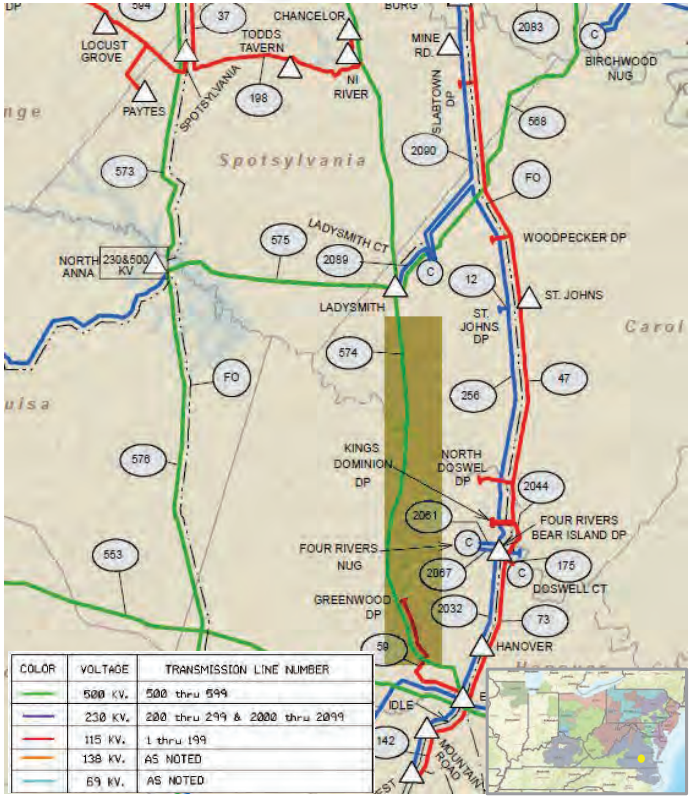
Dominion Transmission Zone: Baseline
Line #574 Ladysmith to Elmont 500 kV line Rebuild

Continued from previous slide…

Recommended Solution:
- Rebuild the Ladysmith to Elmont 500 kV line – 26.2 miles long **(b3020)**
- Conductor ampacity will increase from 3364 amps to 5000 amps
- Use 5-2 Tower design for future 230 kV Line

Alternatives:
- No feasible alternatives

Estimated Project Cost: $87.0 M
Required IS Date: Immediate
Projected IS Date: December 2022
Project Status: Conceptual



Attachment I.A.3

PJM Active Generation Queue Projects Impacting Stability Study Area

Queue	Queue Name	Queue Status	MFO (MW)	CIR (MW)
AC1-107	Chickahominy 500kV	Engineering and Procurement	1600	1600
AC1-158	Spotsylvania 500kV	Partially in Service - Under Construction	500	347.5
AC1-161	Septa 500kV	Engineering and Procurement	240	168.2
AC1-164	Chickahominy 230kV	Engineering and Procurement	320	220.8
AC1-191	Elmont 115kV	Active	80	53.4
AC1-216	Hopewell-Surry 230kV	Partially in Service - Under Construction	97.9	54.8
AC2-137	Elko 34.5kV	Partially in Service - Under Construction	18.8	11.4
AD1-025	Hopewell-Surry 230 kV	Active	150	94.2
AD1-105	Kings Dominion DP 115 kV	Active	74	44.4
AD1-151	Hopewell-Surry 230 kV	Active	150	90
AD2-021	Elko 34.5 kV	Partially in Service - Under Construction	1.2	1.3
AE1-044	Morrisville 230 kV	Active	200	111.7933
AE1-157	Ladysmith CT-St. Johns 230 kV	Active	120	77.8
AE1-158	Ladysmith CT-St. Johns 230 kV	Active	120	79.4
AE1-173	Carson-Suffolk 500 kV	Active	800	480
AE1-175	Light Foot 34.5 kV	Engineering and Procurement	19.9	13.3
AE1-206	Four Rivers-Hanover 230 kV	Active	285	171
AE2-031	Carson-Rawlings 500 kV	Active	290	174
AE2-051	Carson-Septa 500 kV	Active	150	90
AE2-094	Carson-Rogers Road 500 kV	Active	300	207.2
AE2-225	Suffolk 34 kV	Engineering and Procurement	20	12
AE2-227	Iron Bridge 34 kV	Engineering and Procurement	20	12

AE2-228	Tyler 34 kv	Engineering and Procurement	20	12
AE2-229	Suffolk 34 kV	Engineering and Procurement	15	9
AE2-231	St. Johns 115 kV	Active	44	26.4
AE2-313	Carson-Rawlings 500 kV	Active	314	188.4
AF1-031	Kings Dominion DP 115 kV	Active	93.5	60.69
AF1-032	Suffolk 34.5 kV	Engineering and Procurement	15	9.8
AF1-067	Kings Dominion DP 115 kV	Active	50	30
AF1-128	Chesterfield 230 kV	Active	569	569
AF1-129	Chesterfield 230 kV	Active	569	569
AF1-265	Four Rivers-Hanover 230 kV	Active	150	150
AF1-291	Tyler 34.5 kV	Engineering and Procurement	20	12
AF2-037	Louisa-North Anna 230 kV	Active	94	56.4
AF2-043	Suffolk 34.5 kV	Engineering and Procurement	20	12
AF2-049	Ladysmith CT-St. Johns 230 kV	Active	60	34.5
AF2-076	Suffolk-Nucor Steel 230 kV	Active	50	30
AF2-085	Midlothian 34.5 kV	Engineering and Procurement	20	20
AF2-119	Bristers-Sowego 115 kV	Active	80	48
AF2-255	Iron Bridge 34.5 kV	Engineering and Procurement	5	3
AF2-256	Tyler 34.5 kV	Engineering and Procurement	5	3
AF2-257	Tyler 34.5 kV	Active	5	3
AF2-300	St. Johns 115 kV	Active	20	12
AG1-010	Ladysmith-CT-St. Johns 230 kV	Active	0	0
AG1-013	Ladysmith CT-St. Johns 230 kV	Active	0	0
AG1-023	North Anna-Louisa 230 kV	Active	75	15
AG1-094	Burches Hill 230 kV	Active	35.3	0
AG1-133	North Anna-Ladysmith 500 kV	Active	128	76.8

AG1-134	Kings Dominion DP 115 kV	Active	100	60
AG1-145	Lightfoot 34.5 kV	Active	20	12
AG1-154	Ladysmith CT 230 kV	Active	50	20
AG1-178	Carson-Suffolk 500 kV	Active	500	324.94
AG1-184	Carson-Suffolk 500 kV	Active	0	175.06
AG1-195	Valley 230 kV	Active	150	150
AG1-196	Grottoes 115 kV	Active	150	150
AG1-282	Dunnsville 34.5 kV	Active	20	12
AG1-388	Dunnsville 34.5 kV	Active	20	12
AG1-412	Ladysmith CT-Mine Road 230 kV	Active	200	80
AG1-421	Lexington-Dooms 230 kV	Active	200	120
AG1-422	Lexington-Dooms 230 kV	Active	50	50
AG1-518	Suffolk 230 kV	Active	50	50
AG1-558	Buckner 34.5 kV	Active	20	13.3
			3435.3	2843

I. NECESSITY FOR THE PROPOSED PROJECT

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

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

[2] As discussed in PUR-2020-00080, the following known future generation projects require Line #552 (Bristers-Chancellor), Line #581 (Chancellor-Ladysmith), and this Rebuild Project to be constructed:

AC1-107 Chickahominy 500 kV 1600 MW

AC1-158 Spotsylvania 500 kV 500 MW

AC1-161 Septa 500 kV 240 MW

AC1-164 Chickahominy 230 kV 320 MW

AC1-208 Halifax – South Branch 115 kV 80 MW

AC2-141 Septa 500 kV 240 MW

AD1-025 Colonial Trail 230 kV 120 MW

Since the filing and subsequent approval of PUR-2020-00080, the following projects noted below have been placed in-service:

AC1-158 Spotsylvania 500 kV 500 MW

AD1-025 Colonial Trail 230 kV 120 MW

Notable additional future generation projects which require the Rebuild Project to be completed and placed in-service include but not limited to:

AE2-122 Birdneck-Landstown 230 kV 800.1 MW

AE2-123 Birdneck-Landstown 230 kV 800.1 MW

AE2-124 Landstown 230 kV 800.1 MW

AF1-123 Fentress 500 kV 880 MW

AF1-124 Fentress 500 kV 880 MW

AF1-125 Fentress 500 kV 880 MW

Additionally, because generation units entering the PJM Generation Queue are studied with all existing and approved PJM RTEP Projects in-service, the 62 projects listed in Attachment I.A.3 are dependent on the Rebuild Project being completed.

[3] See Section I.A.

[4] Other generation and transmission facilities that were included in the planning studies but that have not yet been placed into service include those identified in response to Section I.B[2] above.

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 Rebuild Project. The existing Line #574 is part of the Company's 500 kV system, which supports the transfer of bulk power from generating resources to major load centers.

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 #574 cannot continue to adequately serve the needs of the Company and its customers because of the 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. See Section I.A. for the justification of the underbuild. The in-service date for the proposed Rebuild Project is December 31, 2025, which reflects the need confirmed by the 2013 Quanta Report balanced against the timeline for permitting, construction, and obtaining necessary outages.

Completing the proposed 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.

ATTACHMENT I.C.1

Historical Loads (MW)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Dominion Zone - Summer	20,061	19,249	18,763	18,692	18,980	19,538	18,902	18,924	19,607	20,087
Growth (%)	4.81%	(4.05)%	(2.52%)	(0.38%)	1.54%	2.94%	(3.25%)	0.1%	3.6%	2.4%
Date	7/22/2011	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
Dominion Zone - Winter	17,689	16,881	17,623	19,785	21,651	18,948	19,661	21,232	19,930	17,544
Growth (%)	0.4%	(4.56%)	4.39%	12.27%	9.43%	(12.48)%	3.76%	8.0%	(6.1%)	(12.0%)
Date	12/15/2010	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

Projected Loads (MW)*

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Dominion Zone - Summer	20,150	20,248	20,491	20,694	20,902	20,962	21,034	21,109	21,154	21,269	21,269
Growth (%)	--	0.5%	1.2%	1.0%	1.0%	0.3%	0.3%	0.4%	0.2%	0.2%	0.4%
Dominion Zone - Winter	20,306	20,499	20,663	20,896	21,113	21,332	21,526	21,720	21,910	22,079	22,269
Growth (%)	--	1.0%	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: The Company considered and rejected constructing the Rebuild Project with a single circuit lattice tower (i.e., 500 kV only). This alternative option for structures was rejected because it would preclude the ability to add a future 230 kV circuit within the existing Elmont–Ladysmith corridor except to wreck and rebuild the single circuit 500 kV structure at a future date to construct the 5-2 Tower Design.

The estimated cost of the Rebuild Project with a single circuit lattice tower is approximately $71.9 million ($60.5 million for the transmission line and $11.4 million for substation work). The structure heights for a 500 kV only rebuild would be approximately 25 feet taller on average (average height: 136 feet, minimum height approximately 104 feet and maximum height approximately 164 feet) than the existing structures (average height: 111 feet, minimum height approximately 75 feet and maximum height approximately 160 feet).

See Section I.A for additional discussion regarding the propriety of pursuing the 5-2 Tower Design as part of this Rebuild Project.

No feasible alternatives have been submitted to PJM since the driver of the 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 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 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.[9] Notwithstanding, when performing an analysis

[9] 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

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 Project. Based on these considerations, the evaluation of the Project demonstrated that despite accounting for DSM consistent with PJM's methods, the Project is necessary. As noted in the 2018 Final Order, pursuant to the Grid Transformation and Modernization Act of 2018, the Company must propose $870 million of EE programs by 2028. Since July 1, 2018, the Company has proposed approximately $476 million for the design, implementation, and operation of energy efficiency programs in the Commonwealth. This amount includes approximately $128.6 million of new energy efficiency programs, designated as "Phase IX" of the Company's DSM portfolio, which the Company filed for approval of on December 2, 2020. These programs are pending before the Commission and have not been accounted for in PJM's load forecast, and thus, were not part of the Company's planning studies.

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 Rebuild Project includes the removal of 122 single circuit 500 kV weathering steel lattice towers and 1 single circuit 500 kV galvanized steel lattice tower supporting existing Line #574 which will be replaced with 101 double circuit 500/230 kV galvanized steel lattice towers, 2 single circuit 500 kV galvanized steel lattice towers, 19 double circuit 500/230 kV galvanized steel 3-pole structures, 1 double circuit 500/230 kV galvanized steel H-frame, and 1 single circuit 500 kV galvanized steel pole. The proposed Rebuild Project also includes the removal of 1 single circuit 500 kV galvanized steel lattice tower supporting existing Line #568 at Ladysmith which will be replaced with 2 single circuit 500 kV galvanized steel lattice towers. An additional structure was necessary on Line #568 for reasons discussed in Section I.A.

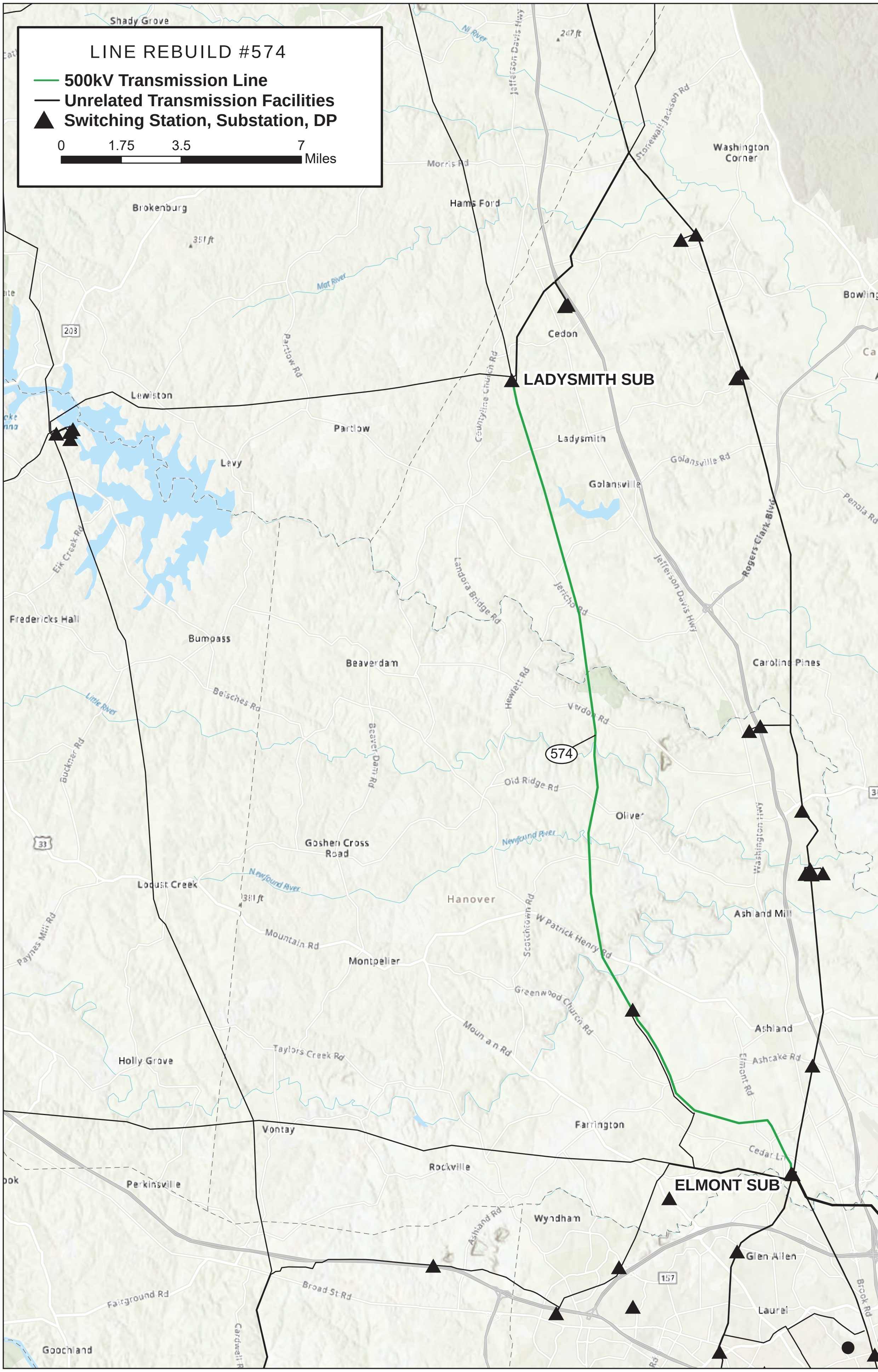
The existing Line #574 3-phase twin-bundled 2500 ACAR and 2049.5 AAAC conductors will be replaced with 3-phase triple-bundled 1351.5 ACSR conductors. The existing Line #574 3-phase twin-bundled 2500 ACAR and 2049.5 AAAC conductor have a normal/emergency transfer capability of 3426 and 2913 MVA, respectively. The two 7#7 alumoweld shield wires will be replaced with two fiber optic shield wires. The proposed conductor and shield wire will be non-specular (de-glared).

The existing Line #568 3-phase twin-bundled 2500 ACAR conductors will be replaced with 3-phase triple-bundled 1351.5 ACSR conductors. The existing Line #568 3-phase twin-bundled 2500 ACAR conductor has a normal/emergency transfer capability of 3426 MVA. The two 7#7 alumoweld shield wires will be replaced with two 7#7 alumoweld shield wires. The proposed conductor and shield wire will be non-specular (de-glared).

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.


LINE REBUILD #574
500kV Transmission Line
Unrelated Transmission Facilities
Switching Station, Substation, DP
0
1.75
3.5
7
Miles
LADYSMITH SUB
ELMONT SUB
574
Shady Grove
Brokenburg
Washington Corner
Hams Ford
Cedon
Lewiston
Partlow
Ladysmith
Levy
Golansville
Bowling
Fredericks Hall
Bumpass
Beaverdam
Caroline Pines
Oliver
Goshen Cross Road
Locust Creek
Hanover
Ashland Mill
Montpelier
Ashland
Holly Grove
Vontay
Farrington
Rockville
Perkinsville
Wyndham
Glen Allen
Laurel
Goochland

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 Line # 574 Rebuild Project is December 31, 2025. The Company estimates that it will take approximately 39 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 in January 2023 and be completed by December 31, 2025. 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.

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 Rebuild Project is approximately $92.2 million, which includes approximately $80.8 million for transmission–related work and approximately $11.4 million for substation-related work (2021 dollars).

The estimated conceptual cost without the proposed underbuild is approximately $71.9 million, which includes approximately $60.5 million for transmission-related work and approximately $11.4 million for substation-related work (2021 dollars). This option was rejected for reasons provided in Section I.A and Section I.E.

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 Rebuild Project was approved by the PJM Board at its June 2018 meeting as baseline project #b3020 (Line #574). The 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 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 Rebuild Project was based on this now set aside allocation method, the Company would expect that the cost allocation for the proposed 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 Line #574. Section I.A provides further detail on the condition of these deteriorating structures.


Str 574/11 (1)


Str 574/11 (2)


Str 574/46 (1)


Str 574/46 (2)


Str 574/48 (1)

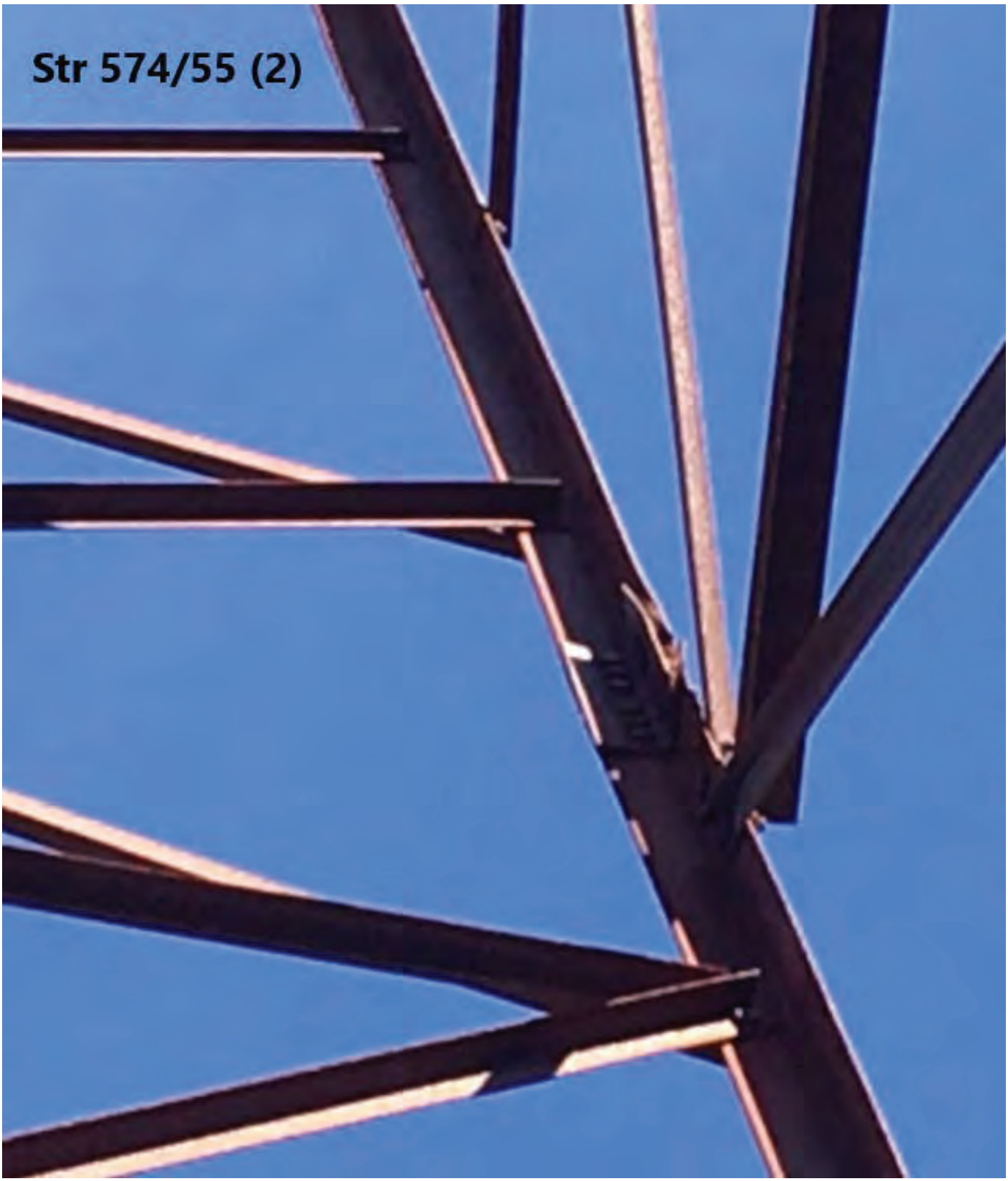

Str 574/48 (2)


Str 574/48 (3)


Str 574/50 (4)
1½"


Str 574/50 (5)


Str 574/55 (1)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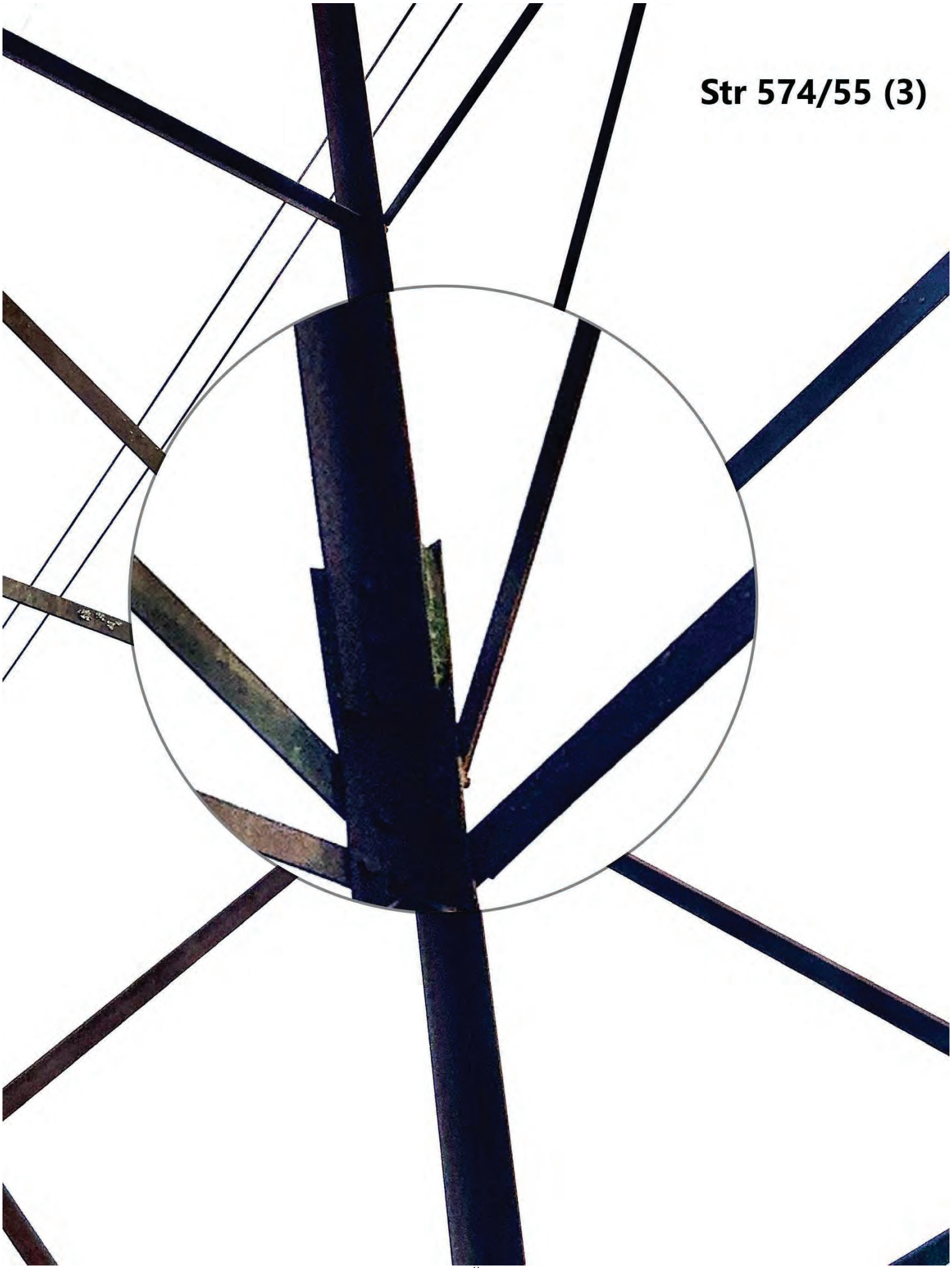
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Str 55
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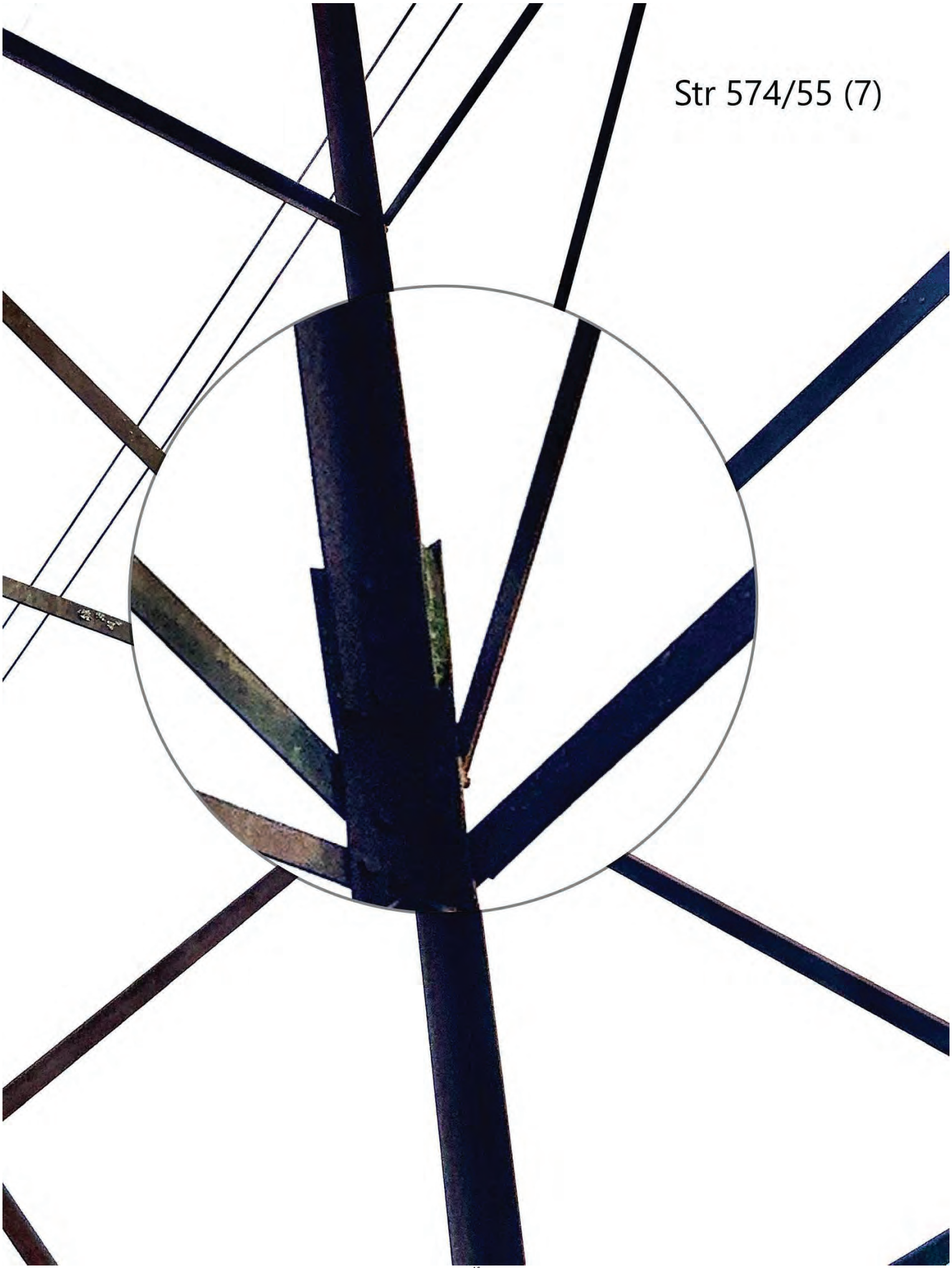
Str 574/55 (5)


Str 574/55 (6)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Str 574/58 (1)


Str 574/59 (1)


Str 574/60 (1)


Str 574/60 (2)


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Str 574/65 (3)


Str 574/65 (4)


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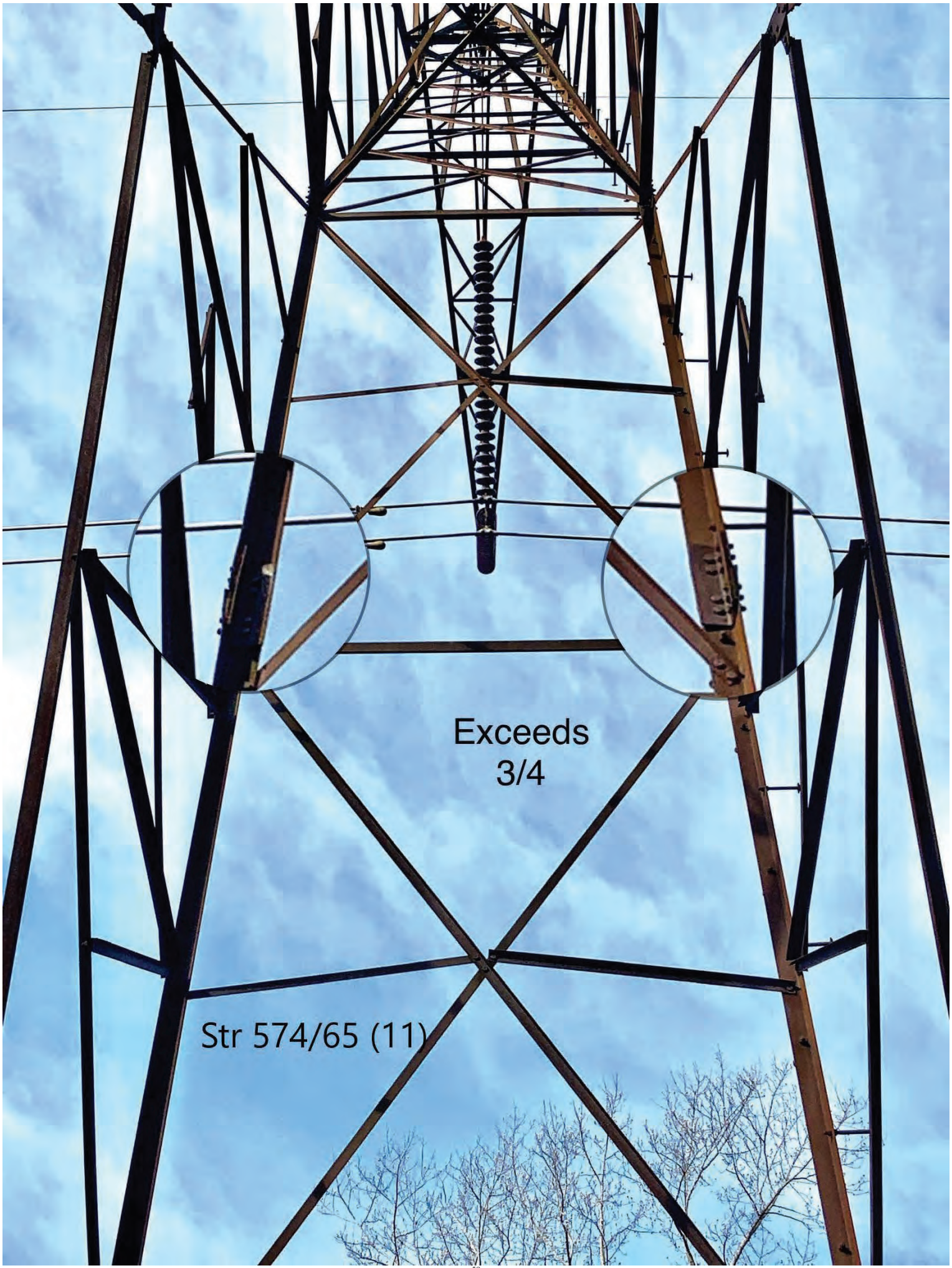
Str 574/ 65 (9)


Pack out exceeds
more than 3/4
Str 574/65 (10)


Exceeds
3/4
Str 574/65 (11)


Str 574/99 (1)


Str 574/99 (2)

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 Rebuild Project is approximately 26.2 miles from the Elmont Substation (Structure #574/1A) to the Ladysmith Substation (Structure #574/124). The right-of-way is located within Hanover and Caroline Counties, Virginia.

The 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 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.

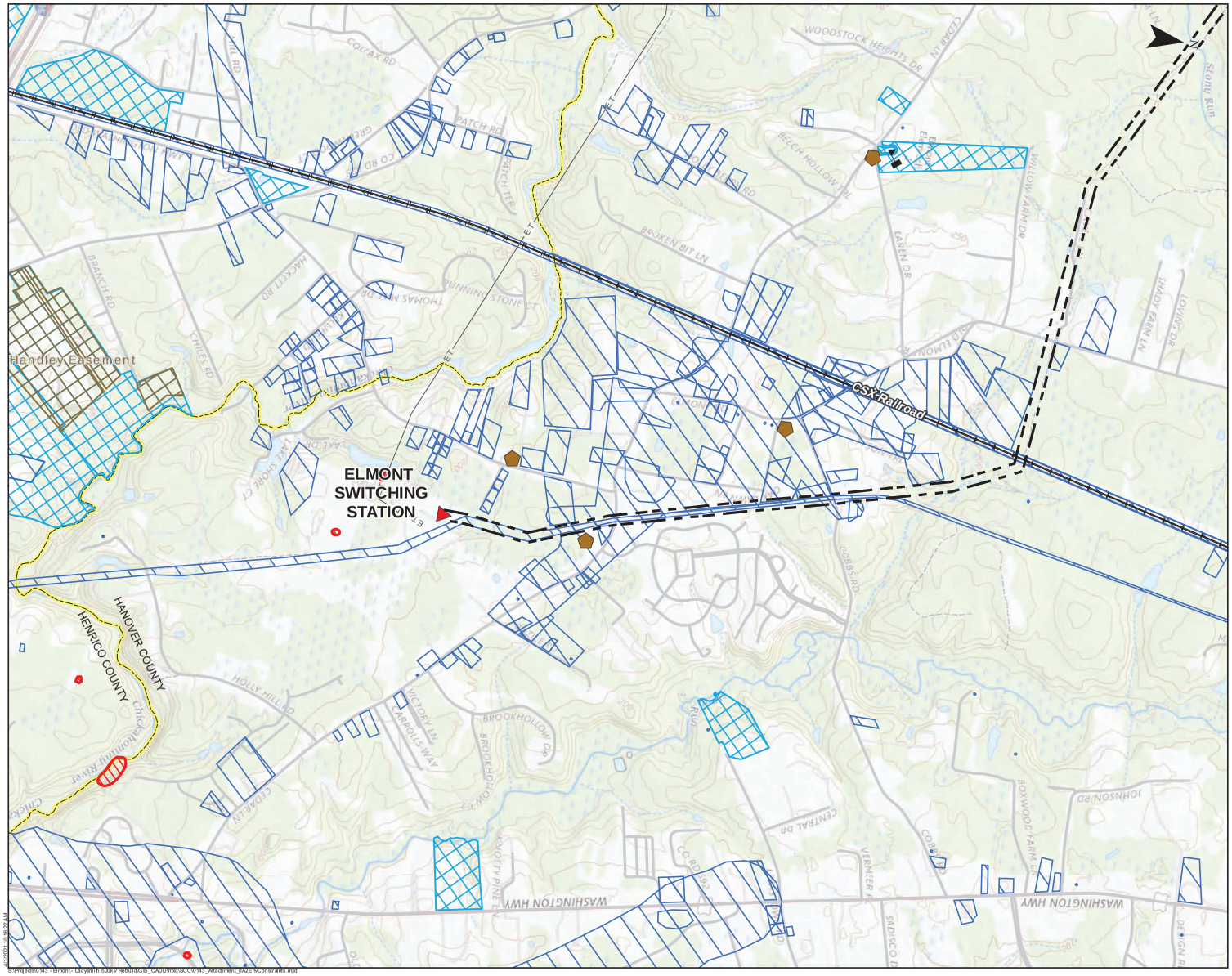
II. DESCRIPTION OF THE PROPOSED PROJECT

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 existing transmission line right-of-way collocates the Rebuild Project and parallels transmission Line #59 from structure #574/19 to #574/37 (approximately 3.5 miles). A gas pipeline intersects the right-of-way at Structure #574/19, where Line #59 leaves the right-of-way. 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 Rebuild Project Application.



ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

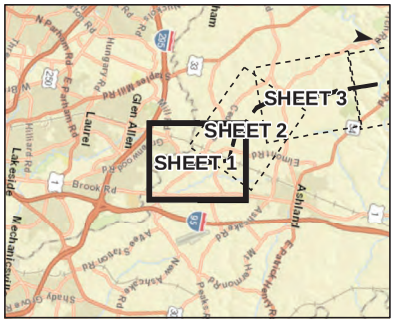
C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

0 750 1,500 3,000 Feet
Scale is 1 IN = 1,500 FT when printed at original size of 11x17

SITE DATA

- Project
- Existing Substation/ Switching Station
- Federally Owned Land
- Locally Owned Land
- Local Conservation Land
- American Battlefield Trust (ABT) Holding
- Virginia Outdoors Foundation (VOF) Easement
- Archaeological Resource
- Architectural Resource
- ET — Other Existing Transmission Line
- Approximate Underground Pipeline
- UG — Underground Utility
- Church
- School
- County Boundary

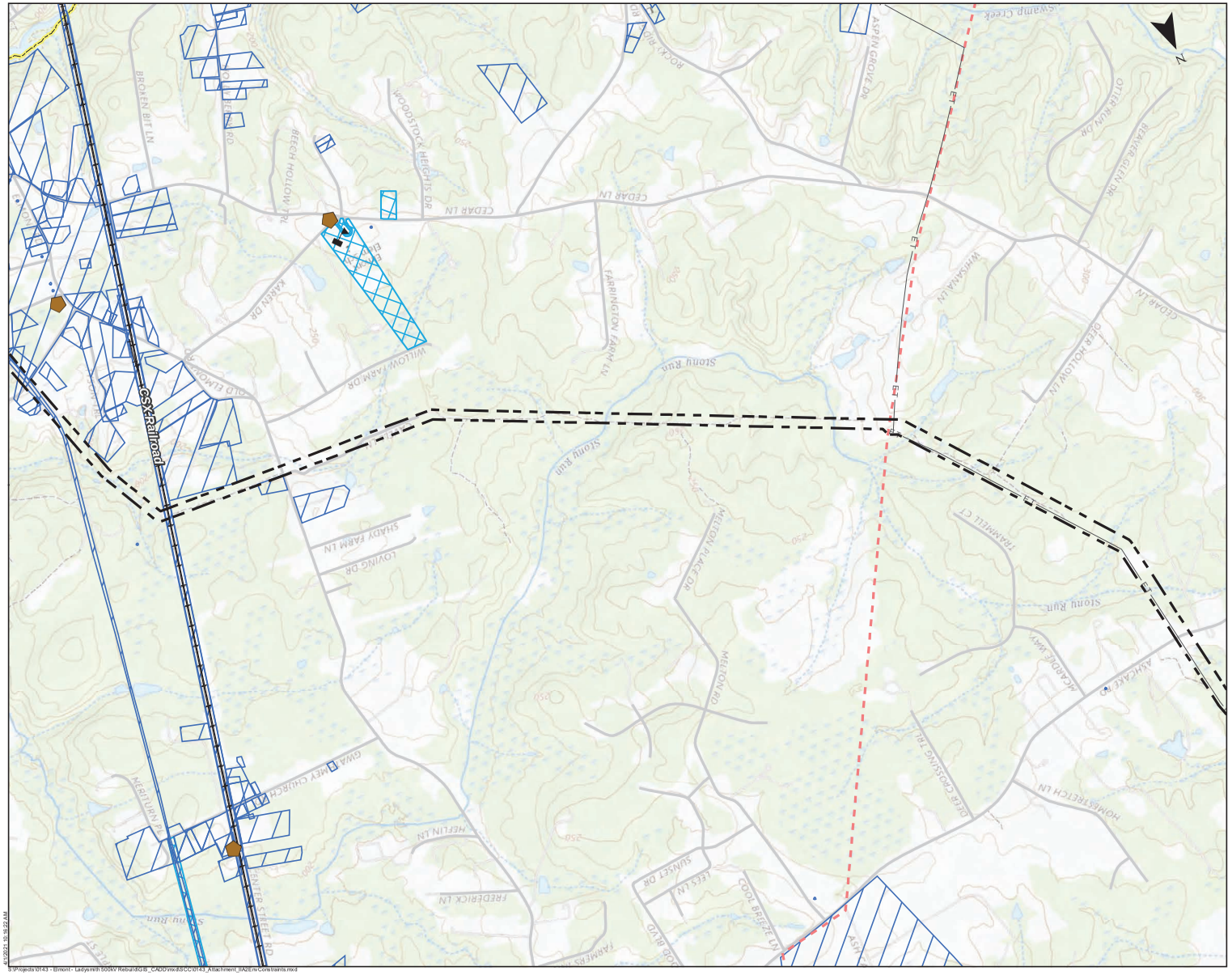
Notes:
1. Basemap from USGS Topo
2. Project centerline provided by Dominion
3. Roads and railroads from VGIN
4. Conservation lands and easements from VDCR and USGS PADUS
5. Local lands derived from Hanover, Caroline, and Henrico County parcel data
6. Historic resources from VDHR
7. Pipeline digitized from National Pipeline Viewer
8. Places from Google Earth



ENVIRONMENTAL

Dominion Energy

SHEET 1 OF 9



ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

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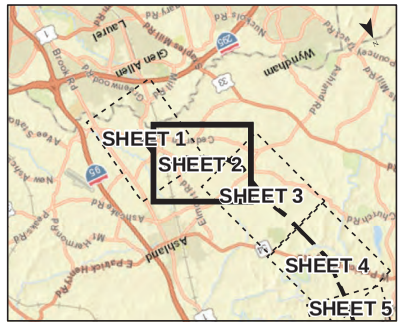

C2 ENVIRONMENTAL

Dominion Energy

SHEET 2 OF 9

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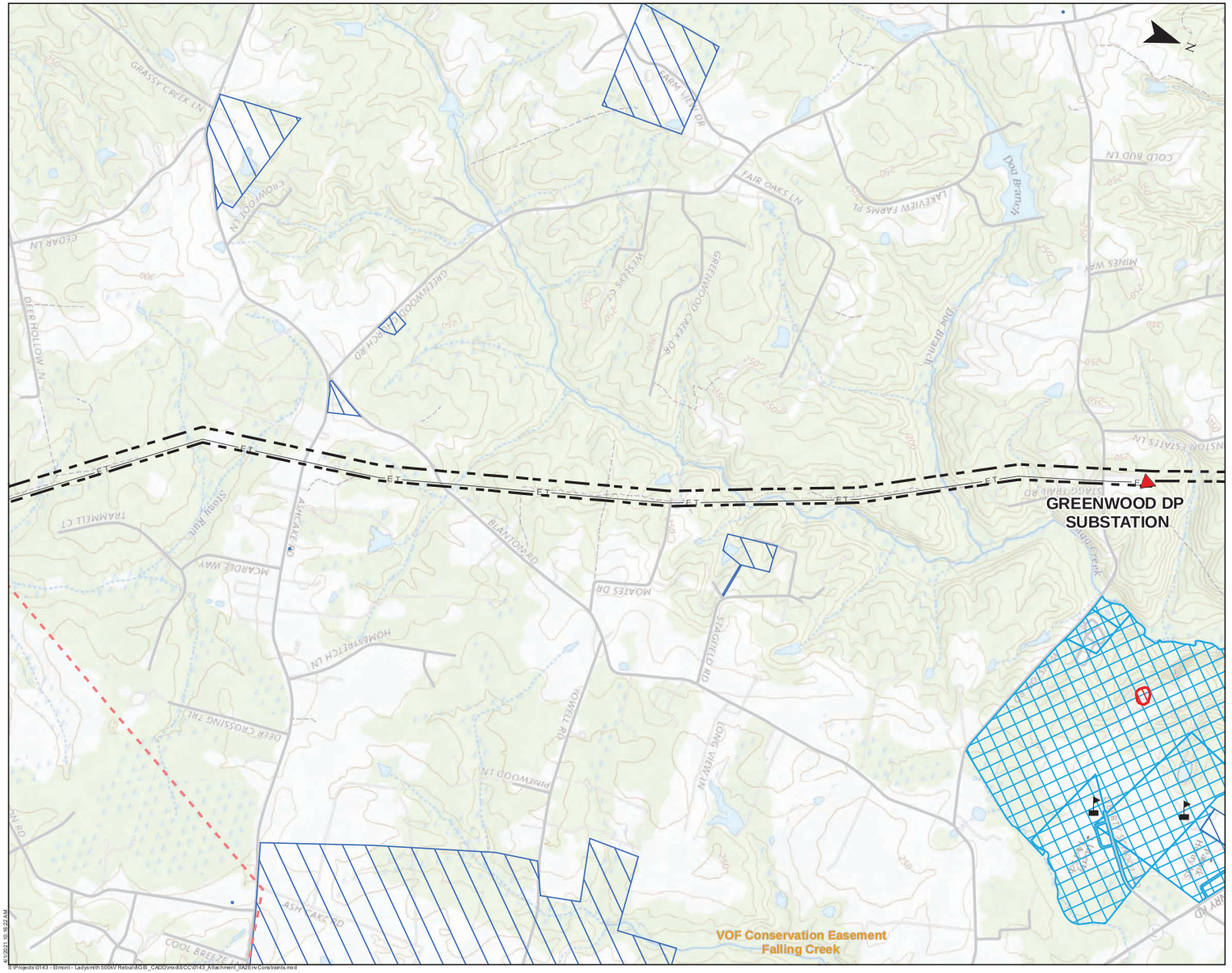

ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

0 750 1,500 3,000 Feet
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SITE DATA

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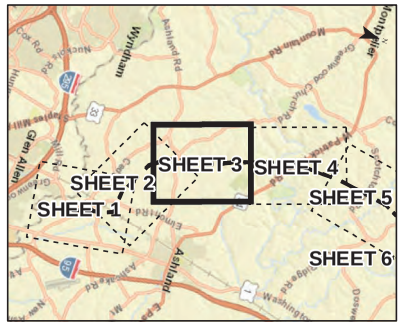

ENVIRONMENTAL

Dominion Energy

SHEET 3 OF 9

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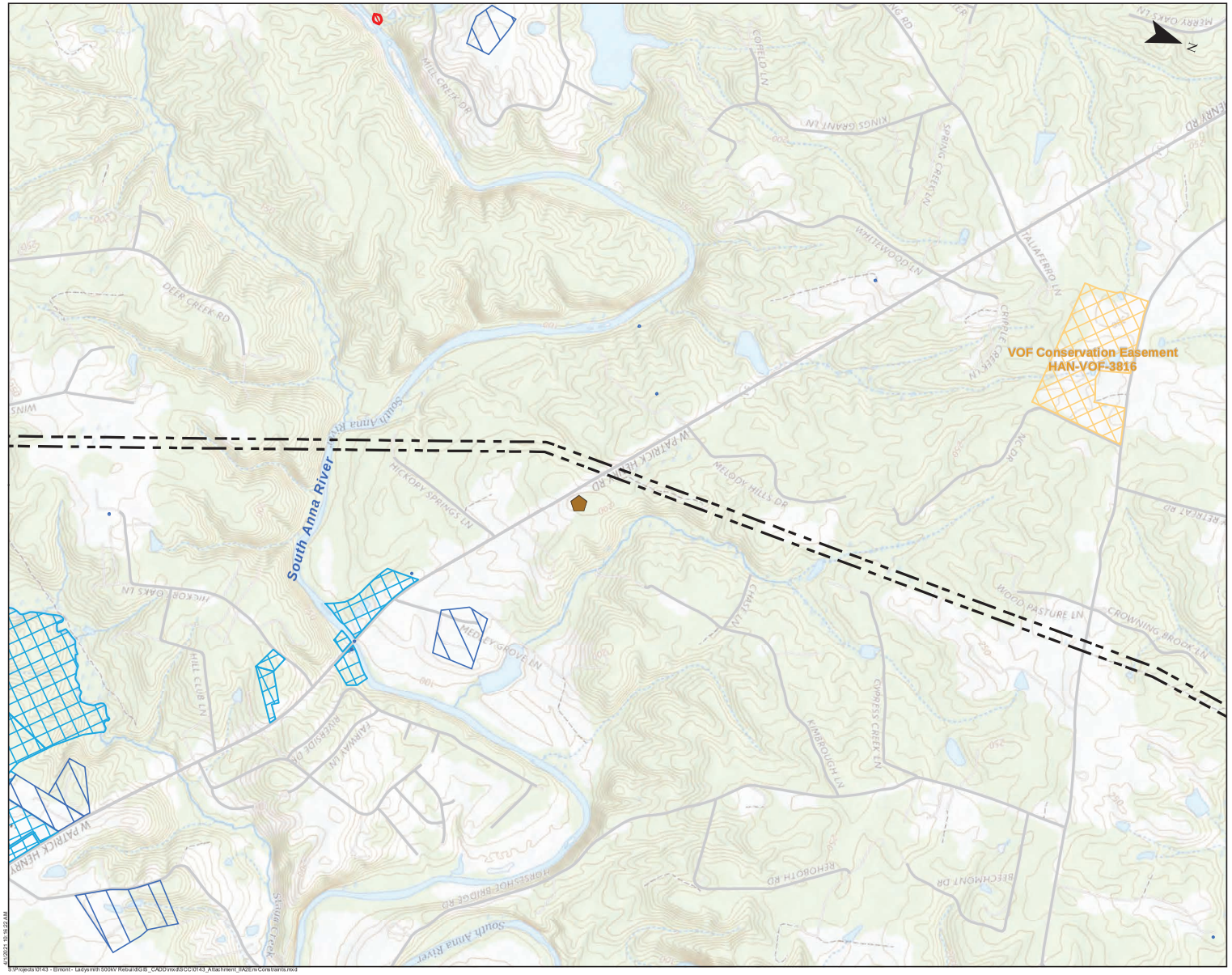

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ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

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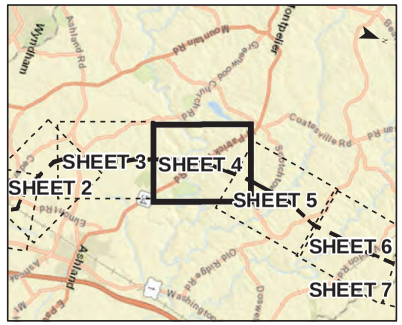
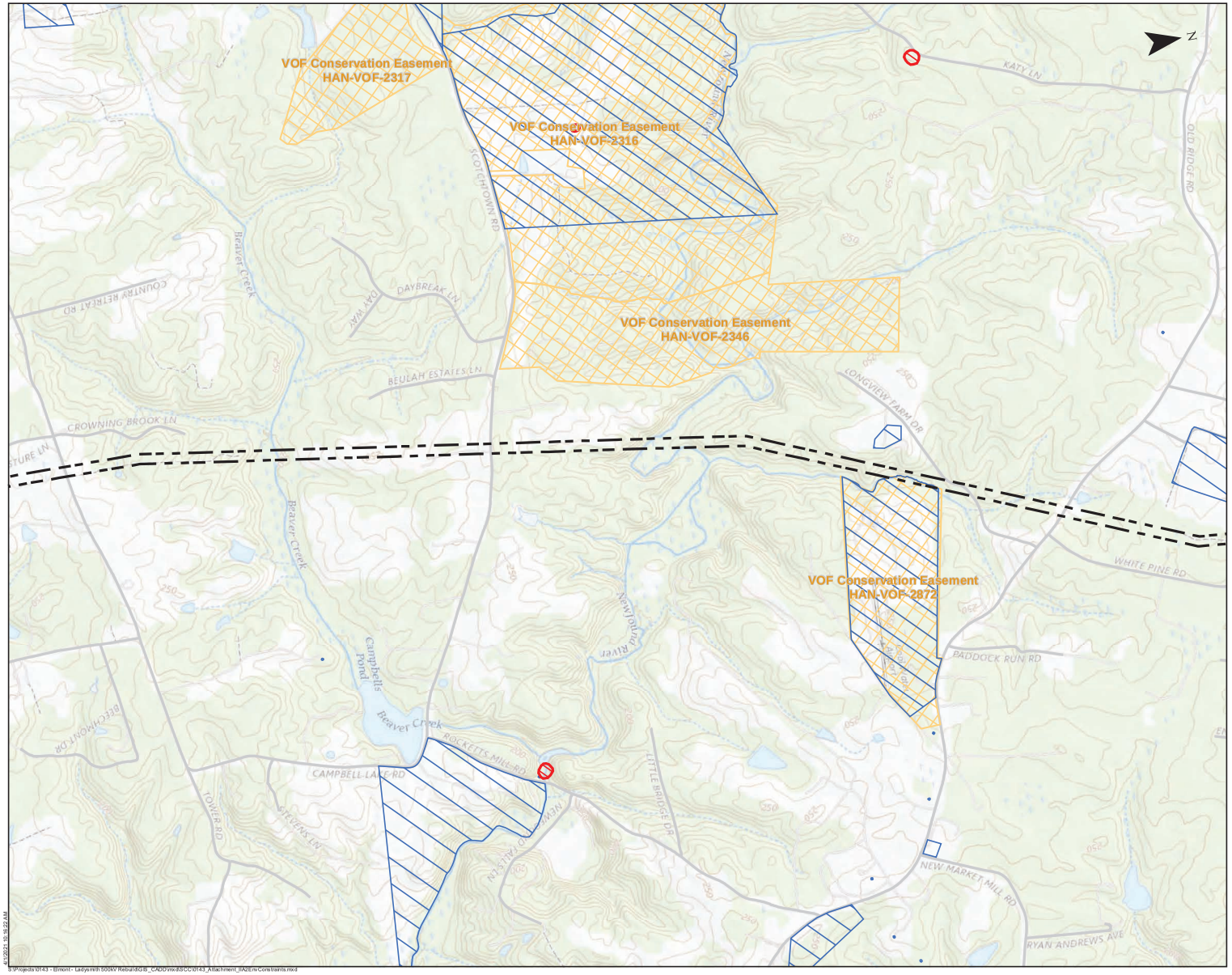


C2 ENVIRONMENTAL

Dominion Energy



ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

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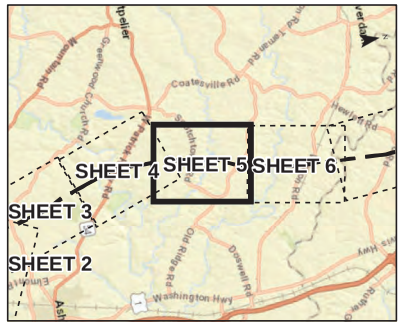
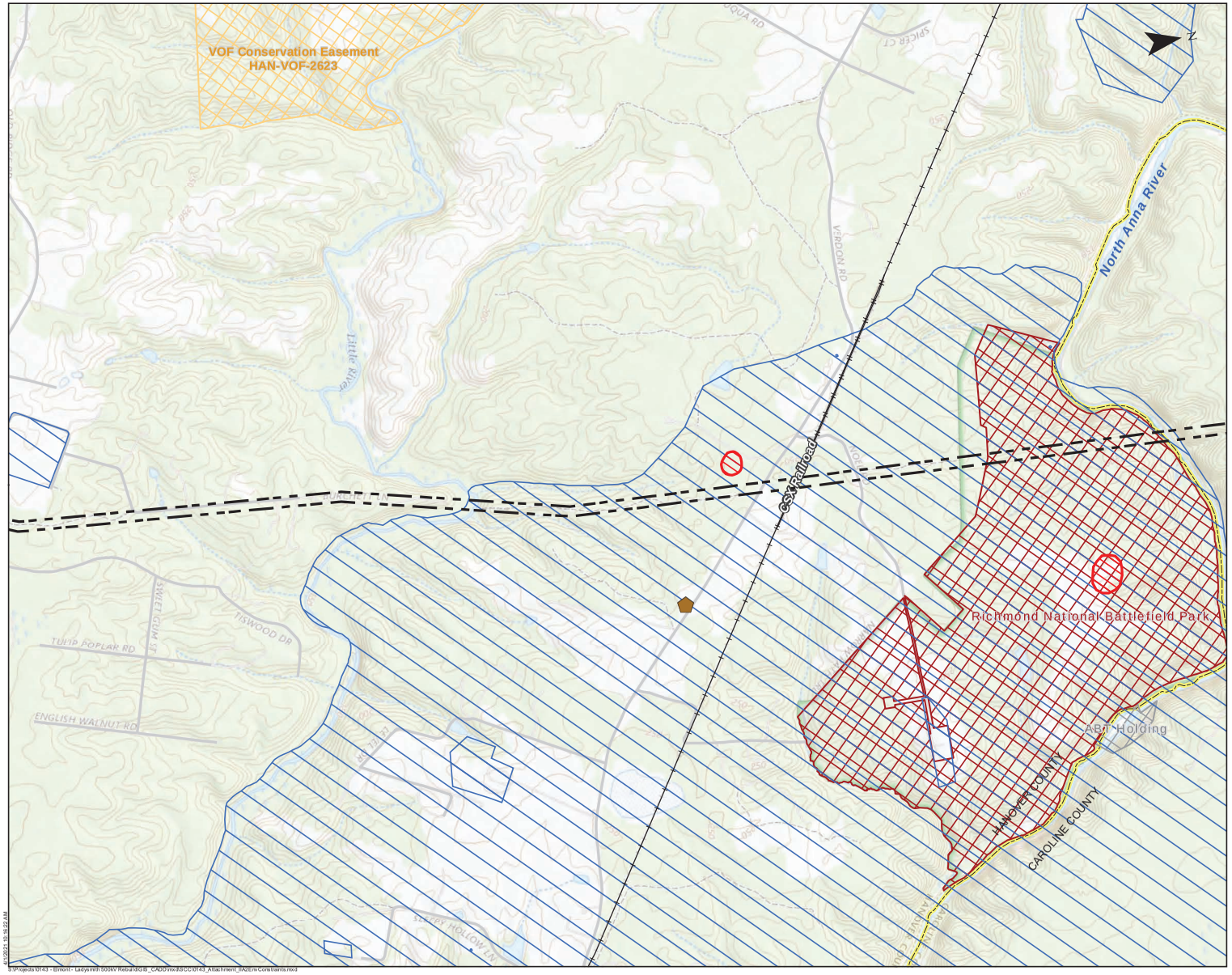


ENVIRONMENTAL

Dominion Energy

SHEET 5 OF 9



ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

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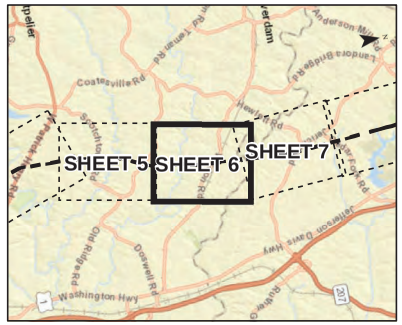
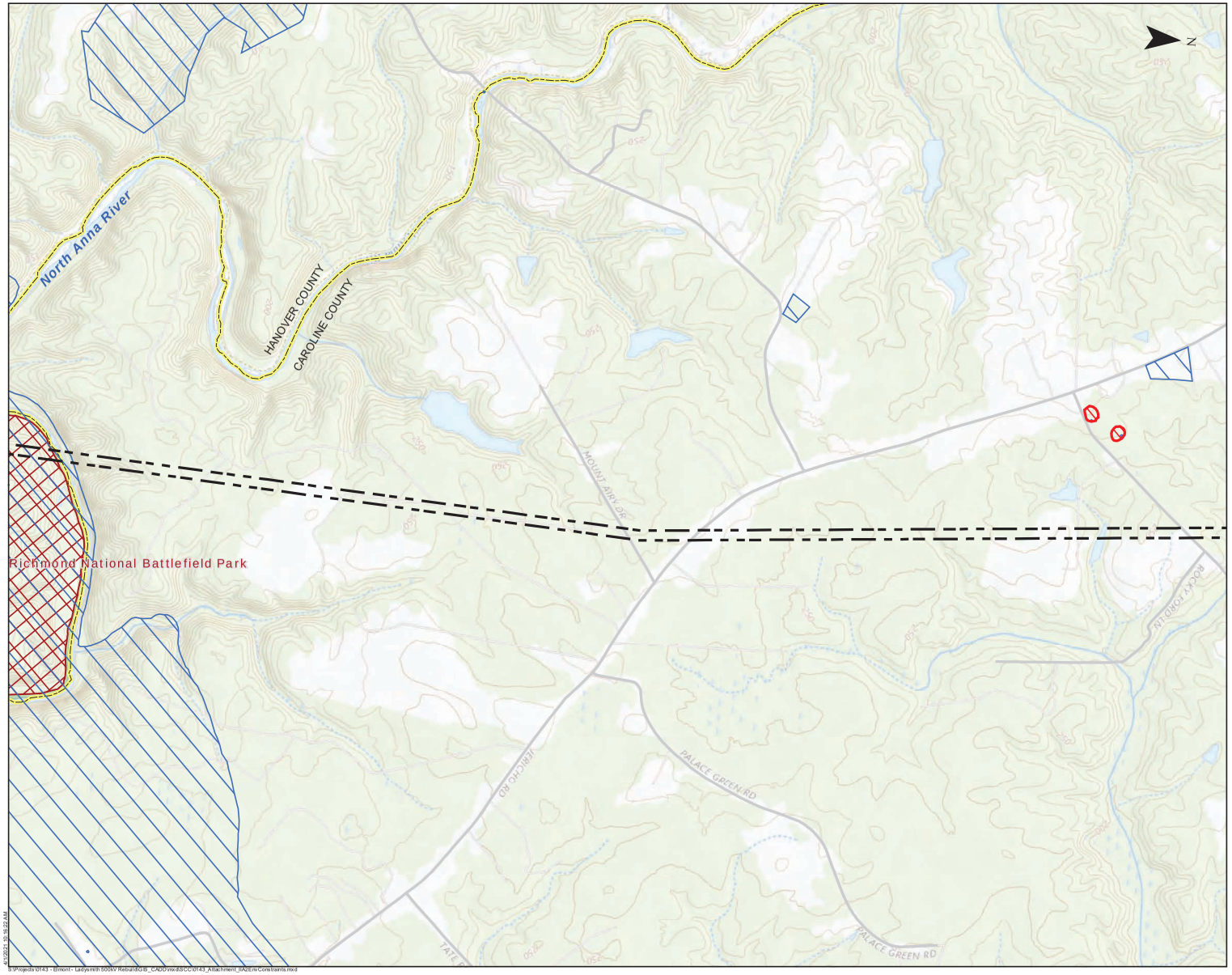


ENVIRONMENTAL

Dominion Energy

SHEET 6 OF 9



ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

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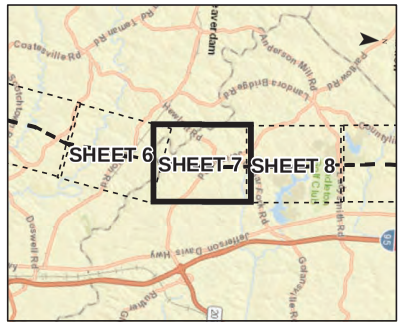
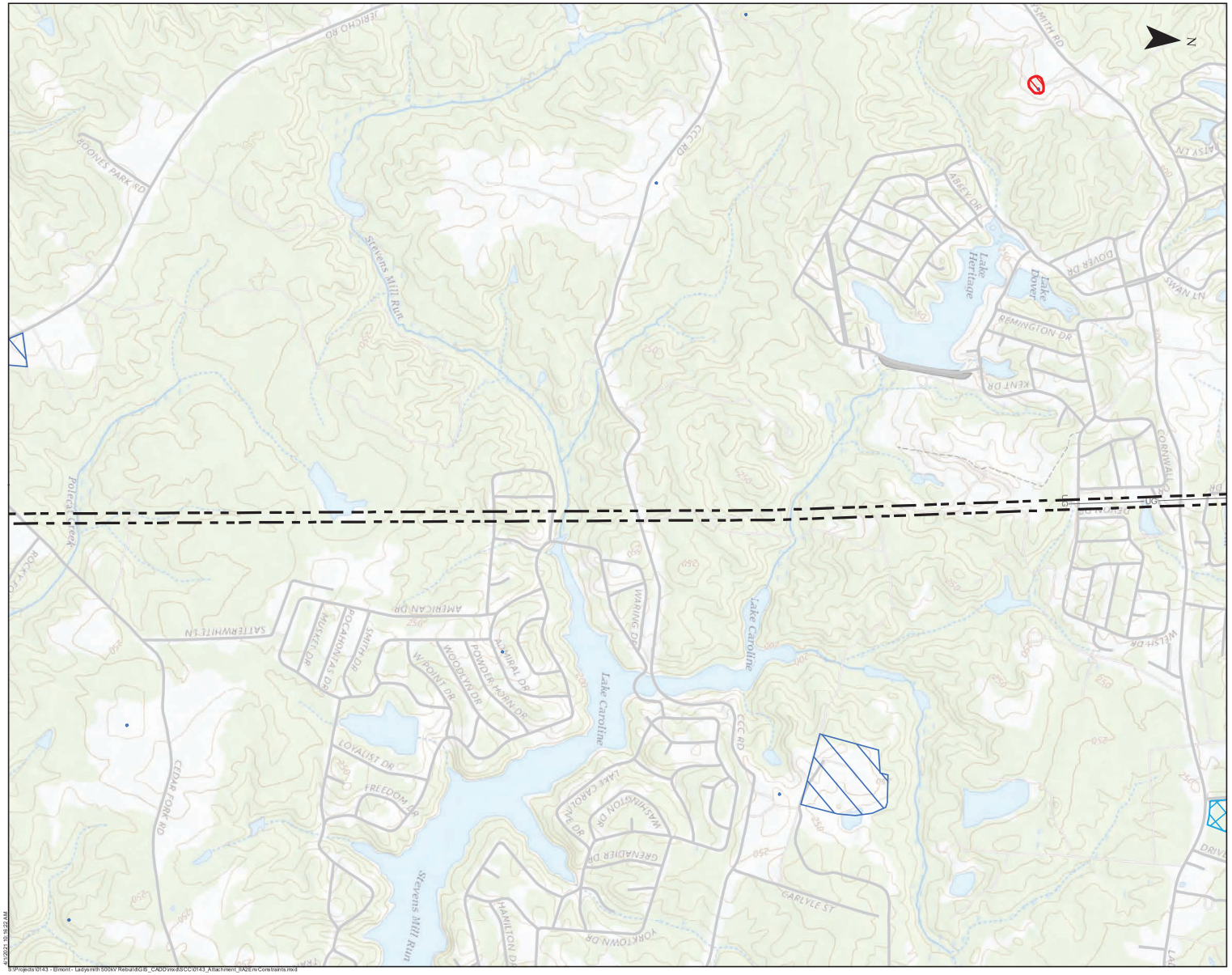


C2 ENVIRONMENTAL

Dominion Energy

SHEET 7 OF 9



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ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

0 750 1,500 3,000 Feet
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SITE DATA

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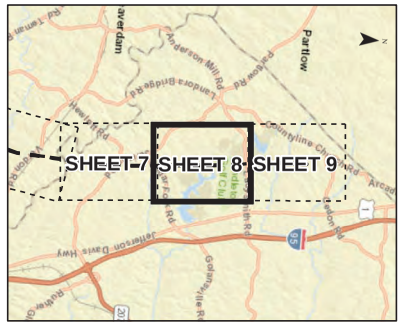
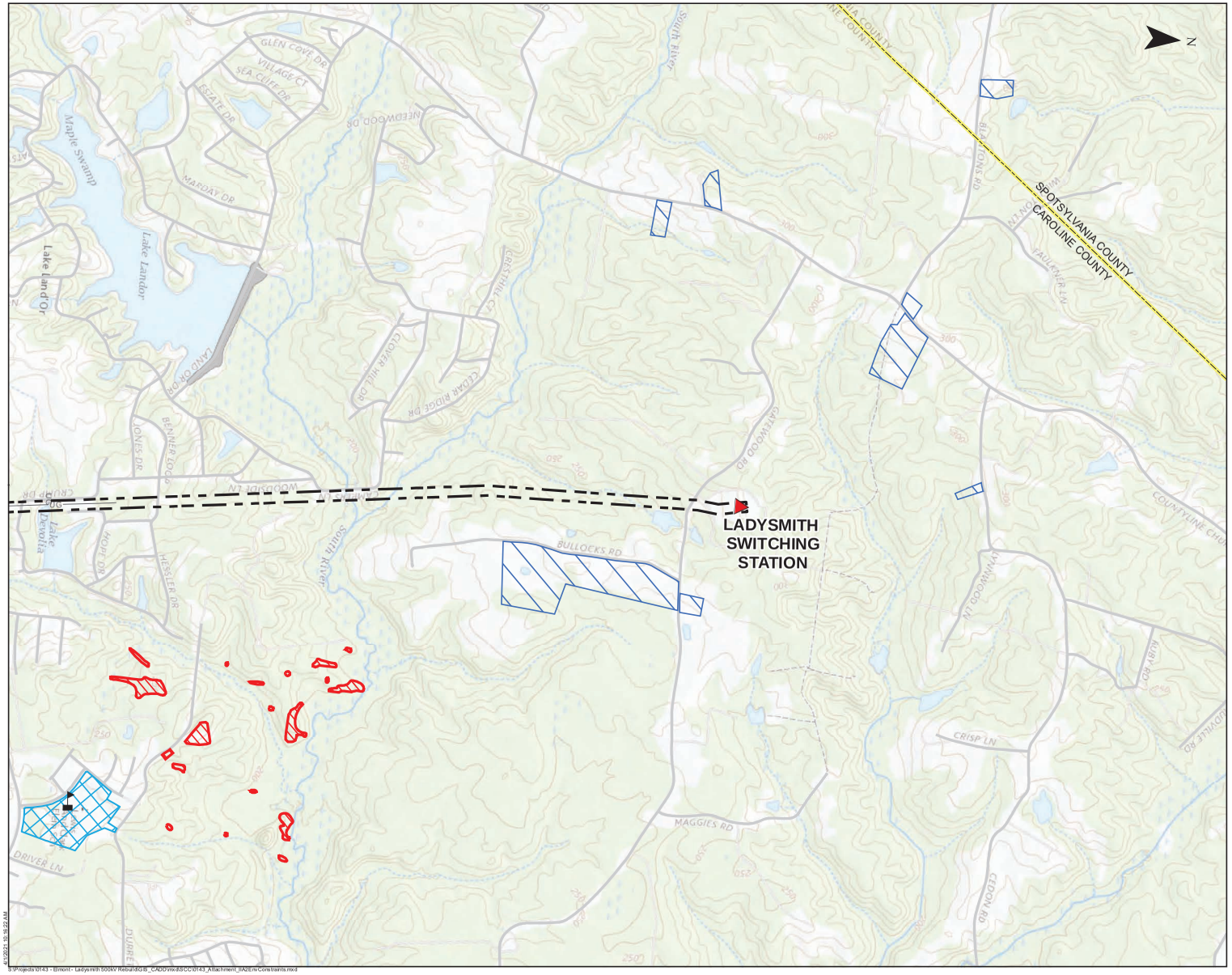


C2 ENVIRONMENTAL

Dominion Energy

SHEET 8 OF 9



ATTACHMENT II.A.2
ENVIRONMENTAL CONSTRAINTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

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C2 ENVIRONMENTAL

Dominion Energy

SHEET 9 OF 9

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;

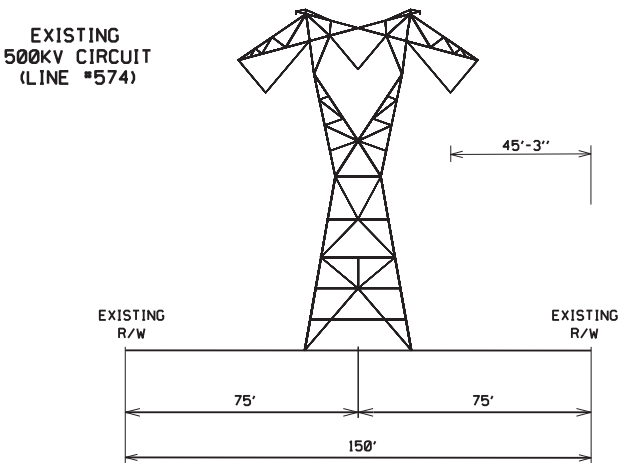
c. Existing utility facilities on the ROW; and

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 Attachment II.A.5.a through c.

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

STRUCTURE #574/1 - 19



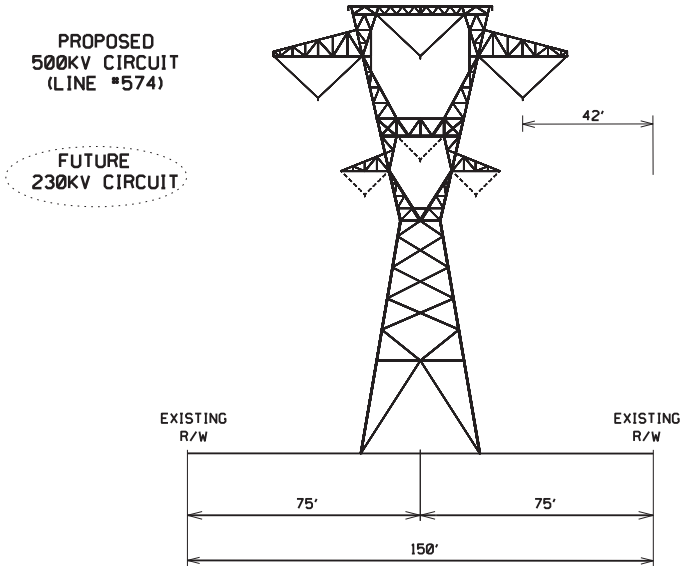
EXISTING CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD LADYSMITH

$DGNSPEC$

PRELIMINARY

STRUCTURE #574/1 - 19



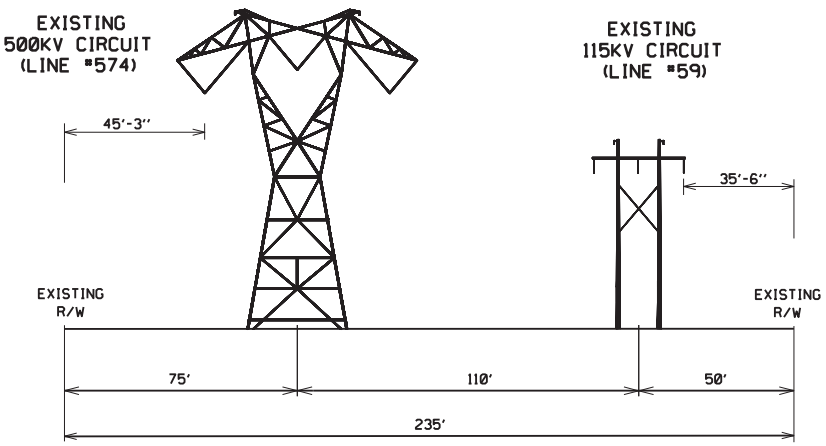
PROPOSED CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD LADYSMITH

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

$DGNSPEC$

STRUCTURE #574/19 - 37

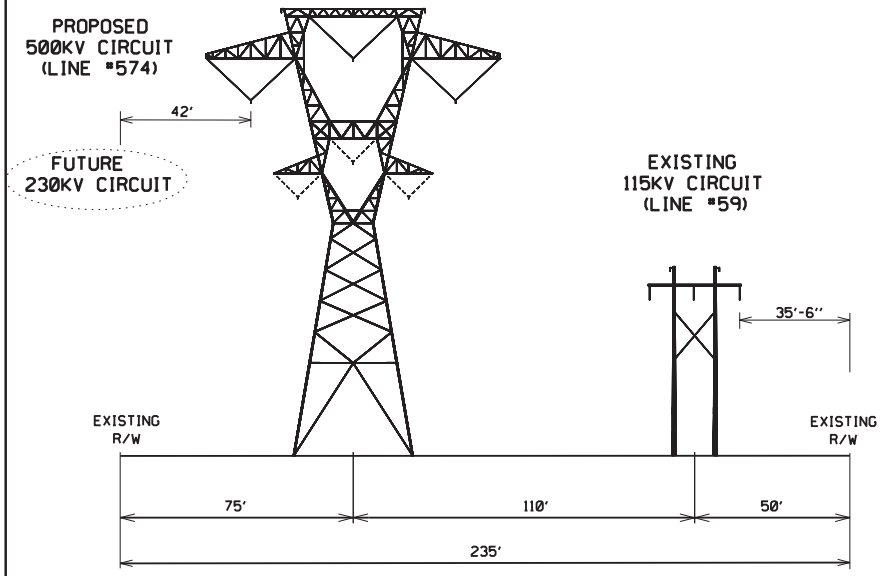


EXISTING CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD LADYSMITH

$DGNSPEC$

PRELIMINARY

STRUCTURE #574/19 - 37



PROPOSED CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD LADYSMITH

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

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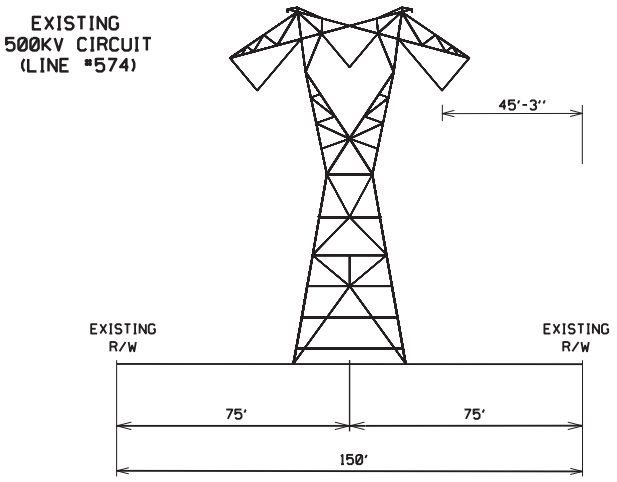
STRUCTURE #574/37 - 124

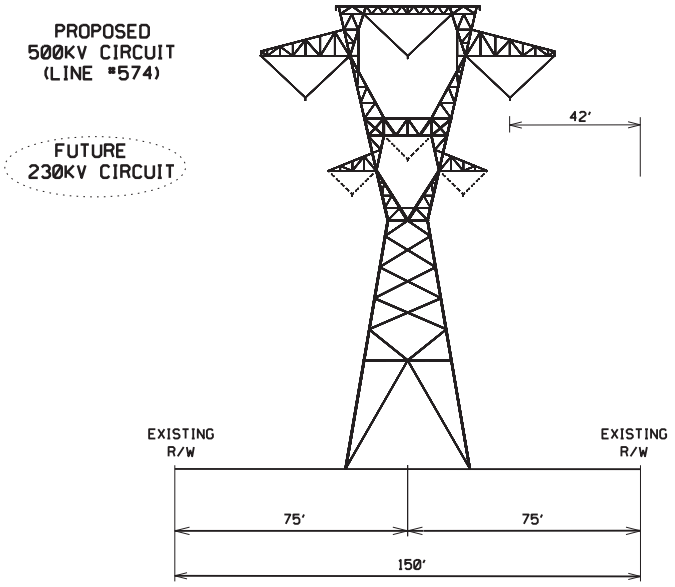


EXISTING CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD LADYSMITH

PRELIMINARY

STRUCTURE #574/37 - 124



PROPOSED CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD LADYSMITH

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

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$DGNSPEC$

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

Response: The Company obtained most its easements along the existing right-of-way of the Elmont-Ladysmith transmission corridor in 1964-1965. The Company does not anticipate that new easements will be required, as the Rebuild Project is within existing rights-of-way or on Company-owned property.

The existing right-of-way intersects a small portion of a Virginia Outdoors Foundation ("VOF") easement (HAN-VOF-2872), which was recorded in 2008.

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 corridor right-of-way, which ranges from 150 feet to 235 feet as shown in Attachments II.A.5.a through c, 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 Rebuild Project. For any such minimal clearing, trees will be cut to no more than three inches above ground level. Trees located outside of the right-of-way that are tall enough to potentially impact the transmission facilities, commonly referred to as "danger trees," may also need to be cut. Danger trees will be cut at or above ground level, limbed, and will remain where felled. No grubbing of roots or stumps will occur. Debris that is adjacent to homes will be disposed of by chipping or removal. In other areas, debris may be mulched or chipped as practicable. Danger tree removal will be accomplished by hand or from equipment placed on mats in wetland areas and within 100 feet of streams, if applicable. Care will be taken not to leave debris in streams or wetland areas that may cause an impediment to the flow of water. No mulching will occur in wetlands. Erosion control devices will be used on an ongoing basis, as appropriate, during all clearing and construction activities.

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

Limited clearing or limbing may be required to accommodate construction access. Any clearing will be done in accordance with the Company's Integrated Vegetation Management Plan ("IVMP") practice with no grubbing of roots or stump materials. The remainder of the existing right-of-way is currently cleared and maintained. The right-of-way will continue to be maintained in its current state on a regular cycle to prevent interruptions to electric service and provide ready access to the right-of-way in order to patrol and make emergency repairs. Periodic maintenance to control woody growth will consist of hand cutting, machine mowing and herbicide application.

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

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

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

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

- Agriculture;
- Hiking Trails;
- Fences;
- Perpendicular Road Crossings;
- Perpendicular Utility Crossings;
- Residential Driveways; and,
- Wildlife / Pollinator Habitat.

II. DESCRIPTION OF THE PROPOSED PROJECT

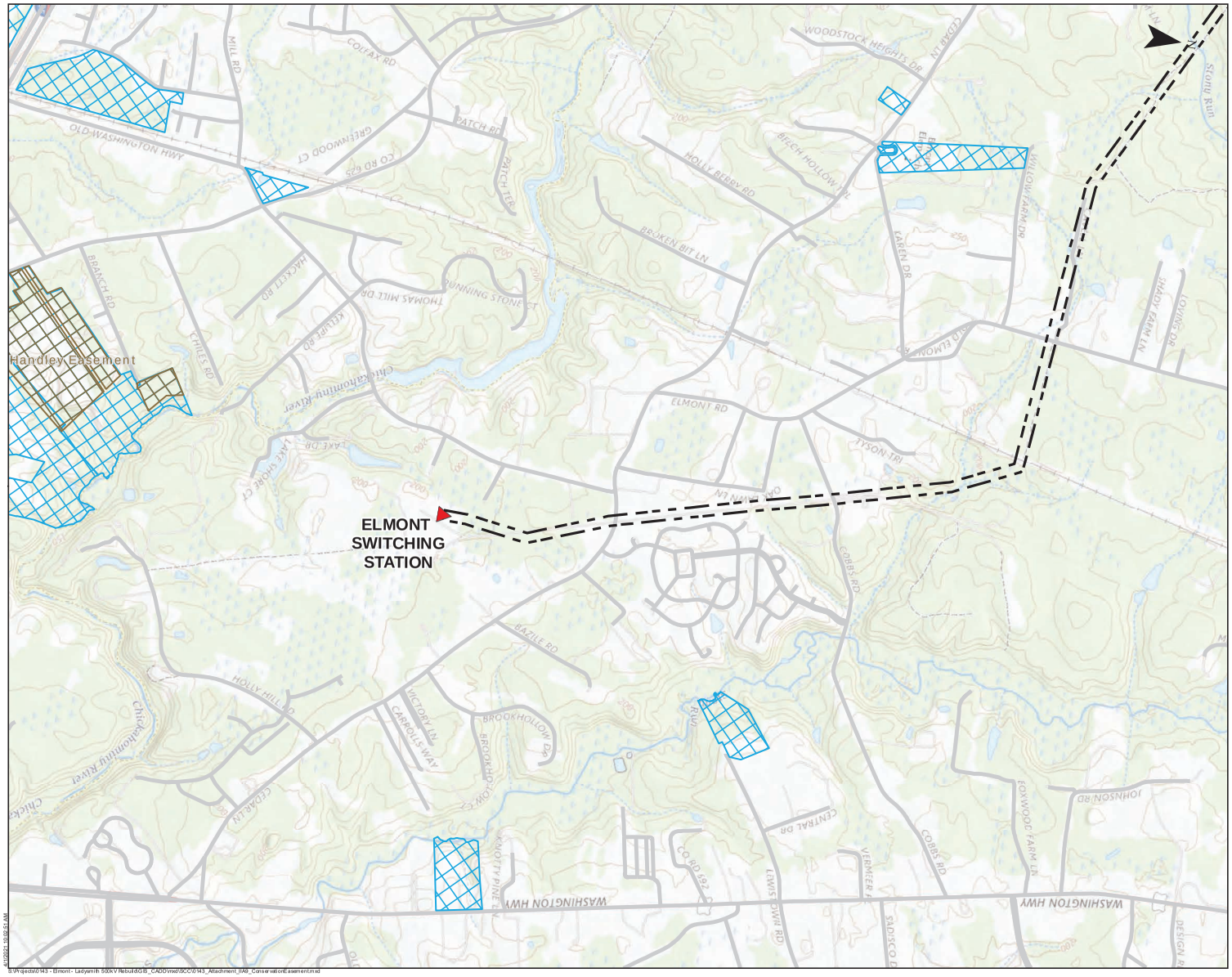
A. Right-of-way ("ROW")

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

Response: The Company's route selection for transmission line rebuild projects begins with a review of the existing right-of-way. This approach generally minimizes impacts on the natural and human environments. This approach is also consistent with Attachment 1 of these Guidelines, which provides a tool routinely used by the Company in routing its transmission line projects. Specifically, this approach is consistent with Guideline #1, which states that existing rights-of-way should be given priority when adding new transmission facilities, and with §§ 56-46.1 and 56-259 of the Code of Virginia, which promote the use of existing rights-of-way for new transmission facilities. For the proposed Rebuild Project, the existing transmission corridor right-of-way that currently contains Line #574 and a portion of Line #59 is adequate.

Because the existing right-of-way and Company-owned property is adequate to construct the proposed 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 of and construction on new right-of-way, the Company did not consider any alternate routes requiring new right-of-way for these Rebuild Project.

The project crosses one existing easement and one federally-owned land as shown on Attachment II.A.9. See also Section II.A.6.



ATTACHMENT II.A.9
CONSERVATION EASEMENTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild
Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

0 750 1,500 3,000 Feet
Scale is 1 IN = 1,500 FT when printed at original size of 11x17

SITE DATA
- Project Area
- Existing Substation/Switching Station
- Federally Owned Land
- Locally Owned Land
- Local Conservation Land
- American Battlefield Trust (ABT) Holding
- Virginia Outdoors Foundation (VOF) Easement

Notes:
1. Basemap from USGS Topo
2. Project centerline provided by Dominion
3. Roads from VGIN
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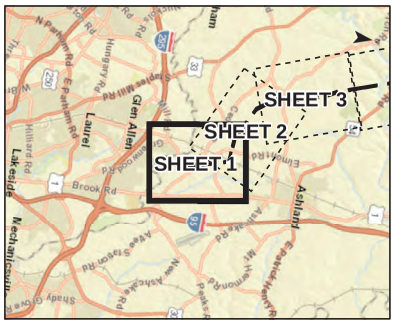
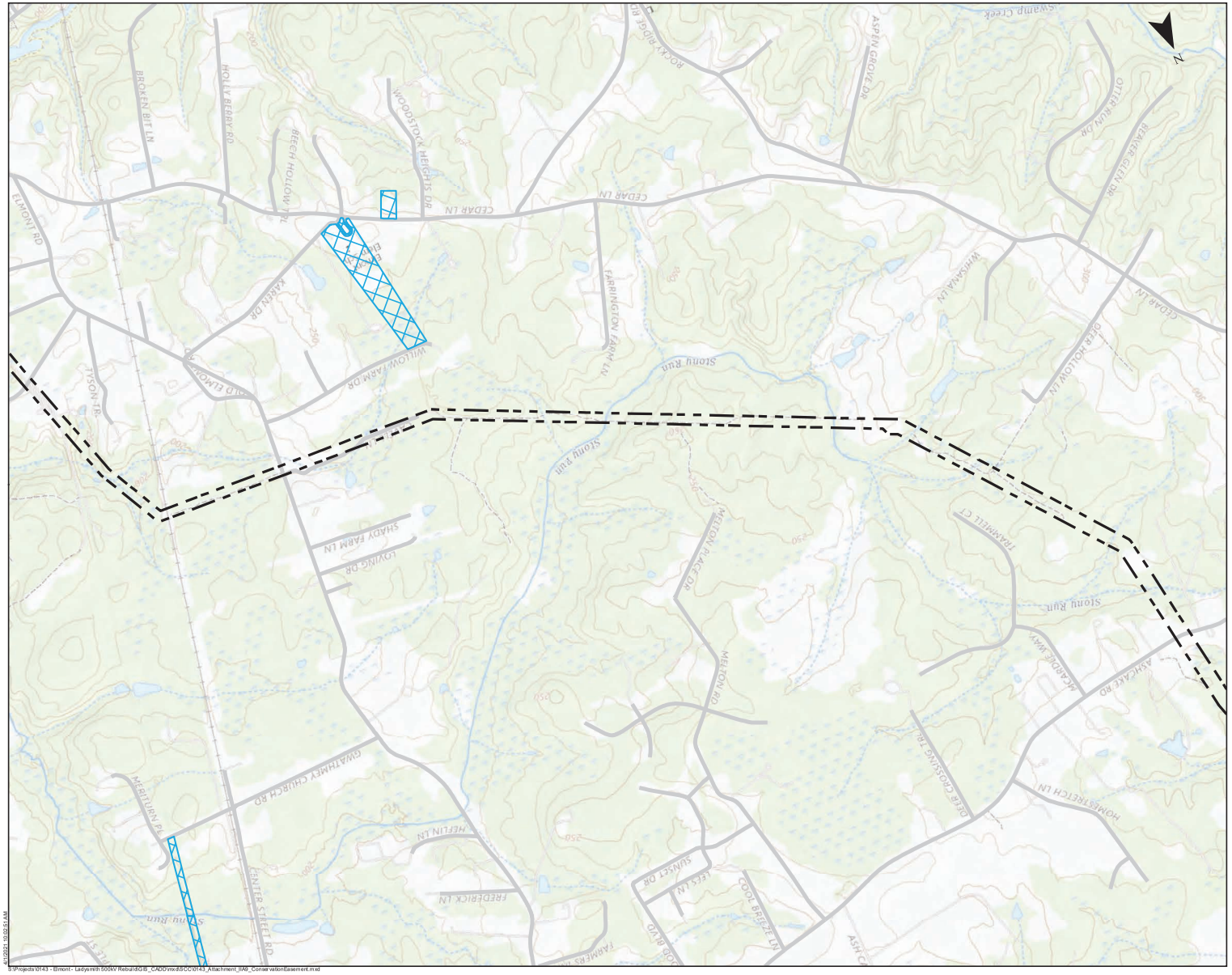


ENVIRONMENTAL

Dominion Energy

SHEET 1 OF 9



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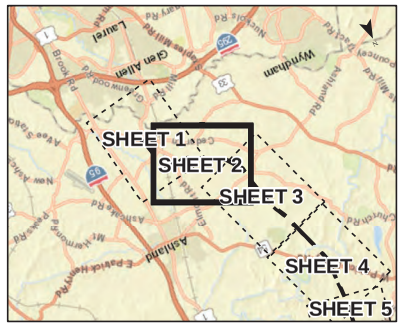
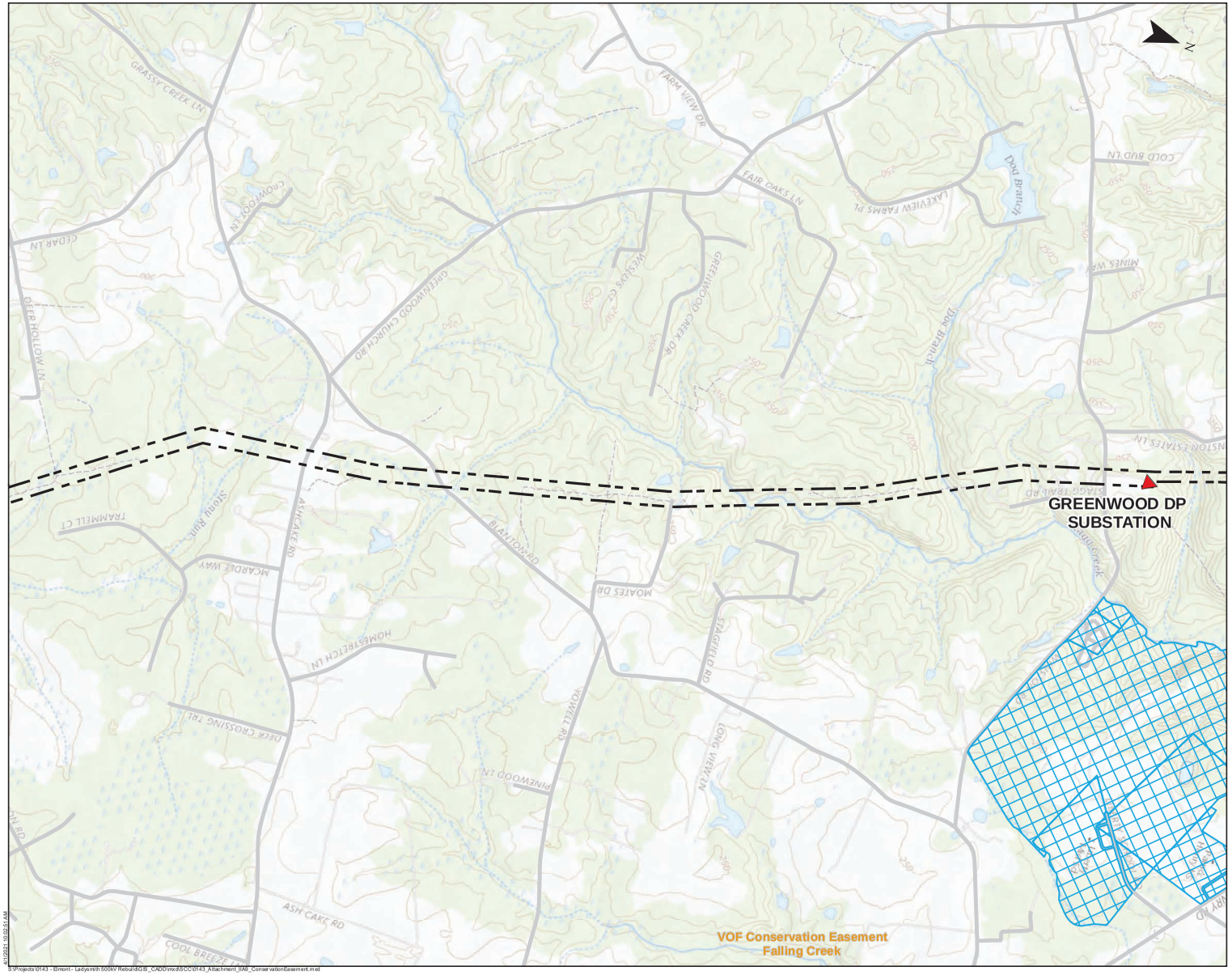


ENVIRONMENTAL

Dominion Energy

SHEET 2 OF 9



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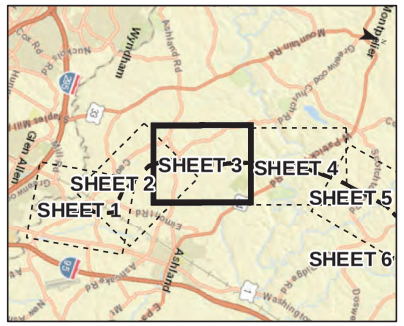
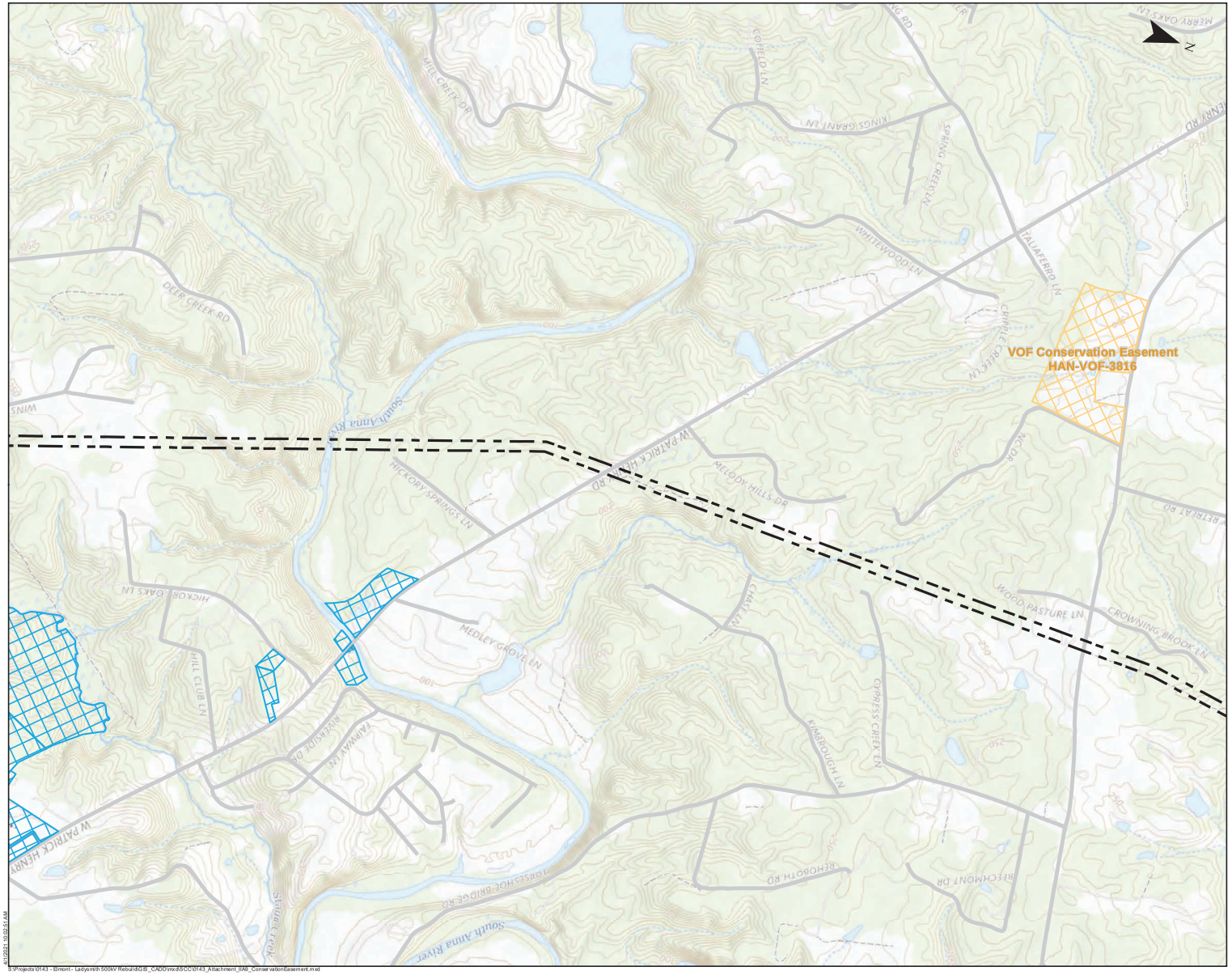


ENVIRONMENTAL

Dominion Energy

SHEET 3 OF 9



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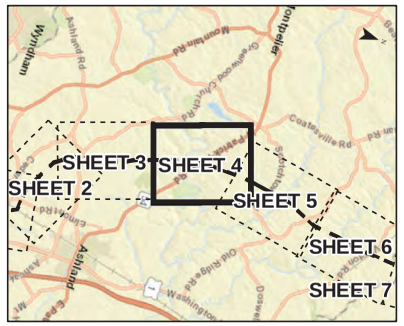
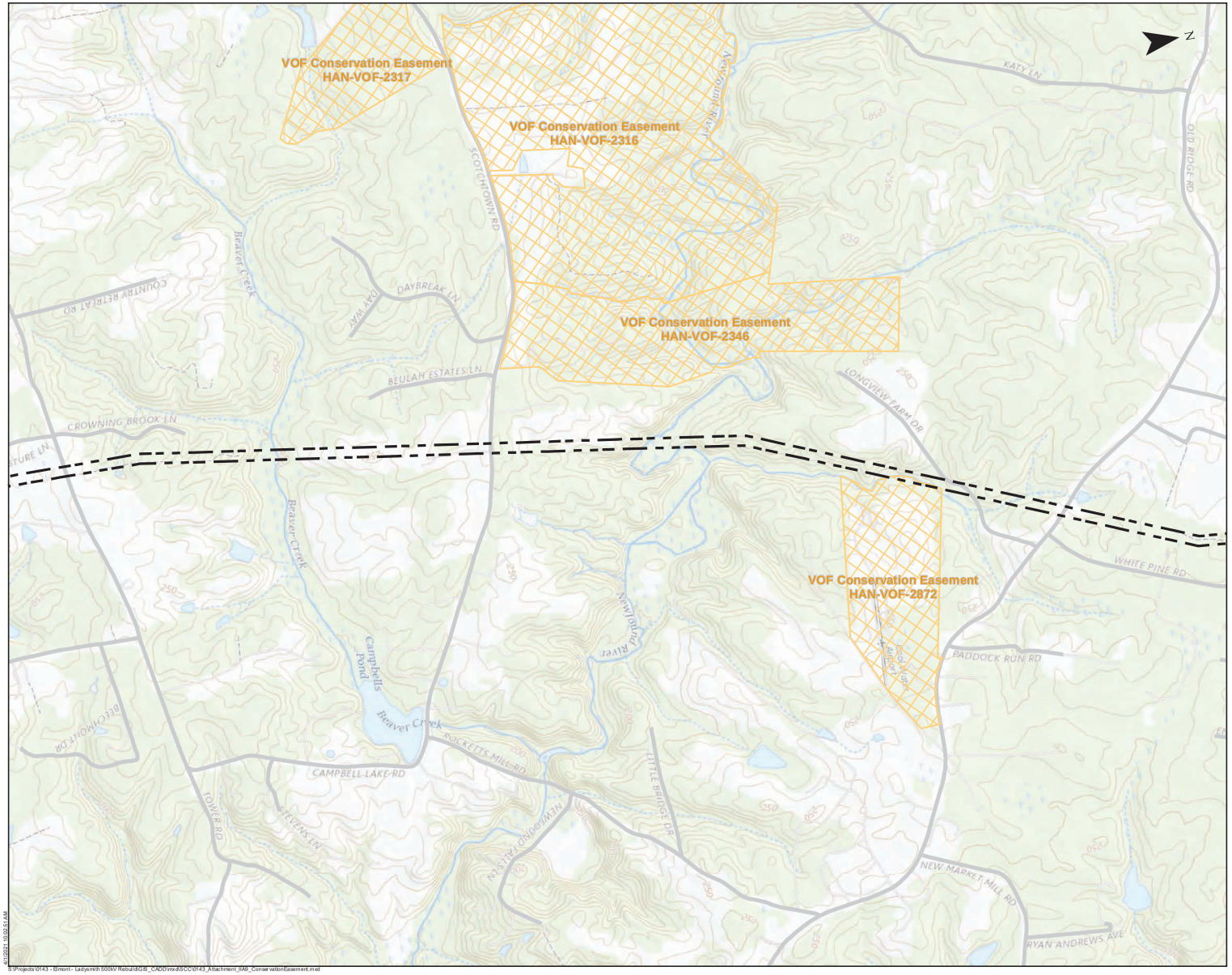


ENVIRONMENTAL

Dominion Energy



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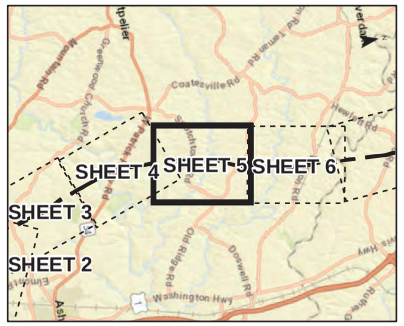
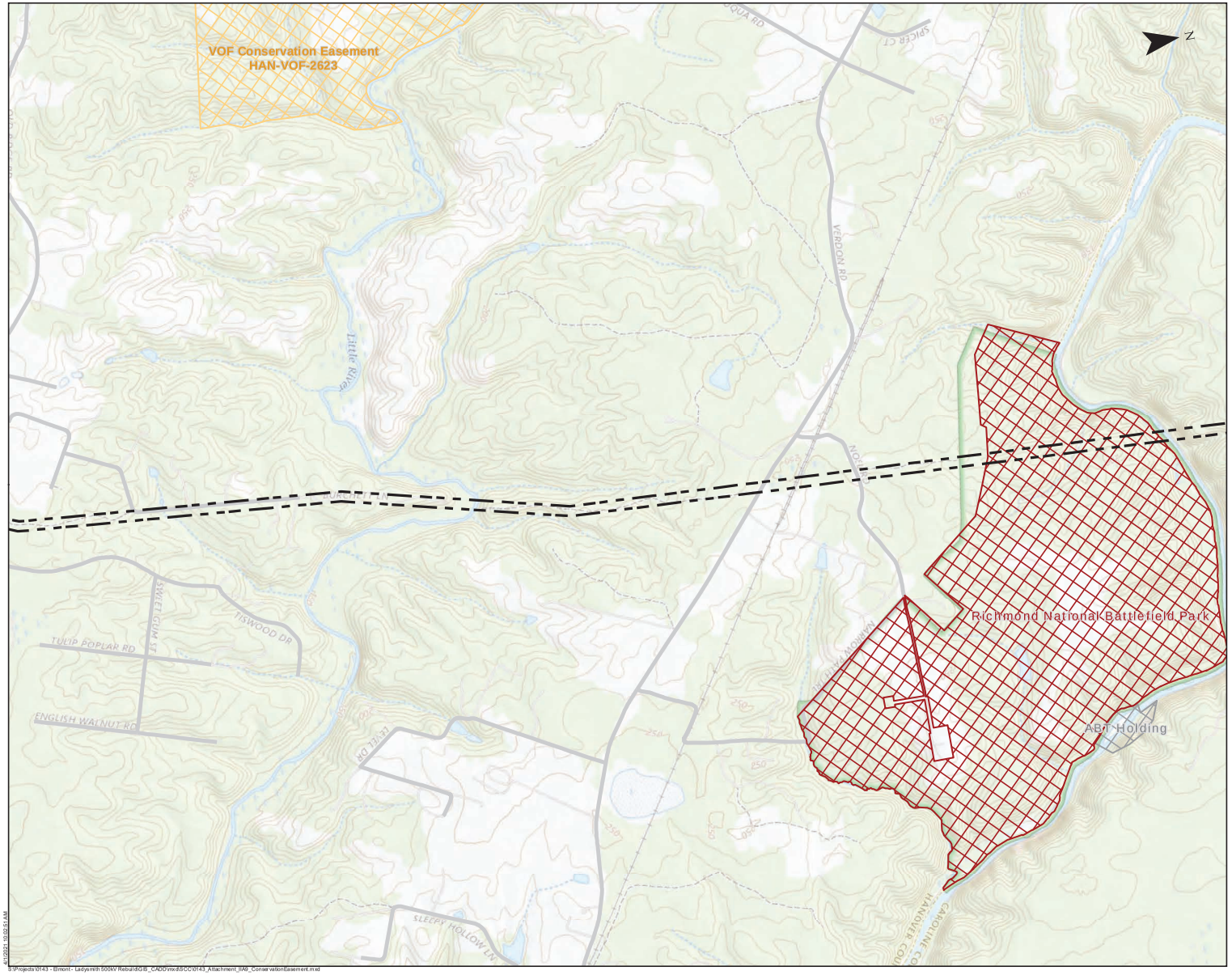


ENVIRONMENTAL

Dominion Energy



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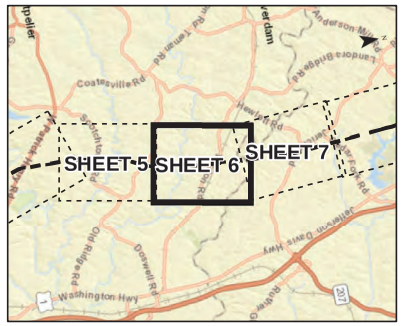

ENVIRONMENTAL

Dominion Energy

SHEET 6 OF 9

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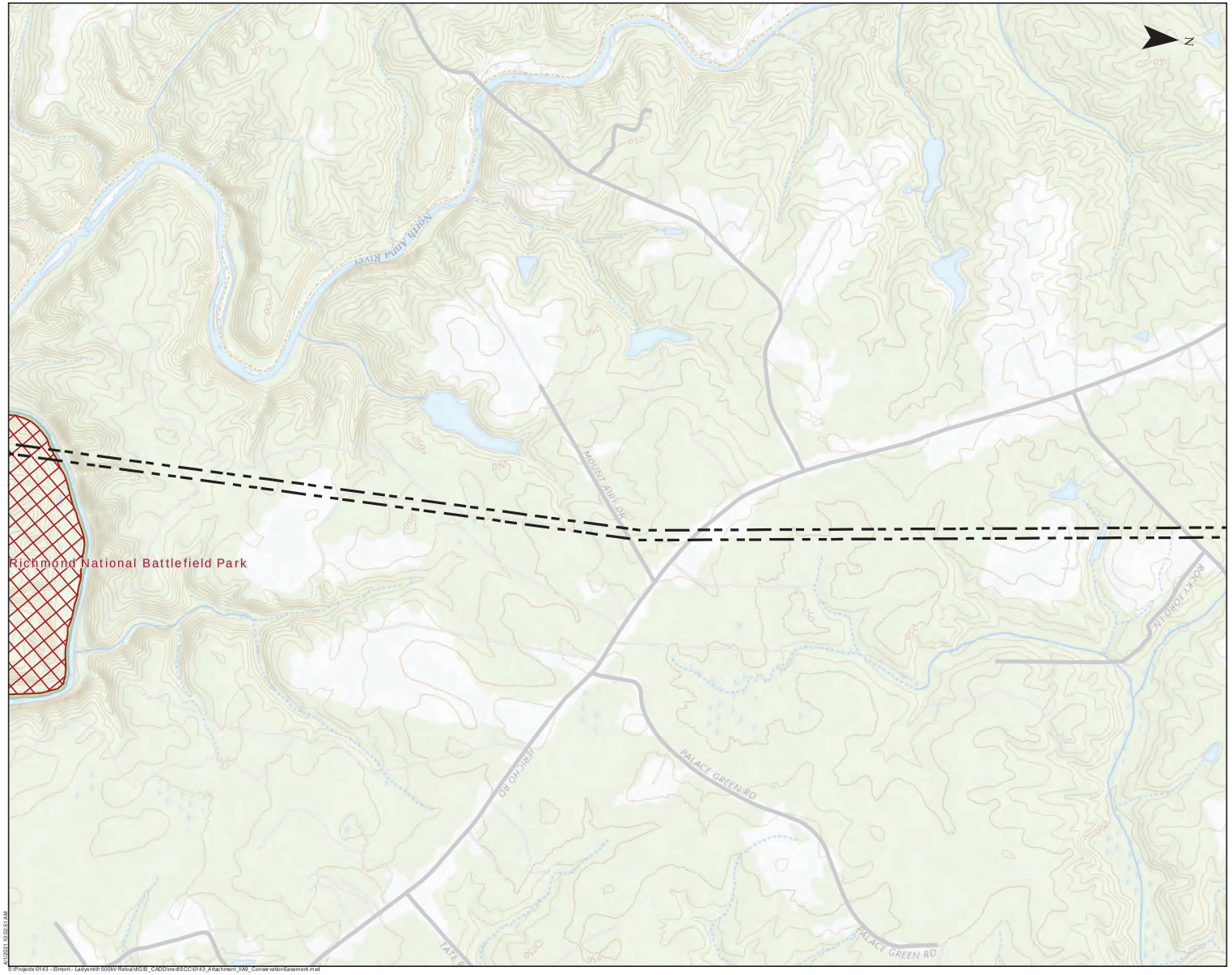

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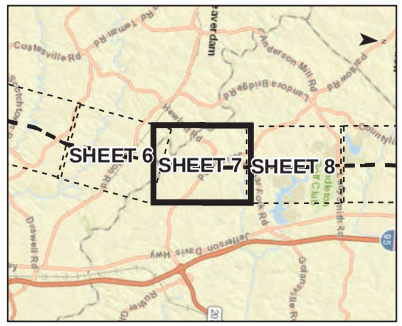

ENVIRONMENTAL

Dominion Energy

SHEET 7 OF 9

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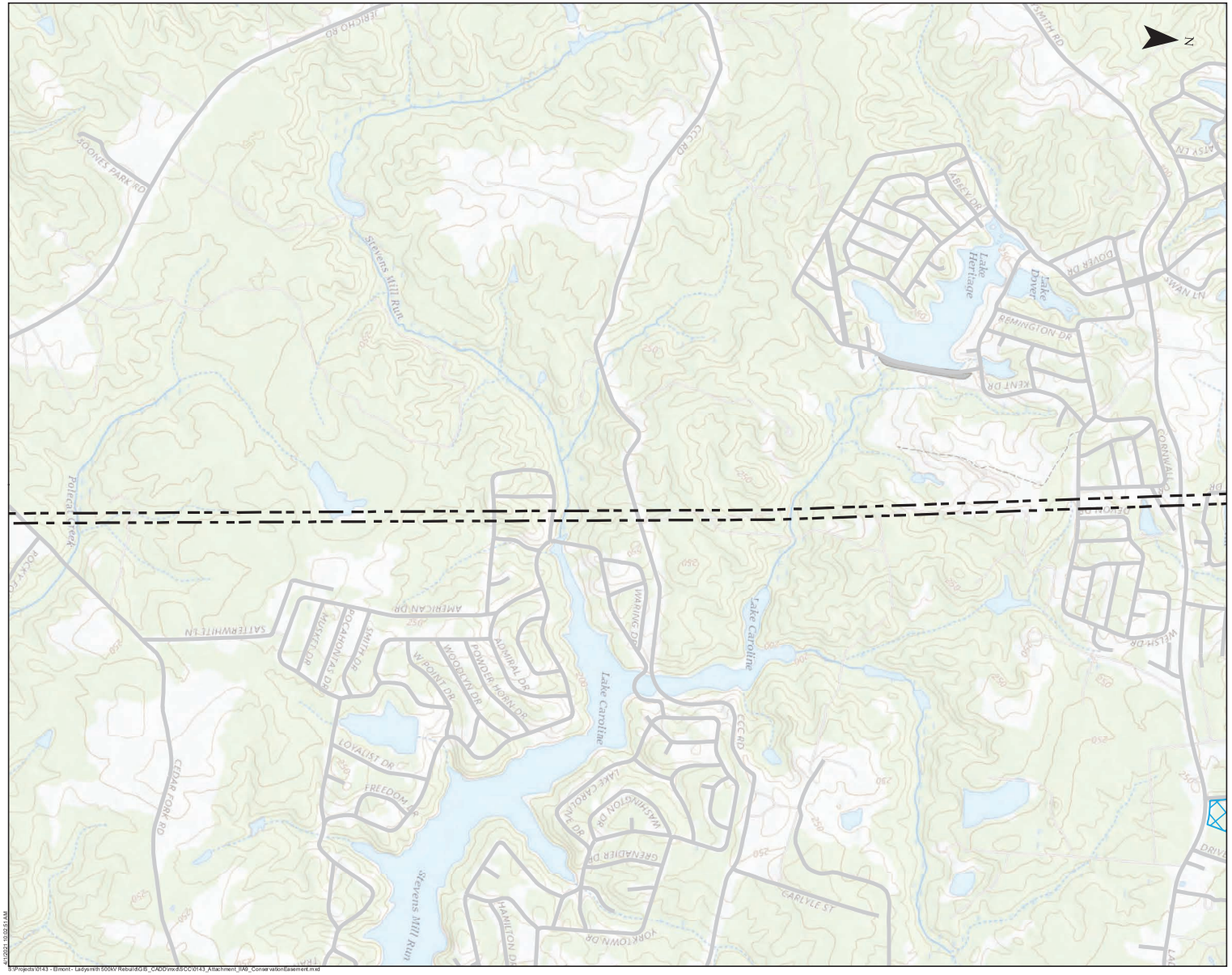

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ATTACHMENT II.A.9

CONSERVATION EASEMENTS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

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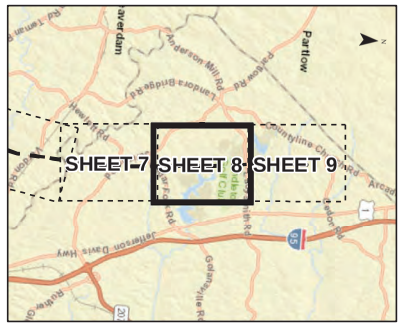
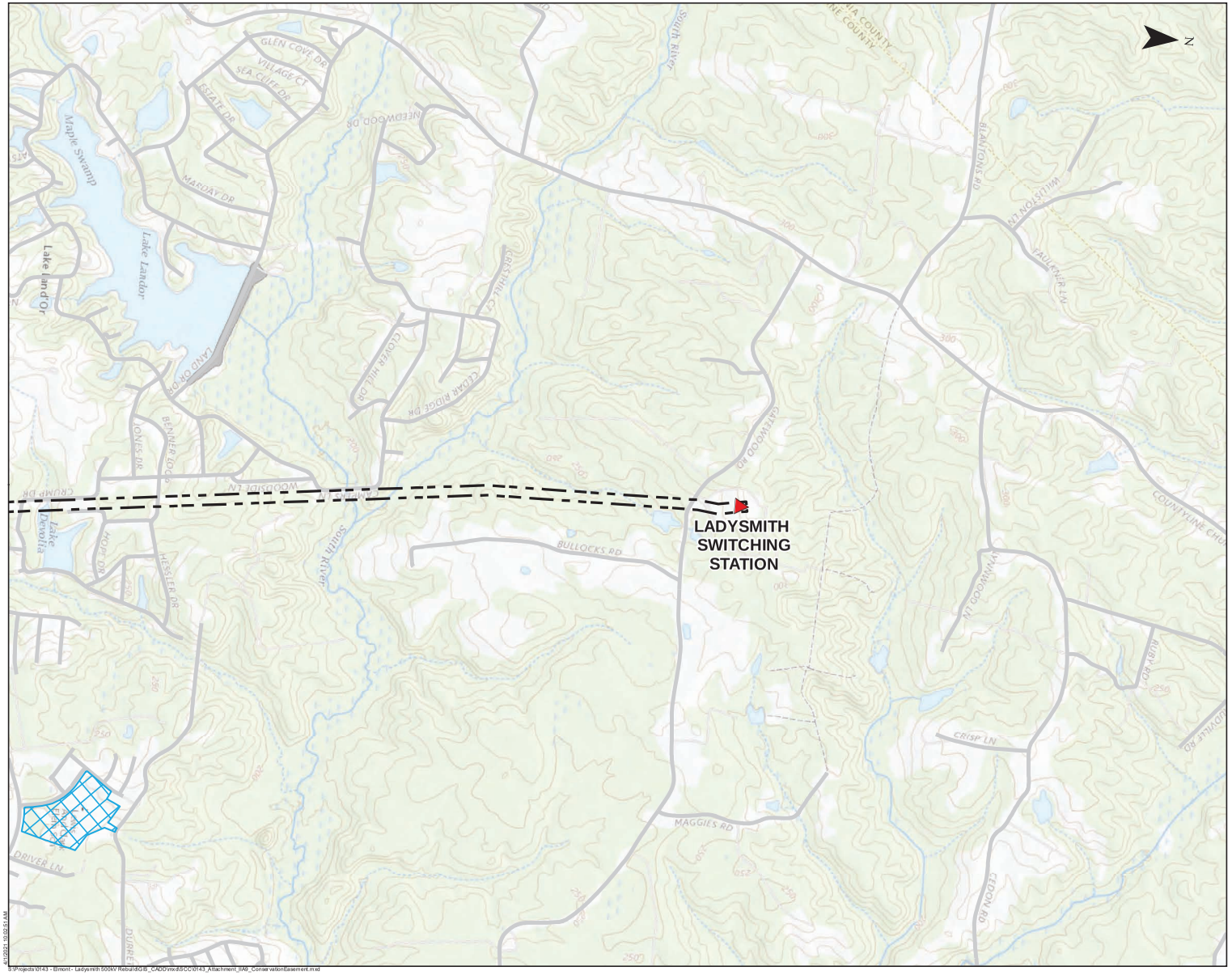


ENVIRONMENTAL

Dominion Energy

SHEET 8 OF 9



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ATTACHMENT II.A.9
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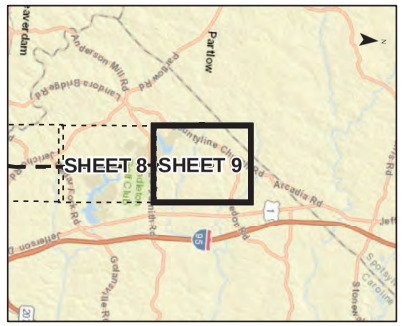


ENVIRONMENTAL

Dominion Energy

SHEET 9 OF 9

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 Line #574, Line #568, Ladysmith Substation and Elmont Substation out of service in ten separate and sequential transmission line outages. The outages are sequenced 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 in January 2023, and to complete construction of the Rebuild Project by December 31, 2025. 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.

The Company has requested four outages from PJM for Line #574 during the Spring of 2024/2025, and Fall of 2024/2025. The eDart Numbers for those outages include: 819852, 819853, 819854, and 819861. The Company has also requested an outage from PJM for Line #568 during the Spring of 2024 at Ladysmith Substation to swap line terminal position with Line #574. The eDart number is 880887. It is customary for PJM to not grant approval of the outages until shortly before the outages are expected to occur.

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: As noted in Section II.A.9, Attachment 1 of these Guidelines provides 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 Rebuild Project within the existing transmission corridor.

By utilizing the existing transmission corridor, the proposed Rebuild Project will minimize impact to any site listed on the National Register of Historic Places ("NRHP"). Thus, the proposed Rebuild Project is consistent with Guideline #2 (where practical, rights-of-way should avoid sites listed on the NRHP). In any event, the Company will coordinate with the Virginia Department of Historic Resources ("VDHR") regarding its plans prior to engineering and construction of the Rebuild Project to avoid or minimize impacts. The NRHP-listed and NRHP-eligible properties that are within or adjacent to the Rebuild Project are presented in the table below. A Stage I Pre-Application Analysis prepared by Dutton & Associates ("Dutton") was submitted to the VDHR in April 22, 2021, as further discussed in Section III.A of this Appendix. See Attachment 2.H.2 of the DEQ Supplement. The Company will coordinate with VDHR through review of the Stage I Pre-Application Analysis regarding these initial findings.

Previously Recorded Architectural Resources Within or Adjacent to the Rebuild Project Right-of-Way

Resource ID#	Resource Name	National Register Status	Impact
042-0030	Patrick Henry Home (Historic), Scotchtown (Historic/Current)	NHL Listing, NRHP Listing, VLR Listing	Minimal
042-0417	Charles Oliver Farm (Current), Oak Knoll (Alternate Spelling)	Potentially Eligible	No Impact
042-0123	Battle of North Anna River (Historic), North Anna Battlefield (Current Name), North Anna Battlefield (Historic)	Potentially Eligible	Minimal
088-5413	CSX Railroad Corridor (Current), Richmond, Fredericksburg & Potomac Railroad (Historic)	Eligible	Minimal
043-5347	Richmond-Ashland Trolley	Eligible	Minimal

	Line (Historic)		
042-0409	Rockets Mill Farm (Historic/Current)	Eligible	No Impact
042-0075	Cool Water (Historic/Current)	Eligible	Moderate
042-0034	Springfield (Historic/Current)	Eligible	No Impact
042-0113	Charles Gwathmey House (Historic/Current), House, 11247 Gwathmey Church Road (Function/Location)	Eligible	No Impact
043-0694	Hunton Grocery (Historic), Hunton Treasures (Current Name)	Eligible	No Impact
500-0001	Richmond, Fredericksburg and Potomac Railroad (Historic), Richmond, Fredericksburg and Potomac Railroad Historic District (Current Name)	Eligible	Minimal
042-0408	Glencairn (Historic/Current)	Eligible	No Impact
042-0326	House, 11230 Lake Shore Ct (Function/Location), Mitchell Farm (Historic)	Not Eligible	No Impact
042-5527	House, 11054 Old Washington Hwy (Function/Location)	Not Eligible	No Impact
042-5542	House, 11262 Chickahominy River Lane (Function/Location)	Not Eligible	No Impact
042-5543	House, 11329 Cedar Lane (Function/Location)	Not Eligible	No Impact
042-5585	House, 11205 Lake Shore Court (Function/Location)	Not Eligible	No Impact

Previously Recorded Archeological Resources Within or adjacent to the Rebuild Project Right-of Way

Resource ID#	Resource Name	National Register Status	Distance to ROW
44CE0108	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0109	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0461	Newton Cemetery	Not Evaluated	Adjacent to ROW

44CE0939	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0940	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0941	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0942	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0943	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0944	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0945	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0946	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0947	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0948	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0949	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0950	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0951	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0952	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0953	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0954	Archaeological Site	Not Evaluated	Adjacent to ROW
44CE0955	Archaeological Site	Not Evaluated	Adjacent to ROW
44HN0010	Archaeological Site	Not Evaluated	Adjacent to ROW
44HN0090	Rock Castle Farm	Not Evaluated	Adjacent to ROW
44HN0118	Archaeological Site	Not Evaluated	Adjacent to ROW
44HN0196	Archaeological Site	Not Evaluated	Adjacent to ROW
44HN0220	Poor Farm Site	Eligible	Adjacent to ROW
44HN0237	Archaeological Site	Not Eligible	Adjacent to ROW
44HN0414	Archaeological Site	Not Evaluated	Adjacent to ROW

***** No archaeological fieldwork was conducted as part of this effort, and previously recorded sites within or adjacent to the project were not assessed at this time. No impacts to any archaeological resources are anticipated at this time. Resources will be assessed for existing conditions and to confirm avoidance of impacts as project planning progresses.

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

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

The Company also utilizes the Guidelines in clearing right-of-way, constructing facilities, and maintaining rights-of-way after construction. Moreover, secondary uses of right-of-way that are consistent with the safe maintenance and operation of facilities are permitted, as noted in Section II.A.8.

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

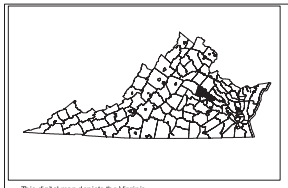
b. Provide three (3) color copies of the Virginia Department of Transportation "General Highway Map" for each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the Applicant. Also, where the line will be located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

Response:

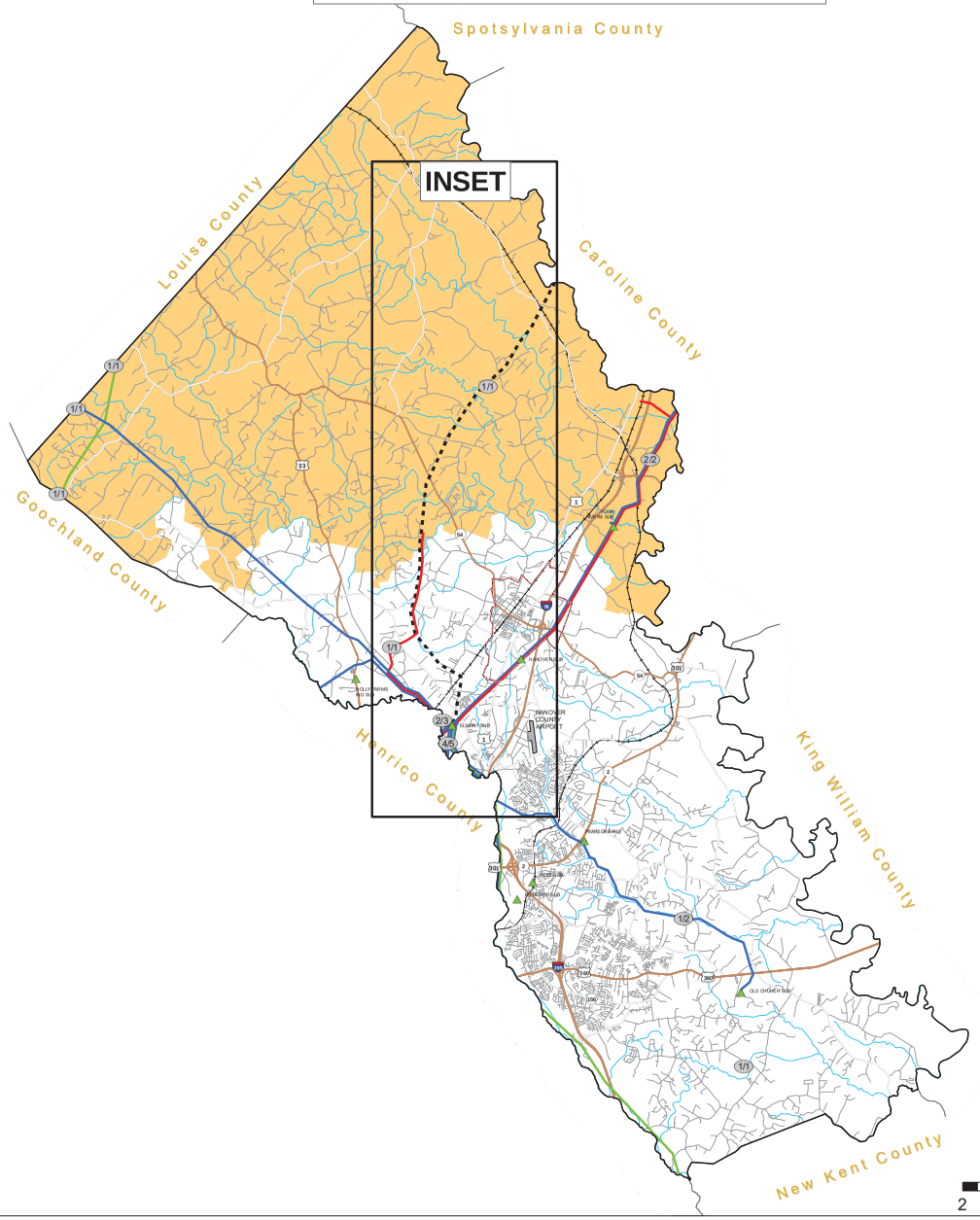
a. The proposed Rebuild Project traverses Hanover County for a total of approximately 17.4 miles and Caroline County for a total of approximately 8.8 miles. The Rebuild Project is located within Dominion Energy Virginia and Rappahannock Electric Cooperative ("REC") service territories.

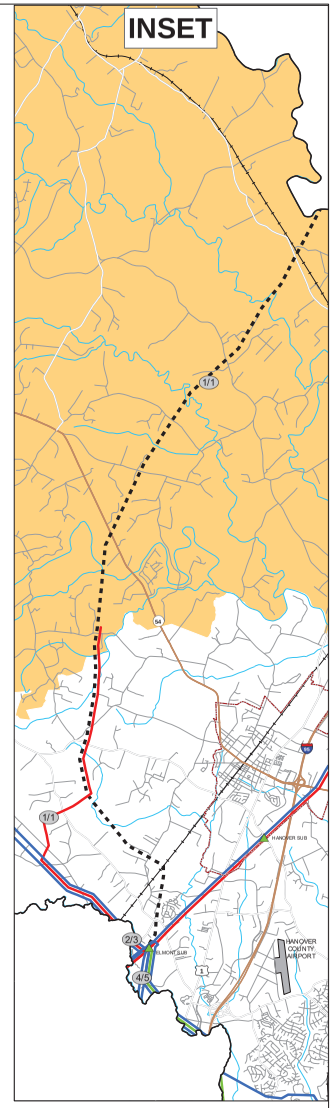
b. Three copies of the Virginia Department of Transportation ("VDOT") "General Highway Map" for Hanover and Caroline Counties are marked as required and filed with the Application. A reduced copy of the map is provided as Attachments II.A.12.b.1 and 2.

Hanover County Road Map



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"), and any proposed transmission facilities in this county as of _____. Other Company facilities previously authorized by the SCC may be depicted on prior SCC approved county maps.





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

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

SIGNATURE

DATE TITLE

Legend

- Proposed 500kV Line 574 Rebuild
- Number of Lines of Structures/Number of Circuits
- Proposed Substation
- Existing Substation
- 115 kV
- 230 kV
- 500 kV
- Railroad
- Ashland Town Limits

Provider Service Territory

- REC
- VEPCO

Miles
2 1 0 2 4 6

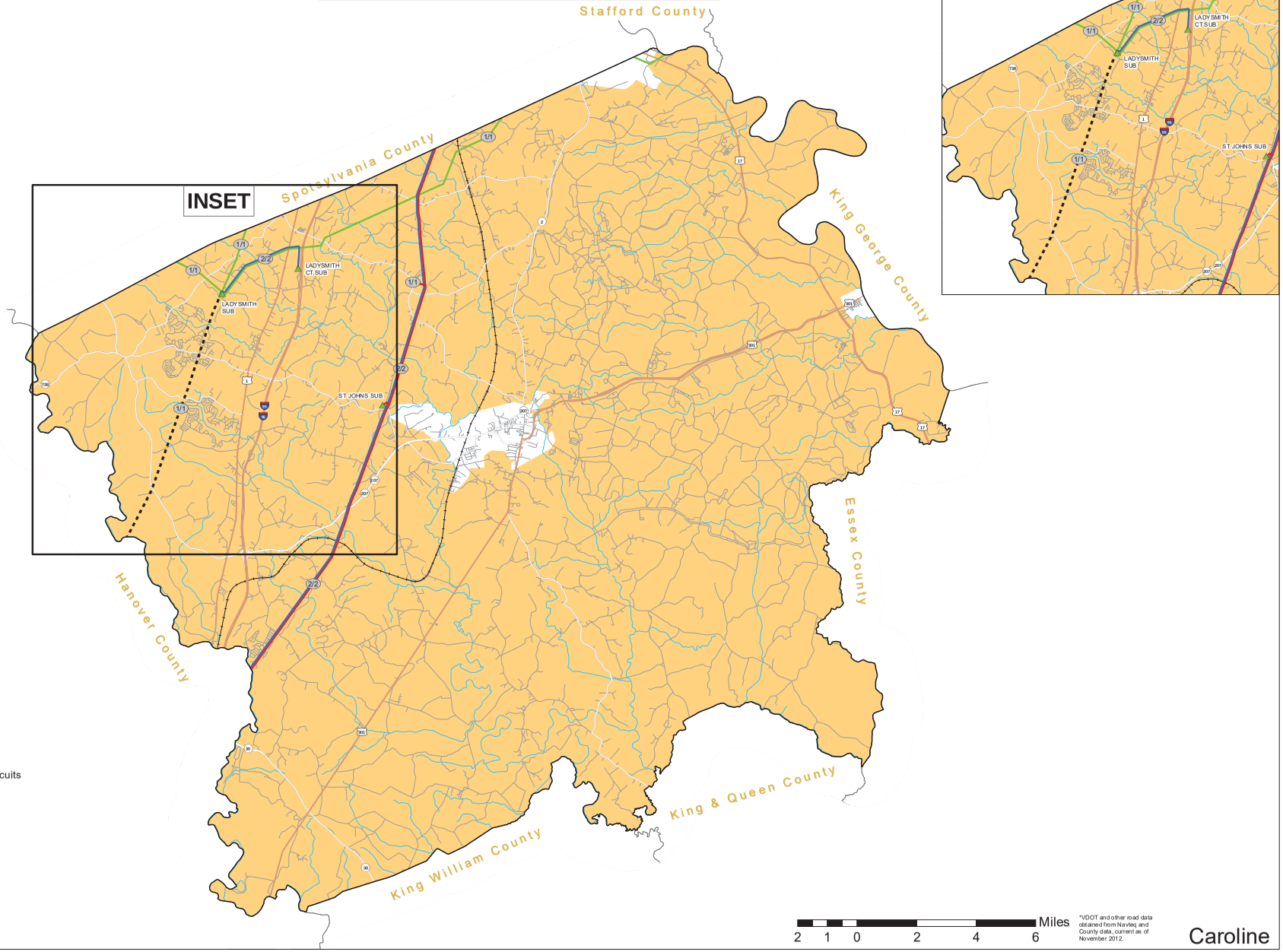
*VDOT and other road data obtained from Navteq and County data, current as of November 2012.

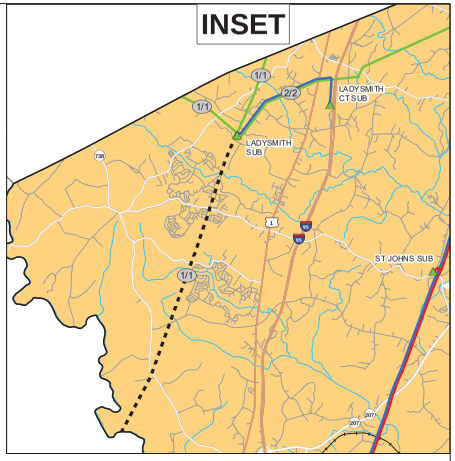
Hanover

Attachment II.A.12.b.1

Caroline County Road Map

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"), and any proposed transmission facilities in this county, as of _____. Other Company facilities previously authorized by the SCC may be depicted on prior SCC approved county maps.





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

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

SIGNATURE

DATE TITLE

Legend

- Proposed 500 kV Line 574 Rebuild
- Number of Lines of Structures/Number of Circuits
- Proposed Substation
- Existing Substation
- 115 kV
- 230 kV
- 500 kV

Provider Service Territory

- REC
- VEPCO

*VDOT and other road data obtained from Navteq and County data, current as of November 2012.

Caroline

101

Attachment II.A.12.b.2

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 #574 will be designed and operated at 500 kV and have a transfer capability of 4330 MVA. The relocated section of single circuit 500 kV Line #568 will be designed and operated at 500 kV and 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 #574 will have 3-phase triple-bundled 1351.5 ACSR conductors arranged as shown in Attachments II.B.3.i through x with two fiber optic shield wires. The triple-bundled 1351.5 ACSR conductors are the Company's standard conductors for new 500 kV construction.

The relocated section of single circuit 500 kV Line #568 will have 3-phase triple-bundled 1351.5 ACSR conductors arranged as shown in Attachments II.B.3.x with two 7#7 alumoweld 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;

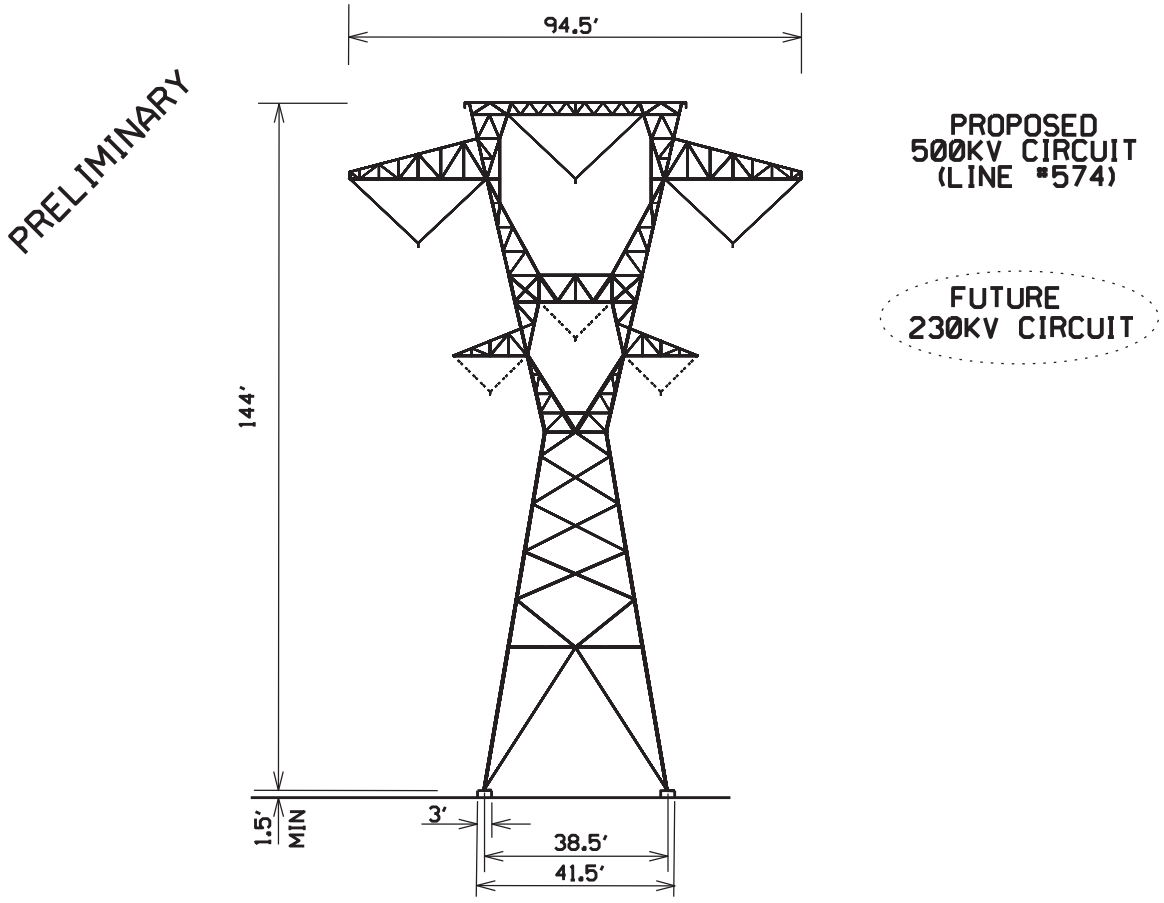
h. the maximum, minimum and average structure heights;

i. the average span length; and

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

Response: See Attachments II.B.3.i through x.

STRUCTURE #574/1 - 19
DOUBLE 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 THE INSTALLATION OF A FUTURE 230kV LINE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
12 AND 3.9 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: 94.5 FEET

g. AVERAGE WIDTH AT BASE: 41.5 FEET (RANGE 38.1 - 44.9 FEET)

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 154 FEET, 134 FEET, AND 145 FEET MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

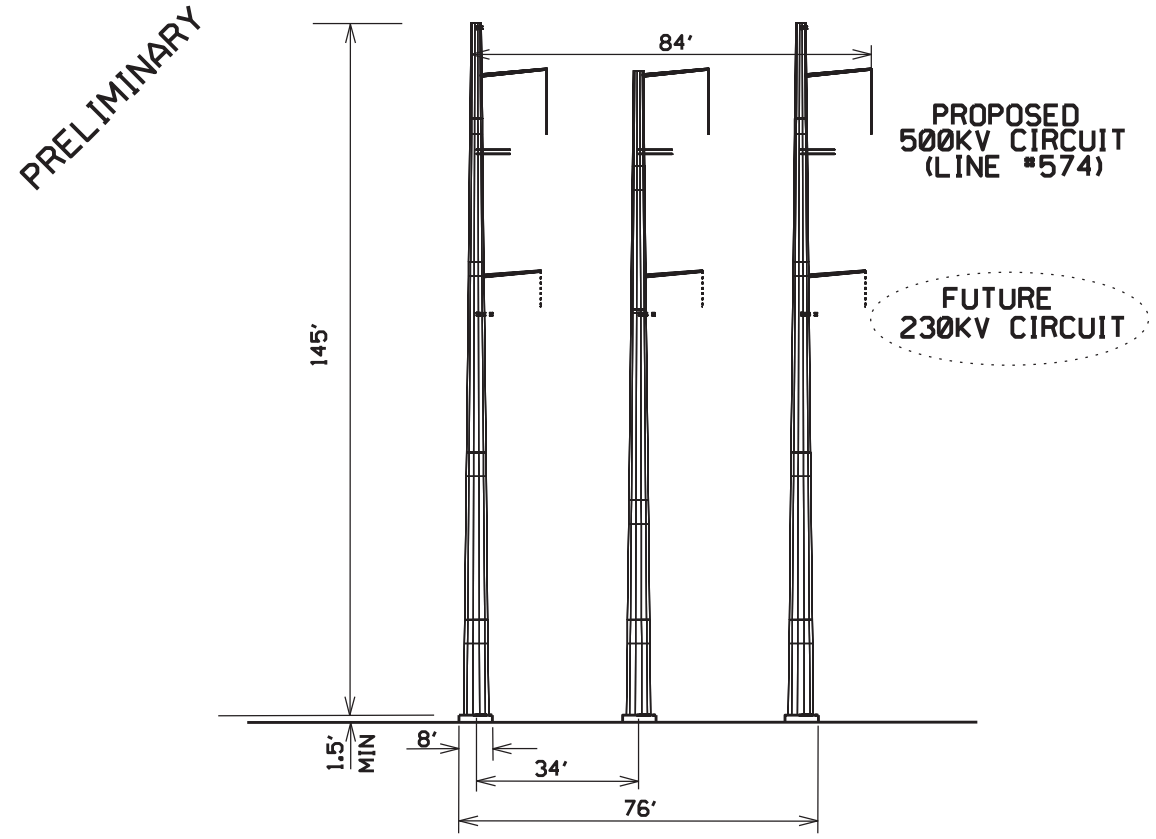
I. AVERAGE SPAN LENGTH: 1026 FEET (RANGE 350 - 1289 FEET)

j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5' AND 32.2' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE FOR THE 230kV LINE

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

$DGNSPEC$

STRUCTURE #574/1 - 19
DOUBLE CIRCUIT 3-POLE STRUCTURE



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 THE INSTALLATION OF A FUTURE 230kV LINE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
4 AND 3.9 MILES

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL TO MATCH THE LATTICE STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)

f. AVERAGE WIDTH AT CROSSARM: 84 FEET

g. AVERAGE WIDTH AT BASE: 76 FEET

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 160 FEET, 125 FEET, AND 143 FEET MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

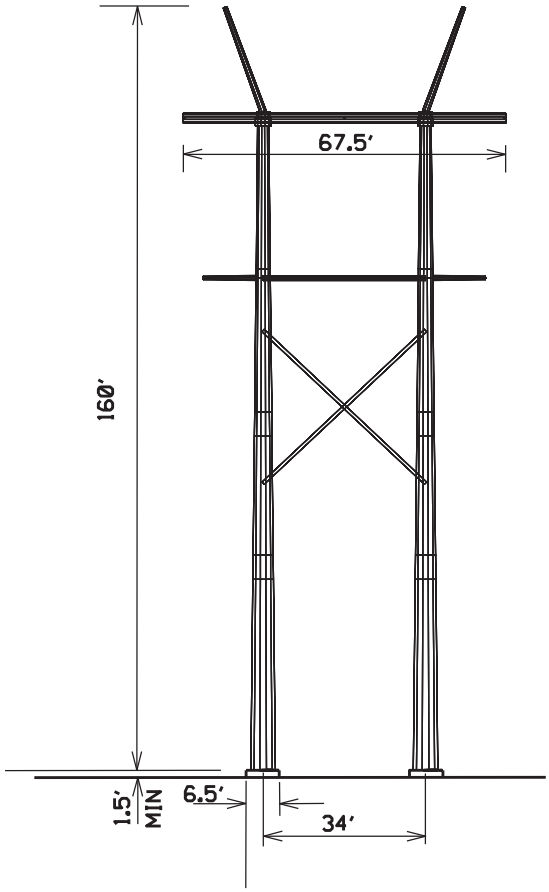
I. AVERAGE SPAN LENGTH: 1026 FEET (RANGE 350 - 1289 FEET)

j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5' AND 32.2' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE FOR THE 230kV LINE

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

$DGNSPEC$

STRUCTURE #574/1 - 19
DOUBLE CIRCUIT H-FRAME STRUCTURE



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 THE INSTALLATION OF A FUTURE 230kV LINE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 3.9 MILES

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL TO MATCH THE LATTICE STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)

f. AVERAGE WIDTH AT CROSSARM: 67.5 FEET

g. AVERAGE WIDTH AT BASE: 40.5 FEET

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 160 FEET, 160 FEET, AND 160 FEET MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

I. AVERAGE SPAN LENGTH: 1026 FEET (RANGE 350 - 1289 FEET)

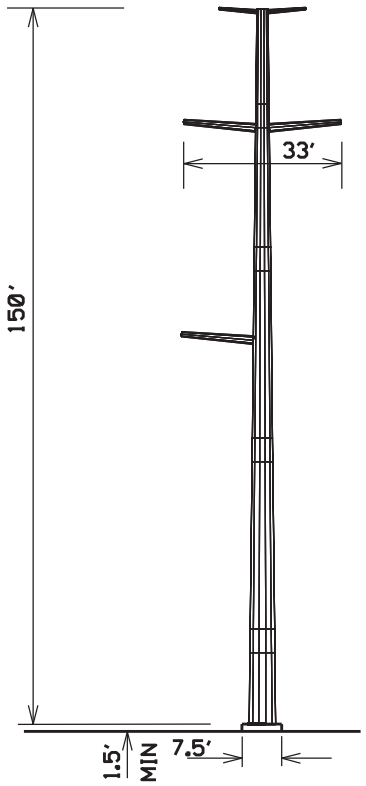
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5' AND 32.2' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE FOR THE 230kV LINE

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

$DGNSPEC$

STRUCTURE #574/1 - 19
SINGLE CIRCUIT DOUBLE DEADEND POLE

PRELIMINARY



PROPOSED
500KV CIRCUIT
(LINE #574)

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 PHASE ROLL TO PROVIDE PHASING AT ELMONT BACKBONE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 3.9 MILES

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL TO MATCH LATTICE STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)

f. AVERAGE WIDTH AT CROSSARM: 33 FEET

g. AVERAGE WIDTH AT BASE: 7.5 FEET

H. MAX. MIN. AND AVERAGE STRUCTURE HEIGHTS: 150 FEET. 150 FEET. AND 150 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL

I. AVERAGE SPAN LENGTH: 1026 FEET (RANGE 350 - 1289 FEET)

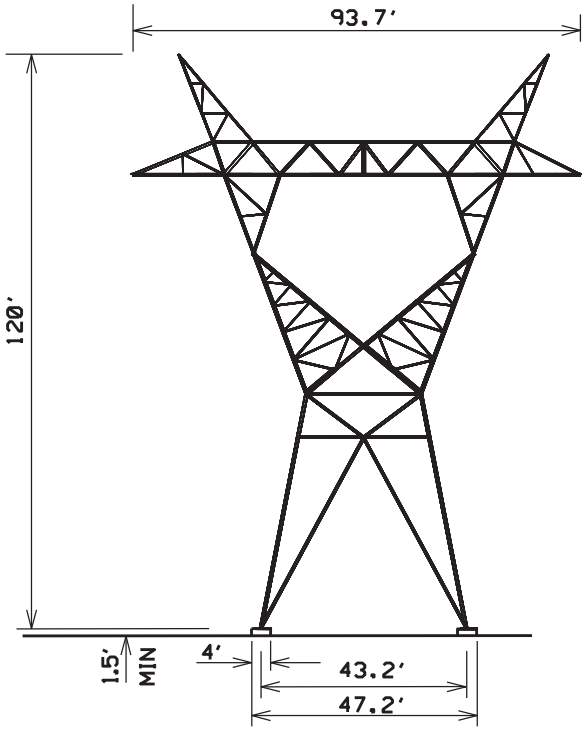
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 27.9'
AND 46.7' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE

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

$DGNSPEC$

STRUCTURE •574/1 - 19
SINGLE CIRCUIT DOUBLE DEADEND TOWER

PRELIMINARY



PROPOSED
500KV CIRCUIT
(LINE •574)

a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.5

b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
SIMILAR TO STRUCTURE BEING REPLACED

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 3.9 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: 93.7 FEET

G. AVERAGE WIDTH AT BASE: 47.2 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

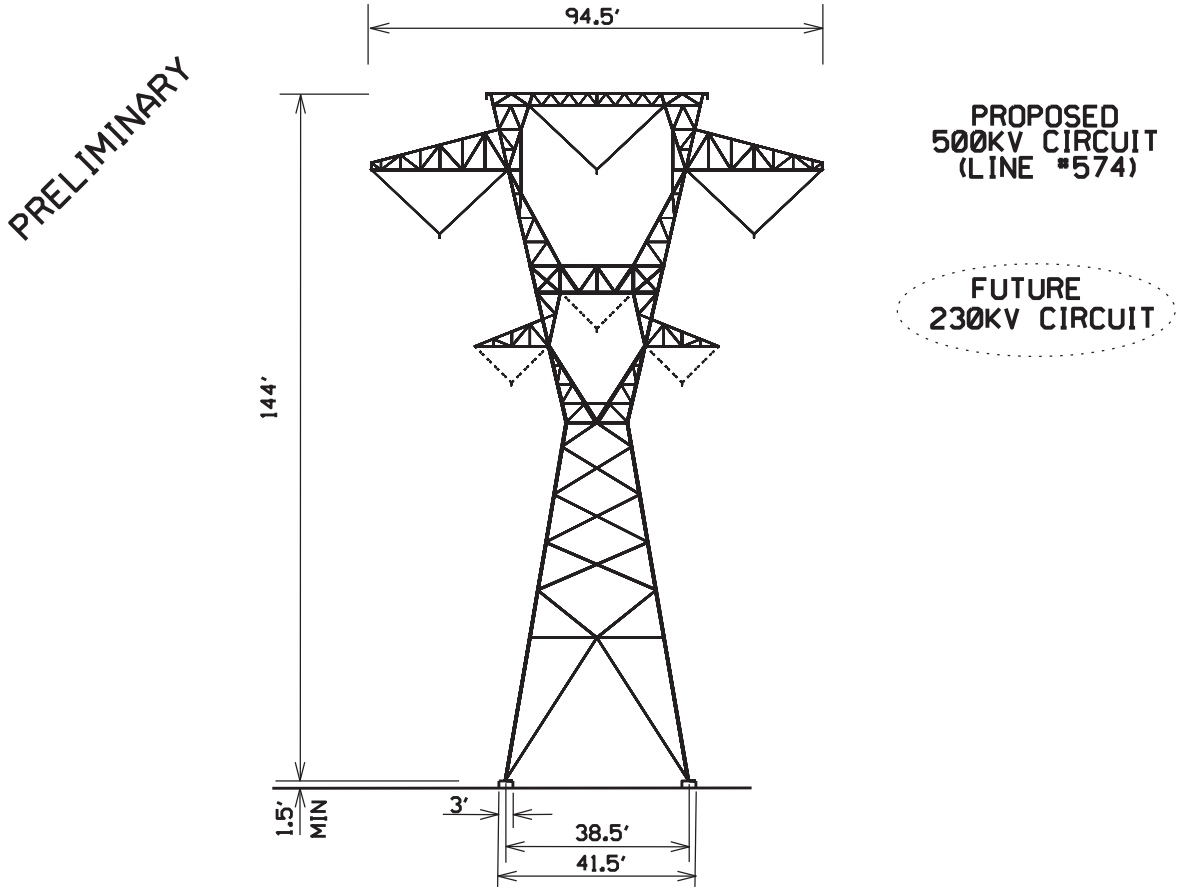
I. AVERAGE SPAN LENGTH: 1026 FEET (RANGE 350 - 1289 FEET)

j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 27.9'
AND 46.7' 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.

$DGNSPEC$

STRUCTURE #574/19 - 37
DOUBLE 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 THE INSTALLATION OF A FUTURE 230kV LINE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
12 AND 3.5 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: 94.5 FEET

g. AVERAGE WIDTH AT BASE: 41.5 FEET (RANGE 33.0 - 50.0 FEET)

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 169 FEET, 119 FEET, AND 142 FEET MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

i. AVERAGE SPAN LENGTH: 1124 FEET (RANGE 696 - 1379 FEET)

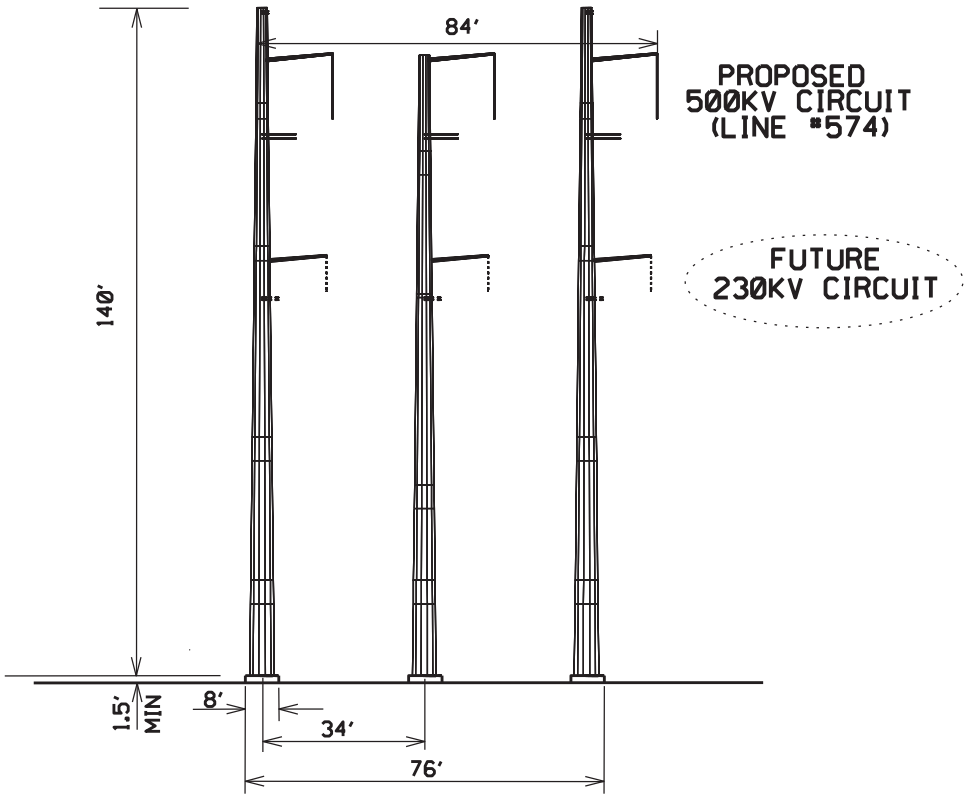
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5' AND 32.2' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE FOR THE 230kV LINE

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

$DGNSPEC$

STRUCTURE #574/19 - 37
DOUBLE CIRCUIT 3-POLE STRUCTURE

PRELIMINARY



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 THE INSTALLATION OF A FUTURE 230kV LINE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
6 AND 3.5 MILES

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL TO MATCH THE LATTICE STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)

f. AVERAGE WIDTH AT CROSSARM: 84 FEET

g. AVERAGE WIDTH AT BASE: 76 FEET

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 150 FEET, 125 FEET, AND 137 FEET MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

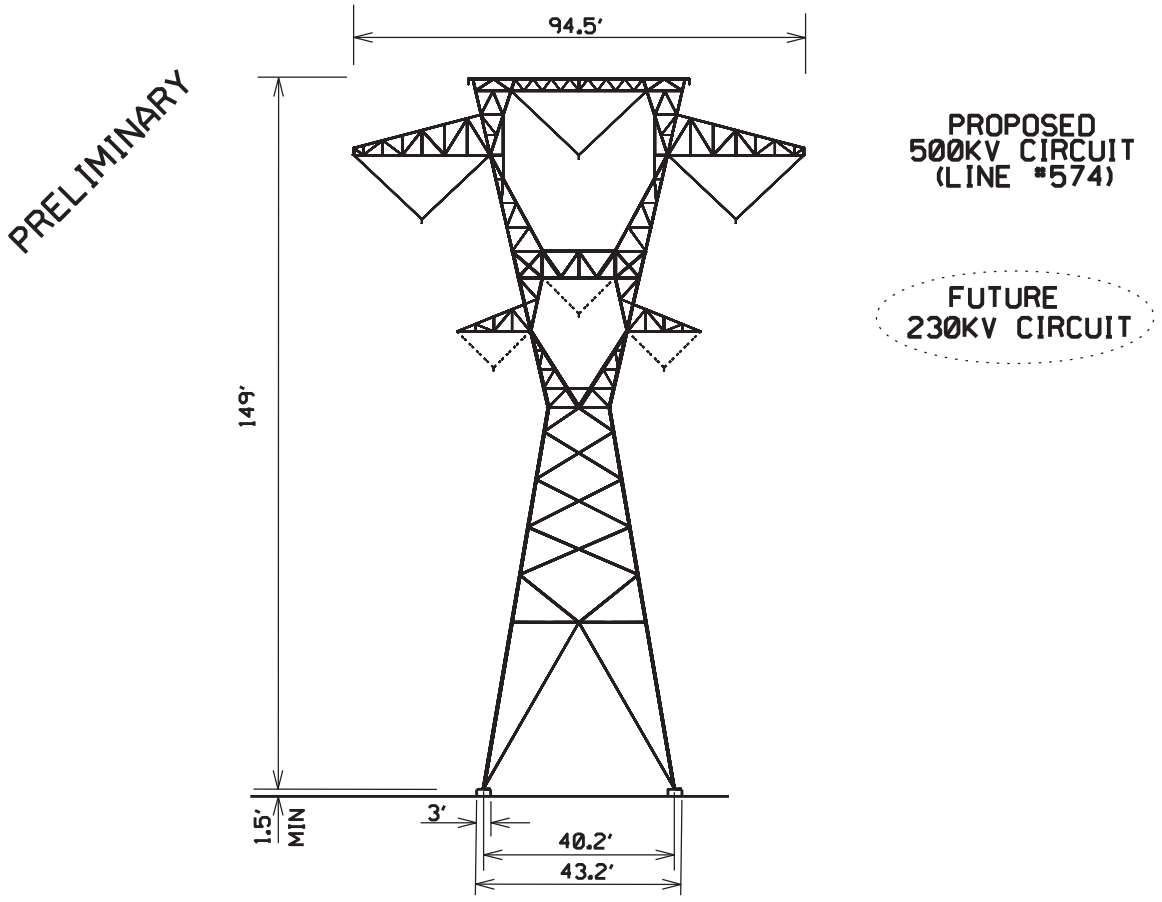
i. AVERAGE SPAN LENGTH: 1124 FEET (RANGE 696 - 1379 FEET)

j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5' AND 32.2' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE FOR THE 230kV LINE

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

$DGNSPEC$

STRUCTURE #574/37 - 124
DOUBLE 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 THE INSTALLATION OF A FUTURE 230kV LINE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
77 AND 18.8 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: 94.5 FEET

g. AVERAGE WIDTH AT BASE: 43.2 FEET (RANGE 33.0 - 51.7 FEET)

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 174 FEET, 119 FEET, AND 148 FEET MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

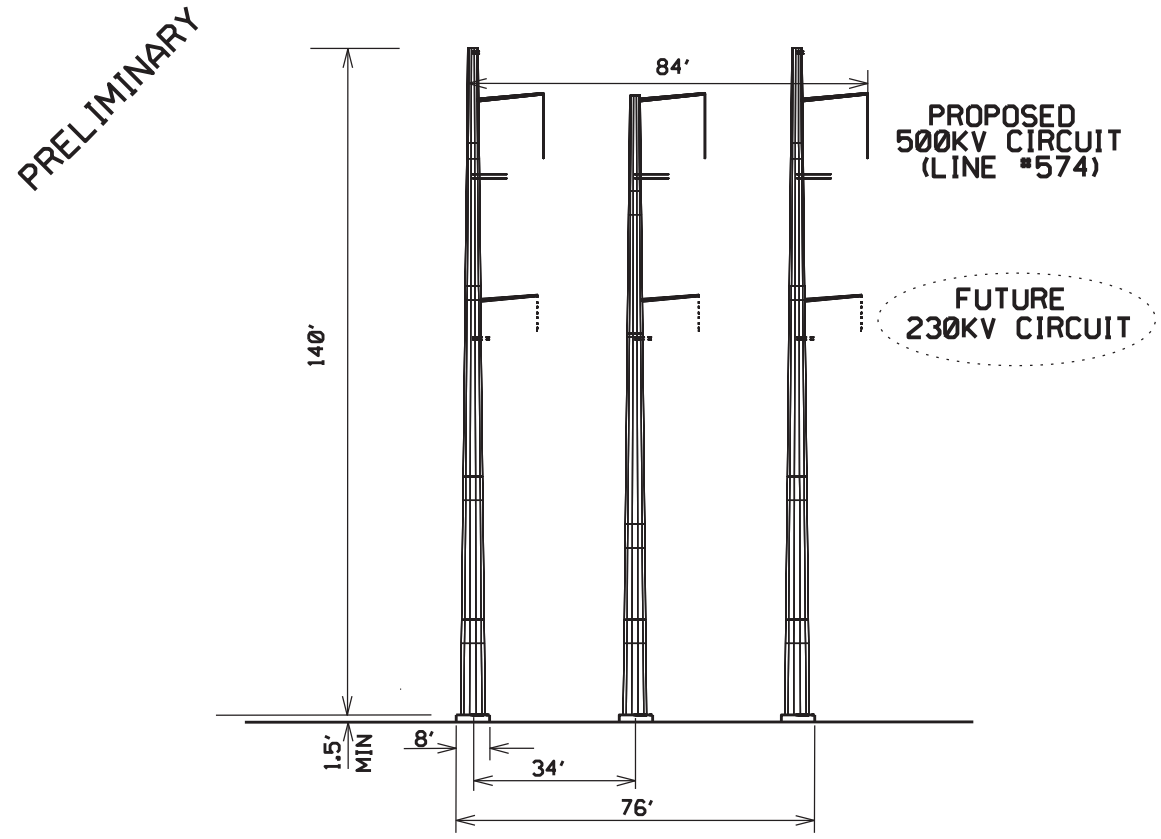
i. AVERAGE SPAN LENGTH: 1141 FEET (RANGE 247 - 1420 FEET)

j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5' AND 32.2' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE FOR THE 230kV LINE

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

$DGNSPEC$

STRUCTURE #574/37 - 124
DOUBLE CIRCUIT 3-POLE STRUCTURE



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 THE INSTALLATION OF A FUTURE 230kV LINE

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
9 AND 18.8 MILES

d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
GALVANIZED STEEL TO MATCH THE LATTICE STRUCTURES

e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)

f. AVERAGE WIDTH AT CROSSARM: 84 FEET

g. AVERAGE WIDTH AT BASE: 76 FEET

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 150 FEET, 120 FEET, AND 137 FEET MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

i. AVERAGE SPAN LENGTH: 1141 FEET (RANGE 247 - 1420 FEET)

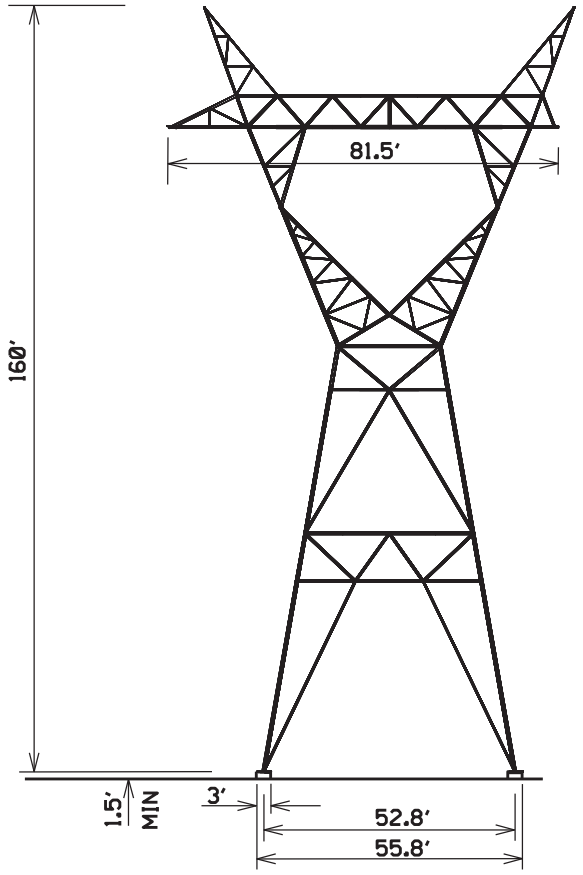
j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5' AND 32.2' AT 120°F PER THE NATIONAL ELECTRICAL SAFETY CODE FOR THE 230kV LINE

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

$DGNSPEC$

STRUCTURE #574/37 - 124
SINGLE CIRCUIT DOUBLE DEADEND TOWER

PRELIMINARY



PROPOSED
500KV CIRCUIT
(LINE #574 & #568)

a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.5

b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
SIMILAR TO STRUCTURE BEING REPLACED

c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 18.8 MILES (LINE 574)
2 AND 0.2 MILES (LINE 568)

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: 81.5 FEET

g. AVERAGE WIDTH AT BASE: 55.8 FEET

h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 160 FEET, 160 FEET, AND 160 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL

i. AVERAGE SPAN LENGTH: 1141 FEET (RANGE 247 - 1420 FEET) (LINE 574)
311 FEET (RANGE 281 - 367 FEET) (LINE 568)

j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 27.9'
AND 46.7' 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.

$DGNSPEC$

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: Using single circuit 500 kV towers, the minimum height would be 104 feet, the max height would be 164 feet, and the average would be 136 feet.

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 existing and proposed structure locations.

The proposed approximate structure heights are from the conceptual design created to estimate the cost of the proposed 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.

Structure Number (Line #574)	Existing Structure Height (ft.)	Proposed Structure Height (ft.)	Attachment II.B.3. Structure Type
1	114	120	v
1A	n/a	150	iv
2	112	160	ii
3	117	160	iii
4	95	139	i
5	100	134	i
6	110	139	i
7	115	134	i
8	82	125	ii
9	114	135	ii
10	95	154	i
11	95	139	i
12	125	154	i
13	107	150	ii
14	120	154	i
15	95	139	i
16	125	154	i
17	110	149	i
18	120	154	i
19	102	150	vii
20	140	169	vi
21	135	164	vi
22	97	140	vii
23	100	139	vi
24	95	134	vi

25	92	135	vii
26	110	134	vi
27	105	144	vi
28	110	144	vi
29	97	135	vii
30	110	149	vi
31	110	144	vi
32	97	135	vii
33	95	134	vi
34	85	119	vi
35	82	125	vii
36	115	134	vi
37	90	139	viii
38	120	139	viii
39	90	134	viii
40	100	139	viii
41	125	154	viii
42	105	139	viii
43	95	134	viii
44	136	159	viii
45	107	150	ix
46	105	144	viii
47	120	144	viii
48	90	134	viii
49	90	119	viii
50	90	119	viii
51	105	134	viii
52	115	154	viii
53	141	154	viii
54	87	135	ix
55	100	119	viii
56	75	119	viii
57	110	144	viii
58	120	159	viii
59	141	164	viii
60	110	139	viii
61	120	134	viii
62	75	134	viii
63	92	140	ix
64	115	134	viii
65	90	124	viii
66	145	169	viii
67	120	169	viii

68	146	164	viii
69	87	135	ix
70	145	174	viii
71	140	174	viii
72	125	164	viii
73	92	135	ix
74	115	144	viii
75	100	134	viii
76	107	150	ix
77	120	154	viii
78	95	134	viii
79	110	144	viii
80	115	149	viii
81	105	139	viii
82	110	154	viii
83	130	164	viii
84	120	159	viii
85	140	164	viii
86	120	164	viii
87	115	149	viii
88	115	144	viii
89	110	154	viii
90	125	149	viii
91	92	125	ix
92	115	144	viii
93	80	129	viii
94	95	129	viii
95	105	134	viii
96	115	144	viii
97	100	139	viii
98	100	134	viii
99	110	154	viii
100	150	169	viii
101	130	164	viii
102	110	154	viii
103	115	144	viii
104	105	149	viii
105	140	169	viii
106	125	174	viii
107	115	154	viii
108	125	154	viii
109	120	159	viii
110	135	164	viii

111	110	139	viii
112	115	154	viii
113	120	154	viii
114	120	159	viii
115	115	139	viii
116	110	154	viii
117	125	154	viii
118	125	159	viii
119	82	120	ix
120	110	134	viii
121	105	154	viii
122	115	140	ix
123	160	160	x
Min	75	119	
Max	160	174	
Average	111	146	
Structure Number (Line #568)	Existing Structure Height (ft.)	Proposed Structure Height (ft.)	Attachment II.B.3. Structure Type
257	160	160	x
258 (New)	n/a	160	x

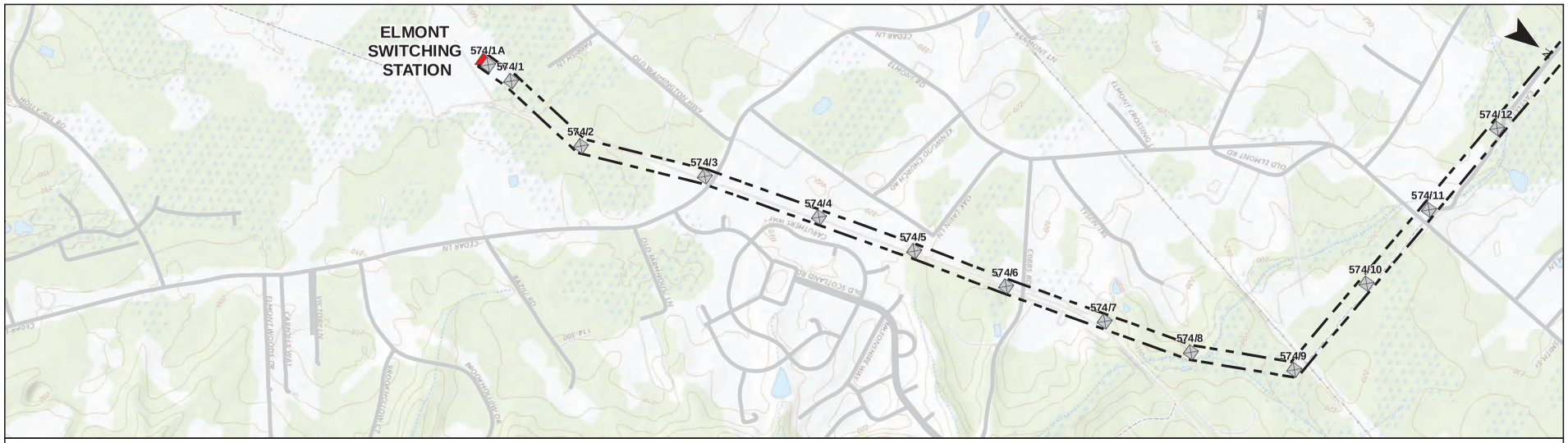
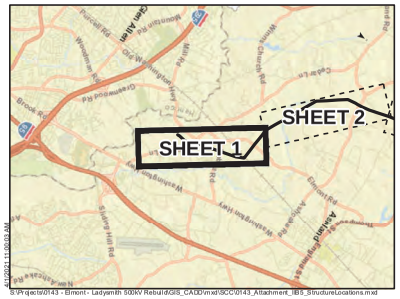


TABLE II.B.5

Structure Number	574/1A	574/1	574/2	574/3	574/4	574/5	574/6	574/7	574/8	574/9	574/10	574/11	574/12
Existing Structure Height (Feet)	N/A	114	112	117	95	100	110	115	82	114	95	95	125
Proposed Structure Height (Feet)	150	120	160	160	139	134	139	134	125	135	154	139	154



SITE DATA

- Project Area
- Existing Structure to be Replaced
- Proposed Structure
- Existing Substation/Switching Station
- County Boundary

0 500 1,000 2,000 FT

Scale is 1 IN = 1,000 FT when printed at original size of 11x17

Notes:
1. Basemap from National Map USGS Topo ESRI World Street Map 2020
2. Structure locations and heights provided by Dominion Energy Virginia and subject to final engineering. Structure heights do not include foundation reveal.

ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

SHEET 1 OF 9

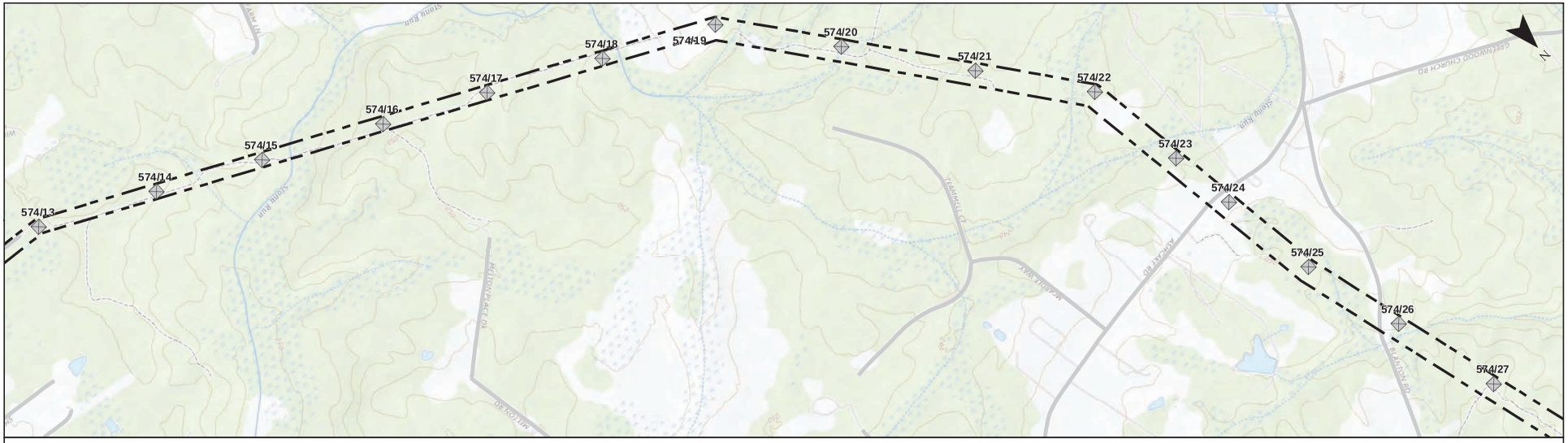
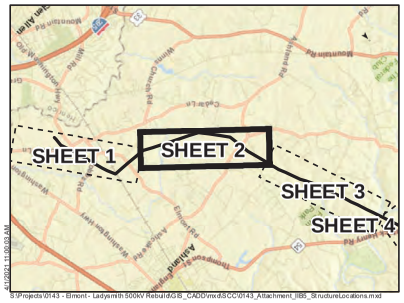


TABLE II.B.5

Structure Number	574/13	574/14	574/15	574/16	574/17	574/18	574/19	574/20	574/21	574/22	574/23	574/24	574/25	574/26	574/27
Existing Structure Height (Feet)	107	120	95	125	110	120	102	140	135	97	100	95	92	110	105
Proposed Structure Height (Feet)	150	154	139	154	149	154	150	169	164	140	139	134	135	134	144



SITE DATA

- Project Area
- Existing Structure to be Replaced
- Proposed Structure
- Existing Substation/Switching Station
- County Boundary

Notes:
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0 500 1,000 2,000 FT

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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

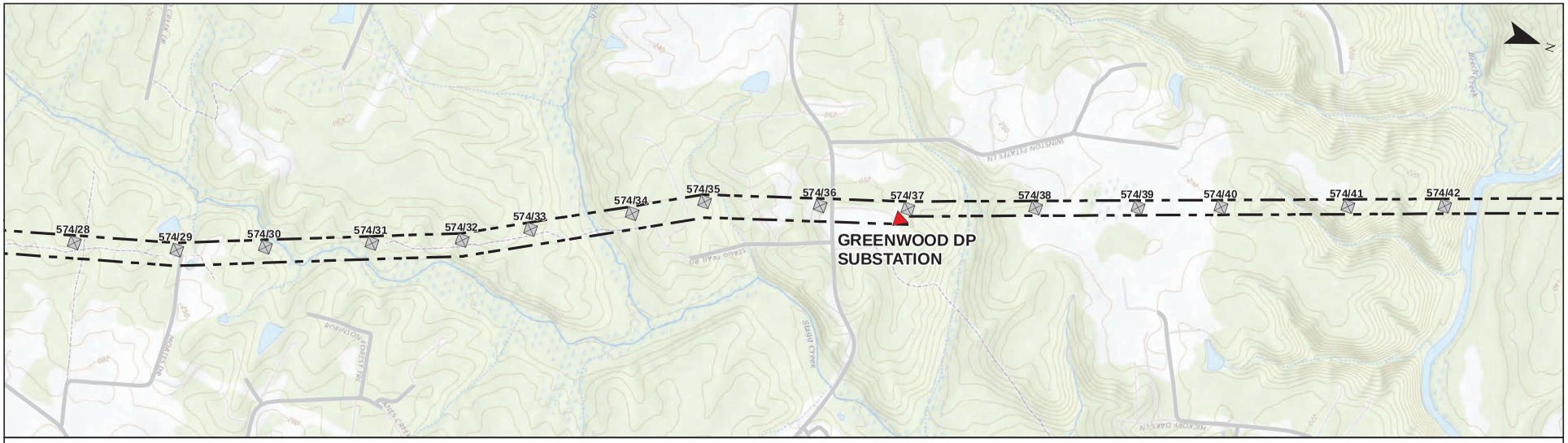
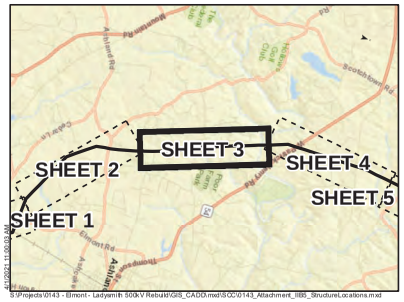


TABLE II.B.5

Structure Number	574/28	574/29	574/30	574/31	574/32	574/33	574/34	574/35	574/36	574/37	574/38	574/39	574/40	574/41	574/42
Existing Structure Height (Feet)	110	97	110	110	97	95	85	82	115	90	120	90	100	125	105
Proposed Structure Height (Feet)	144	135	149	144	135	134	119	125	134	139	139	134	139	154	139



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SITE DATA

- Project Area
- Existing Structure to be Replaced
- Proposed Structure
- Existing Substation/Switching Station
- County Boundary

Notes:
1. Basemap from National Map USGS Topo ESRI World Street Map 2020
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0 500 1,000 2,000 FT

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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

SHEET 3 OF 9

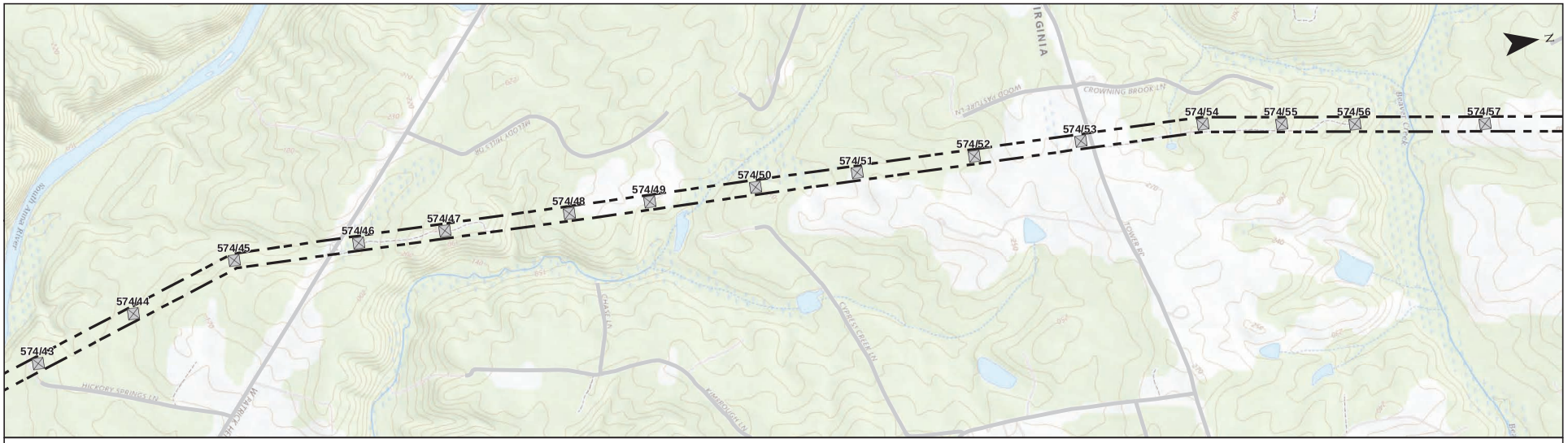
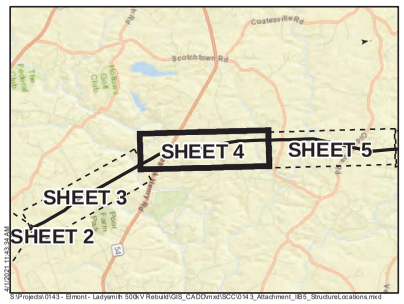


TABLE II.B.5

Structure Number	574/43	574/44	574/45	574/46	574/47	574/48	574/49	574/50	574/51	574/52	574/53	574/54	574/55	574/56	574/57
Existing Structure Height (Feet)	95	136	107	105	120	90	90	90	105	115	141	87	100	75	110
Proposed Structure Height (Feet)	134	159	150	144	144	134	119	119	134	154	154	135	119	119	144



SITE DATA

- Project Area
- Existing Structure to be Replaced
- Proposed Structure
- Existing Substation/Switching Station
- County Boundary

Notes:
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0 500 1,000 2,000 FT

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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

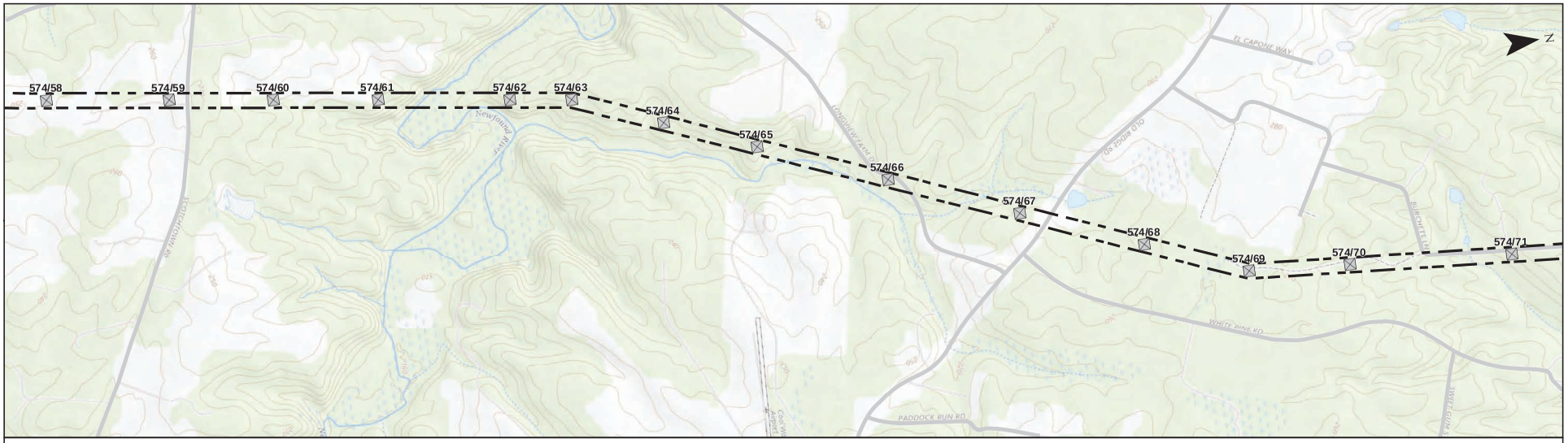
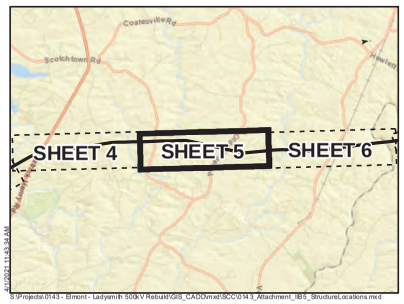


TABLE II.B.5

Structure Number	574/58	574/59	574/60	574/61	574/62	574/63	574/64	574/65	574/66	574/67	574/68	574/69	574/70	574/71
Existing Structure Height (Feet)	120	141	110	120	75	92	115	90	145	120	146	87	145	140
Proposed Structure Height (Feet)	159	164	139	134	134	140	134	124	169	169	164	135	174	174



SITE DATA

- Project Area
- Existing Structure to be Replaced
- Proposed Structure
- Existing Substation/Switching Station
- County Boundary

0 500 1,000 2,000 FT

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Notes:
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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

SHEET 5 OF 9

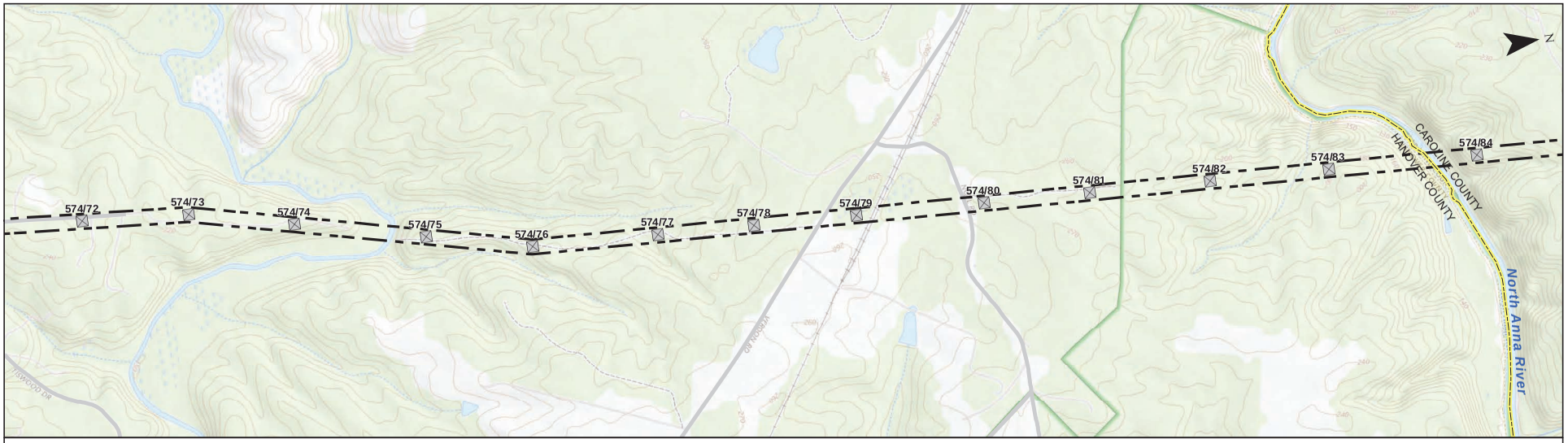
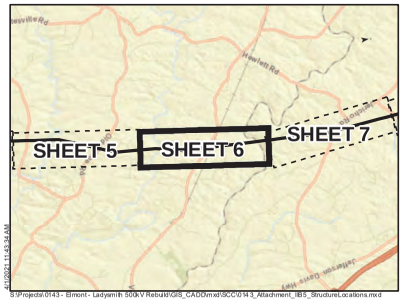


TABLE II.B.5

Structure Number	574/72	574/73	573/74	573/75	573/76	573/77	574/78	574/79	574/80	574/81	574/82	574/83	574/84
Existing Structure Height (Feet)	125	92	115	100	107	120	95	110	115	105	110	130	120
Proposed Structure Height (Feet)	164	135	144	134	150	154	134	144	149	139	154	164	159



SITE DATA

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- Proposed Structure
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- County Boundary

Notes:
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0 500 1,000 2,000 FT

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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

SHEET 6 OF 9

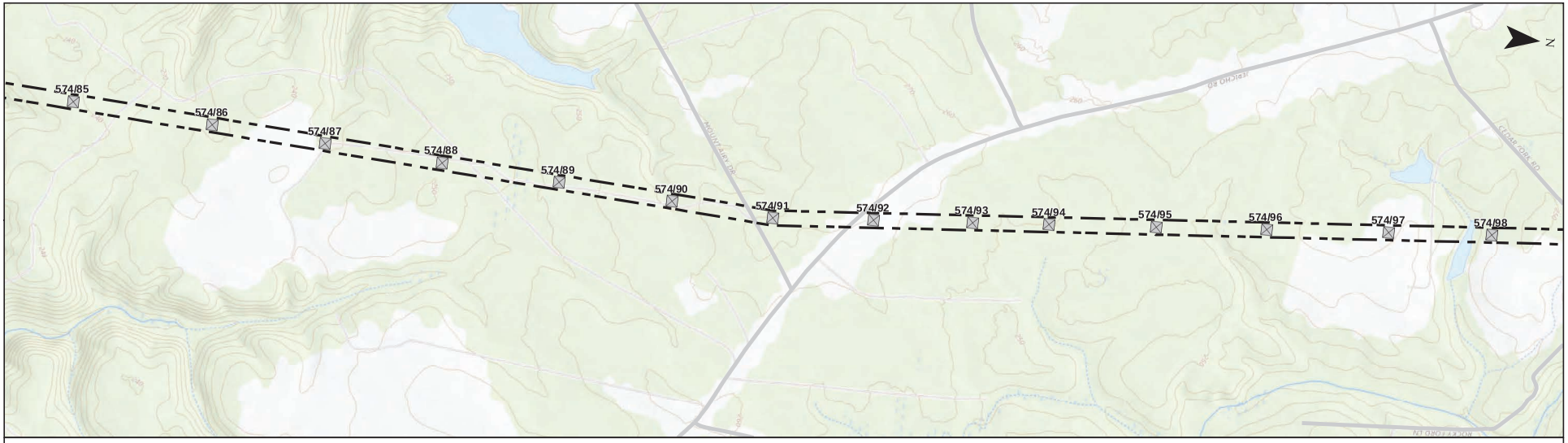
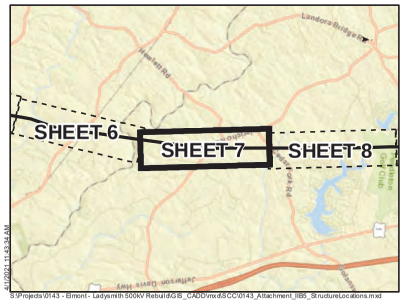


TABLE II.B.5

Structure Number	574/85	574/86	574/87	574/88	574/89	574/90	574/91	574/92	574/93	574/94	974/95	974/96	574/97	574/98
Existing Structure Height (Feet)	140	120	115	115	110	125	92	115	80	95	105	115	100	100
Proposed Structure Height (Feet)	164	164	149	144	154	149	125	144	129	129	134	144	139	134



SITE DATA

- Project Area
- Existing Structure to be Replaced
- Proposed Structure
- Existing Substation/Switching Station
- County Boundary

0 500 1,000 2,000 FT

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Notes:
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2. Structure locations and heights provided by Dominion Energy Virginia and subject to final engineering. Structure heights do not include foundation reveal.

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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

SHEET 7 OF 9

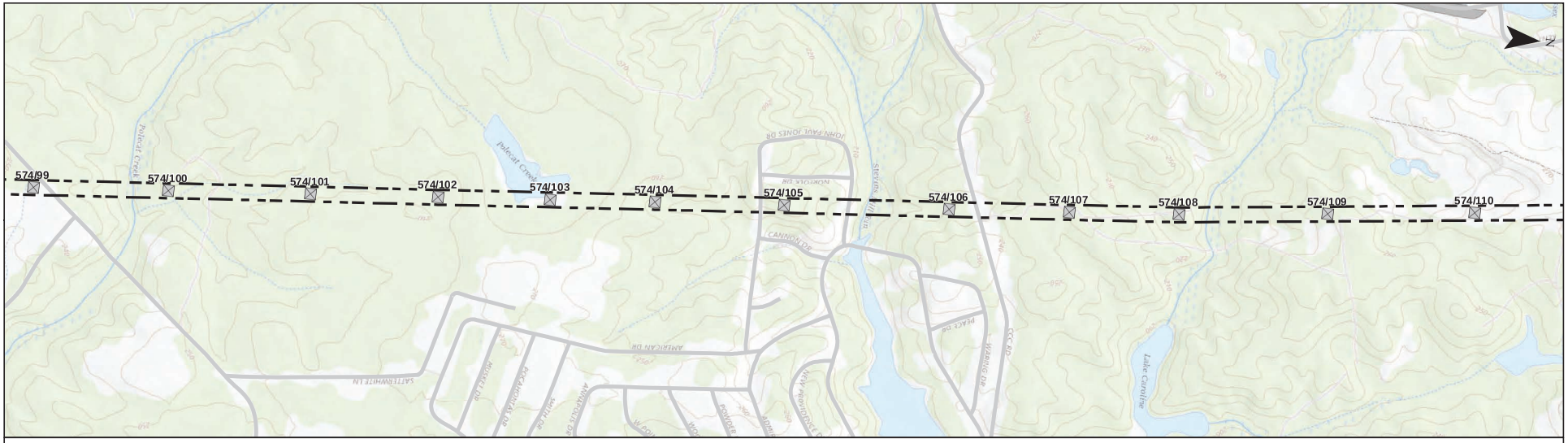
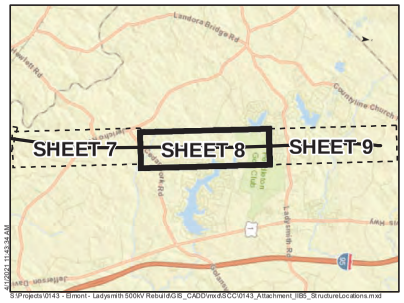


TABLE II.B.5

Structure Number	574/99	574/100	574/101	574/102	574/103	574/104	574/105	574/106	574/107	574/108	574/109	574/110
Existing Structure Height (Feet)	110	150	130	110	115	105	140	125	115	125	120	135
Proposed Structure Height (Feet)	154	169	164	154	144	149	169	174	154	154	159	164



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SITE DATA

- Project Area
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Notes:
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0 500 1,000 2,000 FT

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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

SHEET 8 OF 9

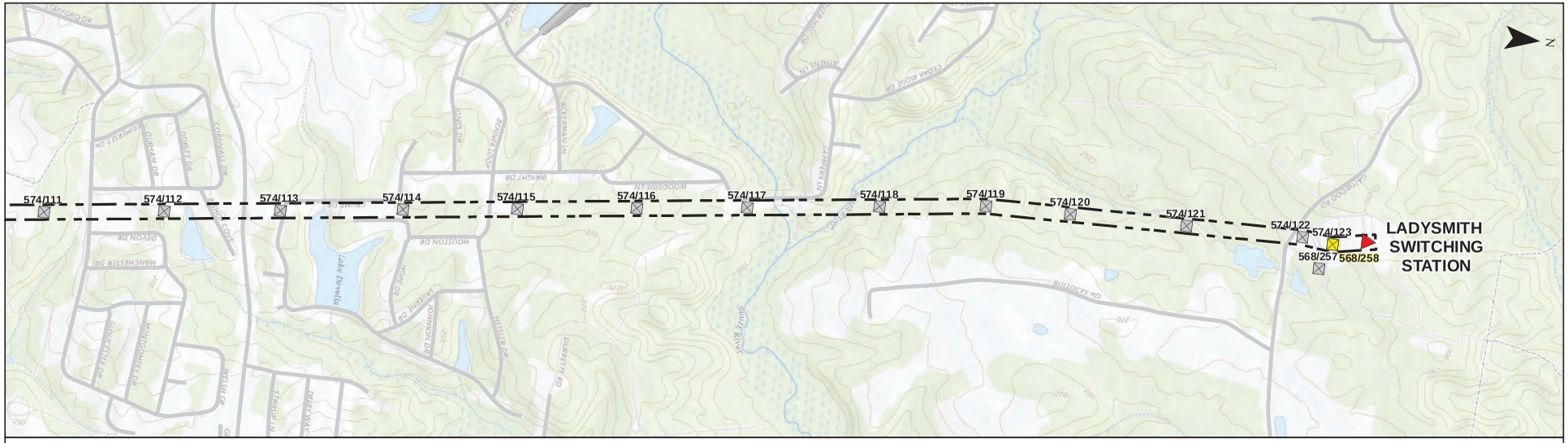
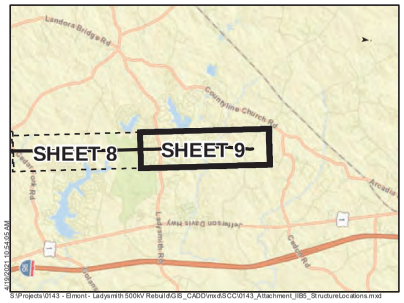


TABLE II.B.5

Structure Number	574/111	574/112	574/113	574/114	574/115	574/116	574/117	574/118	574/119	574/120	574/121	574/122	574/123	568/257	568/258
Existing Structure Height (Feet)	110	115	120	120	115	110	125	125	82	110	105	115	160	160	N/A
Proposed Structure Height (Feet)	139	154	154	159	139	154	154	159	120	134	154	140	160	160	160



SITE DATA

- Project Area
- Existing Structure to be Replaced
- Proposed Structure
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0 500 1,000 2,000 FT

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ATTACHMENT II.B.5
STRUCTURE LOCATIONS MAP

Line 574 Elmont - Ladysmith
500 kV Transmission Line Rebuild

Hanover and Caroline Counties, Virginia

Owner/ Applicant:
Dominion Energy Virginia

C2 Env Project:	Prepared By:	Date:
0143	GCF	04/01/21

SHEET 9 OF 9