

October 27, 2022

BY ELECTRONIC FILING

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

Application of Virginia Electric and Power Company for approval and certification of electric transmission facilities: 500-230 kV Wishing Star Substation, 500 kV and 230 kV Mars-Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop

Case No. PUR-2022-00183

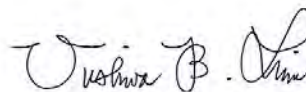
Dear Mr. Logan:

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, DEQ Supplement, and Routing Study including attachments.

As indicated in Section II.A.12.b of the Appendix, an electronic copy of the map of the Virginia Department of Transportation “General Highway Map” for Loudoun County, as well as the digital geographic information system (“GIS”) map required by § 56-46.1 of the Code of Virginia, which is Attachment II.A.2 to the Appendix, were provided via an e-room to the Commission’s Division of Energy Regulation on October 25, 2022.

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

Very truly yours,



Vishwa B. Link

Mr. Bernard Logan, Clerk
October 27, 2022
Page 2

Enclosures

cc: William H. Chambliss, Esq.
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**Dominion
Energy[®]**

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

**Before the State Corporation
Commission of Virginia**

**500-230 kV Wishing Star
Substation, 500 kV and 230 kV
Mars-Wishing Star Lines, 500-230
kV Mars Substation, and Mars 230
kV Loop**

Application No. 318

Case No. PUR-2022-00183

Filed: October 27, 2022

Volume 1 of 3

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

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

500-230 kV Wishing Star Substation, 500 kV and 230 kV
Mars-Wishing Star Lines, 500-230 kV Mars Substation, and
Mars 230 kV Loop

Application No. 318

Case No. PUR-2022-00183

Filed: October 27, 2022

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF)

VIRGINIA ELECTRIC AND POWER COMPANY)

Case No. PUR-2022-00183

For approval and certification of electric)
transmission facilities: 500-230 kV Wishing Star)
Substation, 500 kV and 230 kV Mars-Wishing Star)
Lines, 500-230 kV Mars Substation, and)
Mars 230 kV Loop)

**APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY
FOR APPROVAL AND CERTIFICATION OF
ELECTRIC TRANSMISSION FACILITIES: 500-230 kV WISHING STAR
SUBSTATION, 500 kV AND 230 kV MARS-WISHING STAR LINES,
500-230 kV MARS SUBSTATION, AND MARS 230 kV LOOP**

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

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

other utilities, the Company is engaged in interstate commerce.

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

3. In this Application, in order to relieve identified violations of mandatory North American Electric Reliability Corporation (“NERC”) Reliability Standards beginning in the summer 2025 timeframe brought on by significant increase in electrical demand as well as expected demand growth projected for the future, and to maintain the structural integrity and reliability of its transmission system, Dominion Energy Virginia proposes in Loudoun County, Virginia, to:

- (i) Construct a new 500-230 kV substation in Loudoun County, Virginia, within existing Company-owned right-of-way and on property obtained by the Company (“Wishing Star Substation”). The 500-230 kV source to the Wishing Star Substation will be created by cutting the Company’s existing 500 kV Brambleton-Mosby Lines #546 and #590 into the Wishing Star Substation at Structures #546/26 and #590/1893 just south of the Company’s existing Brambleton Substation.¹ The tie-in of Lines #546 and #590 to the Wishing Star Substation will

¹ The Company’s existing 230 kV Brambleton-Loudoun Lines #2094 and #2045 are underbuilt on structures supporting existing 500 kV Brambleton-Mosby Lines #546 and #590. The two existing double circuit structures where the 500 kV lines will be cut into the Wishing Star Substation (Structures #546/26 / 2094/220 and #590/1893 / 2045/25) will be removed to allow for the termination of Lines #546 and #590 into the new 500 kV Wishing Star Substation bus, with Lines #2094 and #2045 bypassing connection to the Wishing Star Substation 230 kV bus and continuing south towards Loudoun Substation. Backbone structures will be installed within Wishing Star Substation to effectuate the bypass of the 230 kV lines, as needed. Note that, prior to energization of the Project, existing 230 kV Brambleton-Loudoun Line #2094 will be cut in by the Company’s future Racefield Substation, which will result in Brambleton-Racefield Line #2227 and Racefield-Loudoun Line #2094. For purposes of this Appendix, the cut in location for the Wishing Star Substation will refer to the corridor containing the existing Brambleton-Loudoun Line #2094. See Attachment I.A.4 to the Appendix for a one-line diagram of the existing transmission system, and Attachment I.A.7 to the Appendix for a one-line diagram of the area transmission system after the Project is energized. The Company considers the removal of two double circuit 500 kV and 230 kV galvanized lattice suspension towers, Structures #546/26 / 2094/220 and #590/1893 / 2045/25, and the installation of backbones as needed for the 230 kV lines and as described herein, to qualify as an “ordinary extension[] or improvement[] in the usual course of business” pursuant to § 56-265.2 A 1 of the Code of Virginia (“Va. Code”) and, therefore, does not require approval pursuant to Va. Code § 56-46.1 B or a certificate of public convenience and necessity (“CPCN”) from the Commission. As the

result in (i) 500 kV Brambleton-Wishing Star Line #589, (ii) 500 kV Brambleton-Wishing Star Line #501, (iii) Mosby-Wishing Star Line #546, and (iv) Mosby-Wishing Star Line #590.

- (ii) Construct a new approximately 3.55-mile overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt on predominantly new right-of-way.² The new transmission lines will originate at the 500 kV and 230 kV buses of the proposed Wishing Star Substation and continue east to the proposed 500-230 kV Mars Substation, resulting in (i) 500 kV Mars-Wishing Star Line #527, and (ii) 230 kV Mars-Wishing Star Line #2291 (the “Mars-Wishing Star Lines”). From the proposed Wishing Star Substation, the Mars-Wishing Star Lines will extend generally east to the proposed Mars Substation, where the Mars-Wishing Star Lines will terminate. The proposed Mars-Wishing Star Lines will be constructed on new right-of-way³ predominantly 150 feet in width (approximately 2.67 miles of the 3.55-mile total length)⁴ to

Company considers the removal of these two double circuit structures to be ordinary course, detailed supporting documentation has not been provided in the Appendix. Should the Commission determine that a CPCN is required for the work associated with Lines #546, #2094, #590 and #2045 as described herein, the Company requests that the Commission grant such CPCNs as part of its final order in this proceeding.

² As currently designed, there will be small areas of overlap with existing Company-owned right-of-way. The Mars-Wishing Star Lines share approximately 3.52 acres of overlap with the Company’s existing right-of-way, including where the Wishing Star Substation overlaps with the Company’s existing 500 kV Brambleton-Mosby Lines #546 and #590 and 230 kV Brambleton-Loudoun Lines #2094 and #2045, as well as two crossings of existing transmission line corridors. Specifically, the Mars-Wishing Star Lines cross the Company’s existing 230 kV Brambleton-Evergreen Mills Line #2172 and Brambleton-Poland Road Line #2183 transmission line corridor, and then the existing 230 kV Cabin Run-Yardley Ridge Line #2213 and Poland Road-Shellhorn Road Line #2137 transmission line corridor. See Attachment II.A.6.a to the Appendix. Depending on the route selected for the Mars-Wishing Star Lines, there is an additional overlap of the existing Lines #2213/#2137 transmission corridor where the route runs parallel to this corridor. This additional overlap is part of the Proposed Route, as well as Alternative Route 6, as currently designed.

³ See, *supra*, n. 2.

⁴ There are three segments along the proposed Mars-Wishing Star Lines that will require additional right-of-way. For one segment of three spans (approximately 1,500 feet), the right-of-way will be 200 feet wide where the proposed Mars-Wishing Star Lines cross over the Company’s existing 230 kV Line #2213/#2137 transmission corridor (see, *supra*, n. 2) and Old Ox Road (State Route 606), at which point the circuits will be separated onto six separate single circuit structures (four structures carrying the 230 kV circuits and two structures carrying the 500 kV circuits) in order to maintain appropriate clearance from the existing lines but also conform to height restrictions at Washington Dulles International Airport (“Dulles Airport”). See Attachment II.B.3.iv (500 kV) and Attachment II.B.3.v (230 kV) to the Appendix. For one segment of one span (approximately 1,400 feet), the right-of-way will be 200 feet wide where the proposed Mars-Wishing Star Lines span Broad Run in order to maintain clearance for conductor blow-out. See Attachments II.B.3.ii-iii to the Appendix. For one segment of three spans where the Mars-Wishing Star Lines enter into the proposed Mars Substation, the 5/2 configured 150-foot-wide right-of-way will split into two separate rights-of-way, with a 150-foot-wide right-of-way for Line #527 and a 100-foot-wide right-of-way for Line #2291. See Attachment II.B.3.iii (500 kV) and Attachments vi-vii (230 kV) to the Appendix. Line #527 will continue along a 150-foot-wide right-of-way into a terminal located on the west side of Mars Substation. Line #2291 will continue along a 100-foot-wide right-of-way for approximately 0.34 mile into a terminal located on the south side of Mars Substation. See Attachment II.A.1 to the Appendix for the location of these three segments with varying right-of-way widths.

support a 5/2 configuration⁵ primarily on dulled galvanized steel double circuit three-pole or two-pole H-frame structures. The new 500 kV line will utilize three-phase triple-bundled 1351.5 ACSR conductors with a summer transfer capability of 4,357 MVA; the new 230 kV line will utilize three-phase twin-bundled 768.2 ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.⁶

- (iii) Construct a new 500-230 kV substation in Loudoun County, Virginia, on property obtained by the Company (“Mars Substation”).
- (iv) Construct two new approximately 0.57-mile overhead 230 kV double circuit lines on two sets of double circuit structures from Mars Substation to cut in locations on the Company’s existing 230 kV Cabin Run-Shellhorn Road Line #2095 and 230 kV Poland Road-Shellhorn Road Line #2137,⁷ between Structures #2095/72 / #2137/82 and #2095/73 / #2137/83 resulting in (i) 230 kV Cabin Run-Mars Line #2287, (ii) 230 kV Celestial-Mars Line #2261, (iii) 230 kV Mars-Shellhorn Road Line #2095, and (iv) 230 kV Mars-Sojourner Line #2292⁸ (the “Mars 230 kV Loop”). Where the Mars 230 kV Loop cuts into Lines #2095 and #2137, two new two-pole double circuit structures will be installed within existing right-of-way in order to loop the new lines into the Mars Substation and then back to the existing Lines #2095/#2137 corridor.⁹ While the cut-in location is within existing right-of-way, the proposed Mars 230 kV Loop will be constructed on new 160-foot-wide right-of-way supported by a combination of dulled galvanized steel double circuit monopoles and two-pole structures situated side-by-side in the right-of-way

⁵ A “5/2 configuration” means that the supporting structures will be configured such that the upper position of the structure will have a 500 kV circuit and the lower position will have a 230 kV circuit. See, e.g., Attachment II.B.3.i to the Appendix.

⁶ Apparent power, measured in megavolt amperes (“MVA”), is made up of real power (megawatt or “MW”) and reactive power megavolt ampere reactive (“MVAR”). The power factor (“pf”) is the ratio of real power to apparent power. For loads with a high pf (approaching unity), real power will approach apparent power and the two can be used interchangeably. Load loss criteria specify real power (MW) units because that represents the real power that will be dropped; however, MVA is used to describe the equipment ratings to handle the apparent power, which includes the real and reactive load components.

⁷ See Attachment I.A.4 to the Appendix for a one-line diagram of the existing area transmission system. Prior to the in-service date for this Project, the Company’s future Celestial Substation will be in-service. See Attachment I.A.7 to the Appendix for a one-line diagram of the area transmission system after the Project is energized. At that time, the existing 230 kV Poland Road-Shellhorn Road Line #2137 will be renamed Celestial-Poland Road Line #2137. For purposes of this Appendix, the cut-in location for the Mars 230 kV Loop will refer to the existing 230 kV Poland Road-Shellhorn Road Line #2137.

⁸ Prior to energization of the proposed Project, the Company’s future Sojourner Substation will be in-service. See Attachment I.A.7 to the Appendix.

⁹ The Company considers the installation of two new two-pole double circuit structures on Lines #2095 and #2137 to accommodate the loop in of the proposed lines, as described herein, to qualify as an “ordinary extension[] or improvement[] in the usual course of business” pursuant to Va. Code § 56-265.2 A 1 and, therefore, does not require approval pursuant to Va. Code § 56-46.1 B or a CPCN from the Commission. As the Company considers the installation of these two double circuit structures to be ordinary course, detailed supporting documentation has not been provided in the Appendix. Should the Commission determine that a CPCN is required for the work associated with Lines #2095 and #2137 as described herein, the Company requests that the Commission grant such CPCNs as part of its final order in this proceeding.

and will utilize three-phase twin-bundled 768.2 ACSS/TW type conductor with a summer transfer capability of 1,573 MVA.

- (v) Conduct line protection upgrades at the Company's existing remote end substations, including the Company's existing Brambleton, Cabin Run, Mosby, and Shellhorn Road Substations, as well as the future Celestial and Sojourner Substations.

The Wishing Star Substation, Mars-Wishing Star Lines, Mars Substation, Mars 230 kV Loop and related substation work are collectively referred to as the "Project."

4. There is an immediate need for the Project to maintain and improve electric service to customers in the eastern Loudoun load area ("Eastern Loudoun Load Area"), which is generally to the north and west of the Dulles Airport and is inclusive of Data Center Alley; to address significant load growth in the Eastern Loudoun Load Area; and to resolve identified NERC reliability violations. As of this filing, the Eastern Loudoun Load Area is inclusive of approximately 21 locations where load is being served.¹⁰ If not relieved by this proposed Project combined with others proposed or planned in the near term, the identified reliability violations will severely impact the transmission system's ability to provide reliable service to Dominion Energy Virginia's customers in the Eastern Loudoun Load Area.

5. The Company identified an approximately 3.55-mile overhead proposed route for the Mars-Wishing Star Lines ("Mars-Wishing Star Lines Proposed Route" or "Route 5"), as well as five overhead alternative routes ("Mars-Wishing Star Lines Alternative Routes 1, 2, 3, 4 and 6"). For the Mars 230 kV Loop, the Company identified one approximately 0.57-mile overhead

¹⁰ As of this filing, there are a total of 21 locations where load is served in the Eastern Loudoun Load Area. Note that the Company's Yardley Ridge Switching Station serves NOVEC's Yardley Ridge DP. For purposes of this discussion, Yardley Ridge is considered one location in the Eastern Loudoun Load Area where load is served. See Attachment I.A.4 to the Appendix. The locations are served by a combination of switching stations, substations and DPs owned by Dominion Energy Virginia, unless otherwise noted. For ease of reference, the remainder of this Appendix will refer to them collectively as "21 substations." See Attachment I.A.8 to the Appendix for locations where load will be served in the Eastern Loudoun Load Area once the Project is energized, and including all substations presented to PJM in the Eastern Loudoun Load Area at the time of this Application filing.

proposed route (“Mars 230 kV Loop Proposed Route”). The Company is proposing all of these routes for notice and Commission consideration. Discussion of the Project Proposed and Alternative Routes, as well as other overhead and underground route options that the Company studied but ultimately rejected, is provided in Section II of the Appendix and in the Environmental Routing Study included with the Application.

6. The Mars-Wishing Star Lines Proposed Route (Route 5) is the shortest of all the Alternative Routes considered and would utilize the most existing Company-owned transmission rights-of-way, the same amount as Alternative Route 6. The Proposed Route impacts more forested land than Alternative Routes 1, 2, 3, and 4; however, by collocating along existing rights-of-way, the Proposed Route avoids forest and habitat fragmentation and multiple perpendicular crossings of Broad Run. Importantly, the Proposed Route would have substantially less impact on forested wetlands than all the other Alternative Routes.

7. The Mars-Wishing Star Lines Proposed Route is predicted to have the least visual impact on identified visually sensitive resources (“VSRs”) in the study area. VSRs include residential areas and valuable recreation areas in the immediate vicinity of the Project, including Stream Valley Park and trails, Broad Run Trail, and the multi-use paths along Evergreen Mills Road.

8. Based on a comparison of the advantages and disadvantages of the Proposed Route and Alternative Routes for the Mars-Wishing Star Lines, the Company concluded that the Proposed Route would reasonably minimize adverse impacts on scenic assets, planned developments, forested wetlands, and recreation areas, while providing the greatest possible amount of collocation with Company-owned transmission rights-of-way. For these reasons, the Company selected Route 5 as the Proposed Route.

9. No route alternatives were identified for the Mars 230 kV Loop. The Proposed

Route is the shortest, most direct, and least environmentally impactful alignment between the proposed Mars Substation and the cut in locations on the Company's existing 230 kV Cabin Run-Shellhorn Road Line #2095 and 230 kV Poland Road-Shellhorn Road Line #2137. The Proposed Route runs parallel to an existing VDOT road right-of-way, Carters School Road (SR 875), and avoids conflict with the approved development plans for Digital Dulles. For these reasons, the Company selected the Mars 230 kV Loop Proposed Route and did not develop or evaluate longer and more impactful route alternatives.

10. The proposed Wishing Star Substation initially will be constructed with eight 500 kV 5000 ampere ("amps" or "A") circuit breakers, three 230 kV 4000A circuit breakers, five 500 kV line terminals, one 230 kV line terminal, two 230 kV feeds to Northern Virginia Electric Cooperative, one 500-230 kV transformer bank (4-480 MVA, single-phase units, including a spare) and other associated equipment. The total area of the Wishing Star Substation is approximately 41 acres.

11. The proposed Mars Substation initially will be constructed with three 500 kV 5000A circuit breakers, ten 230 kV 4000A circuit breakers, one 500 kV line terminal, five 230 kV line terminals, two 500-230 kV transformer banks (7-480 MVA, single-phase units, including a spare) and other associated equipment. The total area of the Mars Substation is approximately 22 acres.

12. The desired in-service target date for the proposed Project is December 31, 2025. Due to the immediate need for this Project, the PJM required in-service date is June 1, 2025. The Company believes, however, that an in-service date of December 31, 2025, is more reasonably achievable. The Company estimates it will take approximately 32 months for detailed engineering, materials procurement, permitting, real estate, and construction after a final order from the

Commission. Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by April 25, 2023. Should the Commission issue a final order by April 25, 2023, the Company estimates that construction should begin around September 2023, and be completed by December 2025. This schedule is contingent upon obtaining the necessary permits and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Additionally, this schedule is contingent upon timing associated with obtaining necessary right-of-way. The Company has worked collaboratively with property owners to develop the Proposed Routes and selection of an alternative route by the Commission may impact the Company's ability to obtain the necessary right-of-way for the Project. While the Company is actively working with the appropriate agencies regarding all necessary permitting for the Project, dates may need to be adjusted based on potential delays, including delays associated with scheduling outages, right-of-way acquisition, permitting delays, or design modifications to comply with additional agency requirements identified during the permitting application process, as well as unpredictable delays due to labor shortages or materials/supply issues.

13. The estimated conceptual cost of the Project utilizing the Mars-Wishing Star Proposed Route and the Mars 230 kV Loop Proposed Route is approximately \$715.7 million, which includes approximately \$157.2 million for transmission-related work and approximately \$558.5 million for substation-related work (2022 dollars).

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

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

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

17. In addition to the information provided in the Appendix, the DEQ Supplement, and the Environmental Routing Study, this Application is supported by the pre-filed direct testimony of Company Witnesses Harrison S. Potter, Matthew B. Vinson, Santosh Bhattarai, Laura P. Meadows, and Jacob M. Rosenberg 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 Project; and,
- (c) grant a certificate of public convenience and necessity for the 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
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October 27, 2022

COMMONWEALTH OF VIRGINIA
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STATE CORPORATION COMMISSION

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500-230 kV Wishing Star Substation, 500 kV and 230 kV
Mars-Wishing Star Lines, 500-230 kV Mars Substation,
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Application No. 318

Appendix

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

Case No. PUR-2022-00183

Filed: October 27, 2022

TABLE OF CONTENTS

Executive Summary	i
I. Necessity for the Proposed Project	1
II. Description of the Proposed Project	107
III. Impact of Line on Scenic, Environmental and Historic Features	188
IV. Health Aspects of EMF.....	281
V. Notice.....	300

EXECUTIVE SUMMARY

In order to relieve identified violations of mandatory North American Electric Reliability Corporation (“NERC”) Reliability Standards beginning in the summer 2025 timeframe brought on by significant increases in electrical demand as well as expected demand growth projected for the future, and to maintain the structural integrity and reliability of its transmission system, Virginia Electric and Power Company (“Dominion Energy Virginia” or the “Company”) proposes in Loudoun County, Virginia, to:

- (i) Construct a new 500-230 kV substation in Loudoun County, Virginia, within existing Company-owned right-of-way and on property obtained by the Company (“Wishing Star Substation”). The 500-230 kV source to the Wishing Star Substation will be created by cutting the Company’s existing 500 kV Brambleton-Mosby Lines #546 and #590 into the Wishing Star Substation at Structures #546/26 and #590/1893 just south of the Company’s existing Brambleton Substation.¹ The tie-in of Lines #546 and #590 to the Wishing Star Substation will result in (i) 500 kV Brambleton-Wishing Star Line #589, (ii) 500 kV Brambleton-Wishing Star Line #501, (iii) Mosby-Wishing Star Line #546, and (iv) Mosby-Wishing Star Line #590.
- (ii) Construct a new approximately 3.55-mile overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt on predominantly new right-of-way.² The new transmission lines will originate at the 500 kV and 230 kV

¹ The Company’s existing 230 kV Brambleton-Loudoun Lines #2094 and #2045 are underbuilt on structures supporting existing 500 kV Brambleton-Mosby Lines #546 and #590. The two existing double circuit structures where the 500 kV lines will be cut into the Wishing Star Substation (Structures #546/26 / 2094/220 and #590/1893 / 2045/25) will be removed to allow for the termination of Lines #546 and #590 into the new 500 kV Wishing Star Substation bus, with Lines #2094 and #2045 bypassing connection to the Wishing Star Substation 230 kV bus and continuing south towards Loudoun Substation. Backbone structures will be installed within Wishing Star Substation to effectuate the bypass of the 230 kV lines, as needed. Note that, prior to energization of the Project, existing 230 kV Brambleton-Loudoun Line #2094 will be cut in by the Company’s future Racefield Substation, which will result in Brambleton-Racefield Line #2227 and Racefield-Loudoun Line #2094. For purposes of this Appendix, the cut in location for the Wishing Star Substation will refer to the corridor containing the existing Brambleton-Loudoun Line #2094. See Attachment I.A.4 for a one-line diagram of the existing transmission system, and Attachment I.A.7 for a one-line diagram of the area transmission system after the Project is energized. The Company considers the removal of two double circuit 500 kV and 230 kV galvanized lattice suspension towers, Structures #546/26 / 2094/220 and #590/1893 / 2045/25, and the installation of backbones as needed for the 230 kV lines and as described herein, to qualify as an “ordinary extension[] or improvement[] in the usual course of business” pursuant to § 56-265.2 A 1 of the Code of Virginia (“Va. Code”) and, therefore, does not require approval pursuant to Va. Code § 56-46.1 B or a certificate of public convenience and necessity (“CPCN”) from the State Corporation Commission (the “Commission”). As the Company considers the removal of these two double circuit structures to be ordinary course, detailed supporting documentation has not been provided in this Appendix. Should the Commission determine that a CPCN is required for the work associated with Lines #546, #2094, #590 and #2045 as described herein, the Company requests that the Commission grant such CPCNs as part of its final order in this proceeding.

² As currently designed, there will be small areas of overlap with existing Company-owned right-of-way. The Mars-Wishing Star Lines share approximately 3.52 acres of overlap with the Company’s existing right-of-way, including where the Wishing Star Substation overlaps with the Company’s existing 500 kV Brambleton-Mosby Lines #546 and #590 and 230 kV Brambleton-Loudoun Lines #2094 and #2045, as well as two crossings of existing transmission line corridors. Specifically, the Mars-Wishing Star Lines cross the Company’s existing 230 kV Brambleton-Evergreen Mills Line #2172 and Brambleton-Poland Road Line #2183 transmission line corridor, and then the existing 230 kV Cabin Run-Yardley Ridge Line #2213 and Poland Road-Shellhorn Road Line #2137 transmission line corridor. See Attachment II.A.6.a. Depending on the route selected for the Mars-Wishing Star Lines, there is an additional overlap

- buses of the proposed Wishing Star Substation and continue east to the proposed 500-230 kV Mars Substation, resulting in (i) 500 kV Mars-Wishing Star Line #527, and (ii) 230 kV Mars-Wishing Star Line #2291 (the “Mars-Wishing Star Lines”). From the proposed Wishing Star Substation, the Mars-Wishing Star Lines will extend generally east to the proposed Mars Substation, where the Mars-Wishing Star Lines will terminate. The proposed Mars-Wishing Star Lines will be constructed on new right-of-way³ predominantly 150 feet in width (approximately 2.67 miles of the 3.55-mile total length)⁴ to support a 5/2 configuration⁵ primarily on dulled galvanized steel double circuit three-pole or two-pole H-frame structures. The new 500 kV line will utilize three-phase triple-bundled 1351.5 ACSR conductors with a summer transfer capability of 4,357 MVA; the new 230 kV line will utilize three-phase twin-bundled 768.2 ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.⁶
- (iii) Construct a new 500-230 kV substation in Loudoun County, Virginia, on property obtained by the Company (“Mars Substation”).
 - (iv) Construct two new approximately 0.57-mile overhead 230 kV double circuit lines on two sets of double circuit structures from Mars Substation to cut in locations on the Company’s existing 230 kV Cabin Run-Shellhorn Road Line #2095 and 230 kV Poland

of the existing Lines #2213/#2137 transmission corridor where the route runs parallel to this corridor. This additional overlap is part of the Proposed Route, as well as Alternative Route 6, as currently designed.

³ See, *supra*, n. 2.

⁴ There are three segments along the proposed Mars-Wishing Star Lines that will require additional right-of-way. For one segment of three spans (approximately 1,500 feet), the right-of-way will be 200 feet wide where the proposed Mars-Wishing Star Lines cross over the Company’s existing 230 kV Line #2213/#2137 transmission corridor (see, *supra*, n. 2) and Old Ox Road (State Route 606), at which point the circuits will be separated onto six separate single circuit structures (four structures carrying the 230 kV circuits and two structures carrying the 500 kV circuits) in order to maintain appropriate clearance from the existing lines but also conform to height restrictions at Washington Dulles International Airport (“Dulles Airport”). See [Attachment II.B.3.iv](#) (500 kV) and [Attachment II.B.3.v](#) (230 kV). For one segment of one span (approximately 1,400 feet), the right-of-way will be 200 feet wide where the proposed Mars-Wishing Star Lines span Broad Run in order to maintain clearance for conductor blow-out. See [Attachments II.B.3.ii-iii](#). For one segment of three spans where the Mars-Wishing Star Lines enter into the proposed Mars Substation, the 5/2 configured 150-foot-wide right-of-way will split into two separate rights-of-way, with a 150-foot-wide right-of-way for Line #527 and a 100-foot-wide right-of-way for Line #2291. See [Attachment II.B.3.iii](#) (500 kV) and [Attachments vi-vii](#) (230 kV). Line #527 will continue along a 150-foot-wide right-of-way into a terminal located on the west side of Mars Substation. Note that the length of this 150-foot-wide right-of-way for the 500 kV line from the split to the Mars Substation is included in the total 2.67 miles of 150-foot-wide right-of-way discussed above. Line #2291 will continue along a 100-foot-wide right-of-way for approximately 0.34 mile into a terminal located on the south side of Mars Substation. See [Attachment II.A.1](#) for the location of these three segments with varying right-of-way widths.

⁵ A “5/2 configuration” means that the supporting structures will be configured such that the upper position of the structure will have a 500 kV circuit and the lower position will have a 230 kV circuit. See, e.g., [Attachment II.B.3.i](#).

⁶ Apparent power, measured in megavolt amperes (“MVA”), is made up of real power (megawatt or “MW”) and reactive power megavolt ampere reactive (“MVAR”). The power factor (“pf”) is the ratio of real power to apparent power. For loads with a high pf (approaching unity), real power will approach apparent power and the two can be used interchangeably. Load loss criteria specify real power (MW) units because that represents the real power that will be dropped; however, MVA is used to describe the equipment ratings to handle the apparent power, which includes the real and reactive load components.

Road-Shellhorn Road Line #2137,⁷ between Structures #2095/72 / #2137/82 and #2095/73 / #2137/83 resulting in (i) 230 kV Cabin Run-Mars Line #2287, (ii) 230 kV Celestial-Mars Line #2261, (iii) 230 kV Mars-Shellhorn Road Line #2095, and (iv) 230 kV Mars-Sojourner Line #2292⁸ (the “Mars 230 kV Loop”). Where the Mars 230 kV Loop cuts into Lines #2095 and #2137, two new two-pole double circuit structures will be installed within existing right-of-way in order to loop the new lines into the Mars Substation and then back to the existing Lines #2095/#2137 corridor.⁹ While the cut-in location is within existing right-of-way, the proposed Mars 230 kV Loop will be constructed on new 160-foot-wide right-of-way supported by a combination of dulled galvanized steel double circuit monopoles and two-pole structures situated side-by-side in the right-of-way and will utilize three-phase twin-bundled 768.2 ACSS/TW type conductor with a summer transfer capability of 1,573 MVA.

- (v) Conduct line protection upgrades at the Company’s existing remote end substations, including the Company’s existing Brambleton, Cabin Run, Mosby, and Shellhorn Road Substations, as well as the future Celestial and Sojourner Substations.

The Wishing Star Substation, Mars-Wishing Star Lines, Mars Substation, Mars 230 kV Loop and related substation work are collectively referred to as the “Project.”

There is an immediate need for the Project to maintain and improve electric service to customers in the eastern Loudoun load area (“Eastern Loudoun Load Area”), which is generally to the north and west of the Dulles Airport and is inclusive of Data Center Alley (“DCA”); to address significant load growth in the Eastern Loudoun Load Area; and to resolve identified NERC reliability violations. As of this filing, the Eastern Loudoun Load Area¹⁰ is inclusive of approximately 21 locations where load is being served.¹¹ If not relieved by this proposed Project combined with others proposed or planned in the near term,¹² the identified reliability violations will severely impact the transmission system’s ability to provide reliable service to Dominion

⁷ See Attachment I.A.4 for a one-line diagram of the existing area transmission system. Prior to the in-service date for this Project, the Company’s future Celestial Substation will be in-service. See Attachment I.A.7 for a one-line diagram of the area transmission system after the Project is energized. At that time, the existing 230 kV Poland Road-Shellhorn Road Line #2137 will be renamed Celestial-Poland Road Line #2137. For purposes of this Appendix, the cut-in location for the Mars 230 kV Loop will refer to the existing 230 kV Poland Road-Shellhorn Road Line #2137.

⁸ Prior to energization of the proposed Project, the Company’s future Sojourner Substation will be in-service. See Attachment I.A.7.

⁹ The Company considers the installation of two new two-pole double circuit structures on Lines #2095 and #2137 to accommodate the loop in of the proposed lines, as described herein, to qualify as an “ordinary extension[] or improvement[] in the usual course of business” pursuant to Va. Code § 56-265.2 A 1 and, therefore, does not require approval pursuant to Va. Code § 56-46.1 B or a CPCN from the Commission. As the Company considers the installation of these two double circuit structures to be ordinary course, detailed supporting documentation has not been provided in this Appendix. Should the Commission determine that a CPCN is required for the work associated with Lines #2095 and #2137 as described herein, the Company requests that the Commission grant such CPCNs as part of its final order in this proceeding.

¹⁰ See Attachment I.A.2.

¹¹ See *infra*, n. 23.

¹² See Attachment I.A.8 for an ultimate one-line diagram, including the Project and all substations presented to PJM in the Eastern Loudoun Load Area at the time of this Application filing.

Energy Virginia's customers in the Eastern Loudoun Load Area.

The Company identified an approximately 3.55-mile overhead proposed route for the Mars-Wishing Star Lines ("Mars-Wishing Star Lines Proposed Route" or "Route 5"), as well as five overhead alternative routes ("Mars-Wishing Star Lines Alternative Routes 1, 2, 3, 4 and 6"). For the Mars 230 kV Loop, the Company identified one approximately 0.57-mile overhead proposed route ("Mars 230 kV Loop Proposed Route"). The Company is proposing all of these routes for notice and Commission consideration. Discussion of the Project Proposed and Alternative Routes, as well as other overhead and underground route options that the Company studied but ultimately rejected, is provided in Section II of the Appendix and in the Environmental Routing Study included with the Application.

The proposed Wishing Star Substation initially will be constructed with eight 500 kV 5000 ampere ("amp" or "A") circuit breakers, three 230 kV 4000A circuit breakers, five 500 kV line terminals, one 230 kV line terminal, two 230 kV feeds to Northern Virginia Electric Cooperative ("NOVEC"), one 500-230 kV transformer bank (4-480 MVA, single-phase units, including a spare) and other associated equipment. The Wishing Star Substation will be designed to accommodate future growth in the area with a build-out of seventeen 500 kV 5000A circuit breakers, thirteen 230 kV 4000A circuit breakers, five 500 kV line terminals, six 230 kV line terminals, two 500-230 kV transformer banks (7-480 MVA, single-phase units, including a spare), one 500 kV capacitor bank and two 230 kV capacitor banks. The 500 kV and 230 kV infrastructure will be Gas Insulated Substation ("GIS"). Additionally, two control enclosures will be installed to accommodate the protective relay and communications cabinets. The total area of the Wishing Star Substation is approximately 41 acres.

The proposed Mars Substation initially will be constructed with three 500 kV 5000A circuit breakers, ten 230 kV 4000A circuit breakers, one 500 kV line terminal, five 230 kV line terminals, two 500-230 kV transformer banks¹³ (7-480 MVA, single-phase units, including a spare) and other associated equipment. The Mars Substation will be designed to accommodate future growth in the area with a build-out of thirteen 500 kV 5000A circuit breakers, nineteen 230 kV 4000A circuit breakers, three 500 kV line terminals, eight 230 kV line terminals, three 500-230 kV transformer banks (11-480 MVA, single-phase units, including two spares), one 500 kV capacitor bank and two 230 kV capacitor banks. The 500 kV and 230 kV infrastructure will be GIS. Additionally, two control enclosures will be installed to accommodate the protective relay and communications cabinets. The total area of the Mars Substation is approximately 22 acres.

The estimated conceptual cost of the Project utilizing the Proposed Routes is approximately \$715.7 million, which includes approximately \$157.2 million for transmission-related work and approximately \$558.5 million for substation-related work (2022 dollars).¹⁴

The desired in-service target date for the proposed Project is December 31, 2025. Due to the immediate need for this Project, the PJM required in-service date is June 1, 2025. The Company believes, however, that an in-service date of December 31, 2025, is more reasonably achievable.

¹³ The Company is forecasting a need for the second transformer bank in the next RTEP cycle and therefore designed the Mars Substation to accommodate two transformer banks as initially constructed. The Company will submit the need for this second transformer bank to PJM subject to approval at a future date.

¹⁴ These costs are inclusive of projected real estate costs that the Company anticipates will be required to acquire the land for the Proposed Routes and Substations.

The Company estimates it will take approximately 32 months for detailed engineering, materials procurement, permitting, real estate, and construction after a final order from the Commission. Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by April 25, 2023. Should the Commission issue a final order by April 25, 2023, the Company estimates that construction should begin around September 2023, and be completed by December 2025. This schedule is contingent upon obtaining the necessary permits and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Additionally, this schedule is contingent upon timing associated with obtaining necessary right-of-way. The Company has worked collaboratively with property owners to develop the Proposed Routes and selection of an alternative route by the Commission may impact the Company's ability to obtain the necessary right-of-way for the Project. While the Company is actively working with the appropriate agencies regarding all necessary permitting for the Project, dates may need to be adjusted based on potential delays, including delays associated with scheduling outages, right-of-way acquisition, permitting delays, or design modifications to comply with additional agency requirements identified during the permitting application process, as well as unpredictable delays due to labor shortages or materials/supply issues.

I. NECESSITY FOR THE PROPOSED PROJECT

- 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 Project is necessary to relieve identified violations of NERC Reliability Standards and to maintain the structural integrity and reliability of its transmission system. See Attachment I.A.1 for overview maps of the Proposed Routes and Project area.

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, NOVEC, 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 “DOM Zone”). The Company needs to be able to maintain the overall, long-term reliability of its transmission system as its customers require more power in the future.

Dominion Energy Virginia is part of the PJM Interconnection, L.L.C. (“PJM”) regional transmission organization (“RTO”), which provides service to a large portion of the eastern United States. PJM is currently responsible for ensuring the reliability and coordinating the movement of electricity through all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. This service area has a population of approximately 65 million and, on August 2, 2006, set a record high of 166,929 megawatts (“MW”) for summer peak demand, of which Dominion Energy Virginia’s load portion was approximately 19,256 MW. On August 9, 2022, the Company set a record high of 21,156 MW for summer peak demand. On February 20, 2015, the Company set a winter and all-time record demand of 21,651 MW. Based on the 2022 PJM Load Forecast, the Dominion Energy Zone is expected to grow with average growth rates of 2.2% summer and 2.6% winter over the next 10 years compared to the PJM average of 0.4% and 0.7% over the same period for the summer and winter, respectively.

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

support. Dominion Energy Virginia's service to its customers is extremely reliant on a robust and reliable regional transmission system.

NERC has been designated by the Federal Energy Regulatory Commission ("FERC") as the electric reliability organization for the United States. Accordingly, NERC requires that the planning authority and transmission planner develop planning criteria to ensure compliance with NERC Reliability Standards. Mandatory NERC Reliability Standards require that a transmission owner ("TO") develop facility interconnection requirements that identify load and generation interconnection minimum requirements for a TO's transmission system, as well as the TO's reliability criteria.¹⁵

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

PJM's Regional Transmission Expansion Plan ("RTEP") is the culmination of a FERC-approved annual transmission planning process that includes extensive analysis of the electric transmission system to determine any needed improvements.¹⁶ 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.¹⁷ Projects identified through the RTEP process are developed by TO in coordination with PJM, and are presented at the Transmission Expansion Advisory Committee ("TEAC") meetings prior to inclusion in the RTEP, which is then presented for approval to the PJM Board of Managers (the "PJM Board").

Outcomes of the RTEP process include three types of transmission system upgrades or projects: (i) baseline upgrades are those that resolve a system reliability criteria violation, which can include planning criteria from NERC, ReliabilityFirst, SERC Reliability Corporation, PJM, and TOs; (ii) network upgrades are new or upgraded facilities required primarily to eliminate reliability criteria violations caused by proposed generation, merchant transmission, or long-term firm transmission service requests; and (iii) supplemental projects are projects initiated by the TO in order to interconnect new customer load, address degraded equipment performance, improve operational flexibility and efficiency, and increase infrastructure resilience. The Project is classified as a baseline project resolving several system reliability criteria violations. See Section I.J for a discussion of the

¹⁵ See FAC-001-3 (R1, R3) (effective April 1, 2021), which can be found at <https://cdn-dominionenergy-prd-001.azureedge.net/-/media/pdfs/virginia/parallel-generation/facility-interconnection-requirements-signed.pdf?la=en&rev=38f51ffb04b1489f921b32a41d9887c8>.

¹⁶ PJM Manual 14B (effective July 1, 2021) focuses on the RTEP process and can be found at <https://www.pjm.com/-/media/documents/manuals/m14b.ashx>.

¹⁷ See PJM Manual 14B, Attachment D: PJM Reliability Planning Criteria. See *supra*, n. 16.

PJM process as it relates to this Project.

As supported by Section I.J and discussed below, there is an immediate need for the Project to maintain and improve electric service to customers in the Eastern Loudoun Load Area, which is generally to the north and west of the Dulles Airport and is inclusive of DCA; to address significant load growth in the Eastern Loudoun Load Area; and to resolve identified NERC reliability violations. The Northern Virginia data center market is spread across Loudoun, Fairfax, and Prince William Counties, with the largest concentration of data centers in Loudoun County's DCA in the area of Ashburn and Sterling that is contained within the Eastern Loudoun Load Area. The combination of competitive colocation/cloud environment, fiber connectivity, strategic geographic location, low risk of business disruptions, affordable and reliable power, and the business climate in Virginia has created the largest market for data center capacity in the United States.

As of this filing, the Eastern Loudoun Load Area is inclusive of approximately 21 locations where load is being served. If not relieved by this proposed Project combined with others proposed or planned in the near term, the identified reliability violations will severely impact the transmission system's ability to provide reliable service to Dominion Energy Virginia's customers in the Eastern Loudoun Load Area.

Immediate Need for the Project

This Project has been designated "immediate need" by PJM to address several near-term NERC reliability thermal violations (under N-1, N-1-1, and Generation Deliverability studies) expected to occur by the summer of 2025 timeframe. These violations were included in PJM's Competitive Planning Process and listed in the 2022 Open Window 1, which opened on July 1, 2022, and closed on August 30, 2022. The Competitive Planning Process affords non-incumbent transmission developers an opportunity to participate in the regional planning and expansion of the PJM bulk electric system. Due to the "immediate need" designation, PJM has indicated that the Company will be the designated entity to mitigate these violations.

As discussed in Section I.J and supported by the various attachments thereto, PJM has acknowledged that the need for the Project is immediate, stating:

The Data Center Alley located in northern Virginia in the Dominion Transmission Zone is experiencing unprecedented load growth driven by increases in data center load that started in 2018 and is expected to continue growing post 2027. From 2018 to date, Dominion [Energy Virginia] brought forward 44 supplemental project requests to serve 2,050 MW of load increase through the summer of 2025. Some load additions also occurred prior to the Attachment M-3 process introduction. As part of the Attachment M-3 process do-no-harm analysis, PJM identified the need for 11

supplemental transmission reinforcements. In addition to the supplemental projects, PJM identified the need for two baseline reinforcements in the area to support its load growth.

PJM 2022 load forecast reflected the load growth within the Dominion [Energy Virginia] northern Virginia area including approximately 4,000 MW of additional load between 2020/21 and 2026/27. Because the 2027 RTEP case was not available at the time, the supplemental projects were assessed using the case available at the time (a 2025 RTEP); and at the time, the identified 11 supplemental reinforcement and 2 baseline upgrades were sufficient to serve the load increase using the 2025 RTEP case. Once the PJM load forecast was updated for the 2027 RTEP, the system showed a need for reinforcements through additional source(s) to serve the load increase from the 500 and 230 kV transmission system nearby. PJM's 2027 RTEP analysis shows an extensive set of violations ranging between single contingencies, generation deliverability and N-1-1 reliability criteria performance violations. Area reliability violations occur even after the energization of the entire set of 11 supplemental projects and the 2 baseline upgrades. The 2027 RTEP analysis indicates there are 4 flowgate violations leading to load drop of more than 300 MW with all planned supplemental and baseline reinforcements incorporated within the model.

PJM investigated the need for transmission development in the 2024 and 2025 timeframe, evaluating the accelerated energization of baseline and supplemental upgrades. PJM identified the need for additional transmission reinforcements in the area as early as 2024 with an increase in identified reliability violations through 2025. Operationally, the area has been experiencing congestion during the outages required to implement the supplemental and baseline transmission reinforcements planned to be in service in advance of 2025. Due to the area being thermally constrained, multiple coinciding outages will be challenging to implement resulting in potential reliability issues. Because the area is constrained on all 230 kV inlet transmission segments to serve the size of load and data center load has a flat profile throughout the day, power flow control or non-wires solutions are not applicable to solve the identified transmission needs in this area. As a result, this project will be designated immediate need to address the near term reliability violations seen in 2024 and 2025 timeframe. Due to the pace and magnitude of load increase in the data center alley area, current operational and reliability constraints on the transmission system to serve load and consideration that a shortened competitive window will lead to delays of about 6 months, PJM has determined to designate [the Company] construction responsibility to mitigate these immediate need violations.

See Attachment I.J.2. for the discussion quoted above and Section I.J generally. As supported by the attachments and discussion in Section I.J, the Company, working with PJM and its member TOs through PJM's RTEP process, has identified both regional and local NERC reliability violations that will directly impact the Eastern Loudoun Load Area beginning in summer 2025. Under the RTEP, PJM's load flow studies were validated by independent load flow studies performed by Dominion Energy Virginia. These studies have confirmed that by summer 2025, projected load growth will produce multiple contingency conditions that would cause thermal overloads in several parts of the system. See Sections I.C and I.D. As part of the RTEP, PJM and Dominion Energy Virginia have determined that the proposed Project, including the 500 kV and 230 kV facilities described herein, will provide the most comprehensive, robust solution for resolving the projected NERC reliability violations by summer 2025, as well as provide for future load growth in the Eastern Loudoun Load Area and the regional transmission system as a whole. At the September 6, 2022, TEAC meeting, PJM announced an Immediate Transmission Development need (without a window) to serve the new load in the 2024/25 timeframe. As such, PJM designated this Project as an Immediate Need Project. See Attachment I.J.5.

The identified future NERC violations, which take all existing and a subset of planned projects into account that have been communicated to PJM through the M-3 process, if not corrected with the construction of the proposed Project, will severely impact Dominion Energy Virginia's ability to provide reliable service to its customers in the Eastern Loudoun Load Area. Construction of the Project, including the new 500 kV and 230 kV facilities proposed herein, will relieve the identified NERC reliability violations detailed in Sections I.B and I.C.

Infrastructure Serving the Eastern Loudoun Load Area

The Eastern Loudoun Load Area, as described in this Appendix, includes the 230 kV infrastructure to the east of the North-South 500 kV corridor that runs between Brambleton Substation and Goose Creek Substation, as shown in Attachment I.A.2. See also Attachment I.G.1. There are three 230 kV transmission corridors that make up the Eastern Loudoun Load Area, each consisting of two 230 kV lines: the Northern Corridor, the Southern Corridor, and the Eastern Corridor. Attachment I.A.2 is a simplified version of the existing infrastructure feeding the Eastern Loudoun Load Area. The simplified version of the one-line helps to demonstrate that the source for Loudoun County's DCA is to the west with a significant presence of residential development in between. The routing of new infrastructure for the source to the load is limited by the number of west to east corridors.

The Northern Corridor consists of Beaumeade-Belmont Line #227 and Beaumeade-Pleasant View Line #274. Line #274 was uprated to the Company's

highest standard 230 kV rating of 1,573 MVA¹⁸ as part of baseline project b3026. Line #227 will be uprated to the Company's highest standard 230 kV rating of 1,573 MVA as part of supplemental project s1838.2, which was approved by the Commission in Case No. PUR-2021-00100 with a scheduled in-service date of June 1, 2023.¹⁹ The Company is also working on the addition of a 1,440 MVA 500-230 kV transformer at Goose Creek Substation and to cut existing Line #227 into the expanded substation creating Beaumeade-Goose Creek Line #227 and Belmont-Goose Creek Line #2286 as part of supplemental project s2609.2 with a scheduled in-service date of June 1, 2026.²⁰ The 2026 in-service date for the Goose Creek expansion project falls between the 2022 RTEP 2025 and 2022 RTEP 2027 cases and, therefore, the terminal ends of Line #227 are modeled differently in each case.

The Southern Corridor consists of Brambleton-Evergreen Mills Line #2172 and Brambleton-Poland Road Line #2183. Line #2172 will be uprated to the Company's highest standard 230 kV rating of 1,573 MVA as part of baseline project b3300, with a scheduled completion date of June 2025.²¹ Line #2183 is overloaded as part of the 2022 RTEP analysis in both the 2025 and 2027 cases, as discussed further in Sections I.B and I.C.

The Eastern Corridor consists of BECO-Sterling Park Line #2150 and Beaumeade-Sterling Park Line #2081. Currently, there are no uprate projects planned for the two lines in the Eastern Corridor. Power flow through the lines in the Eastern Corridor is limited to the existing generation portfolio in northeastern Virginia. Even during the reliability analysis of the loss of lines in the Northern or Southern Corridor, flows from the Eastern Corridor are limited based on the strength of the source, meaning the Eastern Corridor does not provide significant support for the Eastern Loudoun Load Area.

The Company and PJM have previously taken the approach to upgrade existing infrastructure on existing rights-of-way prior to looking for any greenfield solutions. This approach has led to a significant number of 230 kV line uprates in the Eastern Loudoun Load Area that have been presented through the PJM M-3 process and are in various stages of engineering and construction, with the first line uprate in the Eastern Loudoun Load Area, Beaumeade-Pleasant View Line #274,

¹⁸ The Company's standard 230 kV conductor to obtain a 1,573 MVA summer rating is 2-768 ACSS @250°C MOT with substation terminal equipment rated to 4000A.

¹⁹ *Application of Virginia Electric and Power Company For approval and certification of electric transmission facilities: Beaumeade-Belmont 230 kV Transmission Line #227 Reconductor and Partial Rebuild*, Case No. PUR-2021-00100, Final Order at 15 (Feb. 8, 2022) ("Beaumeade-Belmont Final Order"). While the Beaumeade-Belmont Final Order requires that the project be in service by December 31, 2023, the Company is working to accelerate the target date to June 1, 2023.

²⁰ Due to operational concerns and ability to serve the new customer load, the Company is working to accelerate the target date of the Goose Creek expansion to December 31, 2023. *See infra*, n. 32 and related text.

²¹ *Application of Virginia Electric and Power Company For approval and certification of electric facilities: Evergreen Mills 230 kV Line Loops and Evergreen Mills Switching Station*, Case No. PUR-2019-00191, Final Order at 4 (May 22, 2020).

being completed on July 1, 2022. This strategy benefits from a permitting and land use perspective, but is complicated by the ability to take outages to uprate the lines, as discussed in more detail below. The table below details these projects.

Project Name	County	PJM	Project Target
Cabin Run-Shellhorn Road Line #2095 Uprate	Loudoun	s2328.8	12/31/2025
Beaumeade-Buttermilk ²² Line #2152 Uprate	Loudoun	s2328.4 s2328.5	12/31/2025
Brambleton-Evergreen Line #2172 Uprate	Loudoun	b3300	6/1/2025
Beaumeade-Paragon Park Line #2206 Uprate	Loudoun	s2328.6	12/31/2025
Evergreen Mills-Yardley Ridge Line #2209 Uprate	Loudoun	s2328.7	12/31/2025
Cabin Run-Yardley Ridge Line #2213 Uprate	Loudoun	b3302	6/1/2025
Beaumeade -Belmont Line #227 Uprate	Loudoun	s1838.2	6/1/2023
Beaumeade-Pleasant View Line #274 Uprate	Loudoun	b3026	7/1/2022

As of this filing, load in the Eastern Loudoun Load Area is served at a total of 21 locations, including: the Company's existing Ashburn, Beaumeade, BECO, Buttermilk, Cabin Run, Cumulus, Enterprise, Evergreen Mills, Farmwell, Greenway, NIVO, Pacific, Paragon Park, Poland Road, Roundtable, Shellhorn Road, Sterling Park, and Waxpool Substations; and NOVEC's Cochran Mills, Runway, and Yardley Ridge Delivery Points ("DPs").²³ On August 9, 2022, Dominion Energy Virginia set a new system summer peak of 21,156 MW, with these 21 substations combining to serve 2,324.5 MW of that new system peak.

In addition to the 21 substations, the 2022 RTEP 2025 and 2027 cases include six additional substations that are currently in detailed engineering or construction phases. Discussion regarding these additional substations is provided in Section I.B(4).

The expected load growth in Eastern Loudoun Load Area is not limited to the projects listed above. The Company has presented four additional substations to PJM that are not included in the 2022 RTEP 2025 or 2027 cases. See Section I.B(4) for discussion regarding these four additional substations. Beyond the 10 new

²² Beaumeade-Buttermilk Line #2152 as it currently exists will be split into three separate lines as the Nimbus and Interconnection Substations are energized: Beaumeade-Interconnection Line #2248, Interconnection-Nimbus Line #2152, and Buttermilk-Nimbus Line #2255. For the purposes of this Appendix, Line #2152 will be referenced as the lines from Beaumeade to Buttermilk.

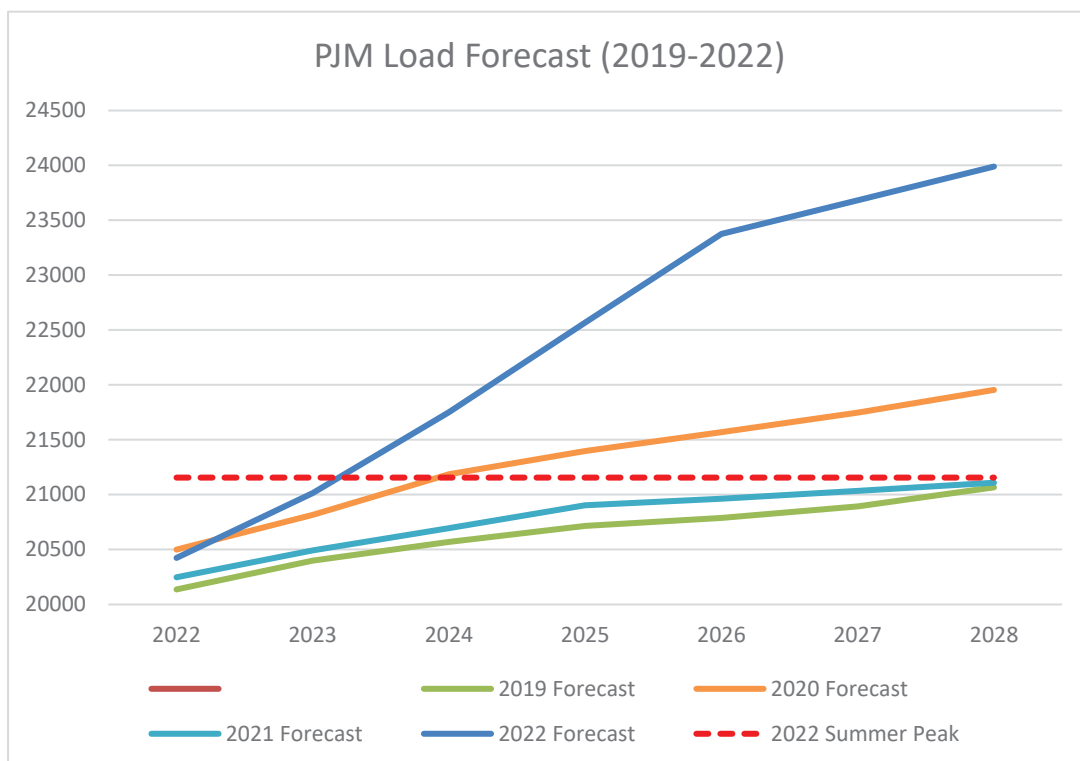
²³ As of this filing, there are a total of 21 locations where load is served in the Eastern Loudoun Load Area. Note that the Company's Yardley Ridge Switching Station serves NOVEC's Yardley Ridge DP. For purposes of this discussion, Yardley Ridge is considered one location in the Eastern Loudoun Load Area where load is served. See Attachment I.A.4. The locations are served by a combination of switching stations, substations and DPs owned by Dominion Energy Virginia, unless otherwise noted. For ease of reference, the remainder of this Appendix will refer to them collectively as "21 substations." See Attachment I.A.8 for locations where load will be served in the Eastern Loudoun Load Area once the Project is energized, and including all substations presented to PJM in the Eastern Loudoun Load Area at the time of this Application filing.

substations that are not currently in service, the Company is aware of significant additional data center development that is planned for this area on parcels that are currently owned by data center developers zoned appropriately for data center use that ultimately will be developed into large scale data center campuses.

See Attachment I.A.3 for a simplified version of the planned infrastructure feeding the Eastern Loudoun Load Area, as generally described above.

PJM Load Forecast

The 2022 PJM Load Forecast²⁴ was significantly adjusted to account for substantial ongoing growth in the data center market from the previous 2019-2021 forecasts. For example, as illustrated by the graph below, in comparison to the 2021 PJM Load Forecast, the 2022 forecast was 1,166 MW greater in 2025 and 2,647 MW greater in 2027. The PJM 2022 Load Forecast for 2022 was surpassed by the 2022 DOM Zone actual recorded summer system peak by 628 MW.



Load projection methodologies accounting for data center growth generally can be grouped into three perspectives: (i) RTO methodology; (ii) distribution company methodology; and (iii) data center customer methodology. The PJM Load Forecast includes input from the TOs on data center growth, but traditionally has been scaled down consistent with PJM’s projection methodology. Dominion Energy Virginia

²⁴ See <https://www.pjm.com/-/media/library/reports-notice/load-forecast/2022-load-report.ashx> for a copy of the 2022 PJM Load Report.

and NOVEC distribution load forecasts typically involve taking customer requested load ramps and project load growth based on historical knowledge of the customer requesting the new data center. The data center customer requests the full capacity that their data center building can support to ensure they are able to fully utilize or lease their building investment.

These three load projection methodologies are not fully aligned. The PJM Load Forecast traditionally has been the minimum forecast, followed by the distribution load projection, and then the customer projection, as detailed further in Section I.C. Each forecasting methodology has risks to over- or under-building the transmission network based off the actual load ramp of the energized buildings. The distribution companies over the last two years have been tracking accelerated load ramps on larger, higher density buildings utilizing a higher percentage of the ultimate building contract. In order to build and operate a reliable and robust transmission network, PJM and the Company must consider the distribution and customer forecasts as part of the planning analysis to ensure adequate facilities are constructed timely to address future growth.

SOC Operating Issues

The Company's System Operating Center ("SOC") and PJM Operations have observed that load growth in the Eastern Loudoun Load Area is outpacing planned facility upgrades, thereby decreasing the margins available to take necessary outages to uprate the existing infrastructure. As a result, SOC has relied upon certain controlling actions such as switching solutions and Post Contingency Local Load Relief Warnings ("PCLLRWs") to manage real-time post-contingency violations. For example, SOC has implemented a switching solution almost continually on the 230 kV system in Loudoun County for the last year in order to re-direct flow temporarily and avoid potential thermal violations if there is an N-1 occurrence. This solution was implemented both during peak load periods and outage seasons.²⁵ While switching solutions are an effective means to temporarily re-direct flows on the transmission network, they are not intended to be used for long periods of time, as they reconfigure the network to temporarily restrict flow, which potentially can lower grid resiliency during system events.

Another way in which this load growth is impacting operations can be seen through the long-term outage planning process. The Eastern Loudoun Load Area around DCA is currently configured such that there are six sources into the area with no internal generation (Lines #274, #227, #2172, and #2183 from the west and Lines #2033 and #2062 from the east). In spring 2022, the main project occurring in this area was the Line #274 reconductor. When SOC began outage coordination 6-months prior in fall 2021, studies indicated that it would be possible to take Line #274 out alongside outages for other projects in the region (*e.g.*, Lines #2081 and #2150 outages for the Paragon Park cut-in, and Lines #295 and #265 outages for

²⁵ PJM Manual 3 – 4.2.6 Peak Period Outage Scheduling Guidelines define the peak summer and winter periods as June 15-September 15 and January 1-February 28, respectively.

reconductors). SOC's outage timeline was independently studied by PJM and both parties agreed that the Company could operate the system in a manner which avoided post-contingency violations. However, during spring 2022, SOC quickly learned that the load growth in the Eastern Loudoun Load Area outpaced planned load growth/behavior in this area. Not only was SOC not able to take multiple line outages, but the system was not N-1 secure with solely Line #274 out. SOC experienced a total of 18 PCLLRWs over the course of the spring 2022 outage season—a clear sign of capacity deficiency. Projects that were planned to occur at the same time as Line #274 had to be delayed until after the line was returned to service.

Even with the uprated Line #274 capacity doubling in June 2022, SOC had an even more difficult time coordinating outages for fall 2022. The main project occurring during the fall 2022 season was the Line #227 reconductor. While working to uprate Line #227, the Company also needed to take outages on Lines #2188 and #2137 for cut-ins of the Lockridge and Sojourner DPs. The Company found that in order to take either Line #2188 or Line #2137 out with Line #227, it required them to occur in the absolute valley of the system peak loading curve and the Company would need to use an excessive five concurrent switching solutions. Even at this point, the Company still was not able to lower post contingency violations below the emergency rating²⁶ threshold. If SOC did not account for load accurately or if load grew more than anticipated, the magnitude of the PCLLRW would be even more severe. PJM agreed to allow the Company to accept a PCLLRW with the understanding that the Company would shed load if certain contingencies occurred. This is far outside of the normal, safe operating protocol but became necessary given all factors involved.

Description of the Project

As part of the Project, the Company proposes to construct the new 500-230 kV Wishing Star Substation in Loudoun County, Virginia, within existing Company-owned right-of-way and on property obtained by the Company. The 500-230 kV source to the Wishing Star Substation will be created by cutting the Company's existing 500 kV Brambleton-Mosby Lines #546 and #590 into the Wishing Star Substation at Structures #546/26 and #590/1893 just south of the Company's existing Brambleton Substation.²⁷ The tie-in of Lines #546 and #590 to the Wishing Star Substation will result in (i) 500 kV Brambleton-Wishing Star Line #589, (ii) 500 kV Brambleton-Wishing Star Line #501, (iii) Mosby-Wishing Star Line #546, and (iv) Mosby-Wishing Star Line #590.

The proposed Wishing Star Substation initially will be constructed with eight 500 kV 5000A circuit breakers, three 230 kV 4000A circuit breakers, five 500 kV line terminals, one 230 kV line terminal, two 230 kV feeds to NOVEC, one 500-230

²⁶ The emergency rating used by the SOC is calculated based off the substation and transmission equipment in service. Typically, the normal and emergency rating are calculated to the same value.

²⁷ See *supra*, n. 1.

kV transformer bank (4-480 MVA, single-phase units, including a spare) and other associated equipment. The Wishing Star Substation will be designed to accommodate future growth in the area with a build-out of seventeen 500 kV 5000A circuit breakers, thirteen 230 kV 4000A circuit breakers, five 500 kV line terminals, six 230 kV line terminals, two 500-230 kV transformer banks (7-480 MVA, single-phase units, including a spare), one 500 kV capacitor bank and two 230 kV capacitor banks. The 500 kV and 230 kV infrastructure will be GIS. Additionally, two control enclosures will be installed to accommodate the protective relay and communications cabinets. The total area of the Wishing Star Substation is approximately 41 acres.

The Company also proposes to construct the Mars-Wishing Star Lines, which include a new approximately 3.55-mile overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt on predominantly new right-of-way.²⁸ The Mars-Wishing Star Lines will originate at the 500 kV and 230 kV buses of the proposed Wishing Star Substation and continue east to the proposed 500-230 kV Mars Substation, resulting in (i) 500 kV Mars-Wishing Star Line #527, and (ii) 230 kV Mars-Wishing Star Line #2291. From the proposed Wishing Star Substation, the Mars-Wishing Star Lines will extend generally east to the proposed Mars Substation, where the Mars-Wishing Star Lines will terminate. The proposed Mars-Wishing Star Lines will be constructed on new right-of-way²⁹ predominantly 150 feet in width (approximately 2.67 miles of the 3.55-mile total length) to support a 5/2 configuration primarily on dulled galvanized steel double circuit three-pole or two-pole H-frame structures. Three segments of the Mars-Wishing Star Lines will require additional right-of-way.

For one segment of three spans (approximately 1,500 feet), the right-of-way will be 200 feet wide where the proposed Mars-Wishing Star Lines cross over the Company's existing 230 kV Lines #2213/#2137 corridor (*see supra*, n. 2) and Old Ox Road (State Route 606), at which point the circuits will be separated onto six separate single circuit structures (four structures carrying the 230 kV circuits and two structures carrying the 500 kV circuits) in order to maintain appropriate clearance from the existing lines but also conform to height restrictions at Dulles Airport. See Attachment II.B.3.iv (500 kV) and Attachment II.B.3.v (230 kV).

For one segment of one span (approximately 1,400 feet), the right-of-way will be 200 feet wide where the proposed Mars-Wishing Star Lines span Broad Run in order to maintain clearance for conductor blow-out. See Attachments II.B.3.ii-iii.

For one segment of three spans where the Mars-Wishing Star Lines enter into the proposed Mars Substation, the 5/2 configured 150-foot-wide right-of-way will split into two separate rights-of-way, with a 150-foot-wide right-of-way for Line #527 and a 100-foot-wide right-of-way for Line #2291. See Attachment II.B.3.iii (500 kV) and Attachments vi-vii (230 kV). Line #527 will continue along a 150-foot-

²⁸ See *supra*, n. 2.

²⁹ See *supra*, n. 2.

wide right-of-way into a terminal located on the west side of Mars Substation. Line #2291 will continue along a 100-foot-wide right-of-way for approximately 0.34 mile into a terminal located on the south side of Mars Substation. See Attachment II.A.1 for the location of these three segments with varying right-of-way widths.

The new 500 kV line will utilize three-phase triple-bundled 1351.5 ACSR conductors with a summer transfer capability of 4,357 MVA; the new 230 kV line will utilize three-phase twin-bundled 768.2 ACSS/TW/HS type conductor with a summer transfer capability of 1,573 MVA.

The Company also proposes to construct the proposed 500-230 kV Mars Substation in Loudoun County, Virginia, on property obtained by the Company. The proposed Mars Substation initially will be constructed with three 500 kV 5000A circuit breakers, ten 230 kV 4000A circuit breakers, one 500 kV line terminal, five 230 kV line terminals, two 500-230 kV transformer banks (7-480 MVA, single-phase units, including a spare) and other associated equipment. The Mars Substation will be designed to accommodate future growth in the area with a build-out of thirteen 500 kV 5000A circuit breakers, nineteen 230 kV 4000A circuit breakers, three 500 kV line terminals, eight 230 kV line terminals, three 500-230 kV transformer banks (11-480 MVA, single-phase units, including two spares), one 500 kV capacitor bank and two 230 kV capacitor banks. The 500 kV and 230 kV infrastructure will be GIS. Additionally, two control enclosures will be installed to accommodate the protective relay and communications cabinets. The total area of the Mars Substation is approximately 22 acres.

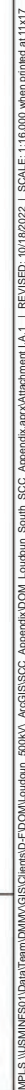
From the proposed Mars Substation, the Company proposes to construct two new approximately 0.57-mile overhead 230 kV double circuit lines on two sets of double circuit structures to cut in locations on the Company's existing 230 kV Cabin Run-Shellhorn Road Line #2095 and 230 kV Poland Road-Shellhorn Road Line #2137 between Structures #2095/72 / #2137/82 and #2095/73 / #2137/83 resulting in (i) 230 kV Cabin Run-Mars Line #2287, (ii) 230 kV Celestial-Mars Line #2261, (iii) 230 kV Mars-Shellhorn Road Line #2095, and (iv) 230 kV Mars-Sojourner Line #2292. Where the Mars 230 kV Loop cuts into Lines #2095 and #2137, two new two-pole double circuit structures will be installed within existing right-of-way in order to loop the new lines into the Mars Substation and then back to the existing Lines #2095/#2137 corridor. While the cut-in location is within existing right-of-way, the proposed Mars 230 kV Loop will be constructed on new 160-foot-wide right-of-way supported by a combination of dulled galvanized steel double circuit monopoles and two-pole structures situated side-by-side in the right-of-way, and will utilize three-phase twin-bundled 768.2 ACSS/TW type conductor with a summer transfer capability of 1,573 MVA.

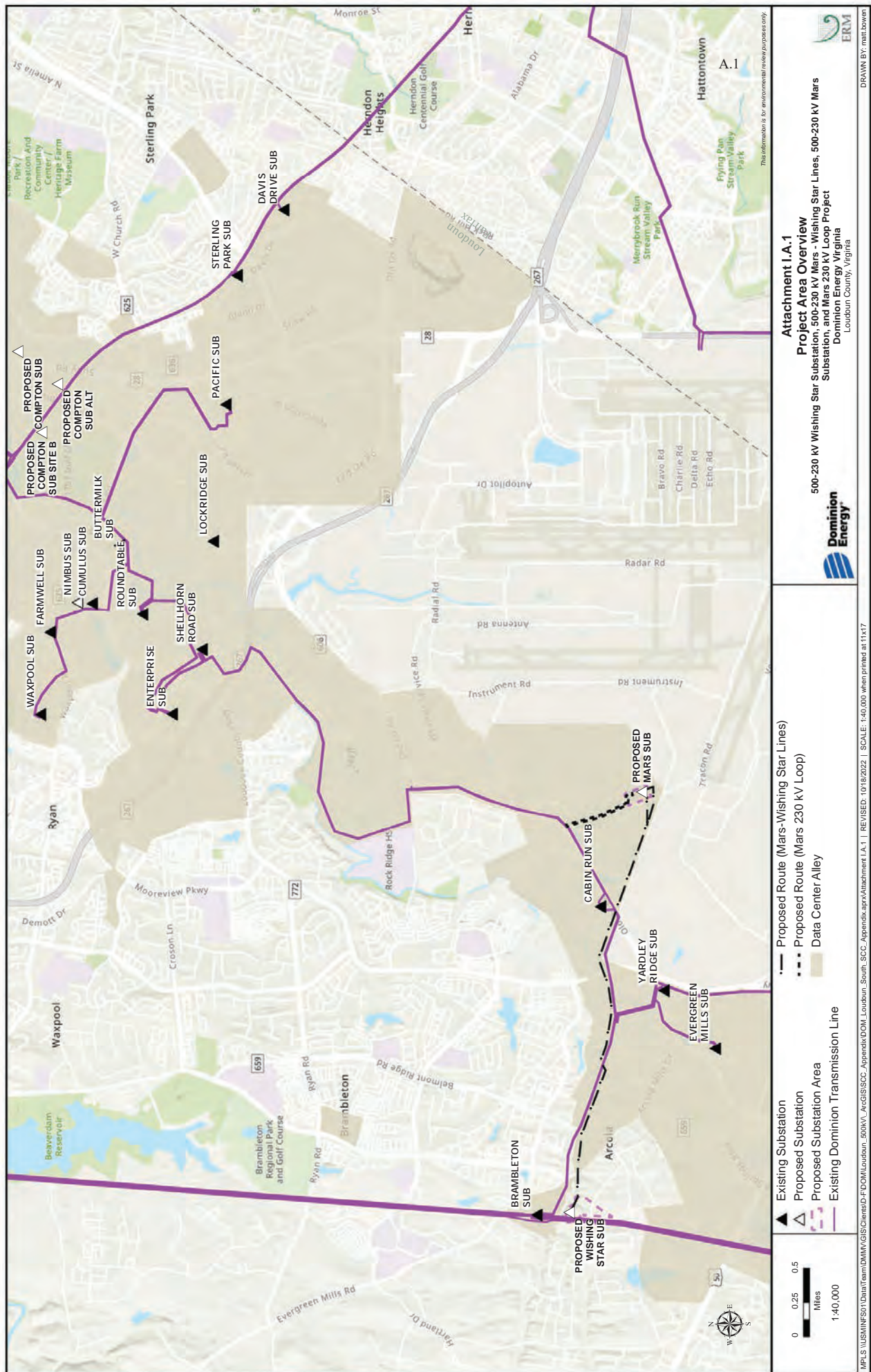
For the Mars-Wishing Star Lines, the Company identified an approximately 3.55-mile overhead Mars-Wishing Star Lines Proposed Route, as well as overhead Mars-Wishing Star Alternative Routes 1, 2, 3, 4 and 6. For the Mars 230 kV Loop, the Company identified one approximately 0.57-mile overhead Mars 230 kV Loop Proposed Route. The Company is proposing all of these routes for notice and Commission consideration. Discussion of the Proposed Routes and Alternative

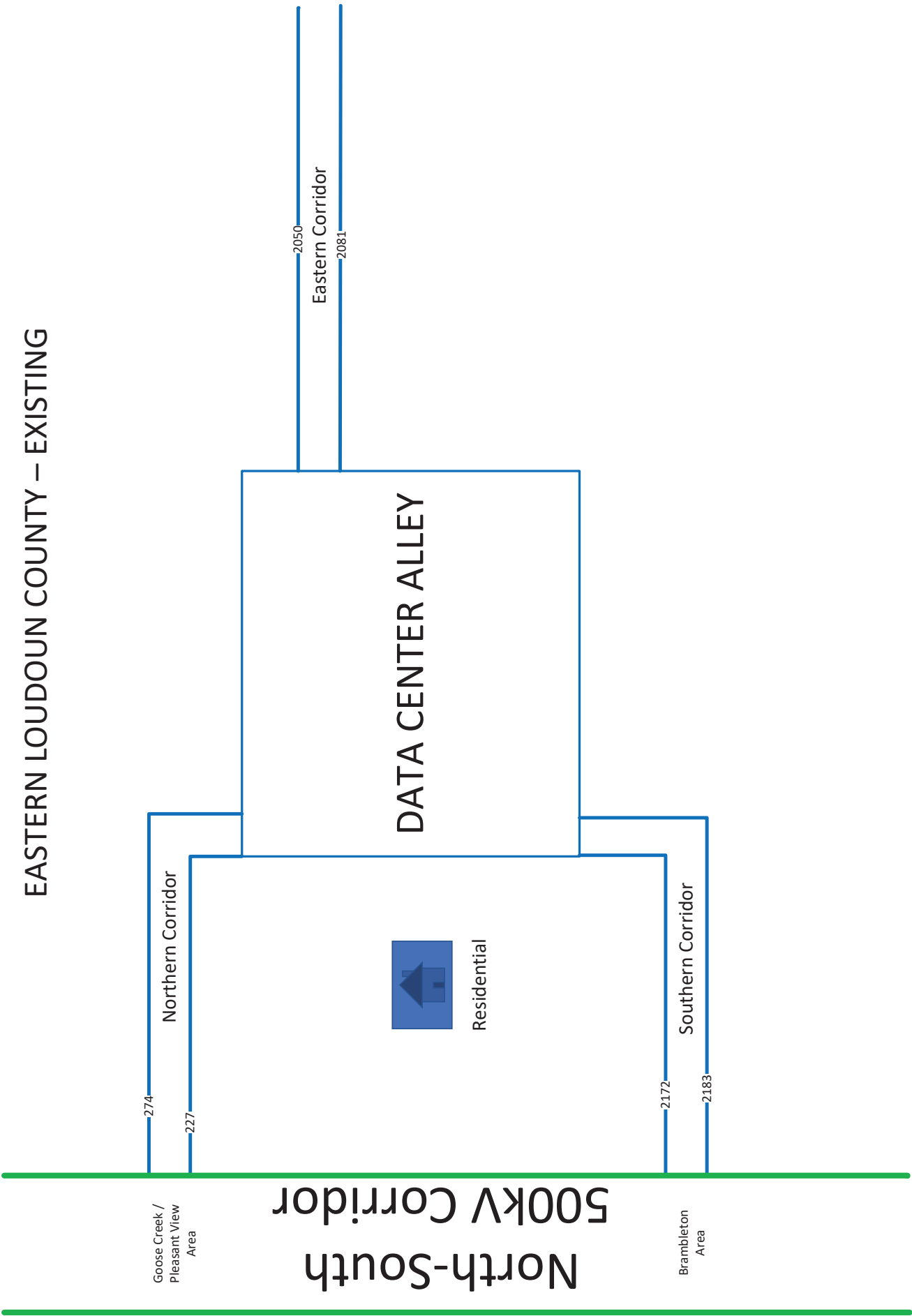
Routes, as well as other overhead and underground route options that the Company studied but ultimately rejected, is provided in Section II of the Appendix and in the Environmental Routing Study included with the Application.

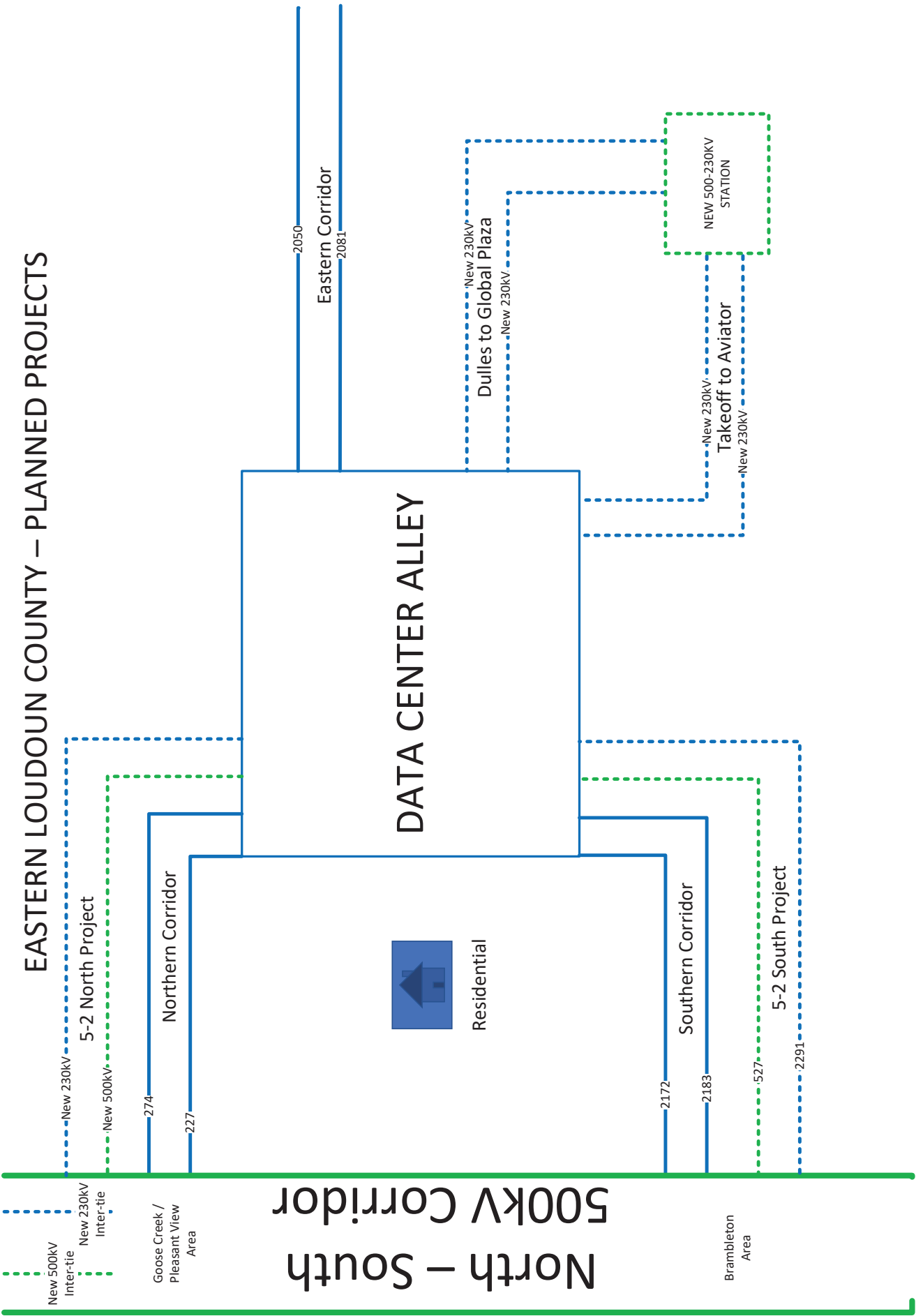
Attachment I.A.4 provides the existing one-line diagram of the transmission system in the Eastern Loudoun Load Area. Attachment I.A.5 provides the 2022 RTEP 2025 configuration one-line diagram, including all baseline and supplemental projects in service prior to summer of 2025. Attachment I.A.6 provides the 2022 RTEP 2027 configuration one-line diagram, including all baseline and supplemental projects in service prior to summer of 2027. Attachment I.A.7 provides a one-line diagram of the transmission system in the Eastern Loudoun Load Area after the proposed Project is energized with all baseline and supplemental projects that have been approved by PJM process through summer of 2027. Finally, Attachment I.A.8 provides an ultimate one-line diagram as of summer 2027, including the additional projects that are not included in Attachment I.A.7 that have been presented but not approved by PJM in the Eastern Loudoun Load Area at the time of this Application filing. See Attachment II.A.2 for a map depicting the proposed Project.

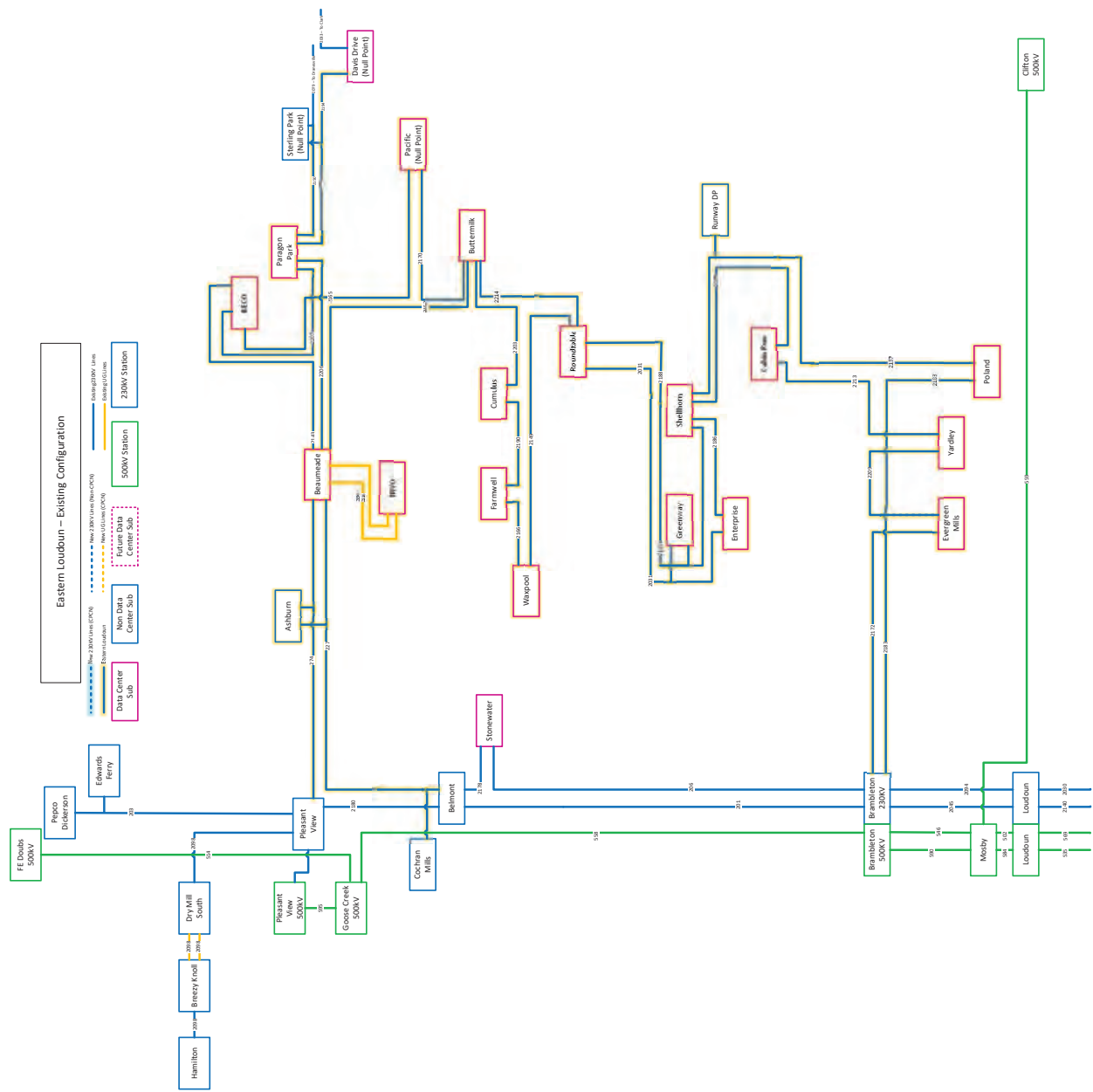
In summary, the proposed Project will relieve identified violations of mandatory NERC Reliability Standards beginning in the summer 2025 timeframe, and maintain the structural integrity and reliability of the transmission system for the overall load growth in the Project area.

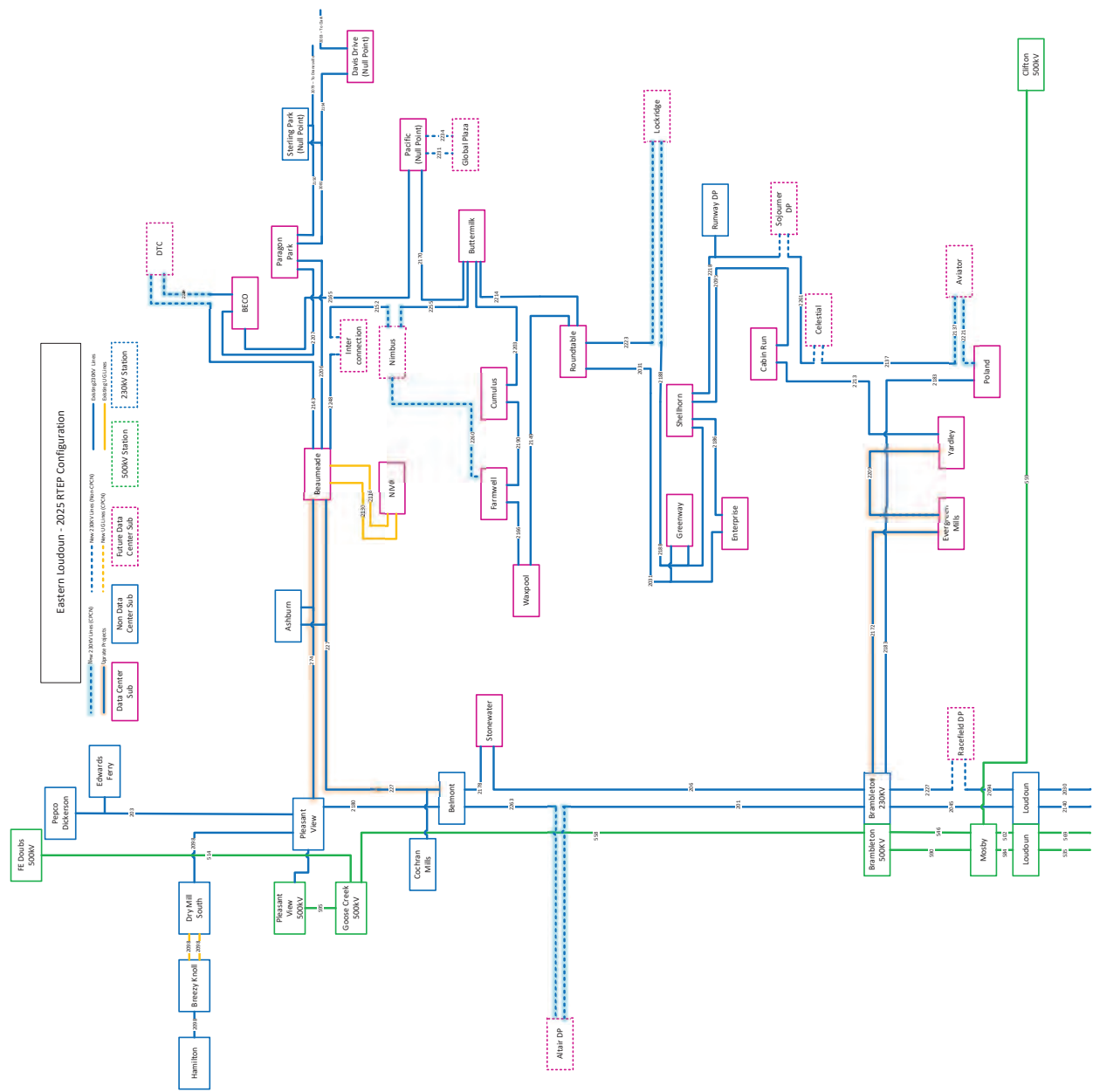


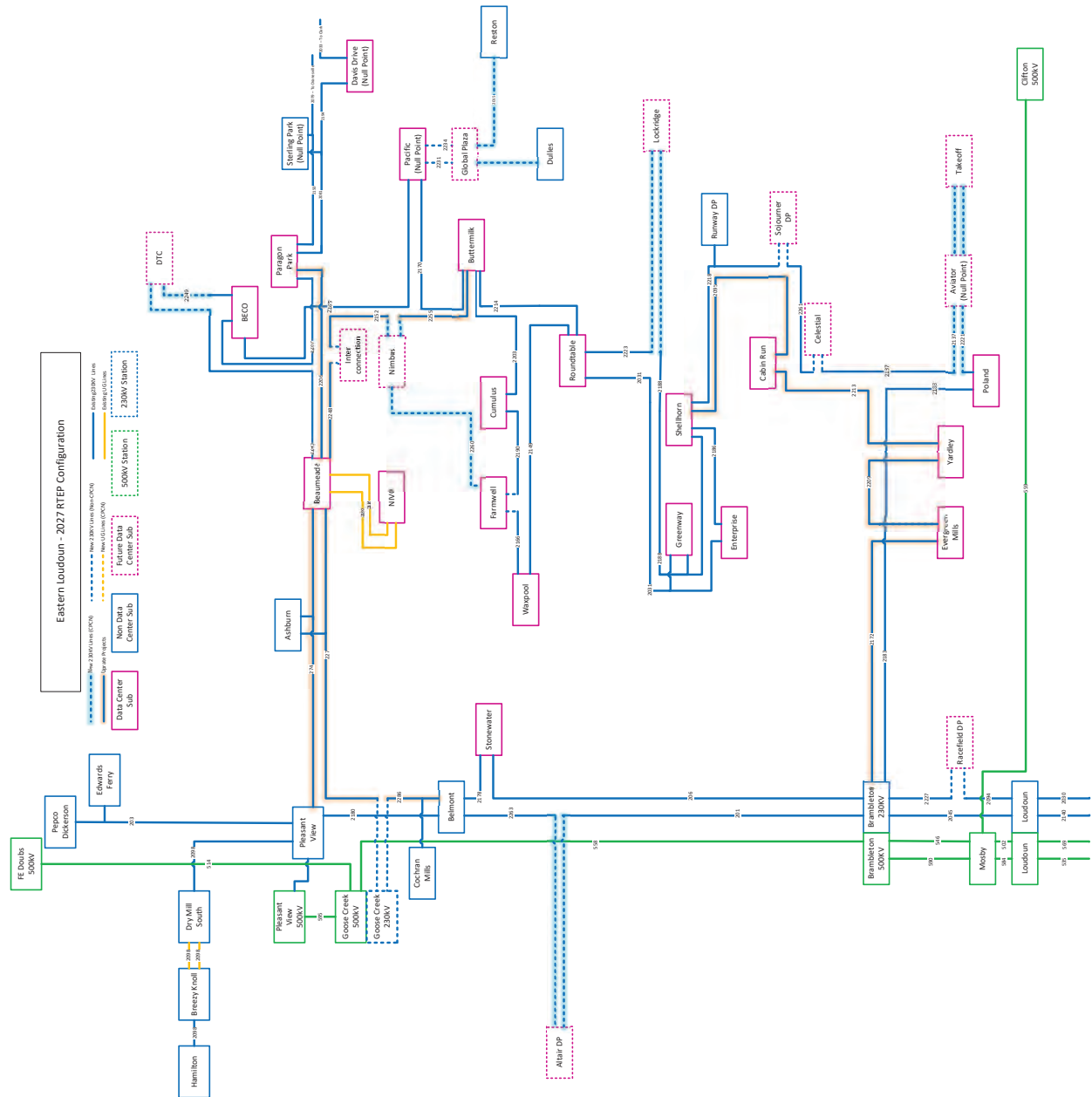


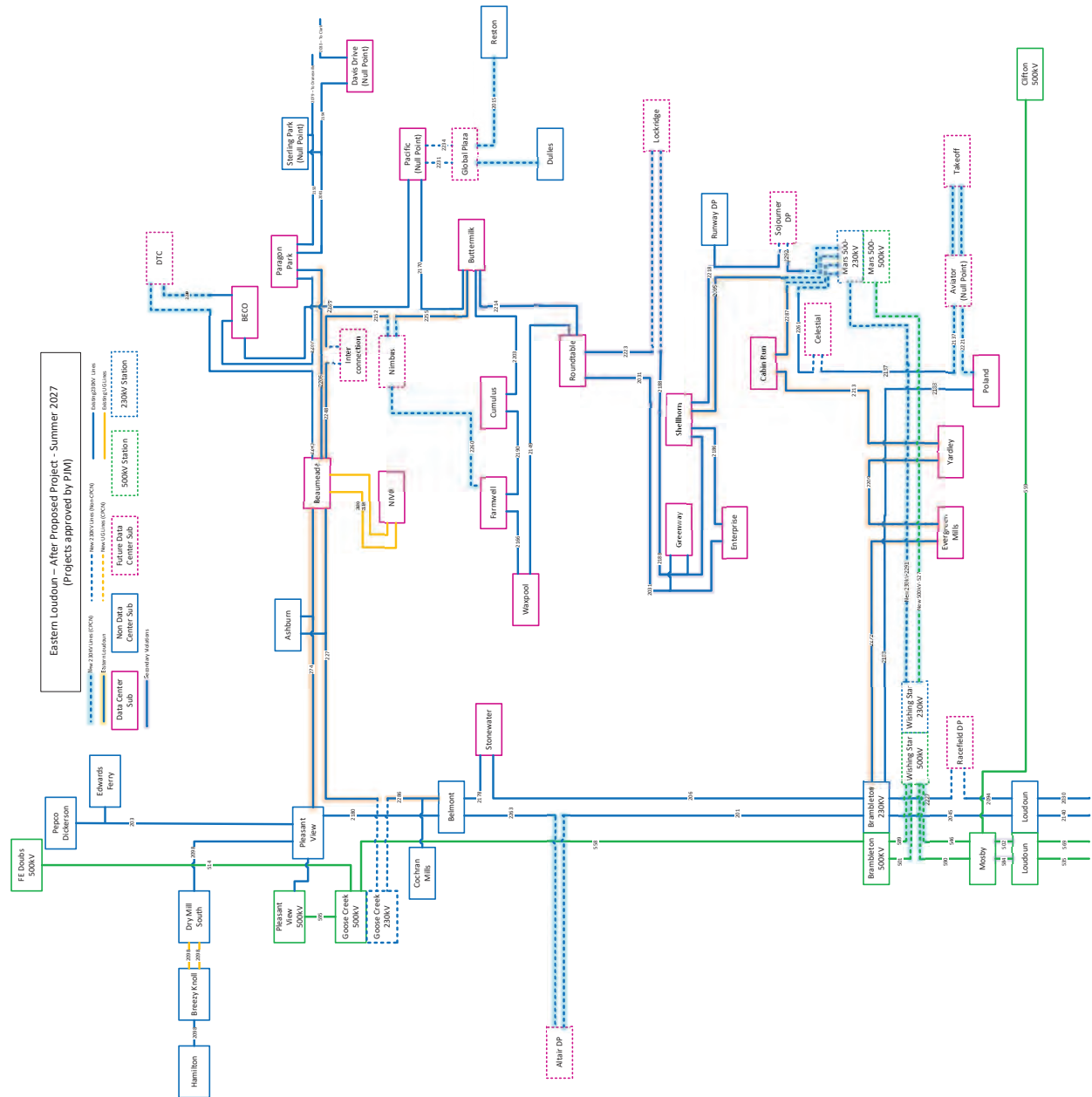


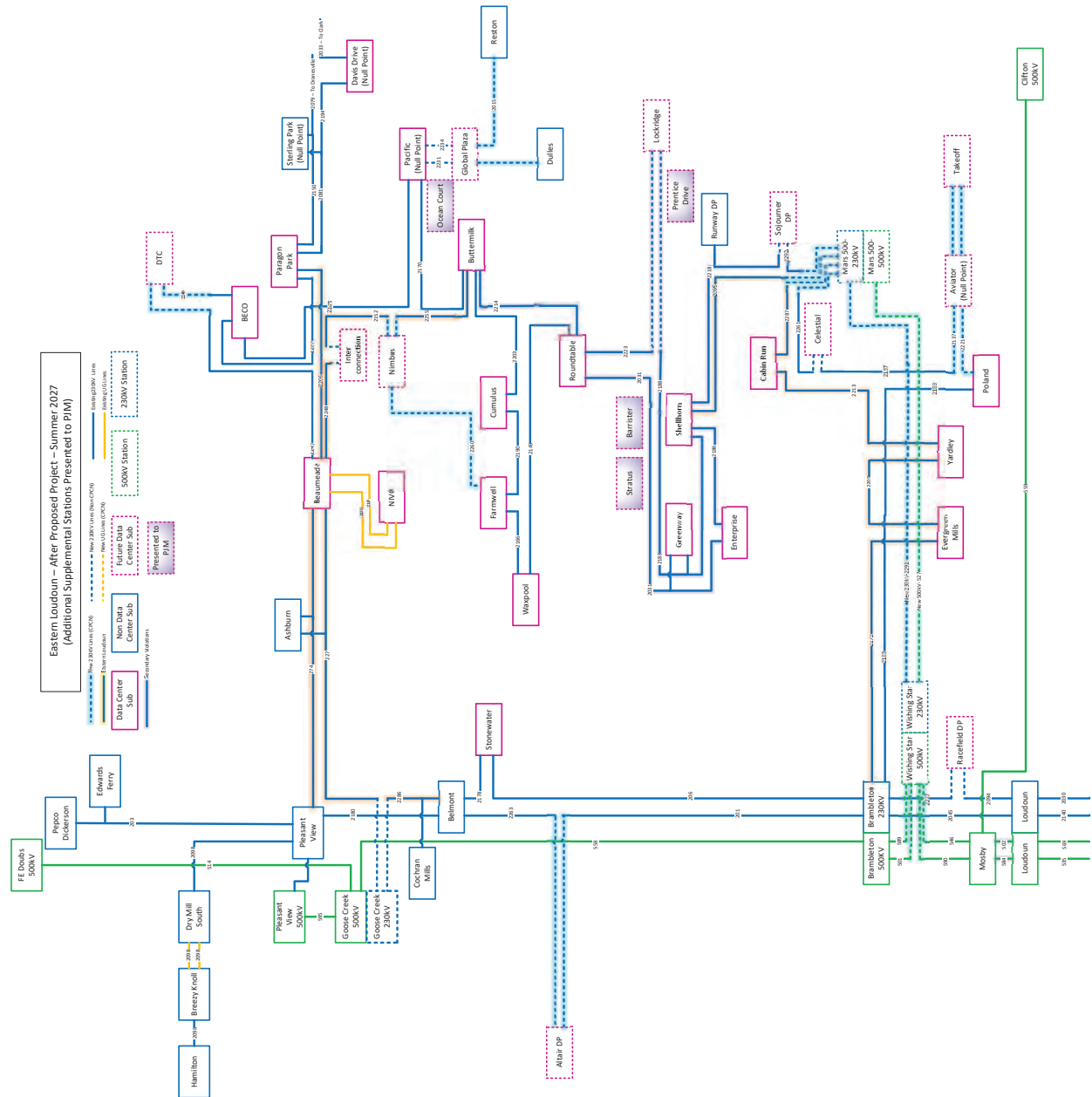












I. NECESSITY FOR THE PROPOSED PROJECT

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

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

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.).

See Section I.A of the Appendix.

(2) Known Future Projects

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

The proposed Project is needed to resolve violations of mandatory NERC Reliability Standards as described in Section I.A. All future transmission/distribution/customer projects planned for the Eastern Loudoun Load Area will require the construction of this Project, as well as others that are planned for this area. The proposed Project is the first of many future reliability upgrades and greenfield projects that the Company and PJM are working on to address the continued load growth in the Eastern Loudoun Load Area.

The Company is evaluating (i) a 500 kV and 230 kV line extension on the northern side of Eastern Loudoun Load Area to address future 230 kV thermal violations; (ii) a 230 kV or 500 kV connection between the northern 500 kV line extension and the proposed Project; (iii) a 500-230 kV substation on the existing 500 kV corridor between Clifton and Mosby Substations; (iv) additional 500 kV lines in the existing north/south corridor between the Company's Brambleton Substation and FirstEnergy Doubs substation to address 500 kV loading concerns. See Attachment I.A.3 for a modified version of the simplified one-line diagram outlining potential future projects the Company and PJM are analyzing to determine the next steps for the Eastern Loudoun Load Area.

As load continues to materialize and future customer projects are fully identified, the list of 500 kV and 230 kV reliability upgrade and greenfield projects will be expanded. PJM and the Company are working on several sensitivity cases that evaluate loads in the 2037 timeframe to understand the potential scope of work that will be required in the Dominion Zone based on data center load growth to meet customer expectations, while maintaining a robust reliable grid. Data center growth is migrating further south into Prince William, Fauquier, Stafford, Orange, Culpeper, Louisa, Henrico, and Mecklenburg Counties, all of which will require new infrastructure. As a transmission network is fully interconnected, load growth in one part of the state may drive transmission projects in another part of the state.

(3) Planning Studies

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

As part of any RTEP cycle, PJM along with the member TOs run baseline reliability analysis to identify if any potential violations exist based on projected network topology and loading. A portion of Manual 14B Section 1.4.1.1 describes the process from a high level:

PJM Manual 14 B – 1.4.1.1 Baseline reliability analyses

The PJM Transmission System (“PJM System”) provides the means for delivering the output of interconnected generators to the load centers in the PJM energy and capacity markets. Baseline reliability analyses ensure the security and adequacy of the Transmission System to serve all existing and projected long term firm transmission use including existing and projected native load growth as well as long term firm transmission service. RTEP baseline analyses include system voltage and thermal analysis, and stability, load deliverability, and generator deliverability testing. These tests variously entail single and multiple contingency testing for violations of established NERC reliability criteria regarding stability, thermal line loadings and voltage limits. Baseline reliability analyses are discussed in more detail in Section 2 and Attachment C.³⁰

Any thermal, voltage, or generation deliverability violations will require a baseline network upgrade. Typically, during the RTEP cycle, PJM is focused on a case that is five years out in time. The Open Window for this Project was based on the 2022 RTEP 2027 case that showed multiple N-1, N-1-1, and Generation Deliverability violations in the Eastern Loudoun Load Area. PJM and the Company then looked

³⁰ See *supra*, n. 16.

at the 2022 RTEP 2025 case to determine if similar violations were showing up by the summer of 2025 based on the increased 2022 PJM Load Forecast.

2022 RTEP 2025 Study Results

As noted in Section I.A, PJM has designated the Project as Immediate Need. The immediate need classification for the Project is justified by the 2022 RTEP 2025 study results (the “2022 RTEP 2025 Study Results”), and those study results are included as Attachment I.B.1.³¹

The 2022 RTEP 2025 Study Results show that both 230 kV lines in the Northern Corridor, Beaumeade-Pleasant View Line #274 and Beaumeade-Belmont Line #227³² are overloaded in the 2022 RTEP 2025 case. Because these two lines already are rated to the Company’s highest 230 kV rating of 1,573 MVA, the Company is unable to uprate them to a higher capacity, thereby requiring the Project. The additional violations designated under PJM ID b3718.1-b3718.3 in Attachment I.B.1 also are addressed by the Project, including Brambleton 500-230 kV TX #1 and Brambleton-Poland Road Line #2183.

The 2022 RTEP 2025 Study Results show that the Project helps mitigate overloads on the following branches:

- Beaumeade-Interconnection Line #2152
- Nimbus-Interconnection Line #2152
- Evergreen Mills-Yardley Ridge Line #2209
- Clark-Idylwood Line #202
- Dulles-Loudoun Line #2008
- Pleasant View 500/230 kV TX #1
- Brambleton 500/230 kV TX#1
- Enterprise-Shellhorn Road Line #2186³³
- Buttermilk-Roundtable Line #2214

The Project reduces all of these branches to <90% loading except for Line #2008 (Dulles-Loudoun) that has a 95.72%.

³¹ Attachment I.B.1 and the related discussion in Section I.B provide an overview of the worst violations on the system as identified by the 2025 RTEP results, and are not intended as an exhaustive list of future projects on the system that may be needed to address this dynamic load area.

³² Line #227 (Beaumeade-Ashburn-Pleasant View) in the 2022 RTEP 2025 case is different in the 2022 RTEP 2027 case due to the Goose Creek 500-230 kV transmission expansion project (s2609.2), which cuts Line #227 into Goose Creek Substation with a tentative target date in 2026. The Company is working to pull this project in to December 31, 2023, to increase the operation flexibility and ability to serve continued data center growth in the Eastern Loudoun Load Area. See *supra*, n. 20.

³³ Line #2186 (Enterprise-Shellhorn Road) and Line #2214 (Buttermilk-Roundtable) projects are listed in Attachment I.B.1 as part of the immediate need overall project scope. See Attachment I.J.5 (slides 7-8).

The 2022 RTEP 2025 Study Results also include secondary violations that did not show up in the base case results but were required after adding the Project:

- Lockridge-Shellhorn Road Line #2188
- Enterprise-Roundtable Line #2031
- Lockridge-Roundtable Line #2223
- Mars-Sojourner Line #2292
- Shellhorn Road-Sojourner Line #2218
- Loudoun-Mosby Line #502
- Loudoun- Mosby Line # 584

Upon completion of the Project, the 2022 RTEP 2025 Study Results show the following branches that are not resolved by the Project:

- Marsh Run CT-Remington CT Line #299
- Loudoun-Morrisville Line #569
- Cannon Branch-Clifton Line #2011
- Remington CT-Rollins Ford Line #2114
- Beaumeade-Paragon Park Line #2206
- Bristers 500/230 kV TX#1
- Ox 500-230 kV TX#1

The PJM ID number column in Attachment I.B.1 lists the project that will resolve each of these. The original target date identified by PJM was after 2025; therefore, it was not modeled in the 2022 RTEP 2025 case. Each of these projects have been accelerated internally to be in-service prior to summer 2025 to resolve these additional violations and are not being addressed as part of this Application.

2022 RTEP 2027 Study Results

The 2022 RTEP 2027 study results (the “2022 RTEP 2027 Study Results”) show the worst violations for each monitored facility (transmission line or substation transformer). The 2027 results again show overloads on both 230 kV lines in the Northern Corridor, Line #274 and Line #227, which are included as Attachment I.B.2.³⁴ The 2022 RTEP 2027 Study Results include all of the various supplemental and baseline projects that have been identified with a target date prior to June 2027. The list of violations is significantly reduced based on all those projects being implemented into the case.

Additionally, the 2022 RTEP 2027 Study Results show that the Project helps mitigate overloads on the following branches:

³⁴ Attachment I.B.2 and the related discussion in Section I.B provide an overview of the worst violations on the system as identified by the 2027 RTEP results, and are not intended as an exhaustive list of future projects on the system that may be needed to address this dynamic load area.

- Glebe-Radnor Heights Line #2036³⁵
- Braddock-Ox Line #237
- Bristers-Vint Hill Line #2101
- Brambleton-Poland Road Line #2183
- Loudoun 500/230 kV TX #1³⁶

(4) Facilities List

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

Reliability Projects

The Company is currently working on three 300 MW N-1-1 Load Drop projects in the Eastern Loudoun Load Area. The table below identifies those substations by name, PJM identification number, and in-service date.

New Substations

Project	PJM	Project Target
Nimbus to Farmwell ³⁷	b3303	6/1/2025
Dulles to Global Plaza	s2328.9	12/31/2025
Aviator to Takeoff	s2324.3	12/31/2025

As discussed in Section I.A, the Eastern Loudoun Load Area is currently made up of 21 substations with six additional substations that are included in the 2022 RTEP 2025 and 2027 planning cases and are currently in detailed engineering or construction phases. Those six substations include: the Company's Aviator, DTC, Global Plaza, Interconnection, Lockridge, and Nimbus Substations, and NOVEC's Sojourner DP.³⁸ The table below identifies those substations by name, PJM identification number, and in-service date.

³⁵ In addition to addressing the need for the Project identified in Section I.A, there are other benefits of the Project. For example, the Project resolves Glebe-Radnor Heights Line #2036 to less than 95% without having to perform construction on Line #2036. Line #2036 is an underground line that runs through Arlington National Cemetery. Upgrading the rating of Line #2036 would require rebuilding the duct bank through one of the most important cemeteries in the United States, and the necessary outage to rebuild that line would likely reduce the reliability to critical infrastructure during construction.

³⁶ Loudoun 500-230 kV TX#1 is rated to 99% after the proposed Project. The Company is monitoring this violation and will propose a new 500-230 kV station to resolve the violation as it appears in future studies.

³⁷ *Application of Virginia Electric and Power Company For approval and certification of electric transmission facilities: Nimbus 230 kV Line Loop and Nimbus Substation and 230 kV Farmwell-Nimbus Transmission Line*, Case No. PUR-2022-00027, Final Order at 14-15 (Oct. 14, 2022).

³⁸ See *supra*, n. 23. Similar to Yardley Ridge, note that the Company's future Sojourner Substation serves NOVEC's Sojourner DP. For purposes of this discussion, Sojourner is considered one location in the Eastern Loudoun Load Area where load is served. See Attachment I.A.8 for locations where load will be served in the Eastern Loudoun Load

Substation	PJM	Project Target
Aviator ³⁹	s2324.1	9/20/2024
DTC ⁴⁰	s2101	6/30/2024
Global Plaza	s2111	12/31/2023
Interconnection	s2609.1	12/15/2024
Lockridge ⁴¹	s2108	7/31/2022
Nimbus ⁴²	s2100	7/1/2024
Paragon Park	s2113	12/31/2022
Sojourner	s2339	11/18/2022

In addition to the substations listed above, the Company presented four other substations to PJM, including Barrister, Ocean Court, Prentice Drive, and Stratus Substations as part of the PJM M-3 process, that are not currently in the 2022 RTEP 2025 or 2027 planning cases. The Company is required to present the need and solution at separate TEAC meetings. As shown in the table below, the Company has presented the need and solution for the Barrister, Stratus, and Ocean Court Substations. The Company has only presented the need for the Prentice Drive Substation. The Company and PJM will then run these projects through its Do No Harm (“DNH”) reliability analysis to determine if there is harm associated with adding these projects to the network. The analysis for these projects has not been completed as of the time of filing this Application.

Substation	Supplemental ID	Project Target	PJM Need	PJM Solution
Barrister	DOM-2022-0001	8/15/2025	6/7/2022	8/9/2022
Stratus	DOM-2022-0002	6/30/2024	6/7/2022	8/9/2022
Ocean Court	DOM-2022-0003	6/30/2024	6/7/2022	8/9/2022
Prentice Drive	DOM-2022-0041	12/15/2024	6/7/2022	

Note: Projects have not been designated a PJM Project number.

Area once the Project is energized, and including all substations presented to PJM in the Eastern Loudoun Load Area at the time of this Application filing.

³⁹ Application of Virginia Electric and Power Company For approval and certification of electric transmission facilities: Aviator 230 kV Line Loop and Aviator Substation Case No. PUR-2022-00012, Final Order (pending).

⁴⁰ Application of Virginia Electric and Power Company For approval and certification of electric transmission facilities: DTC 230 kV Line Loop and DTC Substation, Case No. PUR-2021-00280, Final Order at 17-18 (July 7, 2022).

⁴¹ Application of Virginia Electric and Power Company For approval and certification of electric transmission facilities: Lockridge 230 kV Line Loop and Lockridge Substation, Case No. PUR-2019-00215, Final Order at 10-11 (Oct. 1, 2020).

⁴² *Supra*, n. 35.

Additional substations in the Eastern Loudoun Load Area are in different stages of planning and will be added to the Supplemental list of projects that will be presented to PJM. The exact number, timing, and loading of these stations has not been determined at this time, but the expected load growth in the Eastern Loudoun Load Area should follow existing trends over the next 5-10 years.

2025 RTEP Results (Worst violations)															
Violation Type	PJM ID (Solution to violation)	Violation	Fr Bus	Fr Name	To Bus	To Name	CKT	KVs	Areas	Rating	AC Ld(%) Base	AC Ld% after 5-2 South	AC Ld% after Secondary Upgrades	Comment	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	314933	8BRAMBLETON	314171	6BRAMBL	1	500/230	345	1152.5	101.5	< 90%	< 90%	Brambleton 500-230kV TX	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	313864	6POLAND RD	314171	6BRAMBL	1	230	345	1047	105.22	< 90%	< 90%	Line 2183 (Brambleton-Poland)	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	313859	6BELMONT	314170	6COHMIL	1	230	345	1573	102.46	< 90%	< 90%	Line 227 (Belmont-Cochrin Mill-Ashburn-Beauneade)	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	314006	6ASHBURA	314170	6COHMIL	1	230	345	1573	101.58	< 90%	< 90%	Line 227 (Belmont-Cochrin Mill-Ashburn-Beauneade)	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	313859	6BELMONT	314170	6COHMIL	1	230	345	1573	102.46	< 90%	< 90%	Line 227 (Belmont-Cochrin Mill-Ashburn-Beauneade)	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	313859	6BELMONT	314170	6COHMIL	1	230	345	1573	102.46	< 90%	< 90%	Line 227 (Belmont-Cochrin Mill-Ashburn-Beauneade)	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	314004	6ASHBURN	314010	6BEAMEAD	1	230	345	1573	105.21	< 90%	< 90%	Line 274 (Beauneade-Ashburn-Pleasant View)	
Gen deliv	b3718.1-b3718.3	2025 Violation	314004	6ASHBURN	314010	6BEAMEAD	1	230	345	1573	105.21	< 90%	< 90%	Line 274 (Beauneade-Ashburn-Pleasant View)	
N-1-1 Thermal	b3718.1-b3718.3	2025 Violation	314004	6ASHBURN	314072	6PL VIEW	1	230	345	1573	105.21	< 90%	< 90%	Line 274 (Beauneade-Ashburn-Pleasant View)	
N-1 Thermal	b3718.4	2025 Violation	313721	6BUTTERMILK	313808	6GROUNDTABLE	1	230	345	1047	103.5	126.48	< 90%	< 90%	Line 2214 (Buttermilk-Roundtable)
N-1 Thermal	b3718.6	2025 Violation	313805	6SHELLHORN1	313841	6ENTERPRIS	1	230	345	1047	103.24	120.08	< 90%	< 90%	Line 2186 (Enterprise-Shellhorn)
N-1-1 Thermal	s2324.4	2025 Violation	314061	6LOUDOUN	314109	6CUBRUN	1	230	345	706	100.99	93.6	95.72	< 90%	Line 2008 (Loudoun-Dulles)
N-1-1 Thermal	s2328.4	2025 Violation	313733	6NIMBUS	313743	6INTERCONNEC	1	230	345	876	138.36	< 90%	< 90%	Line 2152 (Beauneade-Interconnection-Nimbus-Buttermilk)	
N-1-1 Thermal	s2328.4	2025 Violation	313743	6INTERCONNEC	314010	6BEAMEAD	1	230	345	1047	128.32	< 90%	< 90%	Line 2152 (Beauneade-Interconnection-Nimbus-Buttermilk)	
N-1-1 Thermal	s2328.7	2025 Violation	313827	6EVERGR MILL	313863	6YARDLEY	1	230	345	1225	117.71	< 90%	< 90%	Line 2209 (Evergreen Mills - Yardley)	
Gen deliv	s2609.2	2025 Violation	314925	8PL VIEW	314072	6PL VIEW	1	500/230	345	933.42	107.95	< 90%	< 90%	Pleasant View 500-230kV TX	
N-1-1 Thermal	s2609.3	2025 Violation	314021	6CLARK	314100	6DYLWO2	1	230	345	516	106.25	< 90%	< 90%	Line 202 (Clark - Idylwood)	
Gen deliv	b3211	2025 Violation (Project)	314916	8MORRISVL	314913	8LOUDOUN	1	500	345	2913	101.69	104.05	104.03	Line 569 (Morrisville-Loudoun)	
Gen deliv	b3689.1	2025 Violation (Project)	314110	6ELK RUN	313775	6ROL FORD	1	230	345	984.18	117.77	114.91	114.9	Line 2114 (Remington CT- Elk Run - Rollins Ford)	
Gen deliv	b3689.1	2025 Violation (Project)	314085	6REMINGCT	314110	6ELK RUN	1	230	345	984.18	118.14	115.27	115.27	Line 2114 (Remington CT - Elk Run - Rollins Ford)	
Gen deliv	b3689.1	2025 Violation (Project)	313775	6ROL FORD	314037	6GAINSVL	1	230	345	984.18	112.63	109.79	109.78	Line 2114 (Remington CT - Elk Run - Rollins Ford)	
N-1-1 Thermal	s2321.4	2025 Violation (Project)	314022	6CLIFTON	314103	6BATTER	1	230	345	797	111.38	110.6	110.59	Line 2011 (Cannon Branch - Clifton)	
N-1-1 Thermal	s2328.6	2025 Violation (Project)	313731	6PARAGON PK	314010	6BEAMEAD	1	230	345	765	116.41	134.64	136	Line 2206 (Beauneade - Paragon Park)	
N-1 Thermal	s2608.7	2025 Violation (Project)	314085	6REMINGCT	314099	6GILMUN	1	230	345	608	108.93	103.07	103.07	Line 299 (Marsh Run CT - Remington CT)	
N-1-1 Thermal	s2608.7	2025 Violation (Project)	314900	8BRISTER	314130	6BRISTER	1	500/230	345	929.3	113.03	115.82	113.79	Bristers 500/230kV TX	
N-1-1 Thermal	s2609.4-7	2025 Violation (Project)	314920	8OX	314069	6OX	2	500/230	345	951.9	114.13	117.02	116.29	OX 500-230kV TX	
N-1-1 Thermal	b3718.5	2025 Secondary	313804	6GREENWAY2	313841	6ENTERPRIS	1	230	345	1047	< 90%	117.13	< 90%	Line 2031 (Enterprise-Greenway-Roundtable)	
N-1-1 Thermal	b3718.5	2025 Secondary	313804	6GREENWAY2	313808	6GROUNDTABLE	1	230	345	1047	< 90%	109.62	< 90%	Line 2031 (Enterprise-Greenway-Roundtable)	
N-1-1 Thermal	b3718.7	2025 Secondary	313735	6LOCKRIDG	314098	6GREENWAY1	1	230	345	1047	< 90%	115.13	< 90%	Line 2188 (Lockridge-Greenway-Shellhorn)	
N-1-1 Thermal	b3718.7	2025 Secondary	313805	6SHELLHORN1	314098	6GREENWAY1	1	230	345	1047	92.61	119.3	< 90%	Line 2188 (Lockridge-Greenway-Shellhorn)	
N-1-1 Thermal	b3718.8	2025 Secondary	313735	6LOCKRIDG	313808	6GROUNDTABLE	1	230	345	1047	< 90%	109.61	< 90%	Line 2223 (Lockridge-Roundtable)	
N-1-1 Thermal	b3718.9	2025 Secondary	313805	6SHELLHORN1	313822	6RUNWAY	1	230	345	1047	< 90%	117.63	< 90%	Line 2218 (Shellhorn-Runway-Sojourner)	
N-1-1 Thermal	b3718.9	2025 Secondary	313746	6SOJOURNER	313822	6RUNWAY	1	230	345	1047	< 90%	120.24	< 90%	Line 2218 (Shellhorn-Runway-Sojourner)	
N-1-1 Thermal	b3718.10	2025 Secondary	313399	6MARS	313746	6SOJOURNER	1	230	345	1047	NA	124.81	< 90%	Line 2292 (Mars-Sojourner)	
Gen deliv	b3718.11	2025 Secondary	314913	8LOUDOUN	314930	8MOSBY	2	500	345	2931	95.9	107.96	< 90%	Line 502 (Loudoun-Mosby) Terminal Equipment	
Gen deliv	b3718.12	2025 Secondary	314913	8LOUDOUN	314930	8MOSBY	1	500	345	3144	< 90%	100.66	< 90%	Line 584 (Loudoun-Mosby) Terminal Equipment	
Notes															
Violations that are resolved by the Project															
Supplemental violations that are resolved by the Project															
Un-resolved Violations that have projects assigned to address with current target dates after 2025															
Secondary Violations caused by the Project.															

2027 RTEP Results - Worst violations											
Violation Type	FG #	Violation	Fr Bus	Fr Name	To Bus	To Name	AC Ld(%)	AC Ld% after the Project	Cont Type / First Contingency	Contingency / 2nd Contingency	Comment
Gen Deliv	2022W1-GD-5588	2027 Violation	314041	6GLEBE	314185	6RADNOR	107.79	94.04	Breaker	DVP_P4-2: 207T2097_SRT-A	Line 2036 (Glebe-Radnor)
N-1-1 Thermal	2022W1-N2-ST34	2027 Violation	314119	6NOKESVL	314130	6BRISTER	107.7	99	DVP_P1-2: LN 539_SRT-A	DVP_P1-2: LN 569_SRT-S	Line 2101 (Bristers-Nokesville-Vint Hill)
N-1-1 Thermal	2022W1-N2-ST48	2027 Violation	313712	6VINTHIL TP	314119	6NOKESVL	106.43	97	DVP_P1-2: LN 539_SRT-A	DVP_P1-2: LN 569_SRT-S	Line 2101 (Bristers-Nokesville-Vint Hill)
N-1-1 Thermal	2022W1-N2-ST49	2027 Violation	313712	6VINTHIL TP	314125	6VINTHIL	106.16	97	DVP_P1-2: LN 539_SRT-A	DVP_P1-2: LN 569_SRT-S	Line 2101 (Bristers-Nokesville-Vint Hill)
N-1-1 Thermal	2022W1-N2-ST36	2027 Violation	313864	6POLAND RD	314171	6BRAMBL	106.27	< 90%	DVP_P1-2: LN 2008_SRT-A	DVP_P1-2: LN 2172_SRT-A	Line 2183 (Brambleton-Poland)
N-1 Thermal	2022W1-N1-ST20	2027 Violation	314171	6BRAMBL	313864	6POLAND RD	103.87	< 90%	Tower	'DVP_P7-1: LN 227-274_SRT-S'	Line 2183 (Brambleton-Poland)
N-1-1 Thermal	2022W1-N2-ST12	2027 Violation	314006	6ASHBURA	314010	6BEAMEAD	112.92	< 90%	DVP_P1-2: LN 274_SRT-S	DVP_P1-2: LN 2172_SRT-A	Line 227 (Goose Creek-Ashburn-Beaumeade)
Gen Deliv	2022W1-GD-535	2027 Violation	313904	6GOOSECRK	314006	6ASHBURA	115.93	< 90%	DVP_P1-2: LN 274_SRT-S	DVP_P1-2: LN 2172_SRT-A	Line 227 (Goose Creek-Ashburn-Beaumeade)
N-1-1 Thermal	2022W1-N2-ST29	2027 Violation	314054	6KEENE M	314068	6OX	102.82	98	DVP_P1-2: LN 2097_SRT-A	DVP_P1-2: LN 281_SRT-A	Line 237 (Braddock-Ox)
N-1-1 Thermal	2022W1-N2-ST28	2027 Violation	314009	6BRADDOCK	314054	6KEENE M	100.84	94.7	DVP_P1-2: LN 2097_SRT-A	DVP_P1-2: LN 281_SRT-A	Line 237 (Braddock-Ox)
N-1-1 Thermal	2022W1-N2-ST23	2027 Violation	314004	6ASHBURN	314072	6PL VIEW	108.36	< 90%	DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2172_SRT-A	Line 274 (Beaumeade-Ashburn-Pleasant View)
N-1-1 Thermal	2022W1-N2-ST19	2027 Violation	314004	6ASHBURN	314010	6BEAMEAD	106.95	< 90%	DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2172_SRT-A	Line 274 (Beaumeade-Ashburn-Pleasant View)
N-1-1 Thermal	2022W1-N2-ST50	2027 Violation	314913	8LOUDOUN	314061	6LOUDOUN	100.05	99	DVP_P1-2: LN 502_SRT-S	DVP_P1-2: LN 584_SRT-S	Loudoun 500-230KV TX

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: The portion of the Company's transmission facilities in the area of the Project is shown in Attachment I.G.1 and includes Loudoun County's DCA, which, according to Loudoun County Economic Development, is home to "the world's largest concentration of data centers, with more than 25 million square feet currently in operation and millions more being planned or developed."⁴³ For the purpose of this Application, the DCA is loosely described as the area north of Dulles Airport, bounded by the Dulles Greenway (Rt. 267) to the south, Sully Road (Rt. 28) to the east, Harry Byrd Highway (Rt. 7) to the north, and a western edge that roughly runs along Loudoun County Parkway and west along both sides of Waxpool Road. See Attachment I.A.1. The DCA boundaries are becoming blurred as multiple large data center buildings are coming online on both sides of Maries Road (east of Rt. 28), and multiple campus developments are also being constructed further south along Old Ox Road (Rt. 606) to Rt. 50, south of Dulles Airport, in both Dominion Energy Virginia's and NOVEC's service territories.

Attachment I.C.1 provides six years of historical loading in Eastern Loudoun Load Area coincident with the Company's system peak. The historical load growth shows a 1,364 MW growth in the Eastern Loudoun Load Area over the last six years, between 2016 and 2022. Attachment I.C.1 also details the 2022 PJM Forecast peak loads for the Eastern Loudoun Load Area based on the 2022, 2025, and 2027 cases. The actual load recorded on August 9, 2022, outpaced the 2022 PJM Load Forecast by 119.7 MW, indicating that there has been an uptick in load growth for this area. Additionally, the 2022 PJM Load Forecast projects an additional 1,460.4 MW of growth in the Eastern Loudoun Load Area between the 2022 and 2027 case years. Load projections provided as part of Attachment I.C.1 are for summer loading only, as there were no winter or light load violations in the 2022 RTEP 2025 or 2027 cases being addressed as part of this Application.

Attachment I.C.2 provides projected non-coincidental peak load forecasted by distribution (either NOVEC or the Company's Distribution Planning Department) as part of their 10-year forecast provided to the Company's Transmission Planning Department. The projected load in 2027 in the Eastern Loudoun Load Area is expected to exceed 5,000 MW, which is a difference of 1,352 MW compared to the 2022 PJM Load Forecast for 2027. While these two forecasting methodologies

⁴³ See <https://biz.loudoun.gov/key-business-sectors/data-centers/>.

(PJM/RTO methodology versus distribution company methodology) have different inputs, they share one common thread—namely, that the Eastern Loudoun Load Area is growing at a pace that will require significant new transmission infrastructure in the Eastern Loudoun Load Area along with additional new infrastructure outside of the Eastern Loudoun Load Area to support the growth.

As detailed in Section I.B, the Company has also presented to PJM the Barrister, Ocean Court, Prentice Drive, and Stratus Substations totaling an additional 346 MW in 2025 and 578 MW in 2027 of load growth based on the distribution projections. Additionally, as mentioned in Section I.A, the Eastern Loudoun Load Area will continue to grow as additional data centers are energized over the upcoming years.

The 2022 PJM Load Forecast is sufficient to drive the need for the proposed Project and the distribution forecast shows the need for a robust electrical solution to be implemented.

Failure to relieve the identified NERC criteria violations will severely impact the transmission system's ability to provide reliable service to Dominion Energy Virginia's customers in the Eastern Loudoun Load Area. The proposed Project, including the 500 kV and 230 kV facilities described herein, will provide the most comprehensive, robust solution for resolving the projected NERC reliability violations by summer 2025, as well as provide for future load growth.

Station	MW Loading Coincident with System Peak							2022 PJM Forecast		
	7/25/2016	7/14/2017	7/2/2018	7/20/2019	7/20/2020	8/12/2021	8/9/2022	2022 Load	2025 Load	2027 Load
Ashburn	101.5	86.5	99.4	94.2	100.7	103.1	98.1	107.4	97.2	97.2
Beaumeade	131.7	176.9	203.2	225.9	271.1	231.4	282.2	261.0	273.7	275.4
Beco	147.0	98.4	121.8	168.7	196.0	287.7	336.2	300.1	295.2	295.2
Buttermilk	-	-	-	-	-	37.6	88.5	41.0	48.3	49.7
Cabin Run	-	-	-	-	-	-	28	0.0	71.9	111.3
Cochrin Mill	-	0.0	16.0	15.9	15.0	14.7	20.7	14.7	13.3	13.3
Cumulus	-	-	-	-	-	76.3	115.9	98.0	144.1	162.5
Enterprise	30.7	44.5	56.5	60.2	58.4	62.0	64.3	67.2	66.9	158.7
Evergreen Mills	-	-	-	-	-	-	1.6	4.3	88.6	128.8
Farmwell	-	-	-	-	-	-	33.8	31.2	101.6	126.0
Greenway	119.4	124.1	110.9	92.0	94.3	73.3	91.4	131.8	120.4	120.6
Nivo	126.3	161.6	167.3	167.7	89.1	115.5	131.5	138.7	174.6	174.6
Pacific	-	53.7	76.6	89.2	108.2	172.4	239.2	207.9	201.4	214.7
Paragon Park	-	-	-	-	-	-	1.6	52.0	162.7	162.7
Poland Road	-	-	-	-	66.9	121.6	176.2	118.3	219.2	219.2
Roundtable	-	-	-	-	54.8	81.8	78.6	86.7	92.5	92.5
Runwy DP	5.3	5.9	11.4	13.5	16.3	20.1	9	20.9	27.2	28.3
Shellhorn Road	127.5	162.1	146.2	61.0	77.9	74.1	84.6	88.5	129.9	160.4
Sterling Park	153.2	151.8	191.8	179.5	210.1	211.4	209.7	240.3	196.9	197.1
Waxpool	18.4	22.0	38.4	72.3	86.4	122.2	141.3	118.3	180.4	197.7
Yardley Ridge	-	-	16.0	32.6	52.0	76.5	92.1	76.5	76.5	76.5
In Service Total	960.9	1087.6	1255.4	1272.6	1497.1	1881.5	2324.5	2204.8	2782.6	3062.6
Aviator	Projects are in service after 2022							47.8	99.6	
DTC								31.8	100.7	
Global Plaza								93.9	154.3	
Interconnection								20.0	60.0	
Lockridge								55.7	83.3	
Nimbus								9.9	27.2	
Sojourner								47.3	77.5	
Grand Total	960.9	1087.6	1255.4	1272.6	1497.1	1881.5	2324.5	2204.8	3089.1	3665.2
Growth (Year to Year)		126.7	167.8	17.1	224.5	384.5	443.0			

MW Loading Projections - Distribution Planning (DEV + NOVEC)											
Station	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2032
Ashburn	110.0	110.0	110.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0
Beaumeade	259.0	267.0	269.0	271.0	273.0	273.0	273.0	273.0	273.0	273.0	273.0
BECO	243.0	256.0	281.0	207.0	213.0	213.0	213.0	213.0	213.0	213.0	213.0
Buttermilk	53	87	104	124	124	124	124	124	124	124	124
Cabin Run	31.6	46.0	58.7	73.1	89.7	104.1	107.4	108.2	108.4	108.5	108.5
Cochrin Mill	83.74	123.17	17.35	17.43	17.49	17.54	17.58	17.62	17.63	17.64	17.64
Cumulus	237	265	282	285	285	285	285	285	285	285	285
Enterprise	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0
Evergreen Mills	37.0	77.0	117.0	157.0	197.0	210.0	210.0	210.0	210.0	210.0	210.0
Farmwell	153	230	261	269	269	269	269	269	269	269	269
Greenway	83.0	86.0	90.0	93.0	95.0	97.0	99.0	101.0	103.0	103.0	103.0
NIVO	174.0	198.0	201.0	208.0	208.0	208.0	208.0	208.0	208.0	208.0	208.0
Pacific	300.0	294.0	294.0	294.0	294.0	294.0	294.0	294.0	294.0	294.0	294.0
Paragon Park	156.0	156.0	156.0	156.0	156.0	156.0	156.0	156.0	156.0	156.0	156.0
Poland Road	210.0	220.0	186.0	186.0	186.0	186.0	186.0	186.0	186.0	186.0	186.0
Roundtable	87.0	104.0	124.0	124.0	124.0	124.0	124.0	124.0	124.0	124.0	124.0
Runwy DP	42.7	55.4	60.1	62.6	63.9	65.1	66.5	68.0	68.9	69.1	69.1
Shellhorn Road	197.0	276.0	258.0	258.0	258.0	258.0	258.0	258.0	258.0	258.0	258.0
Sterling Park	118.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0
Waxpool	191.0	220.0	226.0	227.0	231.0	240.0	240.0	240.0	240.0	240.0	240.0
Yardley Ridge	101.8	105.5	106.5	106.7	106.7	106.7	106.7	106.7	106.7	106.7	106.7
In Service Total	2934.8	3321.1	3346.6	3362.8	3434.7	3474.5	3481.3	3485.5	3488.7	3489.0	3489.0
Aviator	-	-	260.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0	270.0
DTC	-	-	204.0	255.0	257.0	257.0	257.0	257.0	257.0	257.0	257.0
Global Plaza	-	230.0	242.0	247.0	250.0	252.0	254.0	254.0	254.0	254.0	254.0
Interconnection	-	-	188.0	229.0	234.0	234.0	234.0	234.0	234.0	234.0	234.0
Lockridge	203.0	221.0	271.0	272.0	272.0	272.0	274.0	274.0	274.0	274.0	274.0
Nimbus	-	59.0	116.0	147.0	192.0	192.0	192.0	192.0	192.0	192.0	192.0
Sojourner	30.3	81.0	96.1	105.8	107.6	107.8	107.9	107.9	107.9	107.9	107.9
2027 TEAC Total	233.3	591.0	1377.1	1525.8	1582.6	1584.8	1588.9	1588.9	1588.9	1588.9	1588.9
Barrister	-	-	-	-	32	108	167	172	172	172	172
Ocean Court	-	-	123.0	170.0	204.0	219.0	225.0	231.0	231.0	231.0	231.0
Prentice	-	-	-	100	200	299	299	299	299	299	299
Stratus	-	41	101	168	200	204	204	204	204	204	204
Supplemental Total	0.0	41.0	224.0	438.0	636.0	830.0	895.0	906.0	906.0	906.0	906.0
Northwoods	-	0.04	0.22	0.44	0.64	0.83	0.90	0.91	0.91	0.91	0.91
Curiosity	-	-	-	-	-	-	-	-	-	-	14
Spirit	-	-	-	14.19	111.03	148.34	168.56	175.35	176.37	176.53	176.53
Opportunity	-	-	-	0	0.436	33.888	61.495	99.377	144.091	164.509	164.509
Clintmar	0	0	1.647	136.811	226.825	263.661	281.424	284.319	284.75	284.838	284.838
Waterside	113.098	142.838	154.554	160.211	72.107	72.112	72.107	72.107	72.107	72.112	72.112
Zebra West Campus	-	-	113	113	333	477	600	600	600	600	600
Planned Total	113	143	269	425	744	996	1,184	1,232	1,278	1,312	1,312
Grand Total	3281.2	4095.9	5217.1	5751.2	6397.3	6885.1	7149.6	7212.4	7261.8	7296.2	7296.2
Notes:											
Substations are broken down by status. In-Service, 2027 TEAC, Supplemental, Planned.											

Notes:
Substations are broken down by status. In-Service, 2027 TEAC, Supplemental, Planned.

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: **2027 RTEP Results**

PJM's 2022 RTEP 2027 analysis identified thermal violations on the Northern and Southern Corridors.

Line #274 (Pleasant View-Ashburn-Beaumeade)

The screen shot in Figure 1 below demonstrates the worst-case contingency for the loss of Line #227 (Beaumeade-Ashburn-Goose Creek) and Line #2172 (Brambleton-Evergreen Mills) resulting in a 108.4% overload of the segment of Line #274 between Ashburn and Pleasant View and a 107% overload of the segment of Line #274 between Ashburn and Beaumeade. The complete set of contingency pairs include eight additional violations on Line #274 (Pleasant View-Ashburn-Beaumeade) shown in Table 1 below.

Figure 1: Overload on Line #274 for N-1-1 involving Line #227 and Line #2172

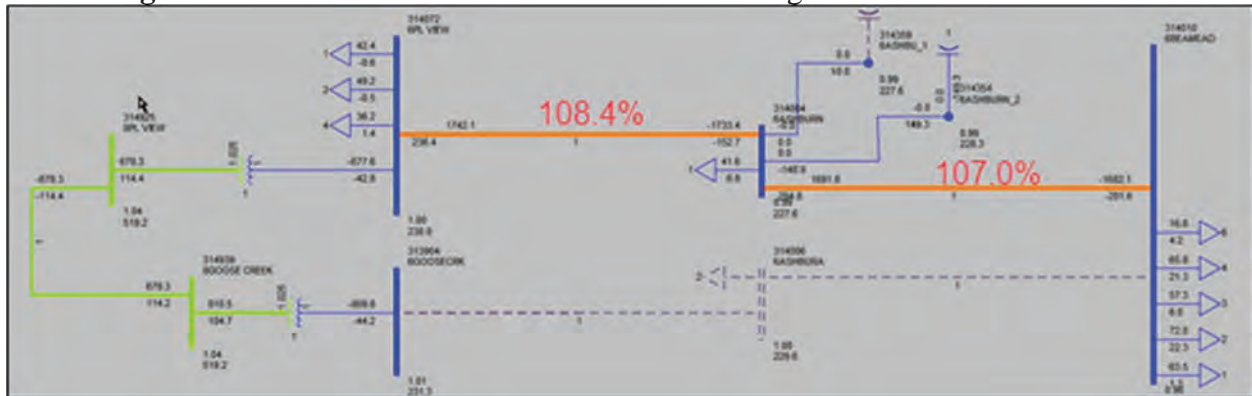


Table 1: Critical Contingencies for Line #274 Violations

Cont Type / First Contingency	Contingency / 2nd Contingency	AC Ld(%)	AC Ld% after the Project
DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2172_SRT-A	108.36	< 90%
DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2172_SRT-A	106.95	< 90%
DVP_P1-2: LN 2172_SRT-A	DVP_P1-2: LN 227_SRT-A	106.71	< 90%
DVP_P1-2: LN 2172_SRT-A	DVP_P1-2: LN 227_SRT-A	105.32	< 90%

DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2209_SRT-A	104.79	< 90%
DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2209_SRT-A	103.3	< 90%
DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2213_SRT-A	102.82	< 90%
DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2213_SRT-A	101.31	< 90%
DVP_P1-2: LN 227_SRT-A	DVP_P1-2: LN 2098_SRT-S	101.03	< 90%

Line #227 (Beaumeade-Ashburn-Goose Creek)

The screen shot in Figure 2 below demonstrates the worst-case contingency for the loss of Line #274 (Pleasant View-Ashburn-Beaumeade) and Line #2172 (Brambleton-Evergreen Mills) resulting in a 115.9% overload of the segment of Line #227 between Ashburn and Goose Creek and a 112.9% overload of the segment of Line #227 between Ashburn and Beaumeade. The complete set of 16 additional contingencies include additional violations on Line #227 (Beaumeade-Ashburn-Goose Creek) shown in Table 2 below.

Figure 2: Overload on Line #227 for N-1-1 involving Line #274 and Line #2172

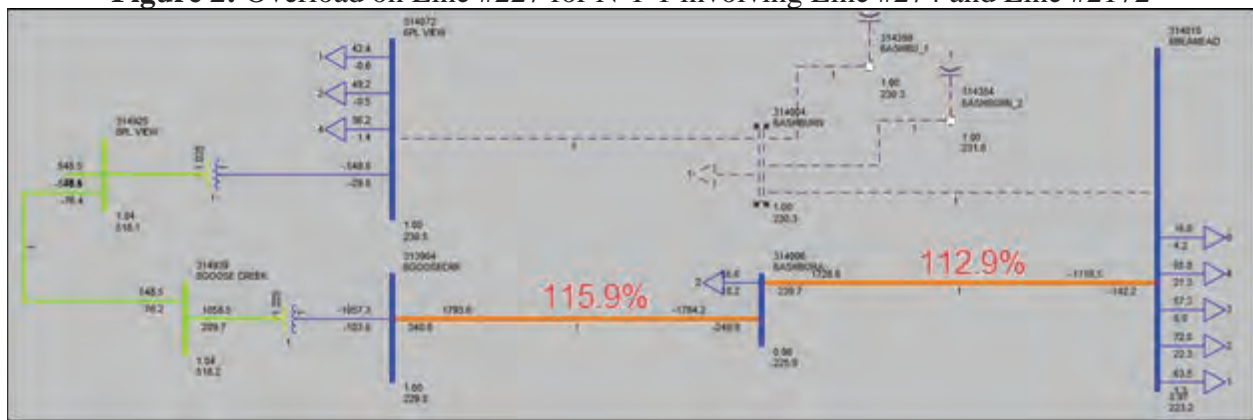


Table 2: Critical Contingencies for Line #227 Violations

Cont Type or First Contingency	Contingency or 2nd Contingency	AC% Loading Before Project	AC% Loading After Project
DVP_P1-2: LN 274_SRT-S	DVP_P1-2: LN 2172_SRT-A	112.92	< 90%
DVP_P1-2: LN 274_SRT-S	DVP_P1-2: LN 2209_SRT-A	109.84	< 90%
DVP_P1-2: LN 2172_SRT-A	DVP_P1-2: LN 274_SRT-S	108.33	< 90%
DVP_P1-2: LN 274_SRT-S	DVP_P1-2: LN 2213_SRT-A	108.1	< 90%
DVP_P1-2: LN 274_SRT-S	DVP_P1-2: LN 2095_SRT-A	105.53	< 90%
Gen Deliv	DVP_P1-2: LN 274_SRT-S	102.64	< 90%
DVP_P1-2: LN 2209_SRT-A	DVP_P1-2: LN 274_SRT-S	102.06	< 90%
DVP_P1-2: LN 2213_SRT-A	DVP_P1-2: LN 274_SRT-S	100.26	< 90%
Single	'DVP_P1-2: LN 274_SRT-S'	100.01	< 90%

2025 RTEP Results

The 2025 RTEP Study Results are attached to justify the immediate need. The 2025 results also identify the secondary violations that require rebuilds. See Attachment I.B.1.

The results show that Line #274 is overloaded in the 2025 RTEP case, as shown in Figure 3 below for the loss of Line #227 and Line #2172. The configuration of Line #227 is different in the 2025 RTEP case because there is a project to cut the line into Goose Creek in 2026. The Project decreases the loading on Line #274 and Line #227 to less than 90%. The complete set of 10 contingencies include additional violations on Line #274 shown in Table 3 below.

Figure 3: Worst Overload on Line #274 in 2025 RTEP Case

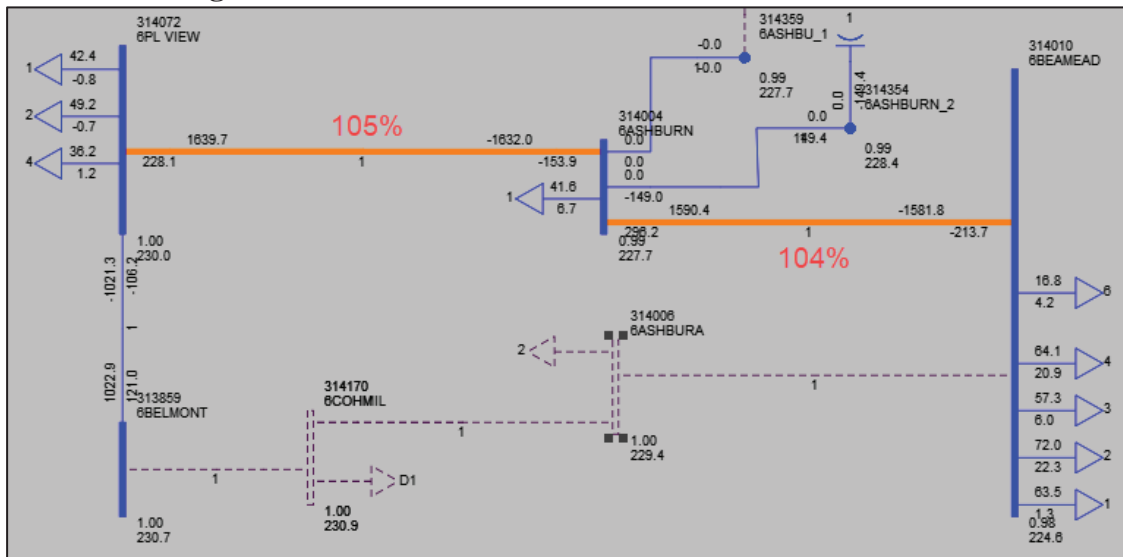
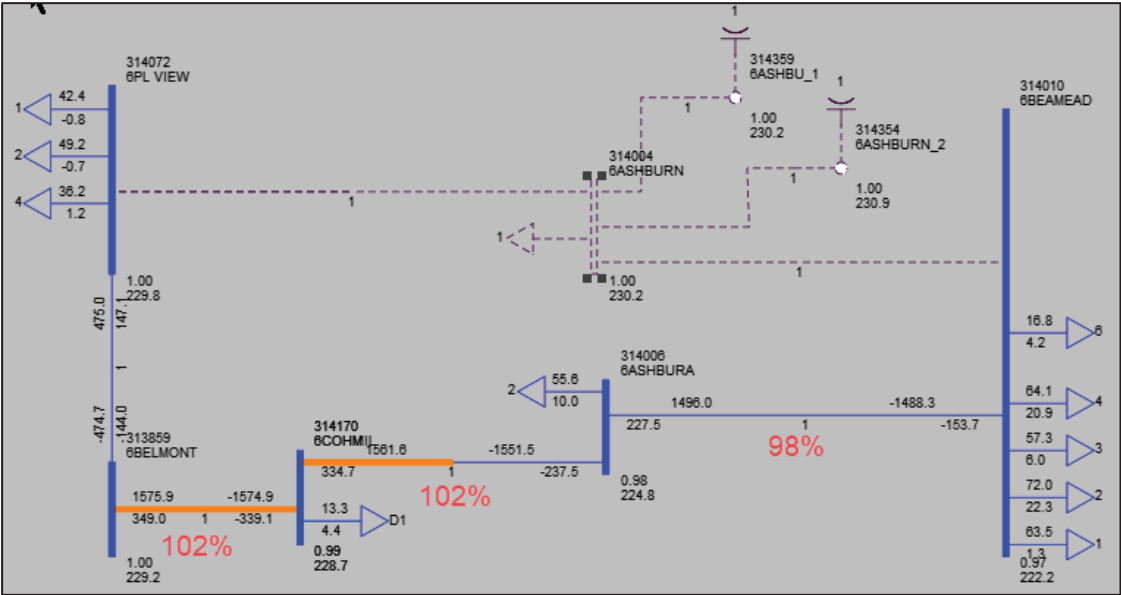


Table 3: Critical Contingencies for Line #274 Violations

Cont Type / First Contingency	Contingency / 2nd Contingency	AC Ld(%)	AC Ld% after the Project
DVP_P1-2: LN 227_SRT-S	DVP_P1-2: LN 2172_SRT-SW	105.21	< 90%
DVP_P1-2: LN 2172_SRT-SW	DVP_P1-2: LN 2130_SRT-S	104.22	< 90%
DVP_P1-2: LN 227_SRT-S	DVP_P1-2: LN 2172_SRT-SW	103.81	< 90%
DVP_P1-2: LN 227_SRT-S	DVP_P1-2: LN 2209_SRT-SW	102.71	< 90%
DVP_P1-2: LN 2209_SRT-SW	DVP_P1-2: LN 2130_SRT-S	102.47	< 90%
DVP_P1-2: LN 2130_SRT-S	DVP_P1-2: LN 2172_SRT-SW	102.37	< 90%
DVP_P1-2: LN 227_SRT-S	DVP_P1-2: LN 2209_SRT-SW	101.26	< 90%
DVP_P1-2: LN 227_SRT-S	DVP_P1-2: LN 2213_SRT-SW	100.63	< 90%
DVP_P1-2: LN 2172_SRT-SW	DVP_P1-2: LN 227_SRT-S	100.5	< 90%
DVP_P1-2: LN 2213_SRT-SW	DVP_P1-2: LN 2130_SRT-S	100.18	< 90%

Additionally, the results show that Line #227 is overloaded in the 2025 case, as shown in Figure 4 below, for the loss of Line #274 and Line #2172. This overload only occurred for one contingency set.

Figure 4: Worst Overload on Line #227 in 2025 RTEP Case



Note: This overload occurred for 1 contingency

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 identified the following transmission electrical alternatives to the Project. No distribution alternatives other than the proposed Project were considered, consistent with the overload conditions and violations described in Sections I.A and I.C.

Each of the Transmission Alternatives discussed below are an iteration of the proposed Project. The Transmission Alternatives are premised on constructing the Mars and Wishing Star Substations in the same locations, and the routing for these alternatives follow the same set of constraints.

Transmission Alternatives:

For additional discussion of the transmission alternatives considered for this Project, see Attachment I.J.4 and Attachment I.J.5. Attachment I.J.4 is a PJM presentation that contains the transmission alternatives that PJM and the Company reviewed prior to developing the proposed Project. Attachment I.J.5 is a PJM presentation that discusses the transmission alternatives, including the final scope of work approved by PJM. The four transmission alternatives discussed below are numbered consistent with the numbering in the PJM presentations and are discussed on slide 6 of Attachment I.J.4 and slide 9 of Attachment I.J.5.

Transmission Alternative (1): Double Circuit 230 kV

Under this scenario, the Company would construct a new 500-230 kV substation in the same location as the proposed Wishing Star Substation. The Company would cut and extend two existing 500 kV lines, Brambleton-Mosby Line #546 and Brambleton-Mosby Line #590, to the proposed Wishing Star Substation and install two 500-230 kV transformers at Wishing Star Substation. The Company would also construct a new 500-230 kV substation in the same location as the proposed Mars Substation. Additionally, the Company would construct a double circuit 230 kV transmission extension between the Wishing Star and Mars Substations.

The Company and PJM rejected this transmission alternative based on the long-term load serving capability of the double circuit 230 kV lines versus the proposed 500 kV transmission line with a 230 kV transmission line underbuilt between the Wishing Star and Mars Substations. The transfer capability of a 500 kV line rated to 4,330 MVA allows for the continued growth in the Eastern Loudoun Load Area compared to the total transfer capability of two 1,573 MVA rated lines or a total of 3,146 MVA. Additionally, the double circuit 230 kV solution would only allow for two 500-230 kV 1,440 MVA transformers at the Wishing Star Substation, compared to the five total transformers planned for the ultimate build out of the proposed Project.

Transmission Alternative (2): 5/2 Brambleton Option

Under this scenario, the Company would construct a new 500-230 kV substation in the same location as the proposed Mars Substation. The Company would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt from Brambleton Substation to Mars Substation and install two 500-230 kV transformers at Mars Substation.

This transmission alternative was not selected due to routing constraints out of Brambleton Substation and due to land limitations within and around Brambleton Substation required for the necessary substation expansion. This alternative also was not selected because it would require rebuilding the existing Brambleton Substation to allow for proper 500 kV and 230 kV terminations, thereby blocking the ability for future 500 kV lines to be terminated heading north. This alternative also presented outage concerns during the construction process.

Transmission Alternative (4): Lines #546 and #2094 Extensions

Under this scenario, the Company would construct a new 500-230 kV substation in the same location as the proposed Mars Substation. The Company would remove 500 kV Brambleton-Mosby Line #546 termination at Brambleton and extend that 500 kV line to Mars Substation, creating a new Loudoun-Mars Line #546. The Company would also remove 230 kV Brambleton-Loudoun Line #2094 termination at Brambleton and extend the 230 kV line to Mars Substation, creating a new Loudoun-Mars Line #2094. Additionally, the Company would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt from just south of Brambleton Substation to Mars Substation and install two 500-230 kV transformers at Mars Substation.

This transmission alternative was not selected due to adverse impacts on North-South 500 kV and 230 kV corridor backbone capability. This configuration would be a temporary solution, and the need for the Wishing Star configuration proposed for the Project would materialize as load continues to increase in the Eastern Loudon Load Area.

Transmission Alternative (5): Double Circuit 500 kV

Under this scenario, the Company would build a new 500-230 kV substation in the same location as the proposed Mars Substation. The Company would cut and extend Brambleton-Mosby Line #546, creating a new 500 kV Mars-Mosby Line #546 and a new 500 kV Brambleton-Mars Line #589. The Company would also install two 500-230 kV transformers at Mars Substation.

This transmission alternative was not selected due to right-of-way limitations, as well as challenges crossing over 230 kV lines coupled with adhering to Federal Aviation Administration (“FAA”) height restrictions around the Dulles Airport.

Additionally, this configuration would change the flow on the North-South 500 kV corridor adding additional impedance to Brambleton-Mosby Line #546.

Analysis of Demand-Side Resources:

Pursuant to the Commission’s November 26, 2013, Order entered in Case No. PUE-2012-00029, and its November 1, 2018, Final Order entered in Case No. PUR-2018-00075 (“2018 Final Order”), the Company is required to provide analysis of demand-side resources (“DSM”) incorporated into the Company’s planning studies. DSM is the broad term that includes both energy efficiency (“EE”) and demand response (“DR”). In this case, the Company has identified a need for the proposed Project based on the immediate need to provide service and to comply with mandatory NERC Reliability Standards, while maintaining the overall long-term reliability of the transmission system.⁴⁴ Notwithstanding, when performing an analysis based on PJM’s 50/50 load forecast, there is no adjustment in load for DR programs that are considered in PJM’s fixed resource requirement (“FRR”) plan because PJM only dispatches DR when the system is under stress (i.e., a system emergency). Accordingly, while existing DSM is considered to the extent the load forecast accounts for it, DR that has been bid previously into PJM’s reliability pricing model (“RPM”) market is not a factor in this particular application because of the identified need for the Project. Based on these considerations, the evaluation of the Project demonstrated that despite accounting for DSM consistent with PJM’s methods, the Project is necessary.

Incremental DSM also will not absolve the need for the Project. The projected load at the Eastern Loudoun Load Area stations identified in Attachment I.C.1 totals more than 2,300 MW loading coincident with system peak as of August 2022, and is projected to total over 3,600 MW by 2027 (including future planned stations). By way of comparison, statewide, the Company achieved demand savings of 308.4 MW (net) / 396.8 MW (gross) from its DSM Programs in 2021.

⁴⁴ While the PJM load forecast does not directly incorporate DR, its load forecast incorporates variables derived from Itron that reflect EE by modeling the stock of end-use equipment and its usages. Further, because PJM’s load forecast considers the historical non-coincident peak (“NCP”) for each load serving entity (“LSE”) within PJM, it reflects the actual load reductions achieved by DSM programs to the extent an LSE has used DSM to reduce its NCPs.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: Two double circuit 500 kV and 230 kV galvanized lattice suspension towers, Structures #546/26 / 2094/220 and #590/1893 / 2045/25, will be removed to construct the proposed Wishing Star Substation. Backbone structures will be installed within Wishing Star Substation to effectuate the bypass of the 230 kV lines, as needed.⁴⁵

⁴⁵ See *supra*, n. 1.

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.**

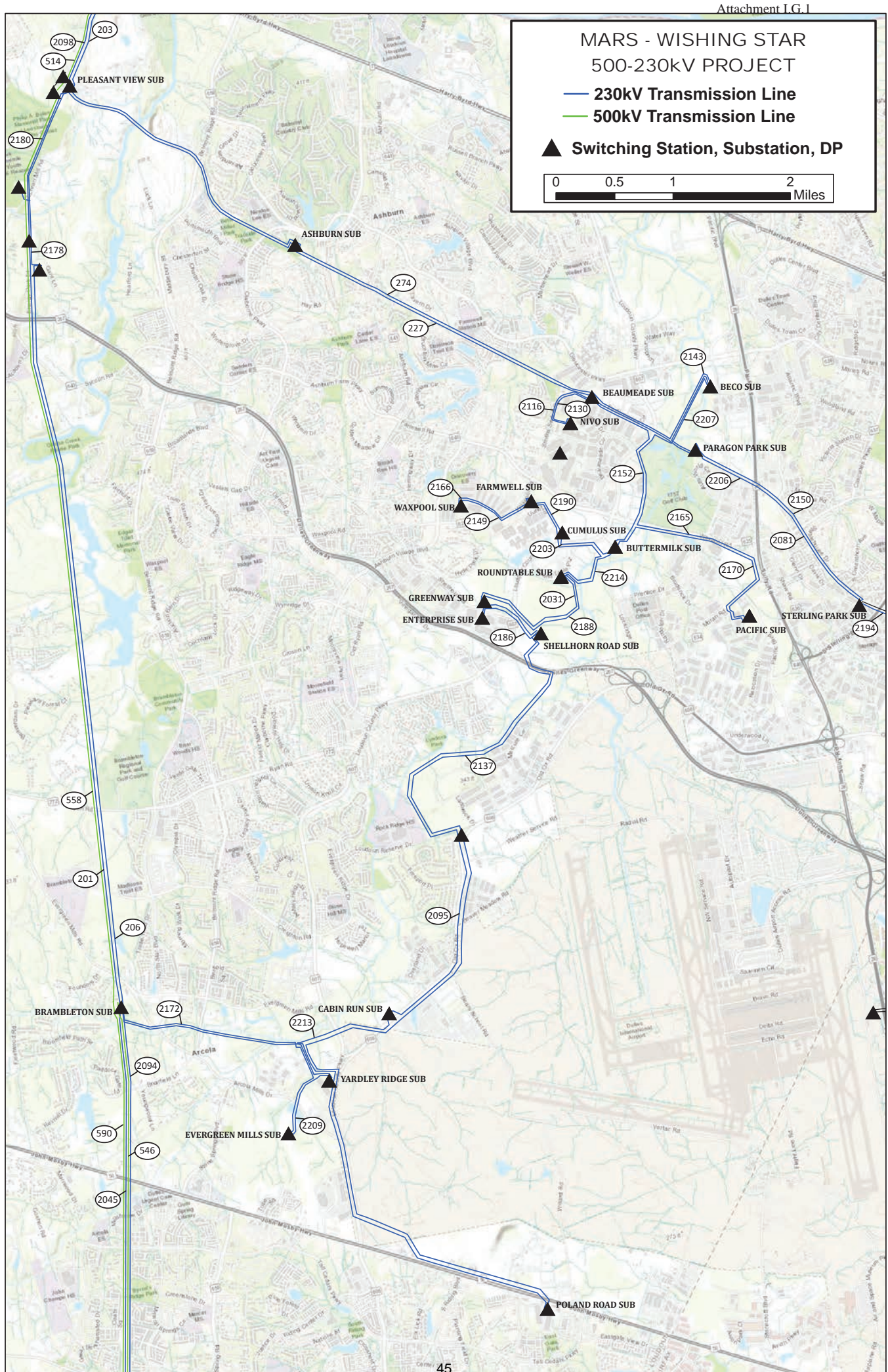
Response: See Attachment I.G.1.

MARS - WISHING STAR 500-230KV PROJECT

— 230kV Transmission Line
— 500kV Transmission Line

▲ Switching Station, Substation, DP

0 0.5 1 2
Miles



I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The desired in-service target date for the proposed Project is December 31, 2025. Due to the immediate need for this Project, the PJM required in-service date is June 1, 2025. The Company believes, however, that an in-service date of December 31, 2025, is more reasonably achievable.

The Company estimates it will take approximately 32 months for detailed engineering, materials procurement, permitting, real estate, and construction after a final order from the Commission. Accordingly, to support this estimated construction timeline and construction plan, the Company respectfully requests a final order by April 25, 2023. Should the Commission issue a final order by April 25, 2023, the Company estimates that construction should begin around September 2023, and be completed by December 2025. This schedule is contingent upon obtaining the necessary permits and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Additionally, this schedule is contingent upon timing associated with obtaining necessary right-of-way. The Company has worked collaboratively with property owners to develop the Proposed Routes and selection of an alternative route may impact the Company's ability to obtain the necessary right-of-way for the Project. While the Company is actively working with the appropriate agencies regarding all necessary permitting for the Project, dates may need to be adjusted based on potential delays, including delays associated with scheduling outages, right-of-way acquisition, permitting delays, or design modifications to comply with additional agency requirements identified during the permitting application process, as well as unpredictable delays due to labor shortages or materials/supply issues.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The estimated conceptual cost of the Project utilizing the Mars-Wishing Star Lines Proposed Route and the Mars 230 kV Loop Proposed Route is approximately \$715.7 million, which includes approximately \$157.2 million for transmission-related work and approximately \$558.5 million for substation-related work (2022 dollars).⁴⁶

A breakdown of the estimated conceptual costs for the transmission-related work by Project route is provided in the chart below. The substation-related costs would be the same as the proposed Project for each alternative.

<u>Project Routes</u>	<u>Total Cost</u> <i>(approximate)</i>
Mars-Wishing Star Lines Proposed Route (Route 5) Mars 230 kV Loop Proposed Route	\$157.2 million
Mars-Wishing Star Lines Alternative Route 1 Mars 230 kV Loop Proposed Route	\$158.3 million
Mars-Wishing Star Lines Alternative Route 2 Mars 230 kV Loop Proposed Route	\$158.5 million
Mars-Wishing Star Lines Alternative Route 3 Mars 230 kV Loop Proposed Route	\$156.0 million
Mars-Wishing Star Lines Alternative Route 4 Mars 230 kV Loop Proposed Route	\$156.4 million
Mars-Wishing Star Lines Alternative Route 6 Mars 230 kV Loop Proposed Route	\$159.8 million

⁴⁶ See *supra*, n. 14.

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 immediate need justification for the Project was presented by PJM during four separate TEAC meetings.

June 7, 2022 TEAC Meeting

PJM presented Attachment I.J.1 concerning the load growth in the Eastern Loudoun Load Area. This presentation was the first introduction to the stakeholders of the load growth concerns and the potential immediate need designation of this Project.

July 12, 2022 TEAC Meeting

PJM presented Attachment I.J.2 detailing the immediate need justification for the Company's Northern Virginia Area Violations and Attachment I.J.3 detailing the drivers behind the immediate need designation, including the significant increased load growth in the area, a summary of previously identified violations, and the violations present in 2025 based off the latest 2022 PJM Load Forecast.

August 9, 2022 TEAC Meeting

PJM presented Attachment I.J.4 as the first phase of the review process introducing the scope of the Project to the TEAC stakeholders along with the other transmission alternatives that PJM and the Company reviewed prior to developing the proposed Project.

September 6, 2022 TEAC Meeting

PJM presented Attachment I.J.5 as the second phase of the review process with the final scope of work approved by PJM. Along with the Project, there are nine secondary violations associated with the Project and a Davis Drive 300 MW N-1-1 load drop violation that are not within the scope of the Project as proposed. The Company is expecting to receive PJM Board approval for the Project by the end of 2022. As detailed in Section I.B, the main driver for the Project is Line #227 and Line #274, which are already uprated to the highest capacity based on Company standards.

The Project is classified as a baseline project (b3718), and is broken into four sub identification numbers for tracking purposes, as detailed in the table below.

Baseline	Facility	Cost	Notes
b3718.1	Wishing Star Substation	89.29	Cost includes the 500-230 kV transformer + 230 kV portion of Wishing Star Substation
b3718.2	Mars Substation	97.04	Cost includes the 500-230 kV transformer + 230 kV portion of Mars Substation
b3718.3	Mars-Wishing Star 500 kV Line	306	Cost includes 500 kV line + 500 kV portion of Wishing Star + 500 kV portion of Mars
b3718.14	Mars-Wishing Star 230 kV Line	78.68	Cost includes the 230 kV line

Secondary Violations

The Project addresses all the identified overloads in both the 2022 RTEP 2025 and 2027 case; however, it creates nine secondary violations that must also be addressed. These violations are not being addressed as part of this filing.

Secondary Upgrades (Required for the Project)				
Baseline	Facility	Line #	Line Upgrade Mileage	Cost (Millions)
b3718.4	Buttermilk-Roundtable	2214	0.62	\$4.79
b3718.5	Enterprise-Roundtable	2031	1.52	\$5.89
b3718.6	Enterprise-Shellhorn Road	2186	0.64	\$3.96
b3718.7	Lockridge-Shellhorn Road	2188	2.17	\$3.8
b3718.8	Lockridge-Roundtable	2223	0.84	\$2.59
b3718.9	Shellhorn Road-Sojourner	2218	3.98	\$6.51
b3718.10	Mars-Sojourner	2292	1.61	\$1.43
b3718.11	Loudoun Mosby	502	0	\$6.27
b3718.12	Loudoun-Mosby	584	0	\$6.38
Notes: Line upgrade projects meet ordinary course designation. b3718.11 and b3718.12 only include terminal equipment upgrades.				

Immediate Need 300 MW N-1-1 Load Drop

PJM identified a 300 MW load drop violation for the loss of Paragon Park-Sterling Park Line #2150 and Reston-Dranesville Line #2062 resulting in the loss of Sterling Park TX #2 and TX #3, Herndon Park Substation, and Dranesville Substation. The Company will seek a CPCN for this project (b3718.12) to address this violation in a future filing to the Commission.

Cost Allocation

Each component of the overall Immediate Need Project b3718 is 100% cost allocated to the DOM Zone except for b3718.3, which is 56.485% cost allocated to the DOM Zone.

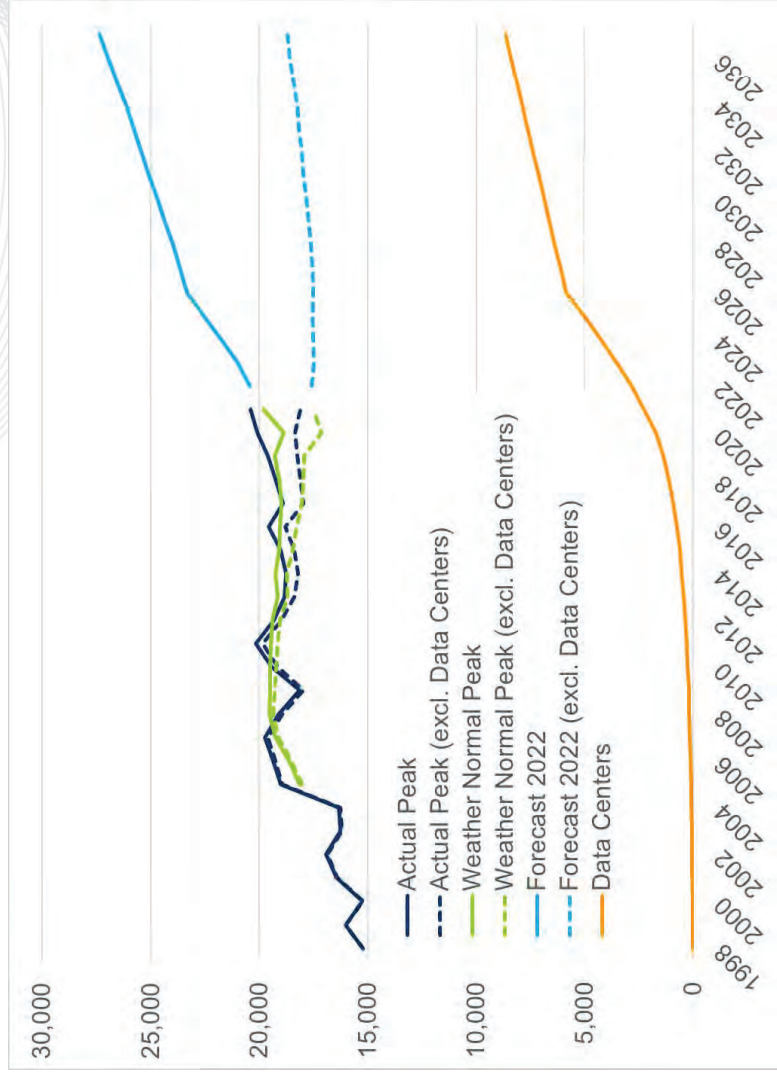


Dominion Data Center Alley Load Increase

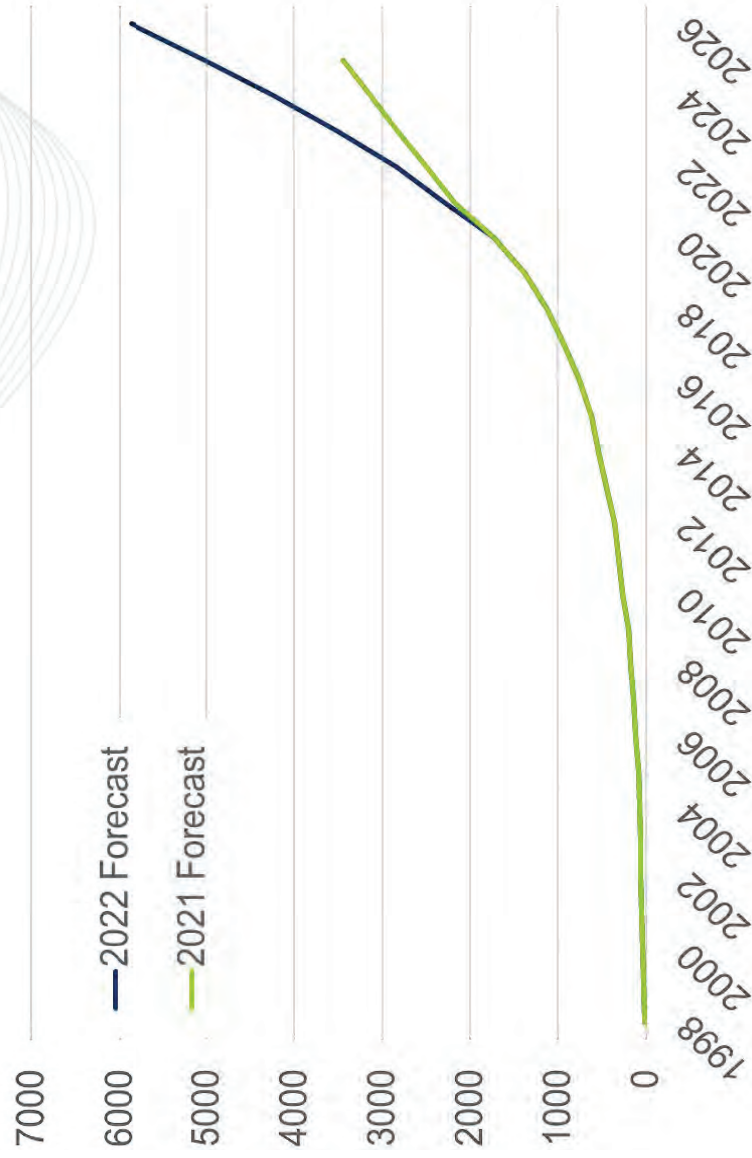
TEAC June 7th 2022

Attachment I.J.1

Dominion 2022 Load Forecast



- 2022-2027 Annualized Growth Rate
 - With data centers: 3%
 - Excluding data centers: 0%



- Forecasted data center additions for the 2022 Load Forecast provided by Dominion and NOVEC were noticeably higher than were provided in the prior year.

- Current Dominion analysis indicate reliability violations as early as 2025
- 2025 Violations (Basecase – Total Load: 10396 MWs):
 - N-1 and N-1-1 Reliability Violations
 - Generation Deliverability Violations
 - 8 total 230 kV thermal violations (within load area)
- PJM is analyzing the 2025 immediate need and the feasibility of holding a 30 day window.

DOMINION NORTHERN VIRGINIA AREA VIOLATIONS

The Data Center Alley located in northern Virginia in the Dominion Transmission Zone is experiencing unprecedented load growth driven by increases in data center load that started in 2018 and is expected to continue growing post 2027. From 2018 to date, Dominion brought forward 44 supplemental project requests to serve 2,050 MWs of load increase through the summer of 2025. Some load additions also occurred prior to the Attachment M-3 process introduction. As part of the Attachment M-3 process do-no-harm analysis, PJM identified the need for 11 supplemental transmission reinforcements. In addition to the supplemental projects, PJM identified the need for two baseline reinforcements in the area to support its load growth.

PJM 2022 load forecast reflected the load growth within the Dominion northern Virginia area including approximately 4,000 MWs of additional load between 2020/21 and 2026/27. Because the 2027 RTEP case was not available at the time, the supplemental projects were assessed using the case available at the time (a 2025 RTEP); and at the time, the identified 11 supplemental reinforcement and 2 baseline upgrades were sufficient to serve the load increase using the 2025 RTEP case.

Once the PJM load forecast was updated for the 2027 RTEP, the system showed a need for reinforcements through additional source(s) to serve the load increase from the 500 and 230 kV transmission system nearby. PJM's 2027 RTEP analysis shows an extensive set of violations ranging between single contingencies, generation deliverability and N-1-1 reliability criteria performance violations. Area reliability violations occur even after the energization of the entire set of 11 supplemental projects and the 2 baseline upgrades. The 2027 RTEP analysis indicates there are 4 flowgate violations leading to load drop of more than 300 MW with all planned supplemental and baseline reinforcements incorporated within the model.

PJM investigated the need for transmission development in the 2024 and 2025 timeframe, evaluating the accelerated energization of baseline and supplemental upgrades. PJM identified the need for additional transmission reinforcements in the area as early as 2024 with an increase in identified reliability violations through 2025. Operationally, the area has been experiencing congestion during the outages required to implement the supplemental and baseline transmission reinforcements planned to be in service in advance of 2025. Due to the area being thermally constrained, multiple coinciding outages will be challenging to implement resulting in potential reliability issues. Because the area is constrained on all 230 kV inlet transmission segments to serve the size of load and data center load has a flat profile throughout the day, power flow control or non-wires solutions are not applicable to solve the identified transmission needs in this area. As a result, this project will be designated immediate need to address the near term reliability violations seen in 2024 and 2025 timeframe. Due to the pace and magnitude of load increase in the data center alley area, current operational and reliability constraints on the transmission system to serve load and consideration that a shortened competitive window will lead to delays of about 6 months, PJM has determined to designate Dominion construction responsibility to mitigate these immediate need violations.

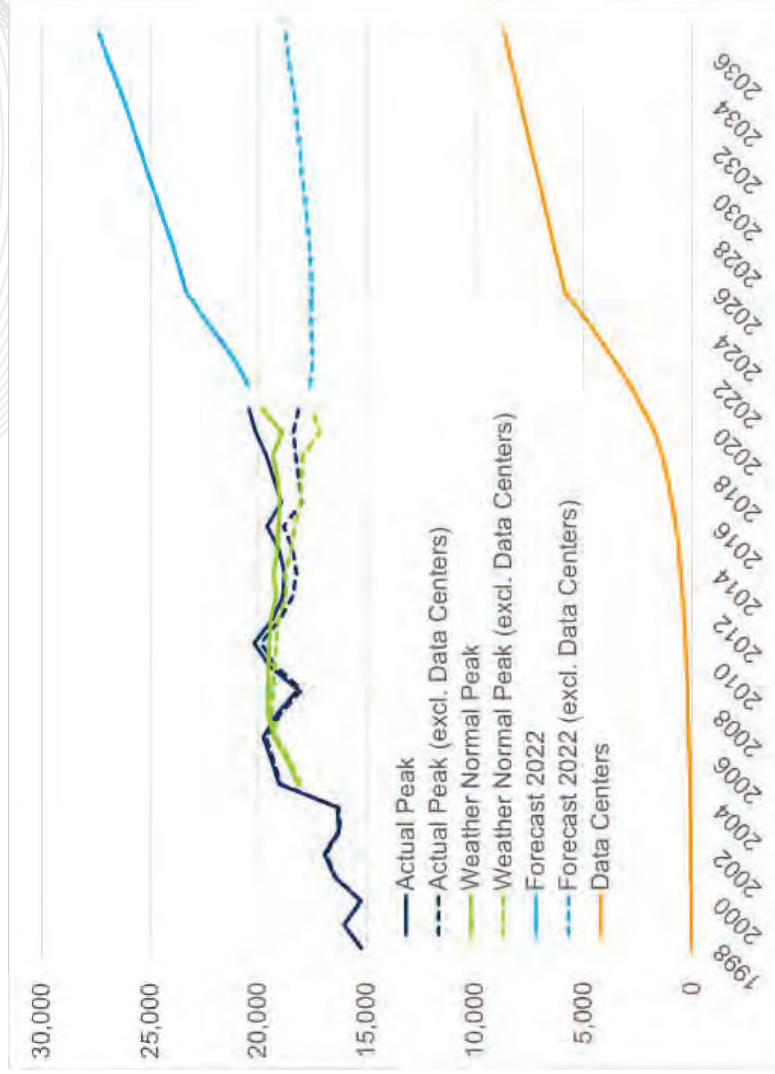
Dominion Northern Virginia Area Immediate Need

Sami Abdulsalam, Senior Manager

Transmission Expansion Advisory Committee
July 12, 2022

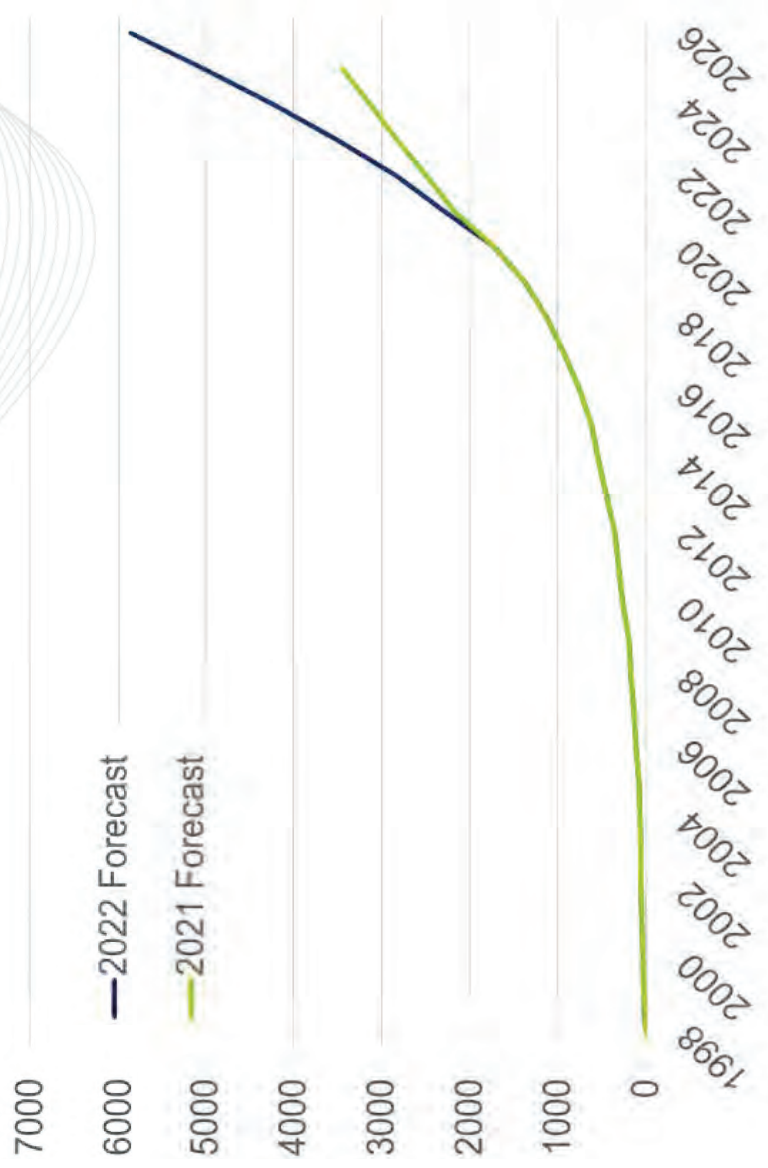
- Data Center Alley Area Load Growth and Transmission System
- Need Drivers
- Reliability Violations and Need Assessment Summary:
- Summary of Need, including time sensitive nature of the need
- Alternatives considered
- Why the need was not identified earlier
- Conclusions and Recommendation
- Next Steps

Dominion 2022 Load Forecast



- 2022-2027 Annualized Growth Rate
 - With data centers: 3%
 - Excluding data centers: 0%

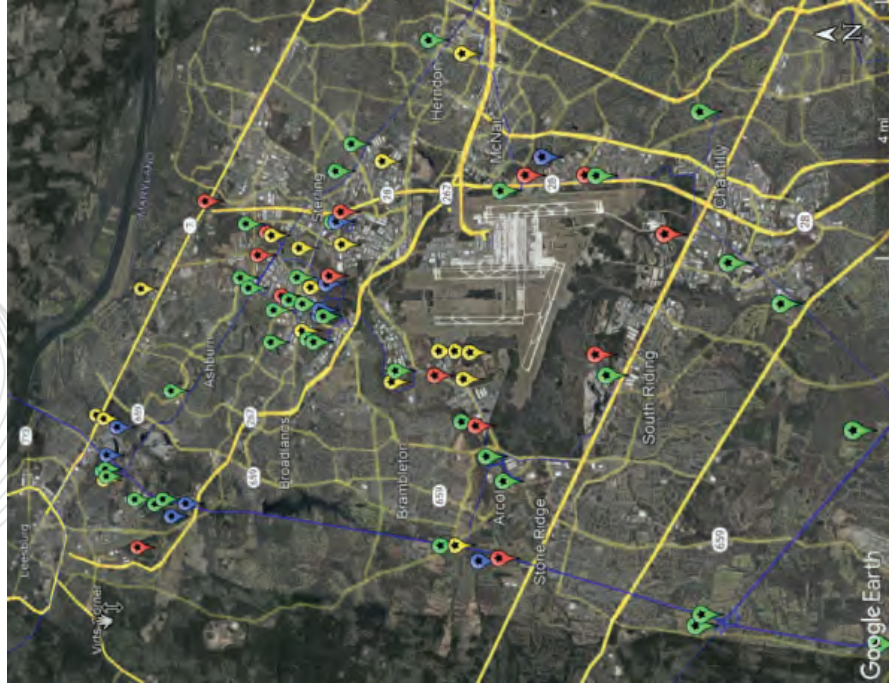
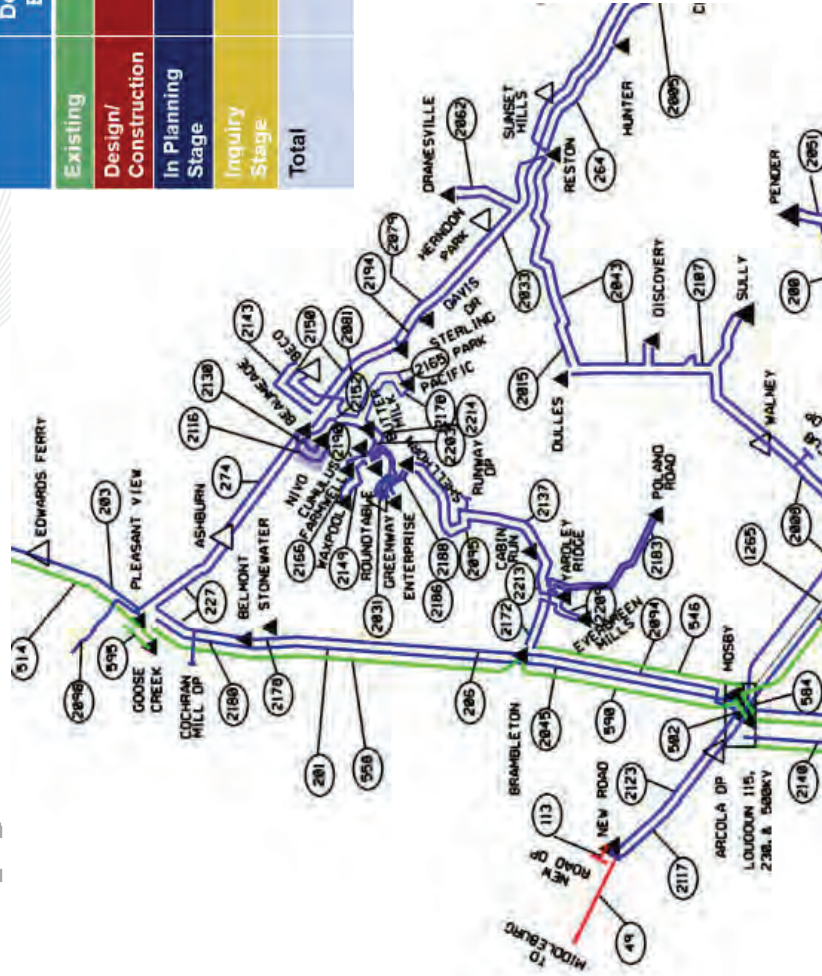
Data Center Load



- Forecasted data center additions for the 2022 Load Forecast provided by Dominion and NOVEC were noticeably higher than were provided in the prior year.

Transmission System – Existing Topology and Activity

	Dominion Energy	NOVEC	Total
Existing	28	7	35
Design/Construction	11	3	14
In Planning Stage	6	3	9
Inquiry Stage	10	6	16
Total	55	19	74



- Rapid Load Growth (Starting as early as 2018)
 - 2050 MWs from 44 Supplemental Projects (load increases through summer 2025)
 - Some load additions occurred prior to the M3 process
- All load studied and impacting the results presented herein:
 - Reflect existing system load and actual additions via supplemental projects and some organic load growth in the Dominion system/area.

Summary of Reliability Violations - Summer

	2024	2025 (pre supplemental upgrades)	2025 (post supplemental upgrades)	2027
Gen Deliverability	12	74	10	10
N-1	8	50	3	5
N-1-1	21	144	22	44

• **Notes:**

- Immediate need scope limited to cover 2025 (post supplemental upgrades) performance.
- Remaining needs in 2027 and beyond will be covered part of a competitive window.
- Results reflect the summer peak analysis.
- **2025 pre-supplemental upgrades:** includes all projects with an in-service date of 6/1/2025.
- **2025 post-supplemental upgrades:** includes planned supplemental upgrades to address the majority of the reliability violations. However these projects have a projected in-service date later in 2025 or 2026. These projects may need to be accelerated.
- **2027** includes violations that are also present in 2025.

- The Northern Virginia, Dulles Airport / Data Center area is experiencing very high concentrated load growth
- Reliability violations are observed in 2024, continue in 2025 even with supplemental upgrades and into 2027.
- 11 planned supplemental projects 2 planned baseline upgrades are not sufficient to address the reliability needs in 2025.
- Without further transmission upgrades, in 2024/25:
 - The area will not have sufficient transmission capability under Gen Deliverability, N-1 and N-1-1 outage conditions in 2024 and beyond

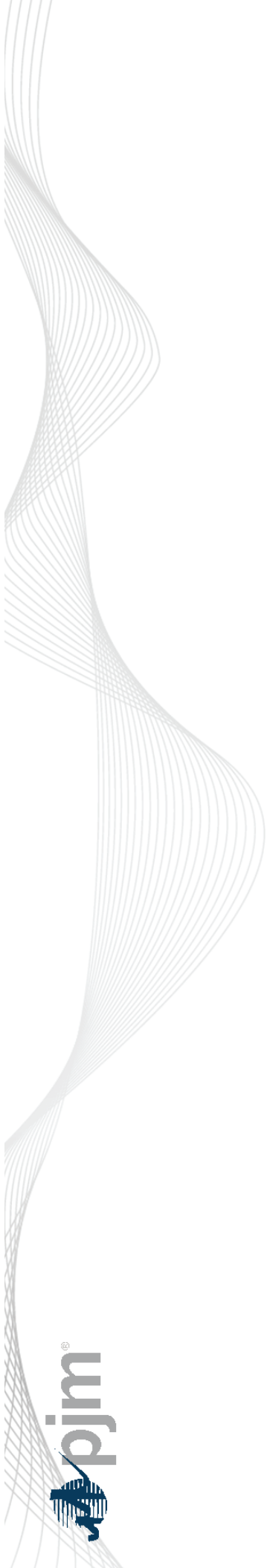
- Post the planned supplemental and baseline upgrades planned in the area (2024 and 2025);
 - There are remaining violations that require immediate transmission reinforcement. These needs are driven by the load growth in the Dulles airport load area.
- There is an immediate need to address remaining reliability violations anticipated in 2025.
 - Dominion has an obligation to serve load and there is high risk of load loss without additional immediate transmission reinforcement in the area.

- The area is constrained on all 230 kV inlet transmission segments to serve the size of load.
- Data center load has a flat profile throughout the day.
- Power flow control devices or non-wires solutions are not applicable to solve the identified transmission needs in this area.

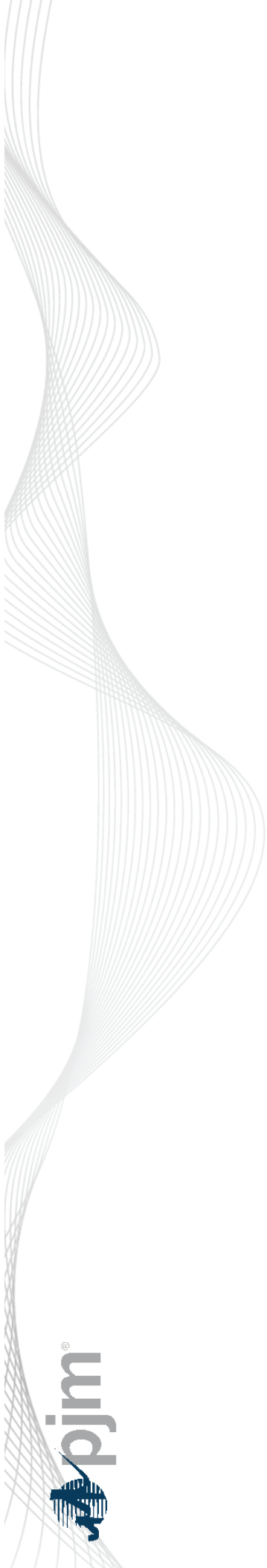
- Part of the Attachment M-3 process do-no-harm analysis, PJM identified the need for 11 supplemental transmission reinforcements. In addition to the supplemental projects, PJM identified the need for two baseline reinforcements in the area to support its load growth.
- Because the 2027 RTEP case was not available at the time, the supplemental projects were assessed using the case available at the time (a 2025 RTEP); and at the time, the identified 11 supplemental reinforcement and 2 baseline upgrades were sufficient to serve the load increase using the 2025 RTEP case.

- PJM will proceed with an Immediate need project(s) –without a Window to address Dominion Northern Virginia area needs up to and including 2025 (building on top of already ongoing supplemental upgrades)
- PJM plans to address the 2027 needs via a future competitive window:
 - There is a need for a coordinated and holistically planned solution to address system constraints in the area/region.
 - PJM will work with Dominion, other Transmission Owners and Stakeholders to finalize the need drivers, problem statement and competitive window details taking into account new load service requests submitted in 2022 and longer-term needs.

- PJM welcomes all stakeholders input and comments on its “Immediate Need Assessment”
- PJM will consider all stakeholder feedback.
- Once a proposed transmission solution is identified, PJM and Dominion will bring it forward to the August 2022 TEAC meeting for first read.



Questions?



Appendix

Supplemental/Baseline Upgrades (62 Miles+2x500 Sub upgrades) \$230M

#	Project	Re-Conductor ?	Length (mi)	Line #	Upgraded Rating	Description	kV	Cost \$M	Projected ISD
1	b3026	Re-Conductor	6.36	274	1572	Re-conductor the entire 230 kV Line No.274 (Pleasant View – Ashburn – Beaumeade) using a higher capacity conductor with an approximate rating of 1572 MVA.	230	17	7/1/2022
2	b3694.8	Re-Conductor	10.34	249	1047 (SE)	Partial wreck and rebuild 10.34 miles of 230 kV line #249 Carson-Locks to achieve a minimum summer emergency rating of 1047 MVA. Upgrade terminal equipment at Carson and Locks to not limit the new conductor rating.	230	15.37	6/1/2026
3	s2321.4	Re-Conductor	7.54	2011	1574	Re-conductor the 230kV Line 2011 from Clifton to Cannon Branch (7.54 miles) using a higher capacity conductor as well as terminal equipment upgrades to achieve an expected rating of 1574 MVA.	230	17	12/31/2025
4	s2324.4	Re-Conductor	2.21		1574?	Reconductor 230kV line segment between Loudoun and Takeoff using a standard high-capacity conductor (approx. 2.21 miles)	230	3.31	12/31/2025
5	s2328.4	Re-Conductor	2.16	2152	1574	Re-conductor the 230kV Line 2152 from Beaumeade to Nimbus (2.16 miles) using a higher capacity conductor as well as terminal equipment upgrades to achieve an expected rating of 1574 MVA.	230	6	12/31/2025
6	s2328.6	Re-Conductor	1	9185	1574	Re-conductor the 230kV Line 9185 from Beaumeade to Paragon Park (1.0 miles) using a higher capacity conductor as well as terminal equipment upgrades to achieve an expected rating of 1574 MVA.	230	4	12/31/2025
7	s2328.7	Re-Conductor	0.16	2209	1574	Re-conductor the 230kV Line 2209 from Evergreen Mills to Yardley Ridge (0.16 miles) using a higher capacity conductor as well as terminal equipment upgrades to achieve an expected rating of 1574 MVA.	230	5	12/31/2025
8	s2328.8	Re-Conductor	4.73	2095	2095	Re-conductor the 230kV Line 2095 from Cabin Run to Shellhorn (4.73 miles) using a higher capacity conductor as well as terminal equipment upgrades to achieve an expected rating of 1574 MVA.	230	8	12/31/2025
9	s2340.1	Re-Conductor	23.17	2114	2114	Re-conductor 230kV Line #2114 from Remington CT to Rollins Ford (approx. 23.17 miles)	230	35	12/31/2025
10	s2609.2	Expand 500kV Sub				Install (1) 1440 MVA 500-230 kV transformer at Goose Creek Substation. Extend the existing 500kV ring bus at Goose Creek Substation to be set up for a future six-breaker ring arrangement. One breaker to be installed initially creating a five-breaker ring bus. Install a new 230kV ring bus at Goose Creek Substation to be set up for a future four-breaker ring arrangement. Three 230kV breakers to be installed initially. Cut and extend line #227 Belmont-Beaumeade into Goose Creek Substation.	500/230	40	12/15/2026
11	s2609.3	Re-Conductor	4	202	1574	Reconductor 230kV Line #202 Clark-Idylwood, approximately 4 miles, using a higher capacity conductor and upgrade terminal equipment to achieve an expected rating of 1574MVA.	230	8	12/15/2026
12	s2609.4- s2609.7	New 500 kV Feed				Install (1) 1440 MVA 500-230 kV transformer and associated 230 kV breaker ring at Occoquan Substation to supply the area with a 500 kV source. Install a 500 kV ring bus and associated 230 kV breaker-and-a-half bus configuration at Occoquan Substation. Cut and loop 500 kV line #571 Ox-Possum Point as the 500 kV source into the proposed 500 kV ring bus. Existing terminations for 230 kV line #2001 Occoquan-Possum Point, line #2013 Occoquan-Ox, and line #2042 Odgen Martin-Ox will be rearranged to terminate into the rebuilt Occoquan station Line #215 Hayfield-Possum Point will be rearranged to route over the expanded Occoquan station.	500/230	71	12/15/2026

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Reliability Analysis Update

Sami Abdulsalam, Senior Manager

Transmission Expansion Advisory Committee
August 9, 2022

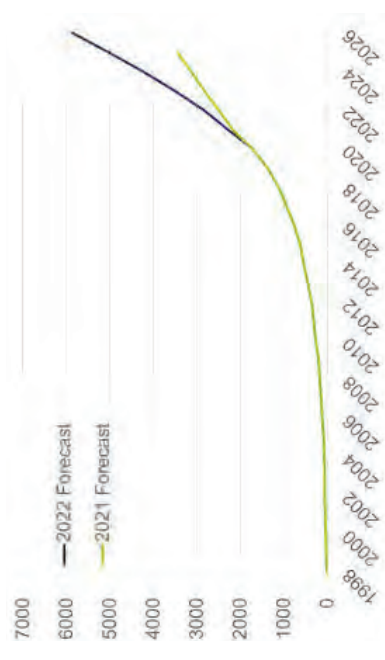
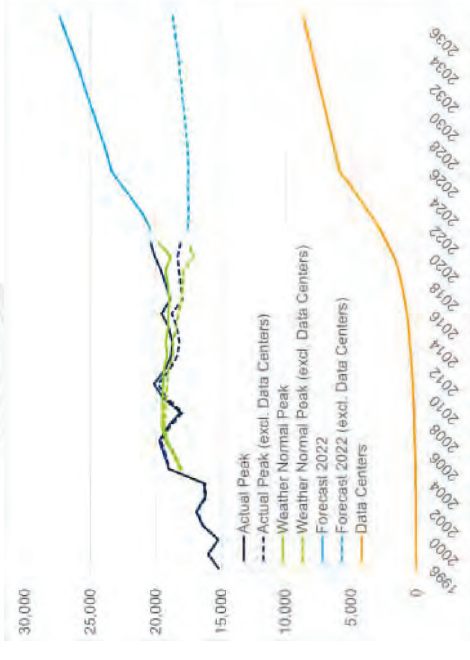
Attachment I.J.4



First Review

Baseline Reliability Projects

- At the June 7th TEAC, PJM presented information concerning the load growth that the Dominion area has been experiencing in the data center alley area around the Dulles airport.
- The data center loads reflect an annualized growth rate of 3%.
- Forecasted data center additions for the 2022 Load Forecast provided by Dominion and NOVEC were noticeably higher than in the prior year.
- At the July 12th TEAC, PJM indicated that due to the highly concentrated load growth in the data center alley area, numerous reliability violations were observed in the 2024 and 2025 timeframes despite planned supplemental and baseline upgrades.
- Without further transmission upgrades in the 2024/2025 timeframe, the area will not have sufficient transmission capability to serve the load.
- PJM announced an Immediate Transmission Development need (without a window) to serve the new load in the 2024/25 timeframe.





Dominion Transmission Zone: Baseline Data Center Alley

Process Stage: First Review

Criteria: Summer N-1, GenDeliv, N-1-1 Thermal & 300 MW Load Loss

Assumption Reference: 2027 RTEP assumption

Model Used for Analysis: 2027 RTEP summer case

Proposal Window Exclusion: Immediate Need

Problem Statement:

- Various thermal issues and load loss in the Data Center Alley area around Dulles airport.
 - [N-1: 2022W1-N1-ST16-18, 2022W1-N1-ST20, 2022W1-N1-ST23](#)
 - [GenDeliv: 2022W1-GD-S588, 2022W1-GD-S1028, 2022W1-GD-S622, 2022W1-GD-S35](#)
 - [N-1-1: 2022W1-N2-ST12-51](#)
 - [N-1-1 Load Loss: 2022W1-N2-SLD1, 2022W1-N2-SLD2](#)

	Dominion Energy	NOVEC	Total
Existing	28	7	35
Design/Construction	11	3	14
In Planning Stage	6	3	9
Inquiry Stage	10	6	15
Total	55	19	74



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
	500 KV	500 HVW 654
	230 KV	230 HVW 259 & 2300 HVW 2044
	115 KV	1 HVW 199
	138 KV	AS NOTED
	69 KV	AS NOTED

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Dominion Transmission Zone: Baseline Data Center Alley

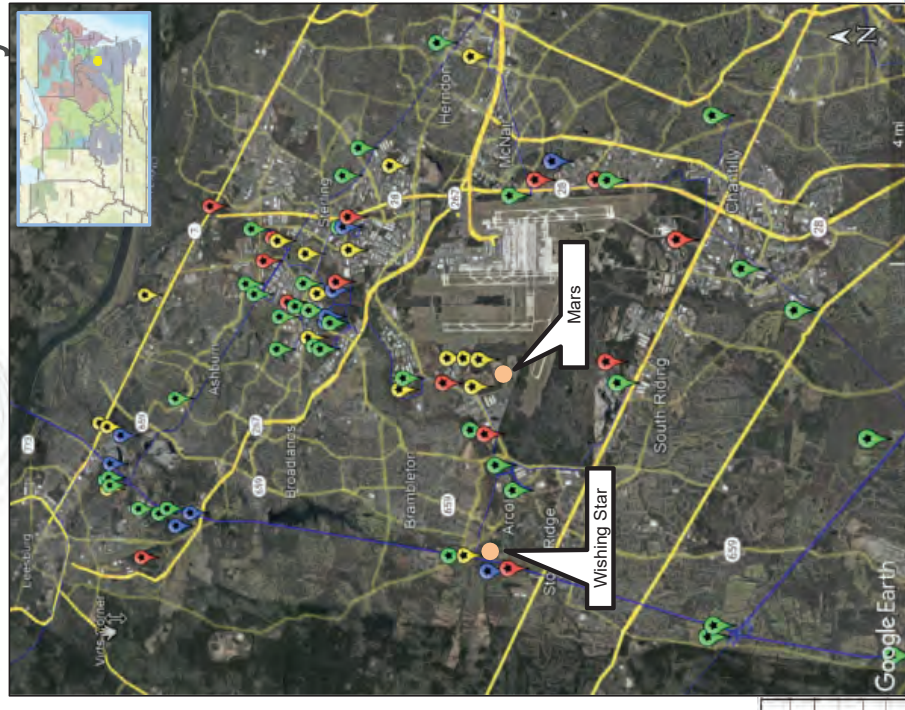
Proposed Solution: Option 3 (5-2, Wishing Star, 2 TXs)

- Build a new 500/230kV substation called Wishing Star near Brambleton substation.
- Cut and extend 500kV Line #546 (Brambleton-Mosby) and 500kV Line #590 (Brambleton-Mosby) to the proposed Wishing Star substation. Lines to terminate in a 500kV breaker and a half configuration.
- Install one 500/230kV 1440MVA transformer at Wishing Star substation.
- Build a new 500/230kV substation called Mars near Dulles International Airport.
- Construct double circuit 500kV and 230kV circuit transmission lines for approximately 3.5 miles from Wishing Star substation to Mars substation. New right-of-way will be needed for the transmission lines. New conductor to have a minimum summer normal rating of 4357MVA at 500kV and 1573MVA at 230kV.
- Install one 500/230kV 1440MVA transformer at Mars substation.
- Upgrade 230kV bus to 4000A, 80 kA equipment at Brambleton substation
- Replace (4) 230kV breakers at Loudoun substation
- Cut and loop 230kV Line #2079 (Sterling Park - Dranesville) into Davis Drive substation and install two GIS 230kV breakers. (Overlap with supplemental need DOM-2021-0032)

Estimated Cost: \$603.0 M

- Wishing Star substation: \$180.0 M
- Mars substation: \$167.0 M
- 500kV and 230kV line extensions: \$132.0 M
- Brambleton substation upgrades: \$ 12.0 M
- Loudoun breaker replacements: \$ 5.0 M
- 230kV Line #2079/Davis Drive upgrades: \$ 15.0 M
- Total Risk/Contingency/Escalation Costs: \$ 92.0 M

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COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
Blue	500 kV	500 HV to 69kV
Green	230 kV	230 HV to 230 & 2300 HV to 230kV
Red	115 kV	1 HV to 115
Orange	138 kV	AS NOTED
Yellow	69 kV	AS NOTED



Dominion Transmission Zone: Baseline Data Center Alley

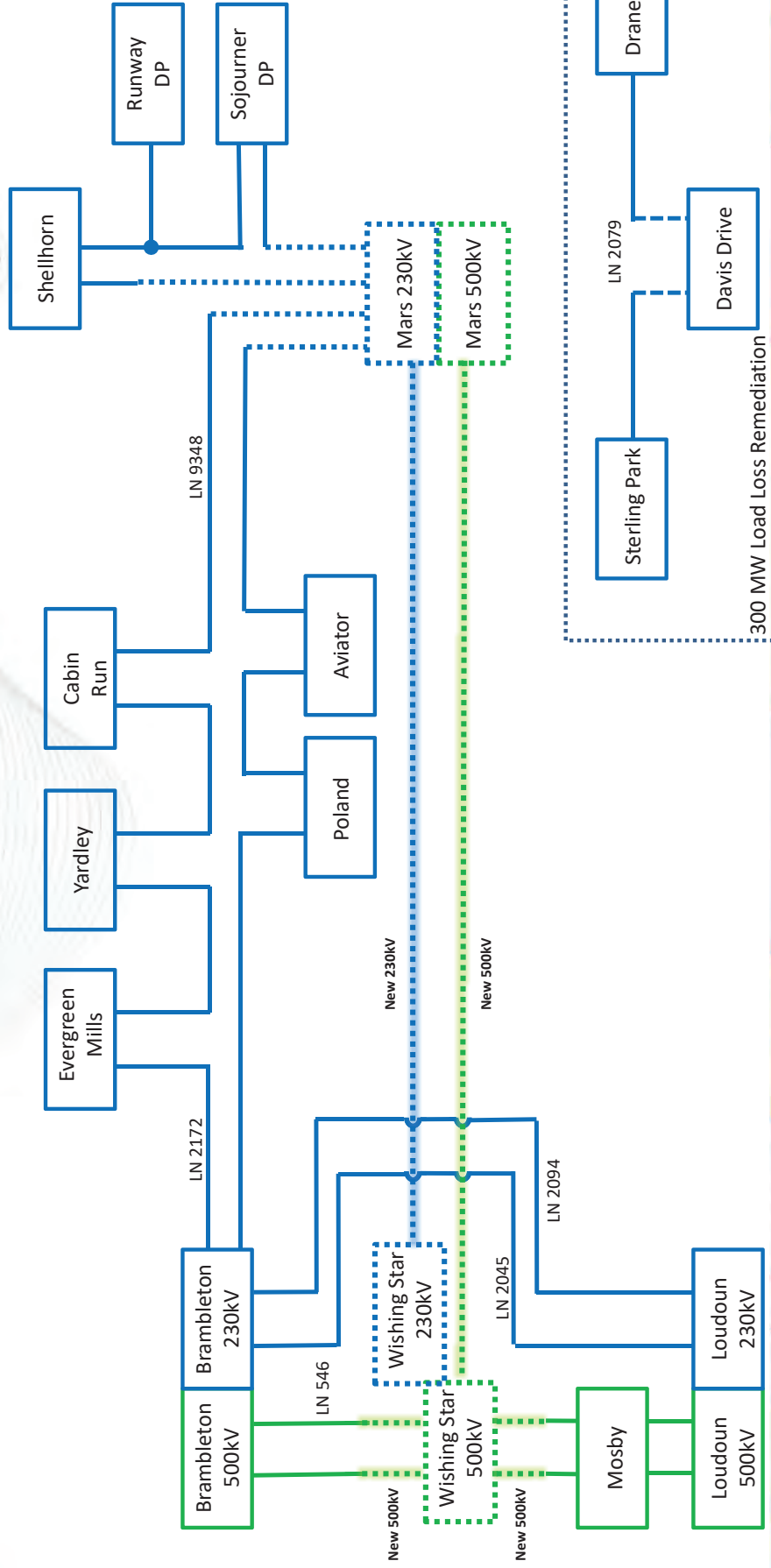
Alternatives:

- **Option 1 (Double Circuit 230 kV):** Build a new 500/230kV substation called Wishing Star. Cut and extend 500kV Line #546 and 500kV Line #590 to the proposed Wishing Star substation. Install two 500/230kV transformers at Wishing Star substation. Build a new 500/230kV substation called Mars. Construct double circuit 230kV – 230kV circuit transmission lines from Wishing Star substation to Mars substation. **Estimated Cost:** \$481.0 M
 - Option not selected due to limitations on transfer capability with 2x230kV feeds going into to Mars substation to serve load.
- **Option 2 (5-2, Brambleton Option):** Build a new 500/230kV substation called Mars. Construct double circuit 500kV – 230kV circuit transmission lines from Brambleton substation to Mars substation. Install two 500/230kV transformers at Mars substation. **Estimated Cost:** \$416.0 M
 - Option not selected due to routing constraints out of Brambleton substation in addition to land limitations within and around Brambleton for substation expansion.
- **Option 4 (Line #546 & # 2094 Line Extensions):** Build a new 500/230kV substation called Mars. Remove 500kV Line #546 termination at Brambleton and extend line to Mars substation. Remove 230kV Line #2094 at Brambleton and extend line to Mars substation. Construct double circuit 500kV – 230kV circuit transmission lines from Brambleton substation to Mars substation. Install two 500/230kV transformers at Mars substation. **Estimated Cost:** \$393.0 M
 - Option not selected due to adverse impacts on north-south backbone capability (both 500kV and 230kV N-S corridor lines). Will also limit options to further reinforce system to accommodate future load growth.
- **Option 5 (Double Circuit 500kV-500kV):** Build a new 500/230kV substation called Mars. Construct double circuit 500kV – 500kV circuit transmission lines by cutting 500kV Line #546 and looping into Mars substation. Install two 500/230kV transformers at Mars substation. **Estimated Cost:** \$462.0 M
 - Option was not selected due to Right of Way limitations, crossing over 230kV lines coupled with FAA height restrictions around the Dulles airport.

Required In-Service: 6/1/2025

Continued on next slide...

Dominion Transmission Zone: Baseline Data Center Alley



Facilitator:
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Reliability Analysis Update



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Reliability Analysis Update Immediate Need

Sami Abdulsalam, Senior Manager

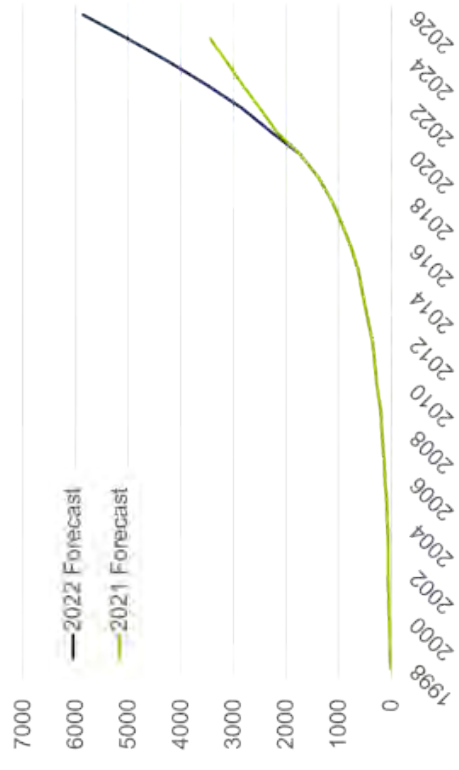
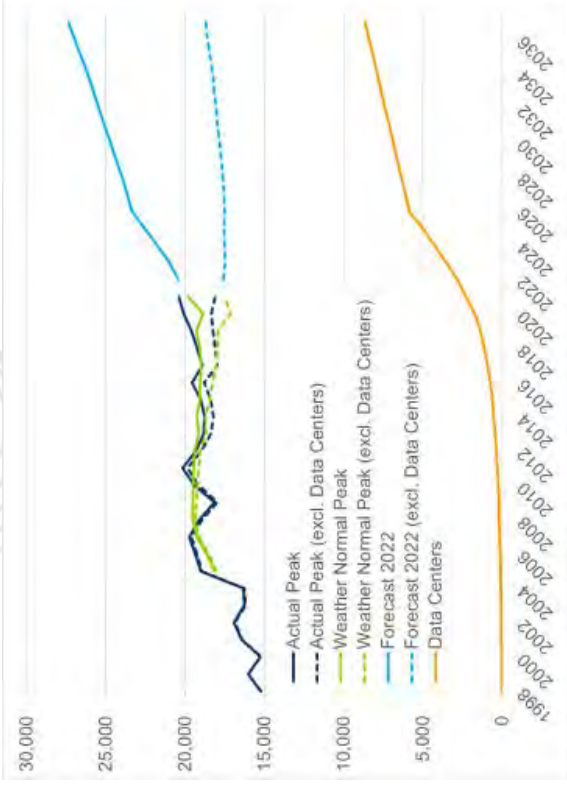
Transmission Expansion Advisory Committee
September 6, 2022

Attachment I.J.5

Second Review

Baseline Reliability Projects

- At the June 7th TEAC, PJM presented information concerning the load growth that the Dominion area has been experiencing in the data center alley area around the Dulles airport.
- The data center loads reflect an annualized growth rate of 3%.
- Forecasted data center additions for the 2022 Load Forecast provided by Dominion and NOVEC were noticeably higher than in the prior year.
- At the July 12th TEAC, PJM indicated that due to the highly concentrated load growth in the data center alley area, numerous reliability violations were observed in the 2024 and 2025 timeframes despite planned supplemental and baseline upgrades.
- Without further transmission upgrades in the 2024/2025 timeframe, the area will not have sufficient transmission capability to serve the load.
- PJM announced an Immediate Transmission Development need (without a window) to serve the new load in the 2024/25 timeframe.



Process Stage: Second Review

Criteria: Summer N-1, GenDeliv, N-1-1 Thermal & 300 MW Load Loss

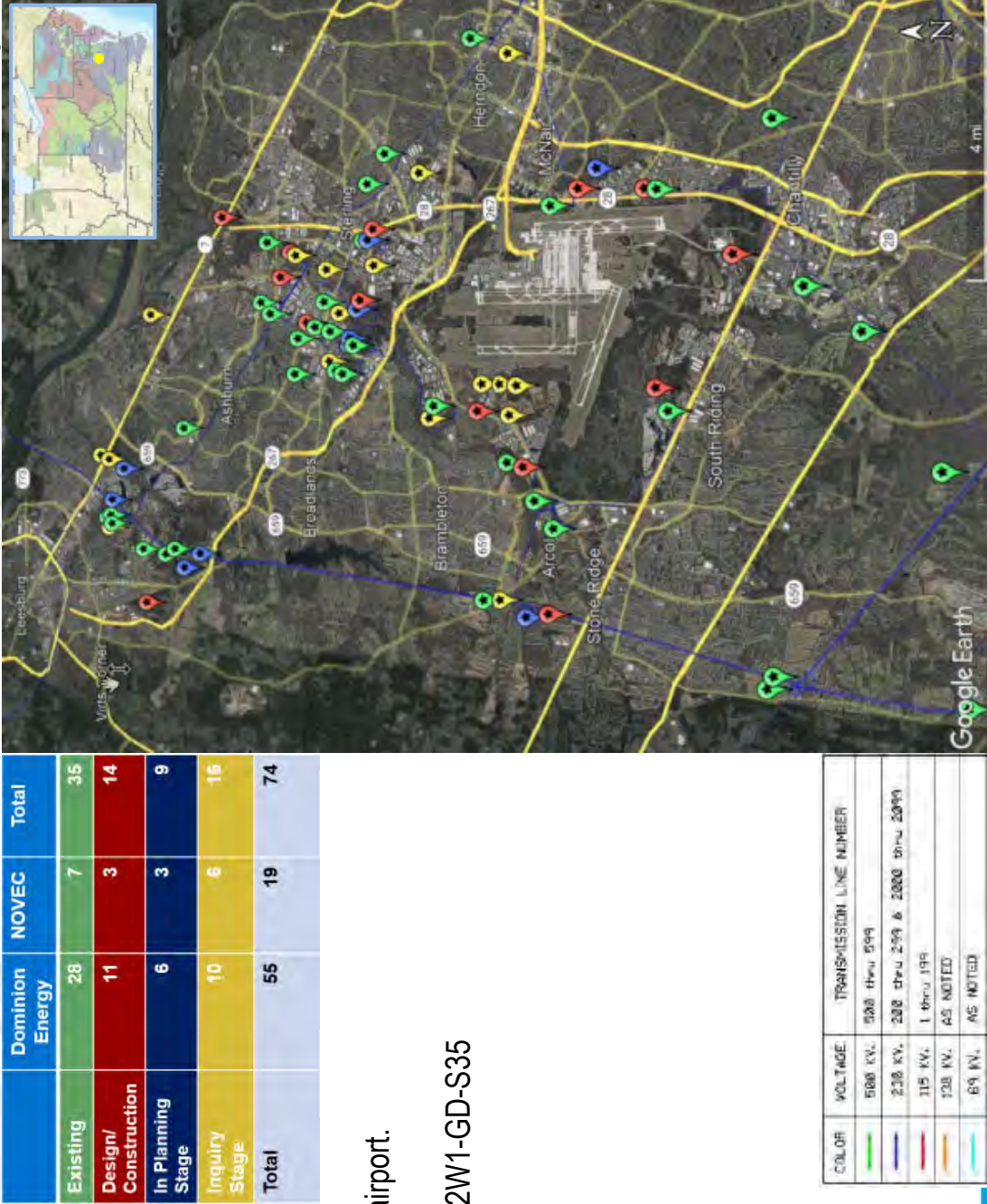
Assumption Reference: 2027 RTEP assumption

Model Used for Analysis: 2027 RTEP summer case

Proposal Window Exclusion: Immediate Need

Problem Statement:

- Various thermal issues and load loss in the Data Center Alley area around Dulles airport.
 - **N-1:** 2022W1-N1-ST16-18, 2022W1-N1-ST20, 2022W1-N1-ST23
 - **GenDeliv:** 2022W1-GD-S588, 2022W1-GD-S1028, 2022W1-GD-S622, 2022W1-GD-S35
 - **N-1-1:** 2022W1-N2-ST12-51
 - **N-1-1 Load Loss:** 2022W1-N2-SLD1, 2022W1-N2-SLD2

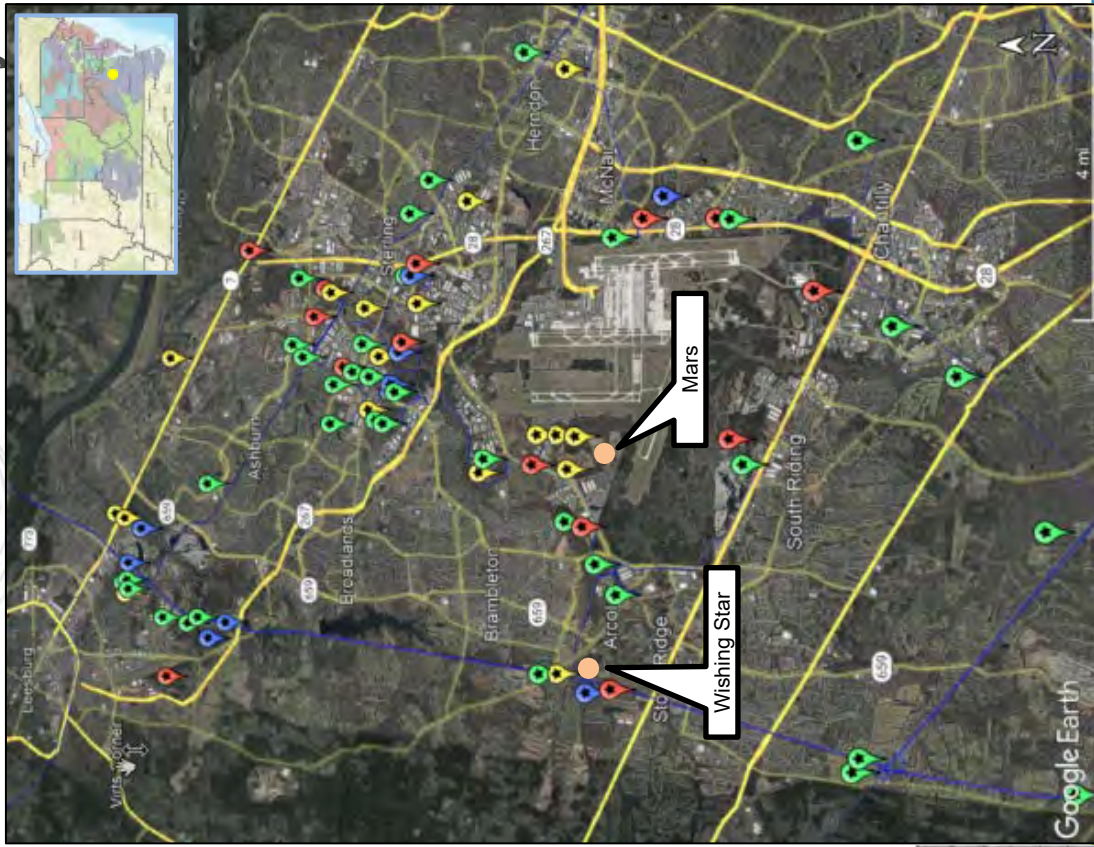


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Recommended Solution: Option 3 (5-2, Wishing Star, 2 TXs)

- Build a new 500/230kV substation called Wishing Star near Brambleton substation.
- Cut and extend 500kV Line #546 (Brambleton-Mosby) and 500kV Line #590 (Brambleton-Mosby) to the proposed Wishing Star substation. Lines to terminate in a 500kV breaker and a half configuration.
- Install one 500/230kV 1440MVA transformer at Wishing Star substation.
- Build a new 500/230kV substation called Mars near Dulles International Airport.
- Construct double circuit 500kV and 230kV circuit transmission lines for approximately 3.5 miles from Wishing Star substation to Mars substation. New right-of-way will be needed for the transmission lines. New conductor to have a minimum summer normal rating of 4357MVA at 500kV and 1573MVA at 230kV.
- Install one 500/230kV 1440MVA transformer at Mars substation.
- ~~Upgrade 230kV bus to 4000A, 80 kA equipment at Brambleton substation~~
- ~~Replace (4) 230kV breakers at Loudoun substation~~
- Cut and loop 230kV Line #2079 (Sterling Park - Dranesville) into Davis Drive substation and install two GIS 230kV breakers. (Overlap with supplemental need DOM-2021-0032)

89



Continued on next slide...



Recommended Solution: Option 3 (5-2, Wishing Star, 2 TXs)

Additional project scope required to clear capacity out of the new 500/230kV Wishing Star and Mars substations:

- Reconductor the following 230kV lines to achieve a summer rating of 1574 MVA:

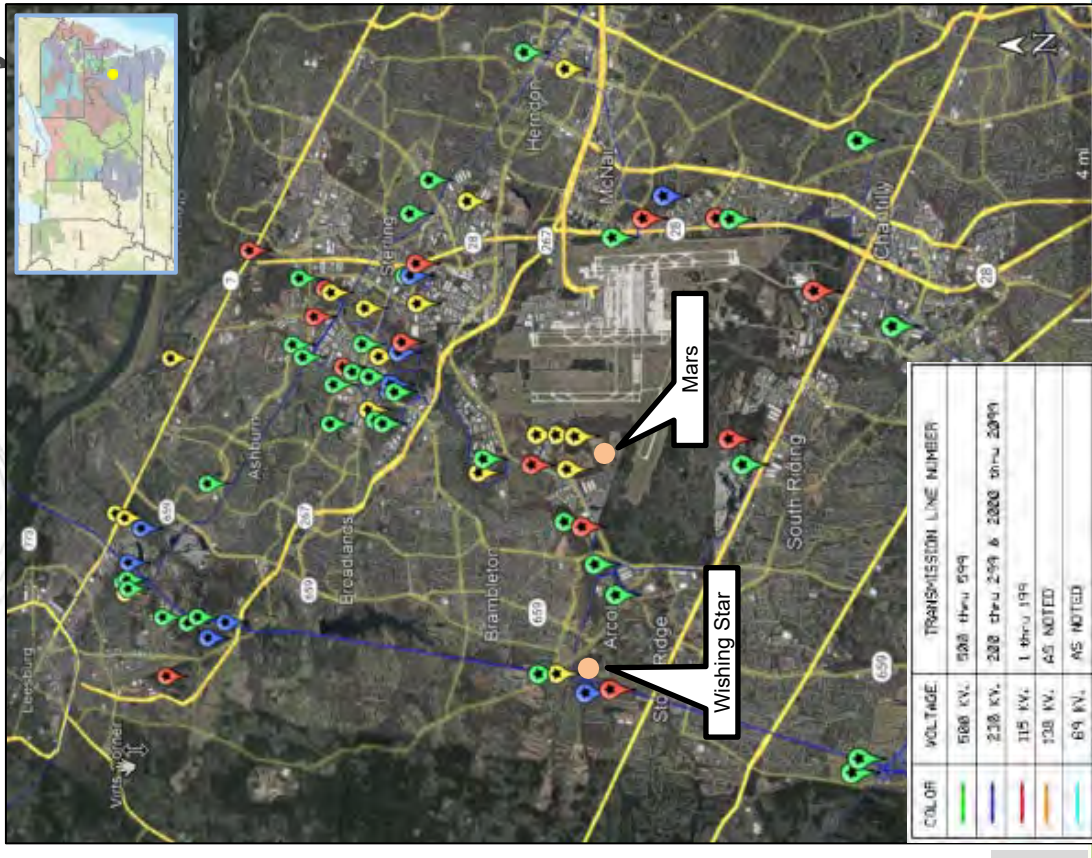
230kV Line	Length (mi)	Existing Rating SN/SE/WN/WE (MVA)	Preliminary Rating SN/SE/WN/WE (MVA)
#2214 Buttermilk - Roundtable	0.62	1047/1047/1160/1160	1574/1574/1648/1648
#2031 Enterprise - Greenway - Roundtable	1.52	1047/1047/1160/1160	1574/1574/1648/1648
#2186 Enterprise - Shellhorn	0.64	1047/1047/1160/1160	1574/1574/1648/1648
#2188 Lockridge - Greenway - Shellhorn	2.17	1047/1047/1160/1160	1574/1574/1648/1648
#2223 Lockridge - Roundtable	0.84	1047/1047/1160/1160	1574/1574/1648/1648
#2218 Sojourner - Runway - Shellhorn	3.98	1047/1047/1160/1160	1574/1574/1648/1648
#9349 Sojourner - Mars	1.61	1047/1047/1160/1160	1574/1574/1648/1648

- Upgrade terminal equipment to remove the single element derates on the following 500kV lines:

500kV Line	Existing Rating (Derate) SE/SLD/WE/WLD (MVA)	Preliminary Rating SE/SLD/WE/WLD (MVA)
#584 Loudoun – Mosby Ckt 1	2858/3144/3403/3637	3967/4562/4832/5196
#502 Loudoun – Mosby Ckt 2	2809/2931/3403/3524	3967/4562/4832/5196

SN / SE / SLD : Summer Normal / Summer Emergency / Summer Load Dump
WN / WE / WLD: Winter Normal / Winter Emergency / Winter Load Dump

Continued on next slide...



Total Estimated Cost: ~~\$603.0 M~~ **\$627.62 M**

- Wishing Star substation: **\$210.0 M⁽¹⁾ (b3718.1)**
- Mars substation: **\$197.0 M⁽¹⁾ (b3718.2)**
- 500kV and 230kV line extensions: **\$164.0 M⁽¹⁾ (b3718.3)**
- ~~Brambleton substation upgrades: \$ 12.0 M~~
- ~~Loudoun breaker replacements: \$ 5.00 M~~
- 230kV Line #2214 Buttermilk – Roundtable reconductor: **\$ 4.79 M (b3718.4)**
- 230kV Line #2031 Enterprise - Greenway - Roundtable reconductor: **\$ 5.89 M (b3718.5)**
- 230kV Line #2186 Enterprise - Shellhorn reconductor: **\$ 3.96 M (b3718.6)**
- 230kV Line #2188 Lockridge - Greenway - Shellhorn reconductor: **\$ 3.80 M (b3718.7)**
- 230kV Line #2223 Lockridge - Roundtable reconductor: **\$ 2.59 M (b3718.8)**
- 230kV Line #2218 Sojourner - Runway - Shellhorn reconductor: **\$ 6.51 M (b3718.9)**
- 230kV Line #9349 Sojourner - Mars reconductor: **\$ 1.43 M (b3718.10)**
- 500kV Line #502 terminal equipment upgrades: **\$ 6.27 M (b3718.11)**
- 500kV Line #584 terminal equipment upgrades: **\$ 6.38 M (b3718.12)**
- 230kV Line #2079/Davis Drive upgrades: **\$ 15.0 M (b3718.13)**

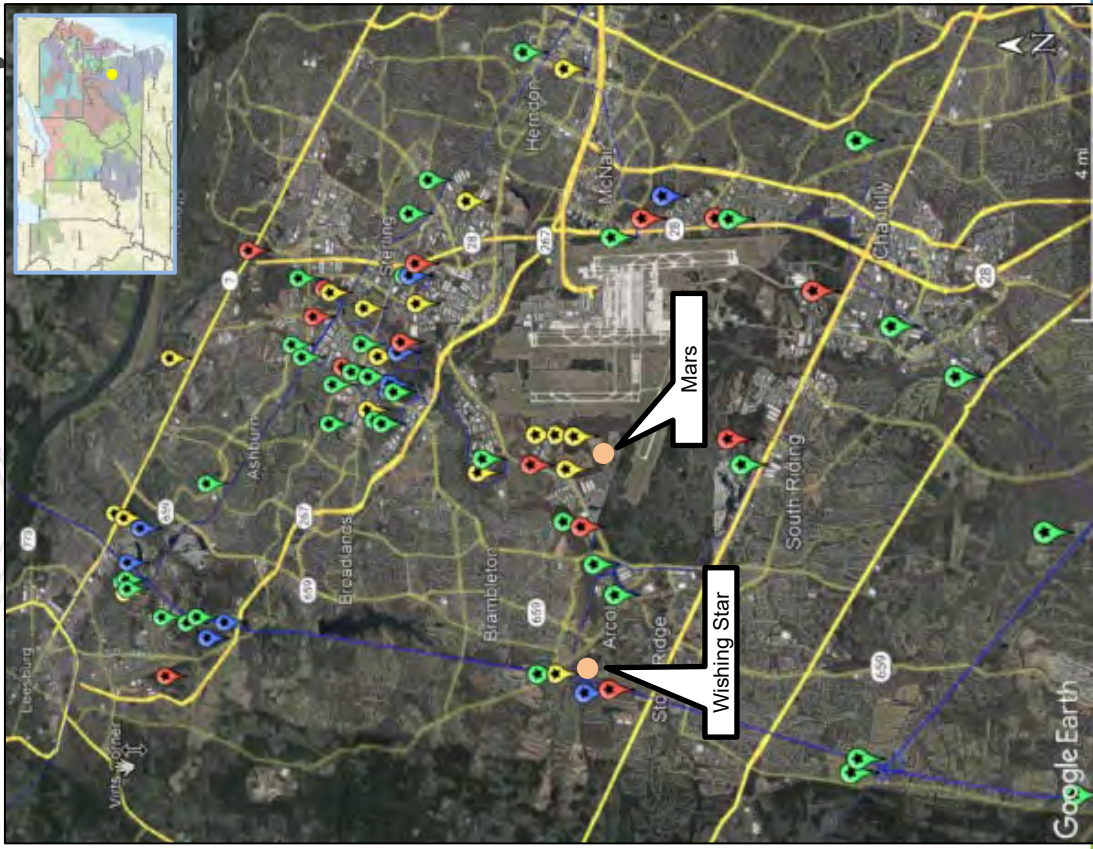
Projected In-Service: 6/1/2025

Required In-Service: 6/1/2025

Previously Presented: 8/6/2022

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⁽¹⁾ Total Risk/Contingency/Escalation Cost of \$92 M spread across project components.



Dominion Transmission Zone: Baseline Data Center Alley

Alternatives:

- **Option 1 (Double Circuit 230 kV):** Build a new 500/230kV substation called Wishing Star. Cut and extend 500kV Line #546 and 500kV Line #590 to the proposed Wishing Star substation. Install two 500/230kV transformers at Wishing Star substation. Build a new 500/230kV substation called Mars. Construct double circuit 230kV – 230kV circuit transmission lines from Wishing Star substation to Mars substation. **Estimated Cost:** \$481.0 M
 - Option not selected due to limitations on transfer capability with 2x230kV feeds going into to Mars substation to serve load.
- **Option 2 (5-2, Brambleton Option):** Build a new 500/230kV substation called Mars. Construct double circuit 500kV – 230kV circuit transmission lines from Brambleton substation to Mars substation. Install two 500/230kV transformers at Mars substation. **Estimated Cost:** \$416.0 M
 - Option not selected due to routing constraints out of Brambleton substation in addition to land limitations within and around Brambleton for substation expansion.
- **Option 4 (Line #546 & # 2094 Line Extensions):** Build a new 500/230kV substation called Mars. Remove 500kV Line #546 termination at Brambleton and extend line to Mars substation. Remove 230kV Line #2094 at Brambleton and extend line to Mars substation. Construct double circuit 500kV – 230kV circuit transmission lines from Brambleton substation to Mars substation. Install two 500/230kV transformers at Mars substation. **Estimated Cost:** \$393.0 M
 - Option not selected due to adverse impacts on north-south backbone capability (both 500kV and 230kV N-S corridor lines). Will also limit options to further reinforce system to accommodate future load growth.
- **Option 5 (Double Circuit 500kV-500kV):** Build a new 500/230kV substation called Mars. Construct double circuit 500kV – 500kV circuit transmission lines by cutting 500kV Line #546 and looping into Mars substation. Install two 500/230kV transformers at Mars substation. **Estimated Cost:** \$462.0 M
 - Option was not selected due to Right of Way limitations, crossing over 230kV lines coupled with FAA height restrictions around the Dulles airport.

Continued on next slide...

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Reliability Analysis Update



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com

Version No.	Date	Description
1	8/29/2022	<ul style="list-style-type: none">• Original slides posted

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Be alert to
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Report suspicious email activity to PJM.
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I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: Not applicable. The need for the proposed Project is not for a rebuild based on reliability issues. See Section I.A.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: Not applicable. See Sections I.A and I.C.

I. NECESSITY FOR THE PROPOSED PROJECT

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

- 1. The full name of the NUG as it appears in its contract with the utility and the dates of initial contract and any amendments;**
- 2. A description of the arrangements for financing the facilities, including information on the allocation of costs between the utility and the NUG;**
- 3. a. For Qualifying Facilities (“QFs”) certificated by Federal Energy Regulatory Commission (“FERC”) order, provide the QF or docket number, the dates of all certification or recertification orders, and the citation to FERC Reports, if available;**
b. For self-certificated QFs, provide a copy of the notice filed with FERC;
- 4. Provide the project number and project name used by FERC in licensing hydroelectric projects; also provide the dates of all orders and citations to FERC Reports, if available; and**
- 5. If the name provided in 1 above differs from the name provided in 3 above, give a full explanation.**

Response: Not applicable.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The Wishing Star Substation and Mars Substation will serve the Eastern Loudoun Load Area described in Section I.C. The Project will also be used to support future load centers in the area.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

Response: The approximate lengths of the Proposed and Alternative Routes for the Mars-Wishing Star Lines are as follows:

Proposed Route (Route 5): 3.55 miles

Alternative Route 1: 3.63 miles

Alternative Route 2: 3.64 miles

Alternative Route 3: 3.62 miles

Alternative Route 4: 3.63 miles

Alternative Route 6: 3.56 miles

The approximate length of the Proposed Route for the Mars 230 kV Loop is 0.57 mile.

See Section II.A.9 for an explanation of the Company’s route selection process, as well as the Environmental Routing Study referenced therein. See Attachment II.A.1 for a Route Overview map.



II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

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

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



II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

Response: See Attachment I.G.1.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

Response: There is no existing Company-owned right-of-way that serves the proposed Mars Substation or connects the Mars Substation to the 230 kV system. There are existing Company-owned transmission line rights-of-way within the Project area; however, those existing transmission lines would not connect the new Mars Substation to the 230 kV system, nor can they be reconductored or rebuilt to accommodate demand in the Eastern Loudoun Load Area. Along segments of the Proposed Route that are collocated with existing right-of-way, only small areas of overlap are proposed and are subject to minor variation subject to detailed engineering.⁴⁷ See Attachment II.A.6.a.

⁴⁷ See *supra*, n. 2.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

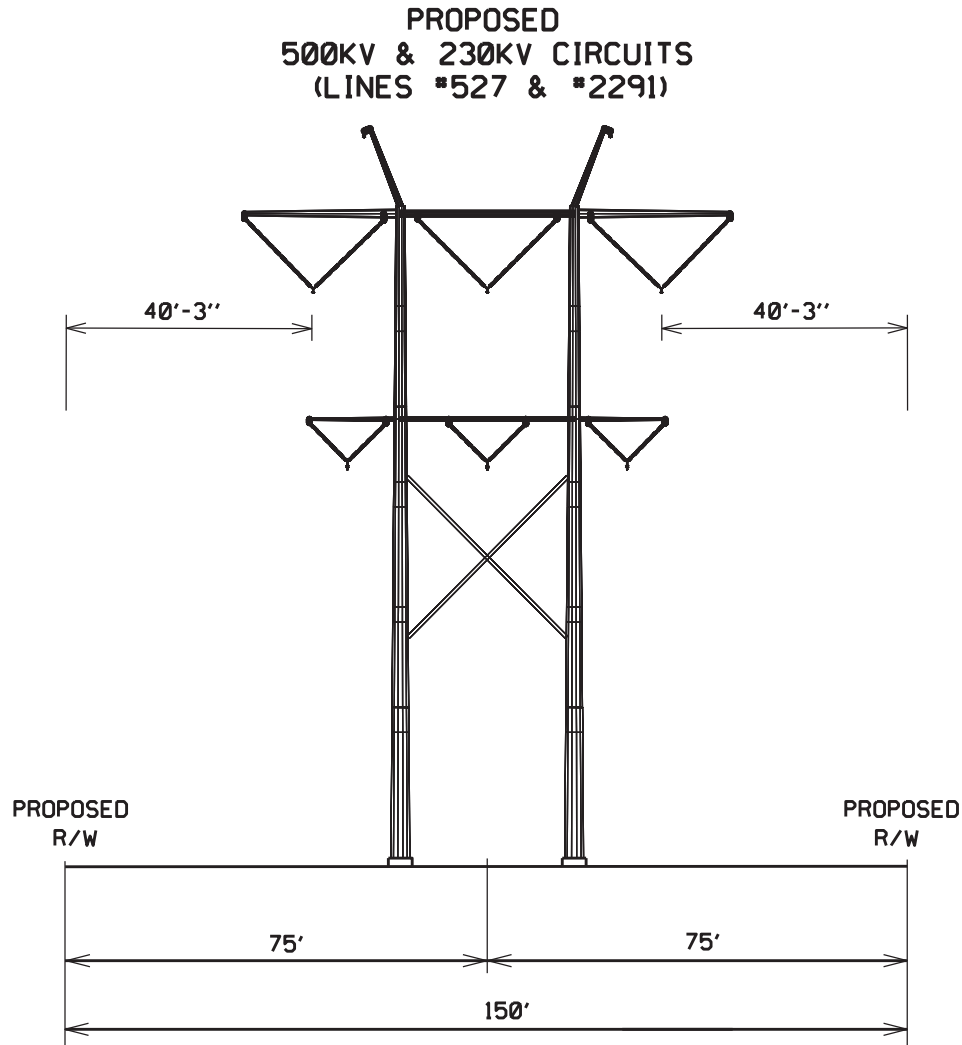
- 5. Provide drawings of the ROW cross section showing typical transmission line structure placements referenced to the edge of the ROW. These drawings should include:**
 - a. ROW width for each cross section drawing;**
 - b. Lateral distance between the conductors and edge of ROW;**
 - c. Existing utility facilities on the ROW; and**
 - d. For lines being rebuilt in existing ROW, provide all of the above (i) as it currently exists, and (ii) as it will exist at the conclusion of the proposed project.**

Response: See Attachments II.A.5.a-e.

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

PRELIMINARY PROPOSED

WISHING STAR - MARS STRUCTURES #527/2, 2291/2 - #527/5, 2291/5
 #527/12, 2291/12 - #527/14, 2291/14; #527/17, 2291/17 - 527/21, 2291/21



PROPOSED CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD MARS

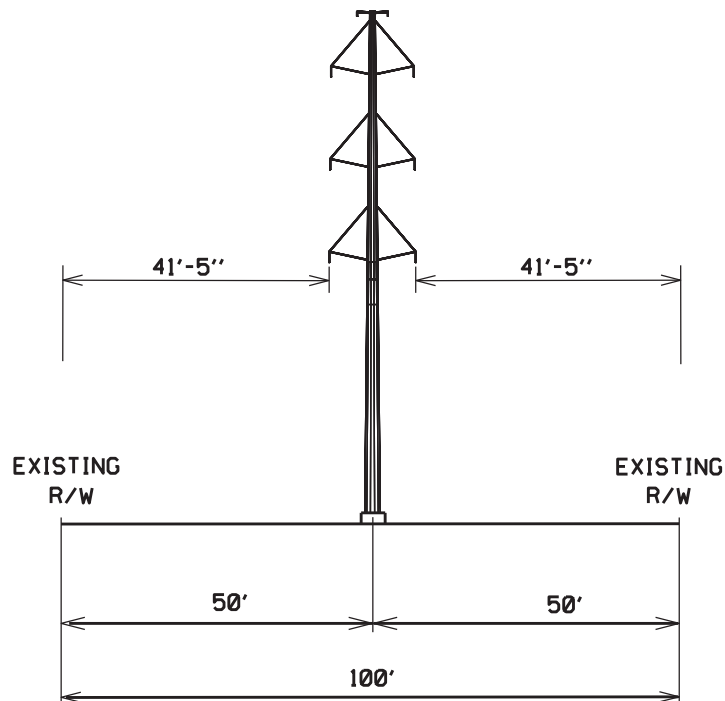
NOTE:

1. Proposed structure shown with approximate average height of 136' and does not include foundation reveal.
2. Approximate average height is measured from groundline at structure centerline.
3. Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

EXISTING

MARS-WISHING STAR STRUCTURES #527/5, 2291/5 - #527/12, 2291/12

EXISTING
230KV CIRCUITS
(LINE #2172) (LINE #2183)



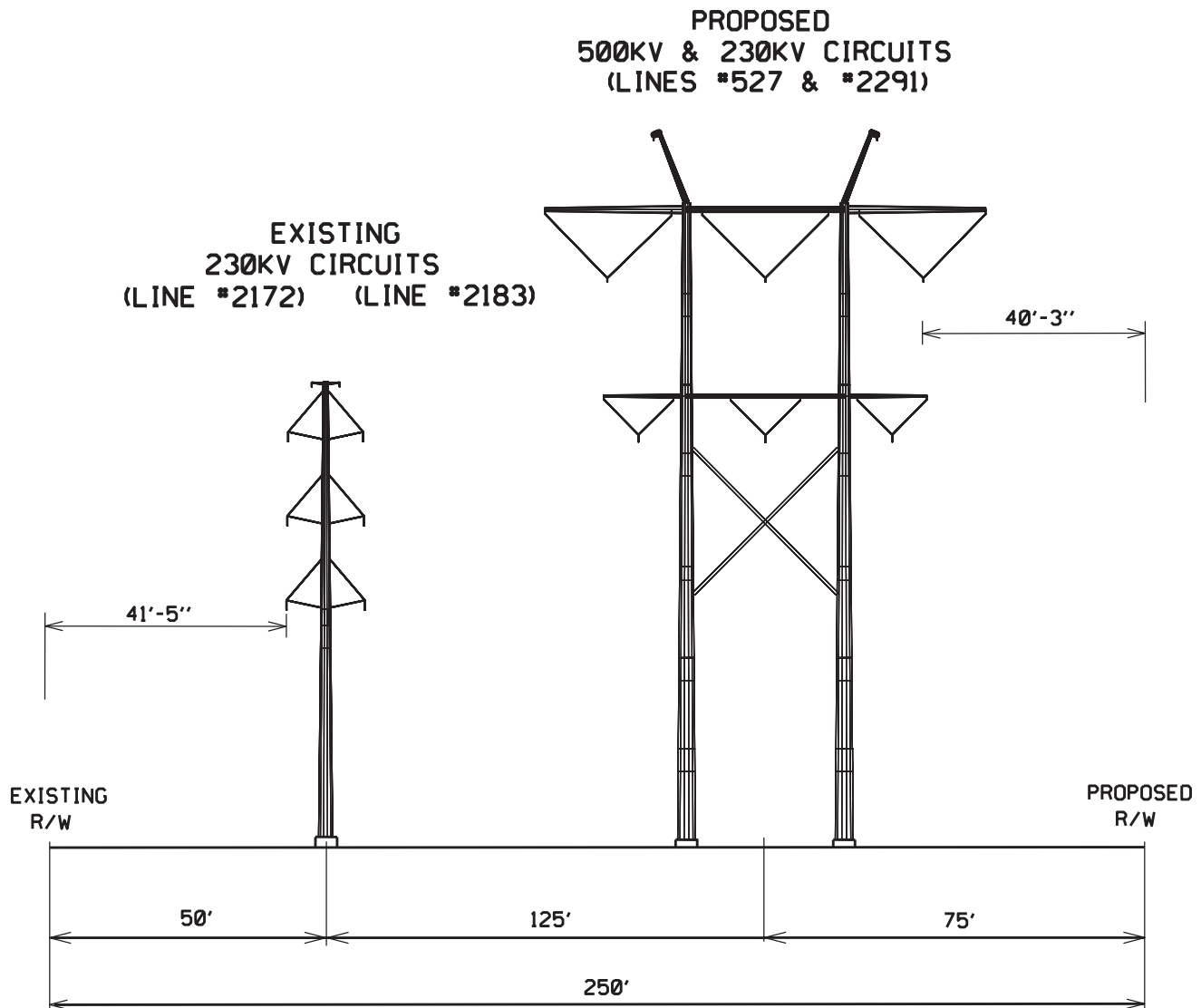
EXISTING CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD MARS

NOTE:

1. Existing structure shown with approximate average height of 100' and does not include foundation reveal.
2. Approximate average height is measured from groundline at structure centerline.

PRELIMINARY PROPOSED

MARS-WISHING STAR STRUCTURES #527/5, 2291/5 - #527/12, 2291/12



PROPOSED CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD MARS

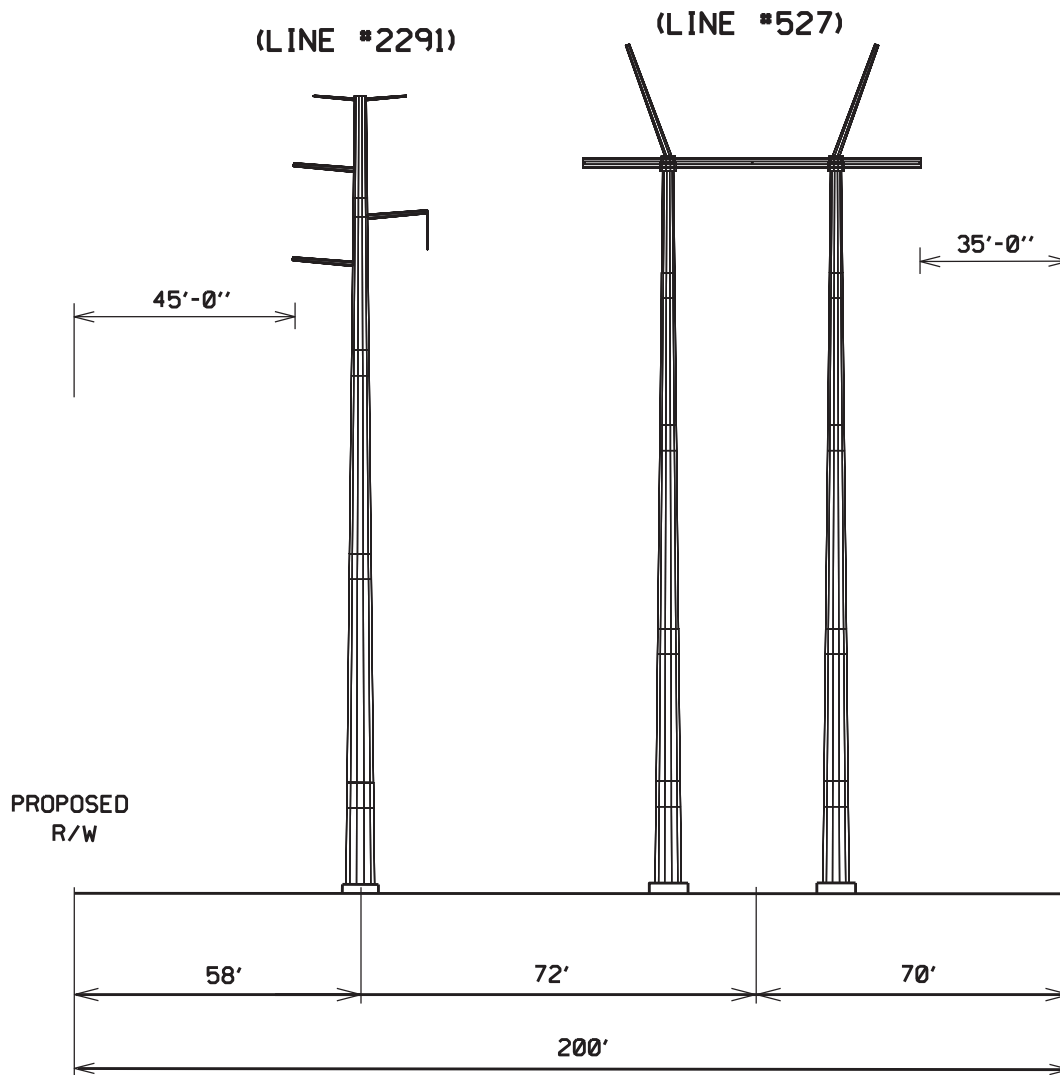
NOTE:

1. Proposed structure shown with approximate average height of 156' and does not include foundation reveal.
2. Approximate average height is measured from groundline at structure centerline.
3. Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

PRELIMINARY PROPOSED

MARS-WISHING STAR STRUCTURES #527/14, 2291/14 - #527/17, 2291/17

PROPOSED
500KV & 230KV CIRCUITS



PROPOSED CONFIGURATION
TYPICAL RIGHT OF WAY LOOKING TOWARD MARS

NOTE:

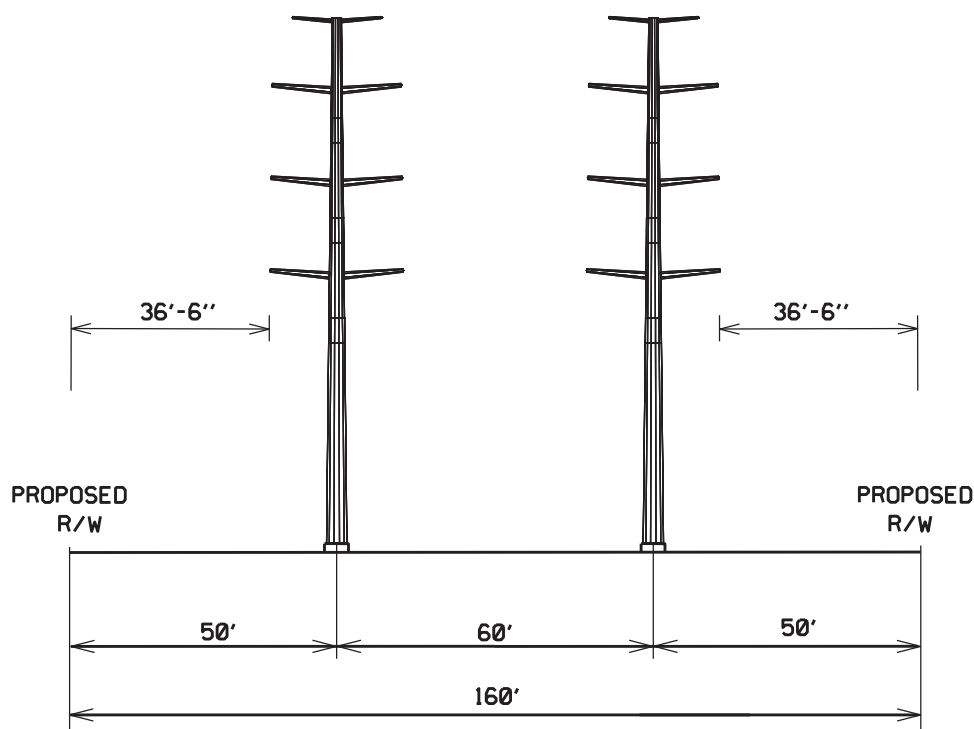
1. Proposed structures shown with approximate average height of 154' for the 2291 Line and 167' for the 527 Line and does not include foundation reveal.
2. Approximate average height is measured from groundline at structure centerline.
3. Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

PRELIMINARY PROPOSED

230KV LOOP TO MARS STRUCTURES #2292/200, #2095/200 &
 #2287/200, #2261/200 - #2292/205, #2095/205 & #2287/205, #2261/205

PROPOSED
 230KV CIRCUITS

(LINES #2292 & #2095) (LINES #2287 & #2261)



PROPOSED CONFIGURATION

TYPICAL RIGHT OF WAY LOOKING TOWARD MARS

NOTE:

1. Proposed structure shown with approximate average height of 103' and does not include foundation reveal.
2. Approximate average height is measured from groundline at structure centerline.
3. Information contained on drawing is to be considered preliminary in nature and subject to change based on final design.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

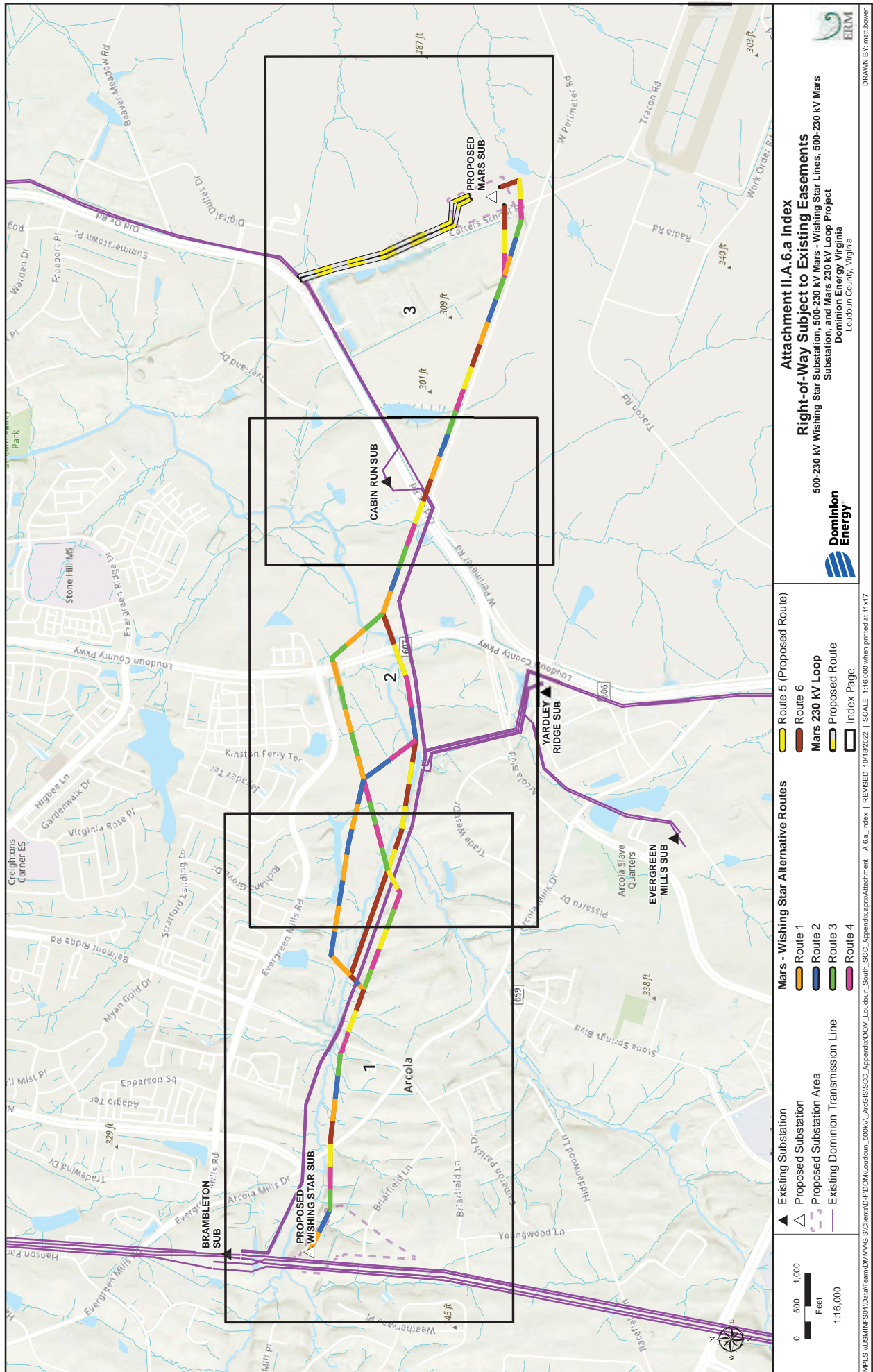
6. Detail what portions of the ROW are subject to existing easements and over what portions new easements will be needed.

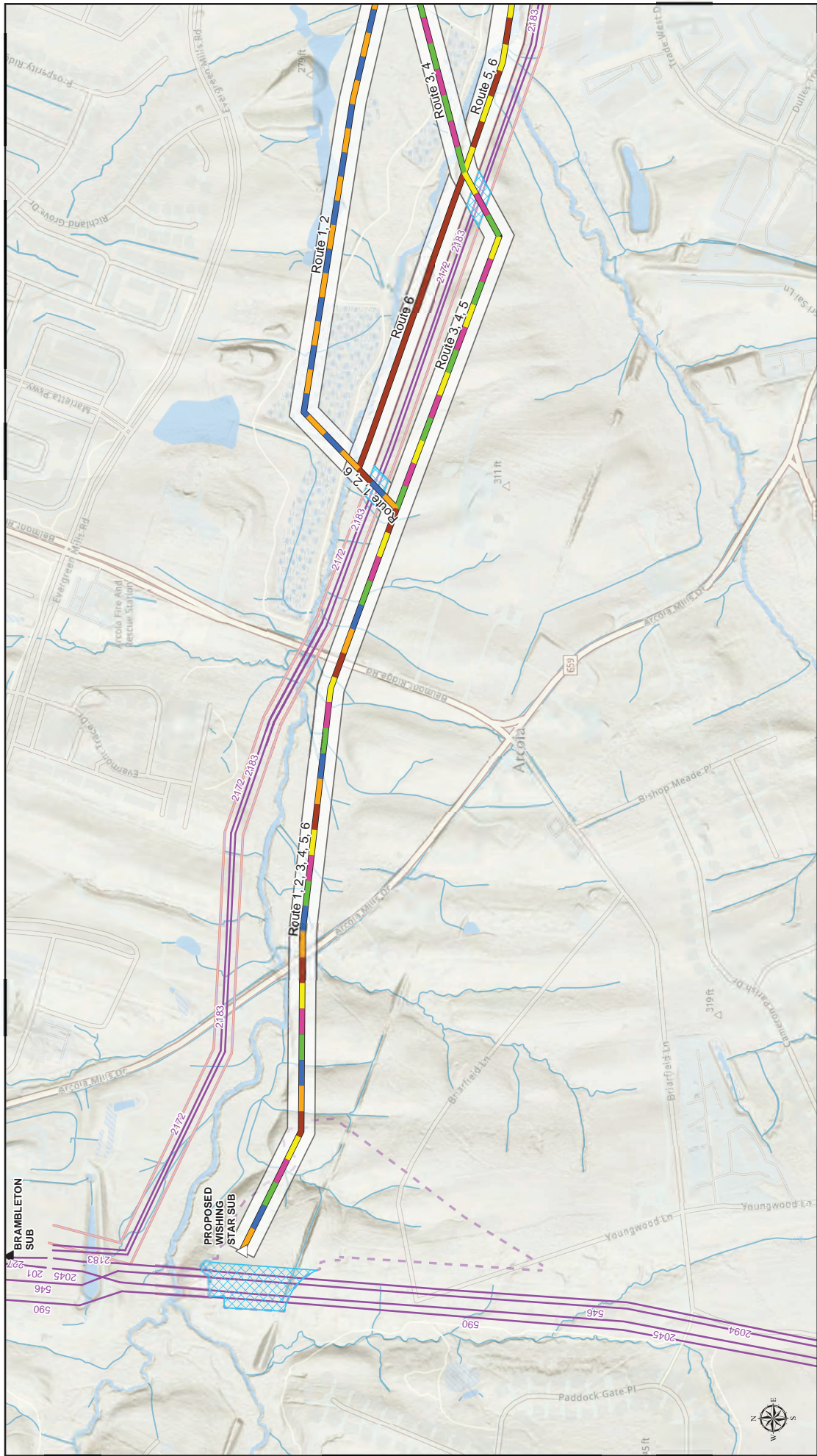
Response: As discussed in Section II.A.4, there is no existing Company-owned right-of-way that serves the proposed Mars Substation or connects the Mars Substation to the existing 230 kV system.

While portions of the Mars-Wishing Star Lines route alternatives parallel existing Company-owned rights-of-way, the entire right-of-way for the Mars-Wishing Star Lines will require easements for a new-build transmission line.

For the Mars 230 kV Loop, the Proposed Route will require easements for the entire route.

See Attachment II.A.6.a for existing transmission line easements, and Attachment II.A.6.b for existing conservation easements. Note that Attachment II.A.6.b also identifies restrictive covenants, which are not considered conservation easements, but are provided for illustrative purposes.





Legend

- ▲ Existing Substation
- △ Proposed Substation
- Existing Dominion Right-of-Way
- Existing Dominion Transmission Lines
- Existing Substation Area

Mars - Wishing Star Alternative Routes

- Route 1 (orange line)
- Route 2 (blue line)
- Route 3 (green line)
- Route 4 (purple line)
- Route 5 (yellow line)
- Route 6 (red line)
- Overlap with Existing Right-of-Way (hatched area)
- Proposed Right-of-Way (white area)

Attachment II.A.6.a

Right-of-Way Subject to Existing Easements

500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop Project

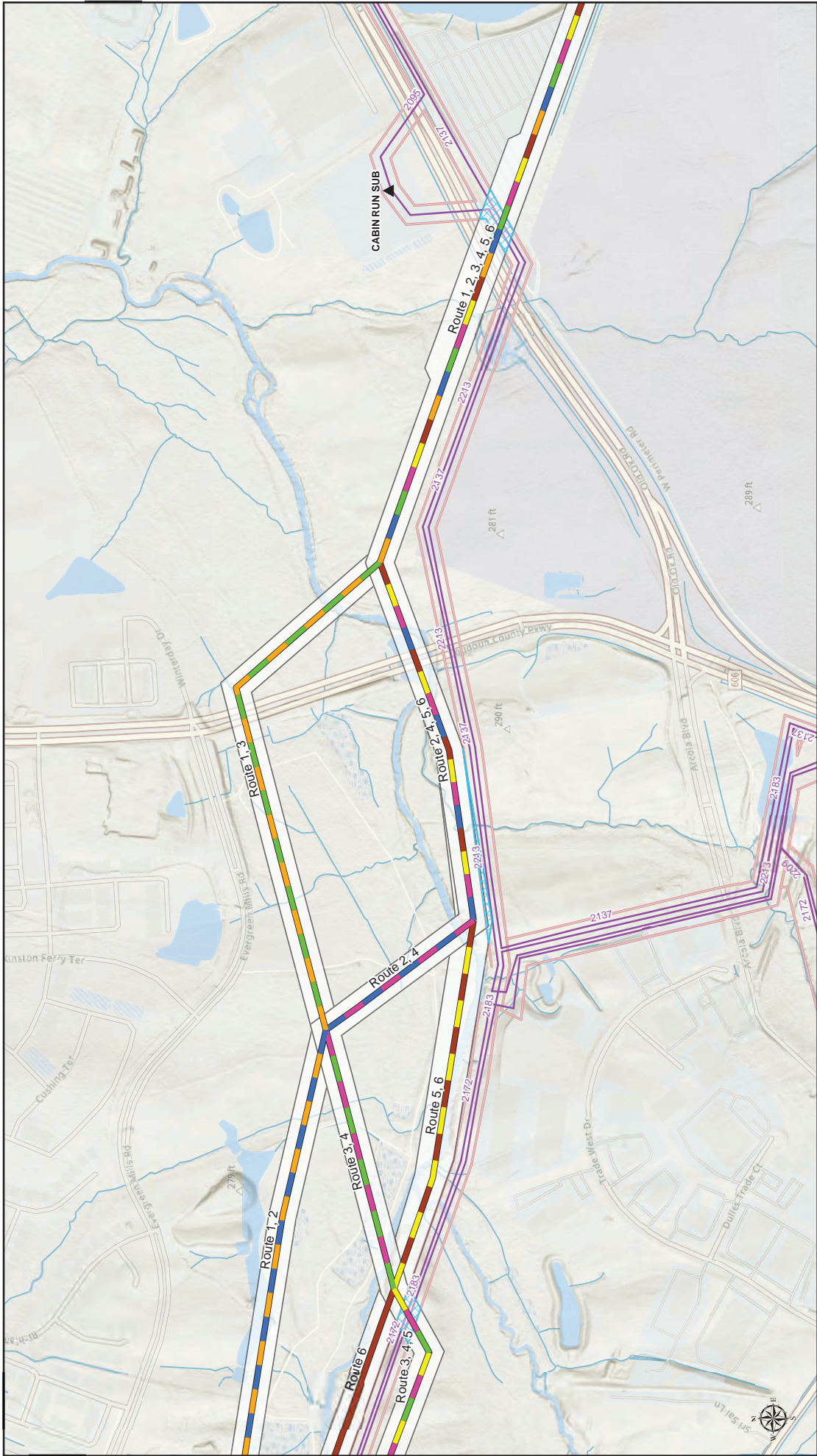
Dominion Energy

Dominion Energy Virginia
Loudoun County, Virginia

Page 1 of 3

ERM

Drawn By: matt.brown



Attachment II.A.6.a
Right-of-Way Subject to Existing Easements
 500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop Project
 Dominion Energy Virginia
 Loudoun County, Virginia

Page 2 of 3

Dominion Energy

ERM

DRAWN BY: matt.brown

Legend

- ▲ Existing Substation
- Existing Dominion Right-of-Way
- Existing Dominion Transmission Lines
- Mars - Wishing Star Alternative Routes
- Route 1
- Route 2
- Route 3
- Route 4
- Route 5 (Proposed Route)
- Route 6

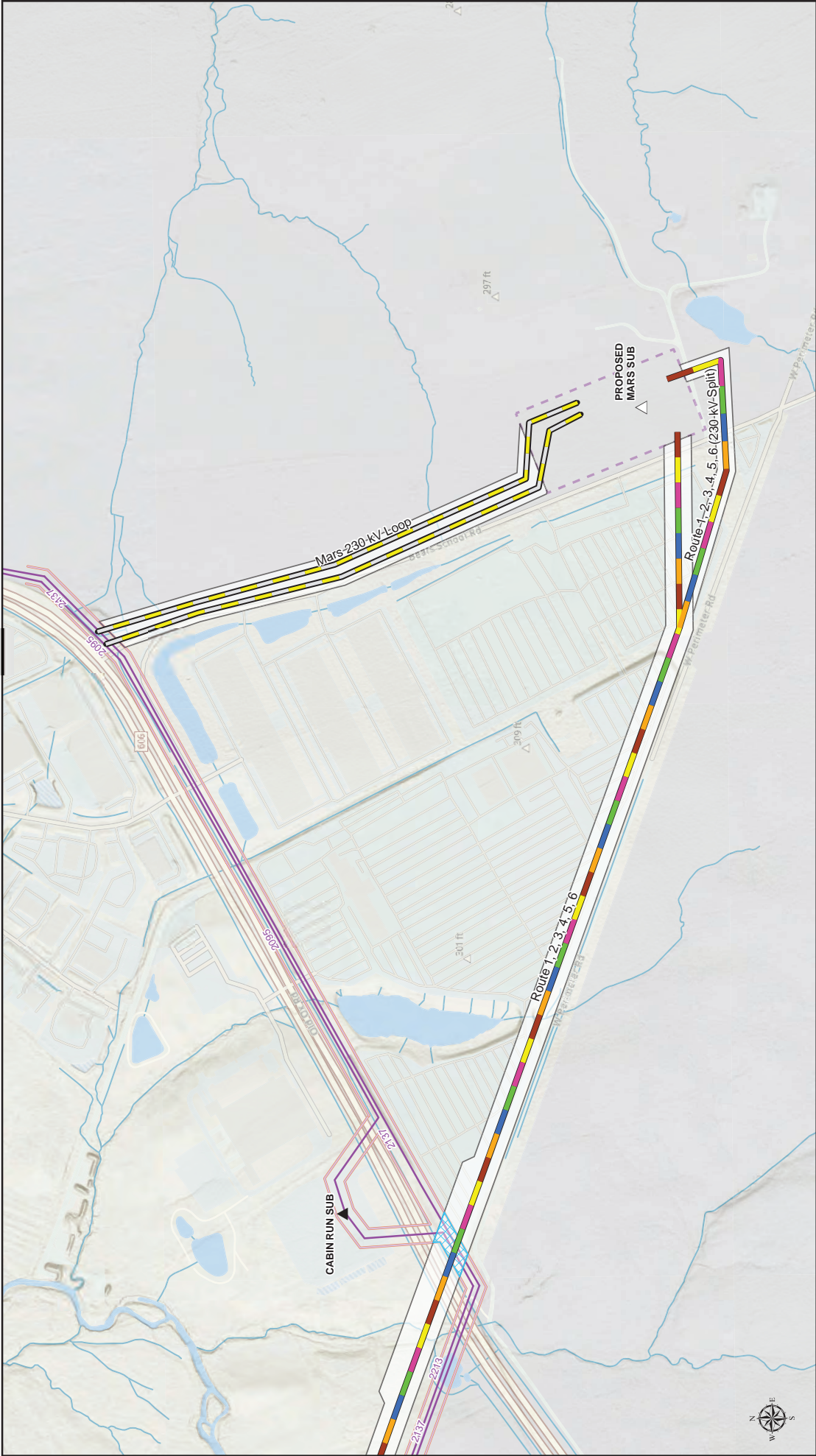
Overlap with Existing Right-of-Way

Proposed Right-of-Way

Scale: 0, 250, 500 Feet

Scale: 1:6,000

MPLS \\USJINFS01\\Data\\Team\\DM\\GIS\\CIS\\SCC\\Appendix\\DOM Loudoun_South_SCC_Appendix\\Appendix II.A.6.a | REVISED: 10/18/2022 | SCALE: 1:6,000 when printed at 11x17





II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

Response: The right-of-way width for the Mars-Wishing Star Lines Proposed Route will primarily be 150 feet wide, with three exceptions described in Section I.A.⁴⁸ The Mars 230 kV Loop Proposed Route will be 160 feet wide. The entire right-of-way for the proposed Project will require clearing.

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

Erosion control will be maintained and temporary stabilization for all soil disturbing activities will be used until the right-of-way has been restored. Upon completion of the 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.

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

⁴⁸ See also *supra*, n. 4.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

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

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

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

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

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

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

For this Project, the Company retained the services of Environmental Resources Management (“ERM”) to help collect information within the study area, identify potential routes, perform a routing analysis comparing the route alternatives, and document the routing efforts in an Environmental Routing Study. After review of the new build options, Dominion Energy Virginia found two electrical options for the Project, which is located entirely within Loudoun County, Virginia:

- The first solution involves constructing an overhead single circuit 500 kV line with a single circuit 230 kV underbuilt from the proposed Wishing Star Substation to the proposed Mars Substation.
- The second solution involves constructing two new 230 kV double circuit transmission lines from the proposed Mars Substation to the Company’s existing 230 kV Cabin Run-Shellhorn Road Line #2095 and 230 kV Poland Road-Shellhorn Road Line #2137.

A study area then was developed encompassing an area containing the Project origin and termination points: The study area is bounded by the following features:

- Brambleton Substation, Evergreen Mills Road, and Old Ox Road to the north;
- Route 50 (formerly John Mosby Highway; renamed Little River

Turnpike in 2020) to the south;

- Dulles Airport to the east; and
- The Company's existing 500 kV Brambleton-Mosby Line #546 and 230 kV Brambleton-Loudoun Line #2094 to the west.

The Company considered the facilities required to construct and operate the new infrastructure, the length of new right-of-way that would be required for the Project, the amount of existing development in the area, the potential for environmental impacts and impacts on communities, and cost.⁴⁹ As discussed in more detail below and in the Environmental Routing Study, ERM identified six viable overhead route alternatives for the Mars-Wishing Star Lines and one route for the Mars 230 kV Loop.

PROPOSED AND ALTERNATIVE ROUTES

Mars-Wishing Star Lines

Proposed Route (Route 5)

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and the proposed Mars Substation. The Proposed Route is approximately 3.55 miles in length.

Beginning at the proposed Wishing Star Substation, Route 5 travels east for about 0.3 mile along the south side of Broad Run before crossing a future Virginia Department of Transportation ("VDOT") right-of-way associated with the Northstar Boulevard extension project.⁵⁰ The Proposed Route then continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way of Lines #2172 and #2183. Continuing along an undeveloped parcel for 0.5-mile, the route then turns north to cross the Company's existing right-of-way then east to parallel the

⁴⁹ For purposes of comparing the relative impacts among routes, impacts (calculated in acres) are represented as *new* right-of-way rather than differentiating *new* versus *existing* right-of-way. This applies to areas where the Proposed Route and Alternative Routes of the Mars-Wishing Star Lines and the Wishing Star Substation footprint overlap existing Company rights-of-way. The Mars-Wishing Star Lines routes all share approximately 3.52 acres of overlap with existing Company right-of-way, including Wishing Star Substation overlap with the Company's existing 500 kV Brambleton-Mosby Lines #546 and #590 and 230 kV Brambleton-Loudoun Lines #2094 and #2045, and crossings of the Company's existing 230 kV Lines #2172/#2183 transmission corridor and Lines #2213/#2137 transmission corridor. Because overlap of existing rights-of-way are nearly identical between the Mars-Wishing Star Lines routes, and subject to minor adjustments in detailed engineering, all right-of-way impacts are considered new for the purposes of route comparison in order to avoid misrepresentation of collocation acreage in the analysis. For comparison purposes, each of the Mars-Wishing Star Lines routes includes the potential impacts associated with the Wishing Star and Mars Substation footprints. The potential impacts associated with the Mars 230 kV Loop are inclusive of the transmission lines only, as the potential impacts of the Mars Substation are already included in the calculation of impacts associated with the Mars-Wishing Star Lines. See *supra*, n. 2.

⁵⁰ See <https://www.loudoun.gov/5209/Northstar-Boulevard-Shreveport-Drive-to->.

north side of the existing right-of-way. For approximately 0.5 mile, the route continues east along Broad Run, paralleling the north side of the existing right-of-way.

Prior to crossing Loudoun County Parkway, the Proposed Route turns slightly northeast away from the existing right-of-way to avoid land owned by the Metropolitan Washington Airports Authority (“MWAA”). After crossing Loudoun County Parkway, the Proposed Route turns southeast for 0.3 mile along the southwestern edge undeveloped parcel before rejoining the existing right-of-way for Lines #2137 and #2213. The route continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning the Company’s Lines #2137 and #2213. The Proposed Route then continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA’s West Perimeter Road.

Approximately 0.2 mile west of the proposed Mars Substation, the Proposed Route splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The 500 kV right-of-way turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the proposed Mars Substation. The 230 kV right-of-way continues southeast for 0.3 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation.

Construction of the Proposed Route will cross a total of 3.55⁵¹ miles of land affecting 92.77⁵² acres of right-of-way. This includes 0.34 mile and 3.36 acres where the Mars-Wishing Star Lines Proposed Route splits into two separate rights-of-way before terminating at the Mars Substation, and 30.01 acres for the proposed Wishing Star and Mar Substations. All 18 parcels crossed are privately owned. Land use along the Proposed Route right-of-way consists of 42.84 acres of forested land, 28.91 acres of open space, 18.81 acres of developed land, and 2.21 acres of open water.

Based on ERM’s desktop wetland and waterbody analysis, the right-of-way of the Proposed Route will encompass approximately 18.98% (17.61 acres) of land with a medium/high or higher probability of containing wetlands and waterbodies. Of these 18.98 acres, the majority (6.70 acres) consist of palustrine emergent (“PEM”) wetlands. The Proposed Route has 11 waterbody crossings, including 9 perennial and 2 intermittent streams. Lastly, the Proposed Route will require the clearing of about 42.84 acres of forested land.

The Proposed Route will be collocated for a total of 1.80 miles along existing Dominion Energy Virginia transmission line easements, representing 51% of the total route length, which is the highest percentage of collocation for any route

⁵¹ Total route length mile calculations for the Proposed Route and Alternative Routes include the length of the 5/2 configuration plus the 0.34-mile 230 kV split.

⁵² Total right-of-way acre calculations for the Proposed Route and Alternative Routes include the route right-of-way, the proposed Mars Substation footprint, the proposed Wishing Star substation footprint, and the 230 kV split.

alternative.

The Proposed Route crosses an open space proffer and preservation areas within and along the Broad Run riparian corridor. These areas include the open space proffer associated with Birchwood Community Association at Brambleton (“Stream Valley Park”) as well as Restrictive Preservation Areas and Wetland Mitigation Areas located on the Brambleton Shreveport property. The Proposed Route impacts Stream Valley Park (4.84 acres), but the centerline does not cross any trails part of the Stream Valley Park Trail System. The Proposed Route crosses Restrictive Preservation Areas adjacent to Broad Run, impacting a total of 5.06 acres but does not cross any Wetland Mitigation Areas. See Attachment II.A.6.b.

The Company consulted landowners and developers crossed by the Proposed Route and Alternative Routes for the Mars-Wishing Star Lines. During these discussions, the Company learned of several planned developments potentially impacted by those routes.

Black Chamber Group plans to construct a data center complex on their property east of Belmont Ridge Road (the Tech Park at Brambleton LLC (“Tech Park”). Based on a review of Tech Park’s preliminary site design, the Proposed Route would not impact the planned building footprints but would span parking areas, utility areas, and a stormwater pond. The area of greatest potential impact, however, is the Proposed Route’s crossing of a planned NOVEC DP located on the northeast corner of the proposed data center development. The Company is in discussions with NOVEC regarding the proposed substation layout, as well as options to modify the substation footprint and equipment layout, to accommodate the Proposed Route. Black Chamber Group shared preliminary Tech Park site plan information with the Company; however, a site plan was not filed with the County until September 22, 2022. As of the date of filing this Application, the site plan is still under County review. Discussions among the Company, NOVEC, and Black Chamber Group are ongoing to reach a solution that accommodates both the future NOVEC DP and the Proposed Route right-of-way. The Company considers the Proposed Route the best option for crossing the Tech Park property because it maximizes collocation on south side of the Company’s existing right-of-way. Along this segment of the Proposed Route, collocation to the south avoids impacts to the Broad Run riparian area, floodplain, stream, and wetlands by maximizing right-of-way on land planned and zoned for industrial development.

The Proposed Route is the shortest of all the Mars-Wishing Star Lines route alternatives considered (3.55 miles) and, along with Alternative Route 6, provides the most collocation with existing transmission rights-of-way (1.80 mile). The Proposed Route impacts more forested land than Alternative Routes 1, 2, 3, and 4; however, by collocating along the existing right-of-way and not crossing Broad Run twice, the Proposed Route avoids forest and habitat fragmentation. In the area adjacent to Broad Run, the Proposed Route is almost entirely collocated with the existing transmission right-of-way, so impacts are contiguous with existing cleared right-of-way and future areas of tree clearing along the Tech Park data center development. To remain collocated along the north side of the existing right-of-

way, the Proposed Route spans directly over Broad Run for approximately 1,400 feet from a point near the confluence with the South Fork to a bluff above the south bank of Broad Run. To accommodate conductor blowout, this portion of the right-of-way will be expanded to 200 feet wide. Despite the impacts of clearing trees and spanning directly over Broad Run, the Proposed Route offers the advantage of shortening the overall crossing of the Broad Run riparian area. Whereas Alternative Routes 1, 2, 3, and 4 require two perpendicular crossings of Broad Run, the Proposed Route crosses over Broad Run in a single span before reaching the bluffs above the south bank. The Proposed Route also impacts the least amount of total wetlands (17.61 acres) including the least amount of forested wetlands (6.50 acres) compared to all other routes.

The Proposed Route also mitigates visual impacts to sensitive user groups: residents living in the neighborhoods north of Evergreen Mills Road and recreational users of the Stream Valley Park and Trail System (“park and trail”). Alternative Routes 1, 2, 3, and 4 cross the existing and future trails multiple times; the Proposed Route does not directly cross directly over any trail segment. The Proposed Route will impact a 0.04-mile segment of trail within the right-of-way and will require clearing. This contrasts with Alternative Routes 1 and 2 that would have 0.50 mile and 0.45 mile of trail within their respective rights-of-way. The visual effect on the park and trail users is also mitigated by avoiding lengthy spans of transmission line overhead or having long, cleared right-of-way corridors visible from multiple points along the trail system. The Proposed Route also mitigates impacts to residential neighborhoods to the north. The route is both further to the south compared to the Alternative Routes and the proposed structure locations are positioned along the existing 230 kV structures owing to the collocated rights-of-way. The visual effect for the user is that, from most viewing angles, the new structures appear very close to one another and will not greatly increase the visual impacts the way a non-collocated right-of-way would increase visual contrast between new and existing structures separated by a greater interval.

For these reasons, and those discussed in the Environmental Routing Study, the Company selected Route 5 as the Proposed Route for the Mars-Wishing Star Lines.

Alternative Route 1

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation. Alternative Route 1 is approximately 3.63 miles in length.

Beginning at the proposed Wishing Star Substation, Alternative Route 1 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. Alternative Route 1 continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road. After crossing Belmont Ridge Road, Alternative Route 1 parallels the south side of the Company’s existing right-of-way for Lines #2172 and #2183 for 0.2 mile on an undeveloped parcel. Alternative Route 1 then

turns north, crossing the existing right-of-way and Broad Run, and continues another 0.2 mile onto an undeveloped parcel. Route 1 then turns east for 0.5 mile along the south side of a stormwater detention pond before turning slightly to the northeast. Alternative Route 1 heads northeast for 0.3 mile and crosses a parcel dedicated as an open space proffer for the Brambleton Community Association.

At a point just south of the intersection of Evergreen Mills Road and Loudoun County Parkway, Alternative Route 1 crosses Loudoun County Parkway before turning southeast and continuing across Broad Run. Alternative Route 1 continues southeast along the southwestern edge of an undeveloped tract for 0.3 mile, rejoining the Company's existing right-of-way for Lines #2137 and #2213. Alternative Route 1 then continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning the Company's Lines #2137 and #2213. Alternative Route 1 continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

Approximately 0.2 mile west of the proposed Mars Substation, Alternative Route 1 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The 500 kV right-of-way turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the proposed Mars Substation. The 230 kV right-of-way continues southeast for 0.2 mile before crossing Carters School Road, then turns north to terminate on the south side of the proposed Mars Substation.

Construction of Alternative Route 1 will cross a total of 3.63 miles of land affecting 91.87 acres of right-of-way. This includes 0.34 mile and 3.36 acres where Alternative Route 1 splits into two separate rights-of-way before terminating at the Mars Substation, and 30.01 acres for the proposed Wishing Star and Mars Substations. All 14 parcels crossed are privately owned. Land use along Alternative Route 1 right-of-way consists of 33.98 acres of forested land, 37.73 acres of open space, 18.88 acres of developed land, and 1.28 acres of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Alternative Route 1 will encompass approximately 23.96% (22.03 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these, the majority (11.05 acres) consist of palustrine forested ("PFO") wetlands. Alternative Route 1 has a total of 9 waterbody crossings, including 6 perennial and 3 intermittent crossings streams. This route will require the clearing of approximately 33.98 acres of forested land, which is the least amount of forest clearing anticipated for any of the routes.

Alternative Route 1 will be collocated with the Company's existing transmission lines for 0.73 mile (20% of the route), which is the least of the alternative routes.

Alternative Route 1 impacts 5.14 acres of Stream Valley Park and crosses the trail system nine times. Alternative Route 1 impacts 2.68 acres of Restrictive Preservation Areas and 4.32 acres of Wetland Mitigation Areas. See Attachment II.A.6.b. Alternative Route 1 impacts the least amount of forested land (33.98

acres) but provides the least amount of collocation along the existing right-of-way (0.73 mile). Because Alternative Route 1 is located closer to the neighborhoods north of Evergreen Mills Road, it will likely result in changes in visual character to groups with great sensitivities including residents and recreational users. By not collocating along the existing right-of-way an approximately 70-acre portion of the Broad Run riparian corridor will be fragmented and encircled by new and existing electric transmission rights-of-way. Alternative Route 1 impacts the most wetlands (22.03 acres) and most forested wetlands (11.05 acres).

Alternative Route 2

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation. Alternative Route 2 is approximately 3.64 miles in length.

Beginning at the proposed Wishing Star Substation, Alternative Route 2 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. The route continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road. After crossing Belmont Ridge Road, Alternative Route 2 parallels the south side of the Company's existing right-of-way for Lines #2172 and #2183 for 0.2 mile across an undeveloped tract. Alternative Route 2 then turns north, crossing Lines #2172 and #2183 and Broad Run, before continuing about 0.2 mile onto another undeveloped parcel. The route then turns east for 0.5 mile along the south side of a stormwater detention pond before turning to the southeast and crossing Broad Run again. After crossing Broad Run, Alternative Route 2 turns east for 0.3 mile to parallel the north side of the existing right-of-way for Lines #2137 and #2213.

Prior to crossing Loudoun County Parkway, Alternative Route 2 turns slightly northeast away from the Company's existing right-of-way to avoid land owned by MWAA. The route then turns southeast and continues about 0.3 mile along the southwestern edge of an undeveloped parcel before rejoining the existing Company's existing right-of-way for Lines #2137 and #2213. Alternative Route 2 then continues for 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning the Company's Lines #2137 and #2213. The route continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

Approximately 0.2 mile west of the proposed Mars Substation, Alternative Route 2 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The 500 kV right-of-way turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the proposed Mars Substation. The 230 kV right-of-way continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation.

Construction of Alternative Route 2 will cross a total of 3.64 mile of land affecting 92.08 acres of right-of-way. This includes 0.34 mile and 3.36 acres where Alternative Route 2 splits into two separate rights-of-way before terminating at the Mars Substation, and 30.01 acres for the proposed Wishing Star and Mar Substations. All 15 parcels crossed are privately owned. Land use along Alternative Route 2 right-of-way consists of 34.96 acres of forested land, 36.21 acres of open space, 18.81 acres of developed land, and 2.11 acres of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Alternative Route 2 will encompass approximately 23.79% (21.92 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these, the majority (9.78 acres) consist of PFO wetlands. Alternative Route 2 has a total of 9 waterbody crossings, including 6 perennial crossings, and 3 intermittent streams. Alternative Route 2 will require the clearing of approximately 34.96 acres of forested land.

Alternative Route 2 will be collocated with the Company's existing transmission lines for a total of 1.13 miles (31% of the route).

Alternative Route 2 impacts 4.93 acres of Stream Valley Park and crosses the trail system nine times. Alternative Route 2 impacts 4.11 acres of Restrictive Preservation Areas and 4.32 acres of Wetland Mitigation Areas. See [Attachment II.A.6.b.](#)

Alternative Route 2 impacts the second least amount of forested land (34.96 acres) but impacts second greatest amount of total wetland (21.92 acres). Alternative Route 2 provides 0.67 mile less collocation with the existing right-of-way compared to the Proposed Route. Although Alternative Route 2 has less total length in close visual proximity to the residential areas than Alternative Route 1, visual impacts to both residential and recreation user groups would be more significant than the Proposed Route.

Alternative Route 3

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation. Alternative Route 3 is approximately 3.62 miles in length.

Beginning at the proposed Wishing Star Substation, Alternative Route 3 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. Alternative Route 3 continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way for Lines #2172 and #2183. Continuing along an undeveloped parcel for 0.5-mile, Alternative Route 3 turns northeast for 0.7 mile, crossing the existing Company right-of-way for Lines #2172 and #2183, Broad Run, and a parcel dedicated as the open space proffer for the neighboring

homeowners' association.

At a point just south of the intersection of Evergreen Mills Road and Loudoun County Parkway, Alternative Route 3 crosses Loudoun County Parkway before turning southeast and crossing Broad Run. Alternative Route 3 continues southeast for 0.3 mile along the southwestern edge undeveloped parcel before rejoining the existing right-of-way for Lines #2137 and #2213. The route continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning the Company's Lines #2137 and #2213. Alternative Route 3 continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

Approximately 0.2 mile west of the proposed Mars Substation, Alternative Route 3 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The 500 kV right-of-way turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the proposed Mars Substation. The 230 kV right-of-way continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation.

Construction of Alternative Route 3 will cross a total of 3.62 miles of land affecting 91.68 acres of right-of-way. This includes 0.34 mile and 3.36 acres where Alternative Route 3 splits into two separate rights-of-way before terminating at the Mars Substation, and 30.01 acres for the proposed Wishing Star and Mar Substations. All 14 parcels crossed are privately owned. Land use along Alternative Route 3 right-of-way consists of 40.69 acres of forested land, 30.94 acres of open space, 18.88 acres of developed land, and 1.17 acres of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Route 3 will encompass approximately 20.82% (19.09 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these, the majority (9.66 acres) consist of PFO wetlands. Route 3 has a total of 6 waterbody crossings, including 3 perennial and 3 streams. Route 3 will require the clearing of approximately 40.69 acres of forested land.

Alternative Route 3 will be collocated with the Company's existing transmission lines for a total of 1.13 miles (31% of the route).

Alternative Route 3 impacts 5.14 acres of Stream Valley Park and crosses the trail system five times. Alternative Route 3 impacts 3.27 acres of Restrictive Preservation Areas and 2.20 acres of Wetland Mitigation Areas. See Attachment II.A.6.b.

Alternative Route 3 provides 0.74 mile less collocation with the existing right-of-way compared to the Proposed Route. Alternative Route 3 has less total length near the residential areas than Alternative Routes 1 or 2, but visual impacts to sensitive user groups would be greater than the Proposed Route. Alternative Route 3 impacts

fewer total wetlands (19.09 acres) than Alternative Routes 1 and 2 and impacts the second least amount of forested land of all the routes considered (31.37 acres).

Alternative Route 4

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation. Alternative Route 4 is approximately 3.63 miles in length.

Beginning at the proposed Wishing Star Substation, Alternative Route 4 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. Alternative Route 4 continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way for Lines #2172 and #2183. Continuing along an undeveloped parcel for 0.5-mile, Alternative Route 4 turns northeast for 0.4 mile, crossing the existing Company right-of-way, Broad Run, and an undeveloped parcel. The route then turns back to the southeast for 0.2 mile, again crossing Broad Run, then turns east for 0.3 mile to parallel the north side of the existing right-of-way for Lines #2137 and #2213.

Before crossing Loudoun County Parkway, Alternative Route 4 turns slightly northeast away from the existing right-of-way to avoid land owned by MWAA. The route then turns and continues southeast for 0.3 mile along the southwestern edge of an undeveloped parcel before rejoining the existing right-of-way for another 0.3 mile. Alternative Route 4 then continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning the Company's Lines #2137 and #2213. The route continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

Approximately 0.2 mile west of the proposed Mars Substation, Alternative Route 4 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The 500 kV right-of-way turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the proposed Mars Substation. The 230 kV right-of-way continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation.

Construction of Alternative Route 4 will cross a total of 3.63 miles of land affecting 91.90 acres of right-of-way. This includes 0.34 mile and 3.36 acres where Alternative Route 4 splits into two separate rights-of-way before terminating at the Mars Substation, and 30.01 acres for the proposed Wishing Star and Mars Substations. All 15 parcels crossed are privately owned. Land use along Alternative Route 4 right-of-way consists of 41.66 acres of forested land, 29.42 acres of open space, 18.81 acres of developed land, and 2.01 acres of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of

Alternative Route 4 will encompass approximately 20.65% (18.98 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these, the majority (8.40 acres) consist of PFO wetlands. Alternative Route 4 has a total of 9 waterbody crossings, including 6 perennial and 3 intermittent streams. Alternative Route 4 will require the clearing of approximately 41.66 acres of forested land.

Alternative Route 4 will be collocated with the Company's existing transmission lines for 1.46 miles (40% of the route).

Alternative Route 4 impacts 4.93 acres of Stream Valley Park and crosses the trail system four times. Alternative Route 4 impacts 4.71 acres of Restrictive Preservation Areas and 2.20 acres of Wetland Mitigation Areas. See Attachment II.A.6.b.

Alternative Route 4 provides 0.34 mile less collocation with the existing right-of-way compared to the Proposed Route. Alternative Route 4 impacts the second least total wetlands (18.98 acres) and impacts slightly less forested land than the Proposed Route (41.66 acres). Alternative Route 4 crosses Broad Run three times. Alternative Route 4 does not run adjacent to Evergreen Mills Road which, in turn, mitigates visual impacts to a greater degree than Alternative Routes 1, 2, and 3. Although the three spans of Broad Run mitigate visual impacts to residential and recreational users, the route also fragments an approximately 15-acre portion of the Broad Run riparian corridor by encircling it with new and existing transmission right-of-way.

Alternative Route 6

This route would construct an overhead 500 kV single circuit transmission line with a 230 kV single circuit transmission line underbuilt between the proposed Wishing Star Substation and Mars Substation. Alternative Route 6 is approximately 3.56 miles in length.

Beginning at the proposed Wishing Star Substation, Alternative Route 6 travels east for about 0.3 mile along the south side of Broad Run before crossing a future VDOT right-of-way associated with the Northstar Boulevard extension project. Alternative Route 6 continues east for 0.3 mile along an undeveloped parcel before crossing Belmont Ridge Road and paralleling the south side of the Company's existing right-of-way for Lines #2172 and #2183. Continuing along an undeveloped parcel for 0.2-mile, Alternative Route 6 turns north to cross the existing Company right-of-way then turns east again to parallel the north side of the existing right-of-way. For approximately 0.9 mile, the route continues east along Broad Run, paralleling the north side of the existing right-of-way.

Prior to crossing Loudoun County Parkway, Alternative Route 6 turns slightly northeast away from the existing right-of-way to avoid land owned by MWAA. After crossing Loudoun County Parkway, Alternative Route 6 turns southeast and continues for 0.3 mile along the southwestern edge undeveloped parcel before

rejoining the existing Company right-of-way for Lines #2137 and #2213. The route continues 0.2 mile across NOVEC-owned land before crossing Old Ox Road and spanning the Company's Lines #2137 and #2213. Alternative Route 6 continues southeast for 0.7 mile across a surface parking lot, paralleling the north side of MWAA's West Perimeter Road.

Approximately 0.2 mile west of the proposed Mars Substation, Alternative Route 6 splits into two separate rights-of-way, one for the 500 kV line and the other for the 230 kV line. The 500 kV right-of-way turns east for 0.2 mile before crossing Carters School Road and terminating on the west side of the proposed Mars Substation. The 230 kV right-of-way continues southeast for 0.2 mile before crossing Carters School Road and turning north to terminate on the south side of the proposed Mars Substation.

Construction of Alternative Route 6 will cross a total of 3.56 mile of land affecting 92.89 acres of right-of-way. This includes 0.34 mile and 3.36 acres where Alternative Route 6 splits into two separate rights-of-way before terminating at the Mars Substation, and 30.01 acres for the proposed Wishing Star and Mar Substations. All 18 parcels crossed are privately owned. Land use along Alternative Route 6 right-of-way consists of 42.96 acres of forested land, 28.36 acres of open space, 18.81 acres of developed land, and 2.74 acre of open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Route 6 will encompass approximately 21.06% (19.56 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these, the majority (7.71 acres) consist of PFO wetlands. Alternative Route 6 has a total of 11 waterbody crossings, including 9 perennial and 2 intermittent streams. Alternative Route 6 will require the clearing of approximately 42.96 acres of forested land.

Alternative Route 6 will be collocated with the Company's existing transmission lines for a total of 1.80 miles (51% of the route).

Alternative Route 6 impacts 4.84 acres of Stream Valley Park and no crossings of the trail system. Alternative Route 6 impacts 10.93 acres of Restrictive Preservation Areas but does not impact any Wetland Mitigation Areas. See Attachment II.A.6.b.

Alternative Route 6 provides the same collocation length as Proposed Route (1.80 mile) but impacts more total wetland (19.56 acres) and forested wetland (7.71 acres). Despite having the same collocation length as the Proposed Route, Alternative Route 6 would parallel the north side of the existing right-of-way 0.32 mile west of the Proposed Route. While this earlier crossing avoids the planned NOVEC DP footprint, this alignment results in greater impacts to the Broad Run riparian area by not leveraging land planned for future industrial (data center) use.

Mars 230 kV Loop

Mars 230 kV Loop Proposed Route

This route would construct two new overhead 230 kV double circuit lines on two sets of double circuit structures from Mars Substation to cut in locations on the Company's existing 230 kV Cabin Run-Shellhorn Road Line #2095 and 230 kV Poland Road-Shellhorn Road Line #2137. The Mars 230 kV Loop Proposed Route is approximately 0.57 mile in length.

Beginning at the proposed Mars Substation, the route travels north across forested land that is planned for future data center development. The route parallels Carters School Road for 0.5 mile before terminating at the cut location along the Company's existing Line #2095. The cut in location is located just east of the intersection of Carters School Road and Old Ox Road.

Construction of the Mars 230 kV Loop Proposed Route will cross a total of 0.57 mile of land affecting 10.34 acres of right-of-way (excluding the Mars Substation). All 5 parcels crossed are privately owned. Land use along the Mars 230 kV Loop Proposed Route right-of-way consists of 8.84 acres of forested land, no amount of open space, 1.50 acres of developed land, and no open water.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of the Mars 230 kV Loop Proposed Route will encompass approximately 22.70% (2.35 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these, the majority (2.24 acres) consist of PFO wetlands. The Mars 230 kV Loop does not cross any perennial, intermittent, or open waterbody features. The Mars 230 kV Loop Proposed Route will require the clearing of approximately 8.84 acres of forested land.

No Alternative Routes were developed for the Mars 230 kV Loop because the Proposed Route is the shortest, most direct, and almost entirely collocated and parallel to Carters School Road. For these reasons, the Company selected the Proposed Route and did not develop or evaluate longer and more impactful route alternatives.

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: The Company plans to construct the Project in a manner that minimizes outage time. Note that it is the Company’s intention to construct the Wishing Star Substation, Mars-Wishing Star Lines, Mars Substation, and Mars 230 kV Loop at the same time.

The Company will request the outages discussed below from PJM prior to the date of such outages. It is customary for PJM not to grant approval of outages until shortly before the outages are expected to occur and, therefore, it may be subject to change.

Wishing Star Substation

The cut-in of Line #546 and Line #590 to the proposed Wishing Star Substation is planned to be completed in a two-phased approach. Assuming Project construction commences around September 2023, Phase 1 would include two subsequent outages in spring 2024 to install new backbones and temporary jumpers for Line #546, #590, #2045, and #2094. The first Phase 1 outage will require a PJM outage eDart ticket on the Brambleton-Mosby Line #546 and Brambleton-Loudoun Line #2094. The first Phase 1 outage should require a 21-day outage. The second Phase 1 outage will require a PJM outage eDart ticket on the Brambleton-Mosby Line #590 and Brambleton-Loudoun Line #2045. The second Phase 1 outage should require a 21-day outage.

Phase 2 would also include two subsequent outages in spring 2025 to complete the cut-in of Lines #546 and #590 to the proposed Wishing Star Substation. The first Phase 2 outage will require a PJM outage eDart ticket on the Brambleton-Mosby Line #546 and Brambleton-Loudoun Line #2094. The first Phase 1 outage should require a 5-day outage. The second Phase 2 outage will require a PJM outage eDart ticket on the Brambleton-Mosby Line #590 and Brambleton-Loudoun Line #2045. The second Phase 2 outage should require a 5-day outage.

Assuming a final order from the Commission by April 25, 2023, as requested in Section I.H of this Appendix, the Company estimates that the proposed Wishing Star Substation cut-ins will commence around spring 2024, and be completed by spring 2025.

Mars-Wishing Star Lines

The proposed Mars-Wishing Star Lines cross the Company's existing 230 kV lines at two locations. The first location is over a double-circuit alignment of the Brambleton-Evergreen Mills Line #2172 and Brambleton-Poland Road Line #2183 between Structure #2172/89 and #2172/90, and #2183/99 and #2183/100, respectively. Assuming Project construction commences around September 2023, a PJM outage eDart ticket on the Brambleton-Evergreen Mills Line #2172 and/or Brambleton-Poland Road Line #2183 will be required in fall 2024 to allow for the construction of the proposed Mars-Wishing Star Lines overtop the existing lines. The outage should require a 14-day outage.

The second location is over a double circuit alignment of the Poland Road-Shellhorn Road Line #2137 and Cabin Run-Yardley Ridge Line #2213 between Structure #2137/88 and #2137/89, and #2213/78 and #2213/79, respectively. Assuming Project construction commences around September 2023, a PJM outage eDart ticket on the Brambleton-Evergreen Mills Line #2172 and/or Brambleton-Poland Road Line #2183 will be required in fall 2024 to allow for the construction of the proposed Mars-Wishing Star Lines overtop the existing lines. The crossing of Line #2137 and Line #2213 also includes a crossing of Old Ox Road, which is under the jurisdiction of VDOT. As such, the duration of this outage may require up to a 21-day outage but will be dependent on coordination with VDOT.

Assuming a final order from the Commission by April 25, 2023, as requested in Section I.H of this Appendix, the Company estimates that the crossing of the existing lines for the construction of the proposed Mars-Wishing Star Lines will commence and be completed during fall 2024.

Mars Substation and Mars 230 kV Loop

The cut-in of Line #2095 and Line #2137 to the proposed Mars Substation is planned to be completed in a two-phased approach. Assuming Project construction commences around September 2023, Phase 1 would include two subsequent outages in fall 2024 to install new structures and temporary jumpers for Line #2095 and Line #2137, and dead-end new conductor coming from the proposed Mars Substation to the new structures. The first Phase 1 outage will require a PJM outage eDart ticket on the Cabin Run-Shellhorn Road Line #2095 and Poland Road-Shellhorn Road Line #2137. The first Phase 1 outage should require a 14-day outage. The second Phase 1 outage will require a PJM outage eDart ticket on the Cabin Run-Shellhorn Road Line #2095 and Poland Road-Shellhorn Road Line #2137. The second Phase 1 outage should require a 14-day outage.

Phase 2 would also include two subsequent outages in spring 2025 to complete the cut-in of Lines #2095 and #2137 to the proposed Mars Substation. The first Phase 2 outage will require a PJM outage eDart ticket on the Cabin Run-Shellhorn Road Line #2095 and Poland Road-Shellhorn Road Line #2137. The first Phase 1 outage should require a 5-day outage. The second Phase 2 outage will require a PJM

outage eDart ticket on the Cabin Run-Shellhorn Road Line #2095 and Poland Road-Shellhorn Road Line #2137. The second Phase 2 outage should require a 12-day outage.

Assuming a final order from the Commission by April 25, 2023, as requested in Section I.H of this Appendix, the Company estimates that the proposed Mars Substation and for the Mars 230 kV Loop cut-ins will commence around fall 2024, and be completed by spring 2025.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

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

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

The Company utilized Guideline #1 (existing rights-of-way should be given priority when adding additional facilities) by siting portions of the proposed Project along an existing Company-owned transmission line right-of-way. Collocation numbers for the Project routes are discussed in Section III.D.

The proposed Project will have no impact to any site listed on the National Register of Historic Places (“NRHP”). Thus, it is consistent with Guideline #2 (where practical, rights of-way should avoid sites listed on the NRHP). A Stage I Pre-Application Analysis prepared by ERM on behalf of the Company, which is included with the Environmental Routing Study as Attachment Appendix F and was submitted to the Virginia Department of Historic Resources (“VDHR”) on October 27, 2022.

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

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (“ROW”)

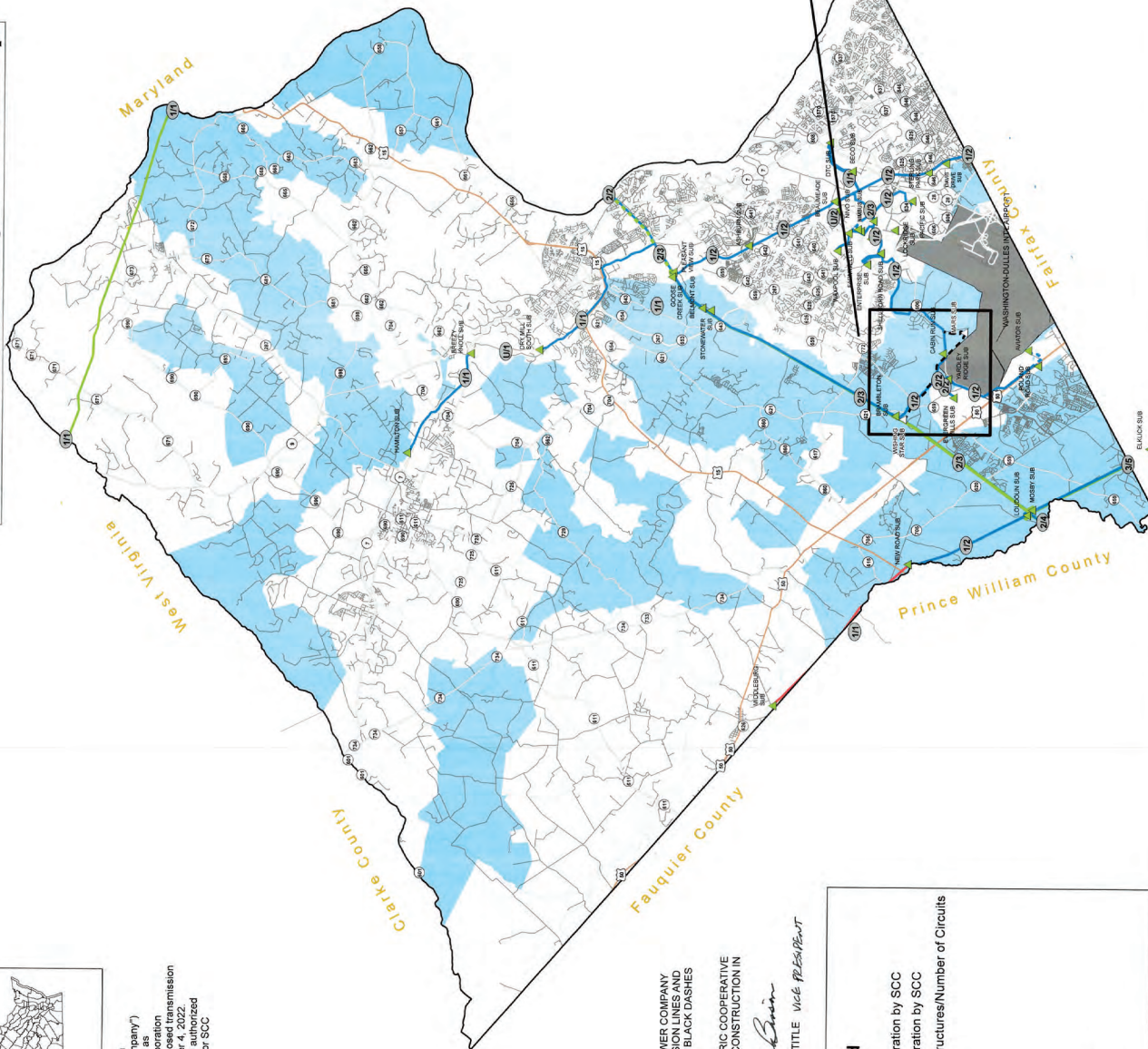
12. a. Detail counties and localities through which the line will pass. If any portion of the line will be located outside of the Applicant’s certificated service area: (1) identify each electric utility affected; (2) state whether any affected electric utility objects to such construction; and (3) identify 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 Mars-Wishing Star Lines traverse Loudoun County for a total of approximately 3.55 miles. Approximately 0.04 miles are located in the Company’s service territory, and approximately 3.51 miles are located in NOVEC’s service territory. The entire 0.57-mile Mars 230 kV Loop is located in NOVEC’s service territory within Loudoun County. The Company has confirmed that NOVEC does not object to the proposed Project.

 b. An electronic copy of the VDOT “General Highway Map” for Loudoun County has been marked as required and submitted with the Application. A reduced copy of the map is provided as Attachment II.A.12.b.

Loudoun County Road Map



*NOT used for other road data
County data current as of
June 2018.

Loudoun



The digital map depicts the Virginia Electric and Power Company ("VEPCO") transmission facilities in this county as approved by the Virginia State Corporation Commission ("SCC"), and any proposed transmission facilities in this county, as of October 4, 2022. County data current as of June 2018. The SCC may be depicted on prior SCC approved county maps.

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

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

SIGNATURE *Mark E. Brin*

DATE 10/11/22 TITLE VICE PRESIDENT

Legend

- Proposed Project
- 500KV Under Consideration by SCC
- 230KV Under Consideration by SCC
- Number of Lines of Structures/Number of Circuits
- Proposed Substation
- Existing Substation
- 115 KV
- 230 KV
- 500 KV
- Provider Service Territory
- NOVEC
- VEPCO

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: Mars-Wishing Star Lines

The proposed 500 kV line will be designed and operated at 500 kV with no anticipated voltage upgrade and have a transfer capability of 4,357 MVA.

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

Mars 230 kV Loop

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

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: Mars-Wishing Star Lines

The proposed 500 kV line will include three-phase triple-bundled 1351.5 ACSR conductors arranged as shown in Attachments II.B.3.i-iv. The three-phase triple-bundled 1351.5 ACSR conductors are a Company standard for new 500 kV construction.

The proposed 230 kV line will include 3-phase twin-bundled 768.2 ACSS/TW/HS conductors arranged as shown in Attachments II.B.3.i-iii and v-vii. The twin-bundled 768.2 ACSS/TW/HS conductors are a Company standard for new 230 kV construction.

Mars 230 kV Loop

The two proposed double circuit 230 kV lines will include 3-phase twin-bundled 768.2 ACSS/TW/HS conductors arranged as shown in Attachments II.B.3.viii-ix. The twin-bundled 768.2 ACSS/TW/HS conductors are a Company standard for new 230 kV construction.

II. DESCRIPTION OF THE PROPOSED PROJECT

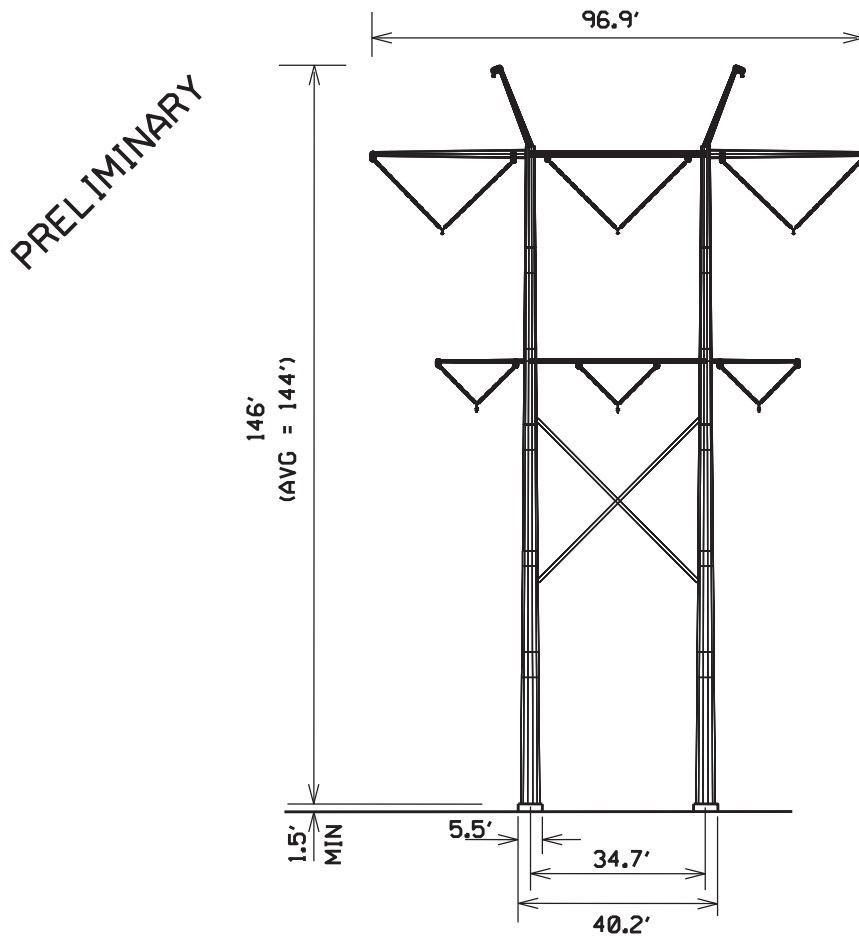
B. Line Design and Operational Features

- 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-ix.

See Attachment II.B.3.x for approximate mapping of the proposed structures along the Proposed Route, which is subject to change during final engineering.

DOUBLE CIRCUIT H-FRAME SUSPENSION

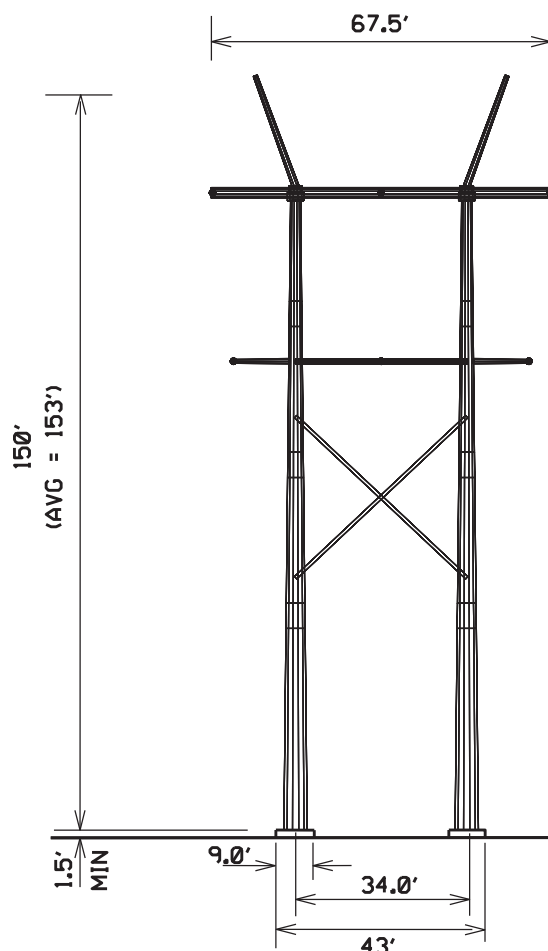


- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
SHORTER STRUCTURES FOR DOUBLE CIRCUIT CONFIGURATION, PREFERRED BY PUBLIC OVER LATTICE
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
6 AND 3.2 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 96.9 FEET
- g. AVERAGE WIDTH AT BASE: 40.2 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 151 FEET, 136 FEET, AND 144 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 722 FEET (RANGE 158 - 1379 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5 / 27.9 FEET (230/500 KV) AND 64.7/32.2 FEET (230/500 KV) 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.

DOUBLE CIRCUIT H-FRAME

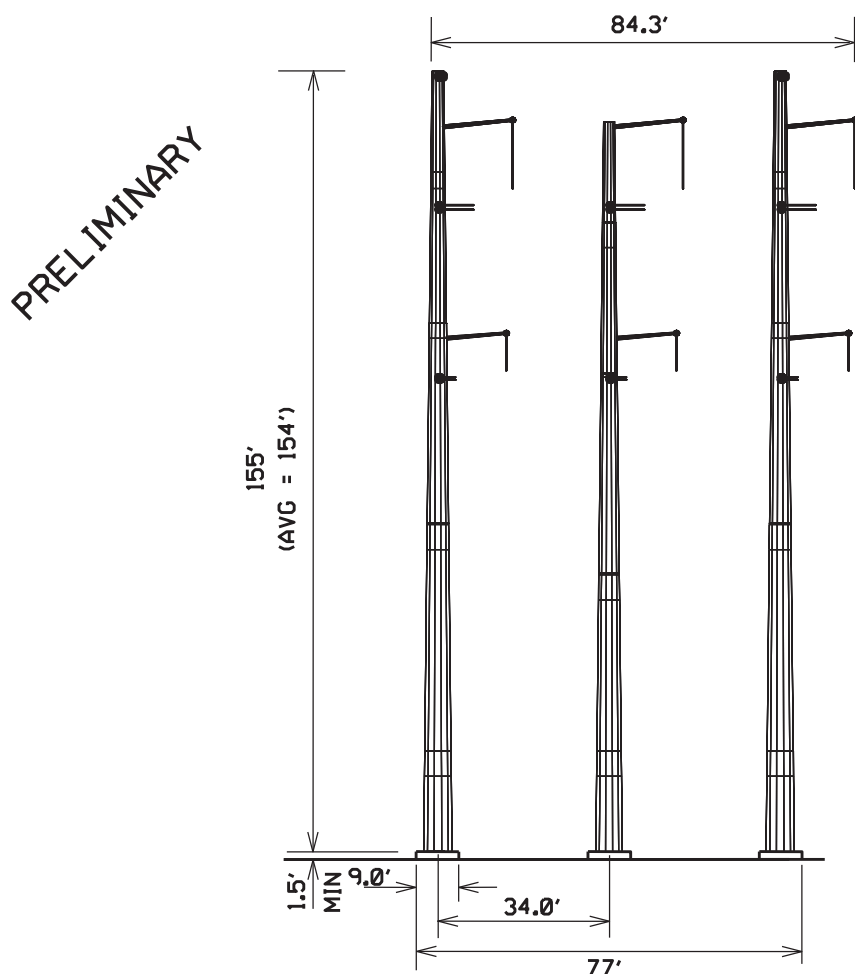
PRELIMINARY



- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
SHORTER STRUCTURES FOR DOUBLE CIRCUIT CONFIGURATION, PREFERRED BY PUBLIC OVER LATTICE
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
4 AND 3.2 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 67.5 FEET
- g. AVERAGE WIDTH AT BASE: 43.0 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 165 FEET, 135 FEET, AND 153 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 722 FEET (RANGE 158 - 1379 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5
/27.9 FEET (230/500 KV) AND 64.7/32.2 FEET (230/500 KV) 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.

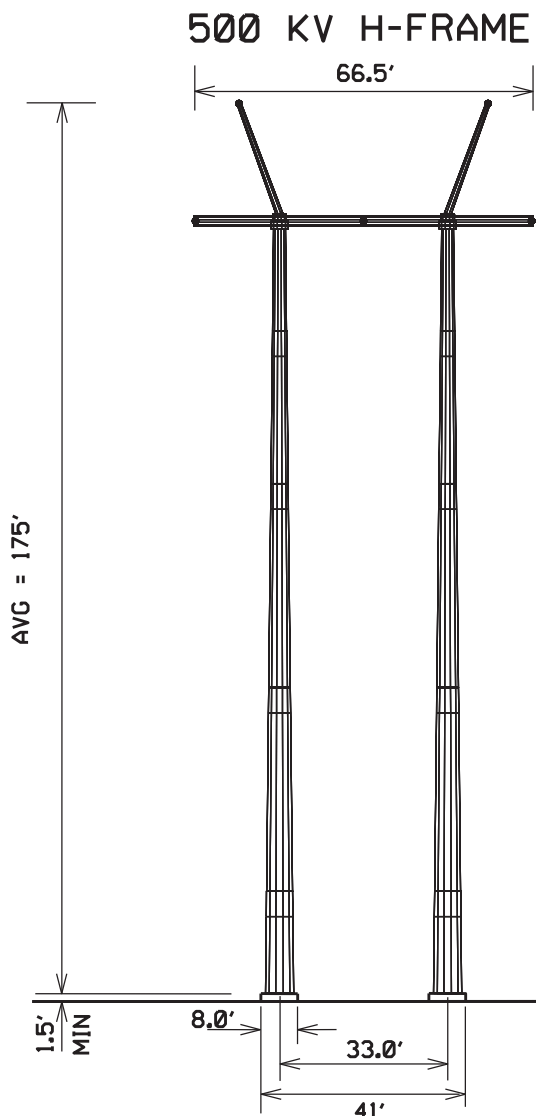
DOUBLE CIRCUIT 3-POLE



- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
SHORTER STRUCTURES FOR DOUBLE CIRCUIT CONFIGURATION, PREFERRED BY PUBLIC OVER LATTICE
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
8 AND 3.2 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 84.3 FEET
- g. AVERAGE WIDTH AT BASE: 77.0 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 185 FEET, 130 FEET, AND 154 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 722 FEET (RANGE 158 - 1379 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS: 22.5 / 27.9 FEET (230/500 KV) AND 64.7/32.2 FEET (230/500 KV) 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.

PRELIMINARY

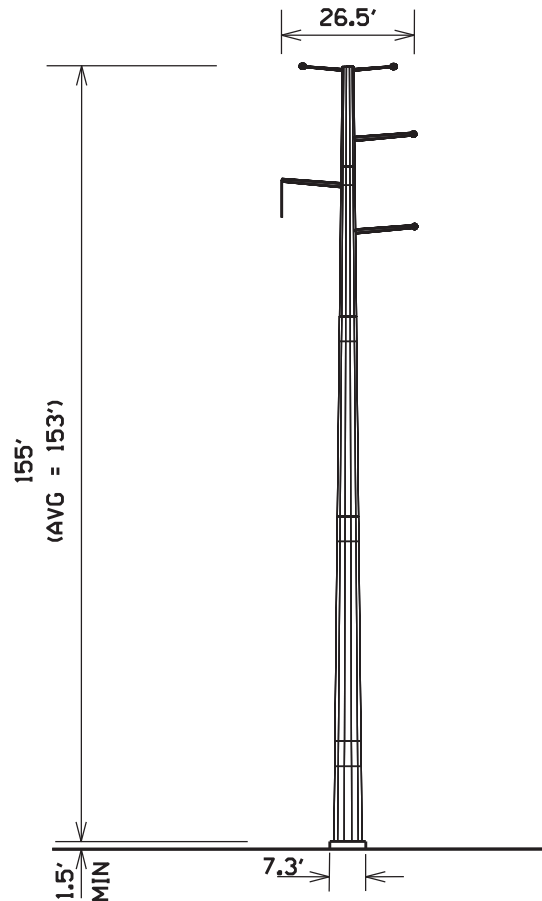


- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
SHORTER STRUCTURES FOR SINGLE CIRCUIT 500 KV CONFIGURATION, PREFERRED BY PUBLIC OVER LATTICE
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
2 AND 3.2 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 66.5 FEET
- g. AVERAGE WIDTH AT BASE: 41.0 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 190 FEET, 160 FEET, AND 175 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 722 FEET (RANGE 158 - 1379 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS:
27.9 FEET (500 KV) AND 64.7 FEET (500 KV) 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.

1-POLE W/ ARMS

PRELIMINARY

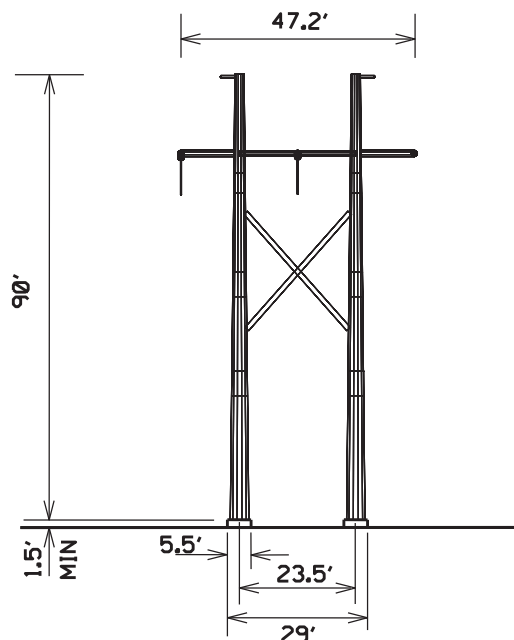


- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
MORE COMPACT STRUCTURES FOR SINGLE CIRCUIT 230KV CONFIGURATION
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
4 AND 3.2 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 26.5 FEET
- g. AVERAGE WIDTH AT BASE: 7.3 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 190 FEET, 130 FEET, AND 153 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 722 FEET (RANGE 158 - 1379 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS:
22.5 FEET (230 KV) 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.

230 KV H-FRAME

PRELIMINARY

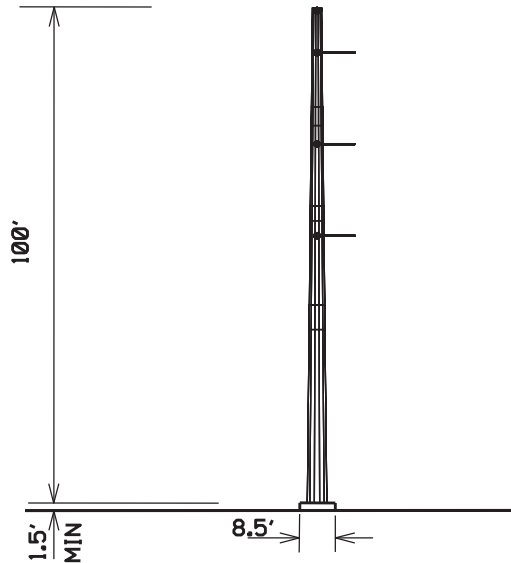


- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
SHORTER STRUCTURES FOR SINGLE CIRCUIT 230KV CONFIGURATION
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 0.3 MILES (230 KV SPLIT AT MARS)
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 47.2 FEET
- g. AVERAGE WIDTH AT BASE: 29.0 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 90 FEET, 90 FEET, AND 90 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 722 FEET (RANGE 158 - 1379 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS:
22.5 FEET (230 KV) 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.

1-POLE

PRELIMINARY

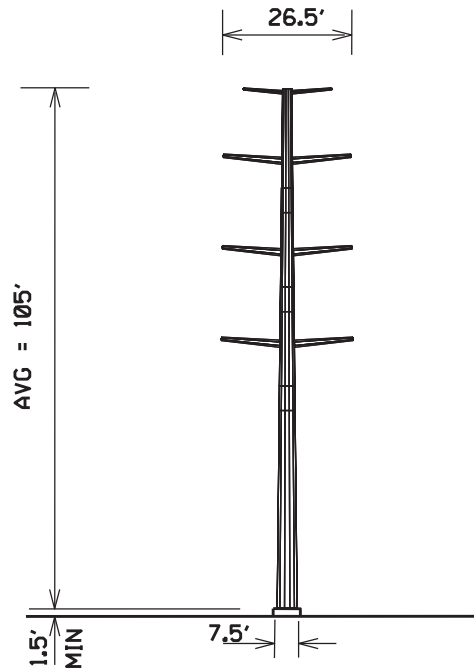


- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
MORE COMPACT STRUCTURES FOR SINGLE CIRCUIT 230KV CONFIGURATION
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
1 AND 0.3 MILES (230 KV SPLIT AT MARS)
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 3 FEET
- g. AVERAGE WIDTH AT BASE: 8.5 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 100 FEET, 100 FEET, AND 100 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 722 FEET (RANGE 158 - 1379 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS:
22.5 FEET (230 KV) 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.

DOUBLE CIRCUIT 1-POLE

PRELIMINARY

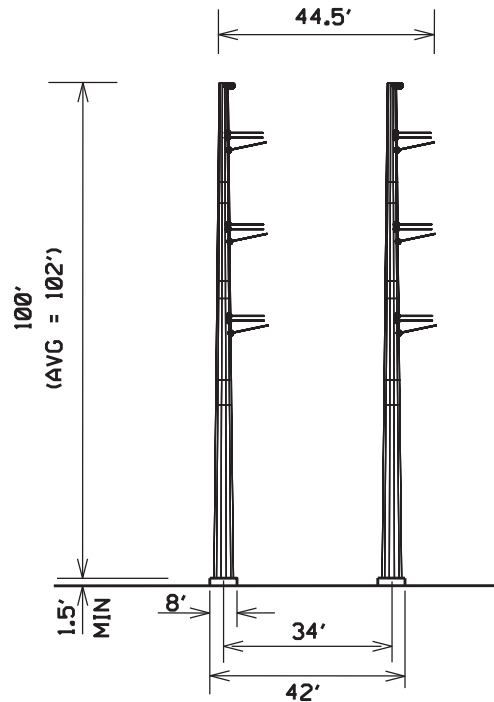


- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
MORE COMPACT STRUCTURES FOR DOUBLE CIRCUIT 230KV CONFIGURATION
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
6 AND 0.6 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 26.5 FEET
- g. AVERAGE WIDTH AT BASE: 7.5 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 115 FEET, 100 FEET, AND 105 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 520 FEET (RANGE 171 - 794 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS:
22.5 FEET (230 KV) 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.

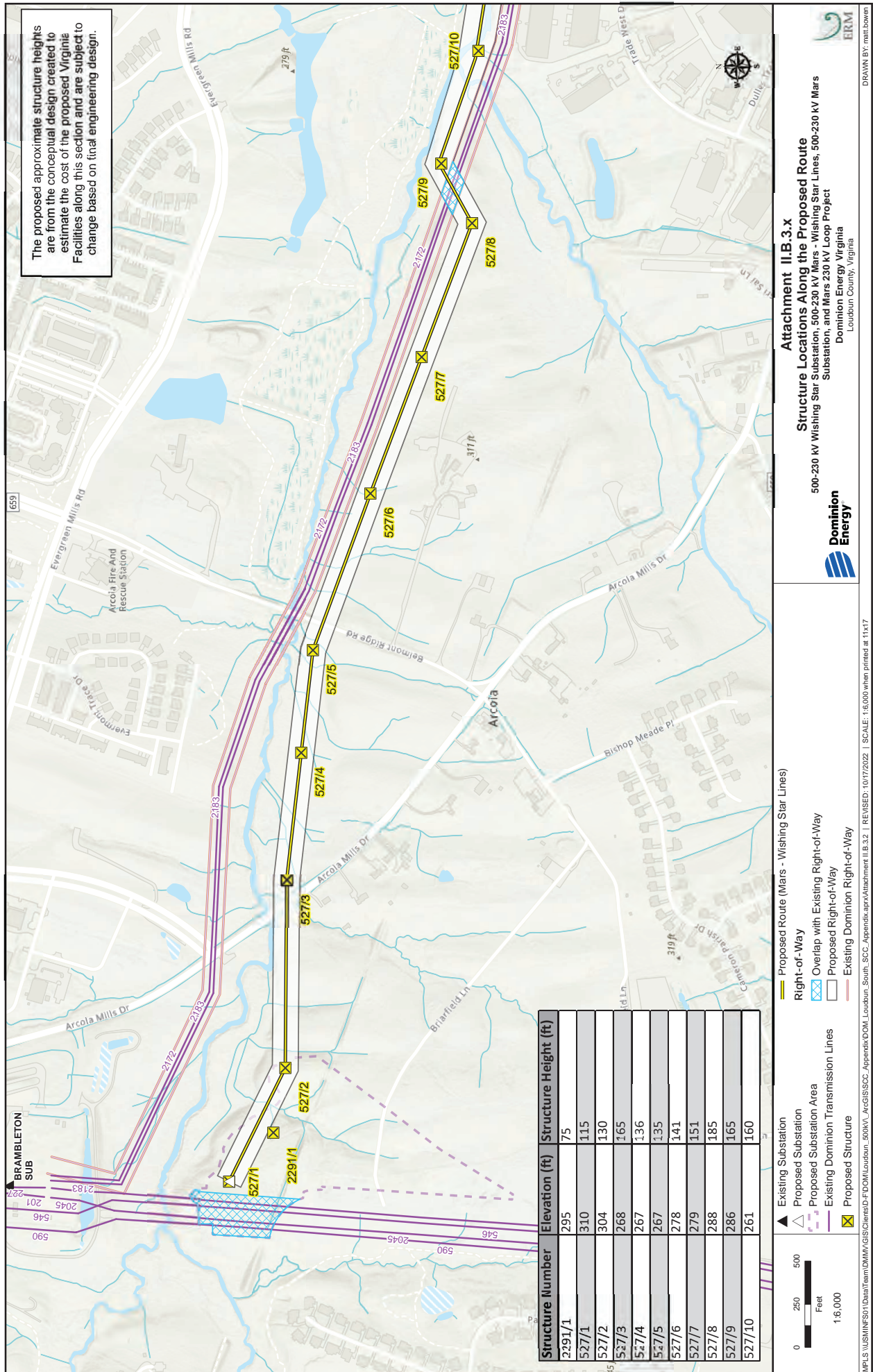
DOUBLE CIRCUIT 2-POLE

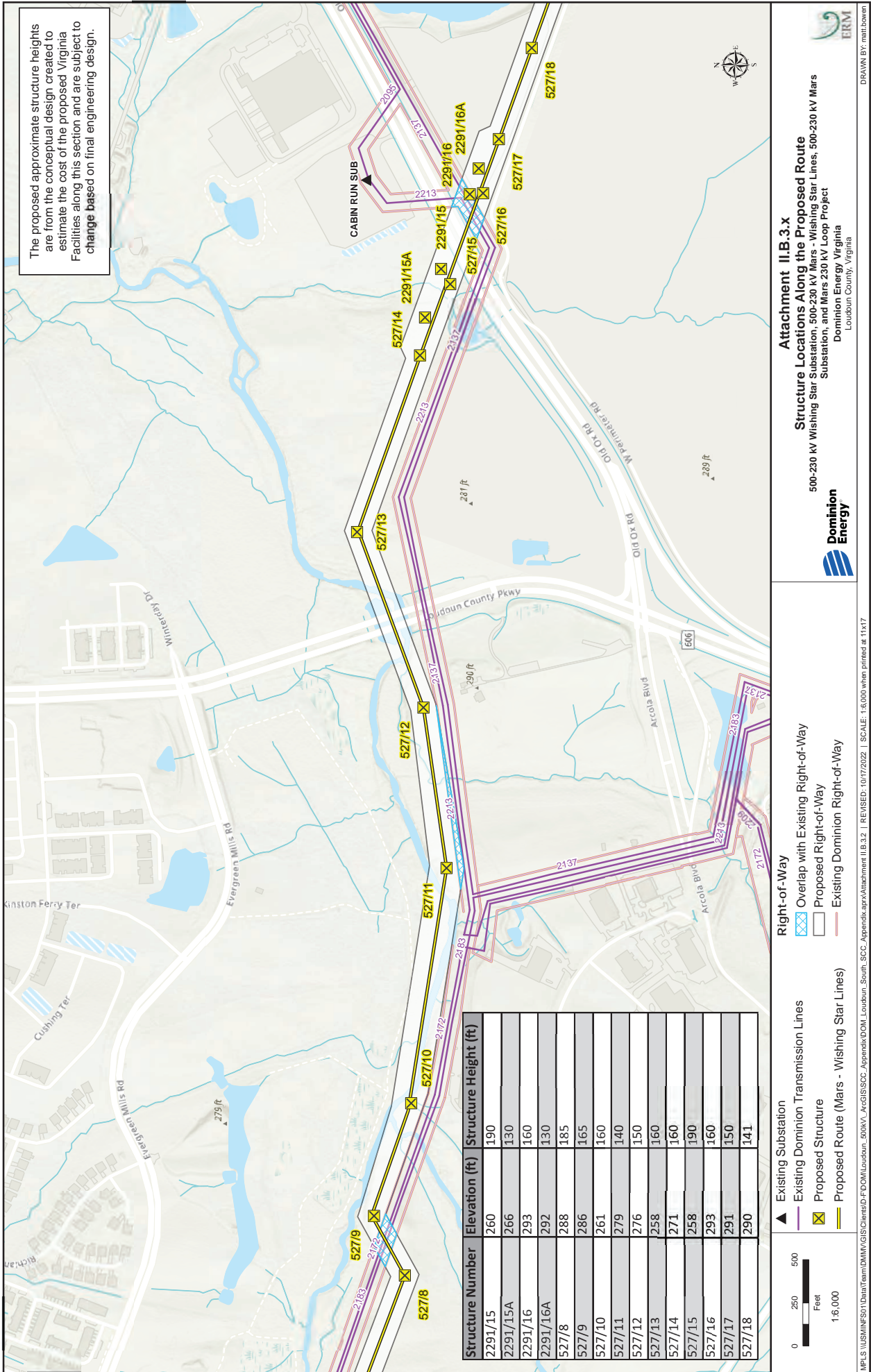
PRELIMINARY

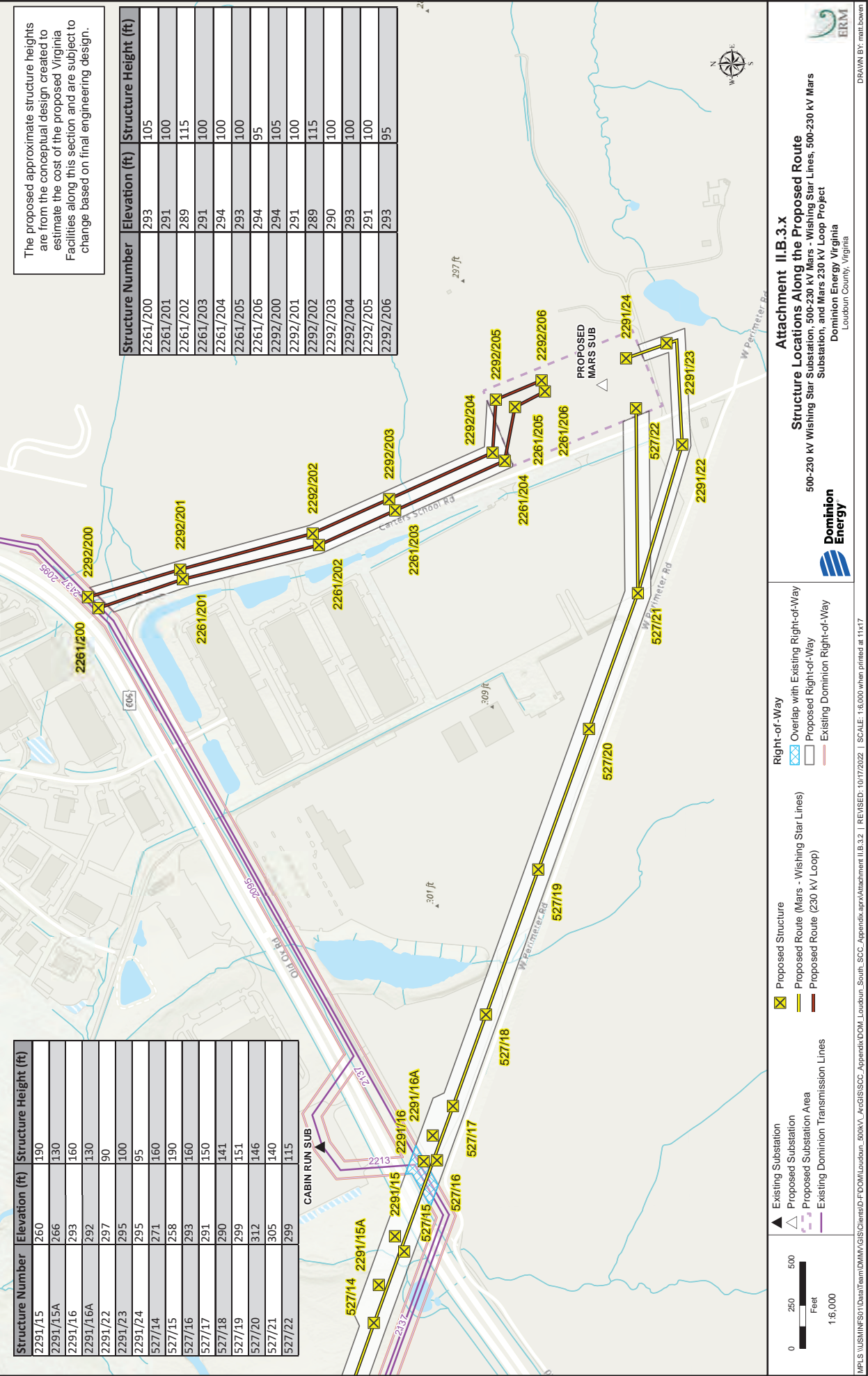


- a. MAPPING THAT IDENTIFIES EACH PORTION OF THE PREFERRED ROUTE:
SEE ATTACHMENT II.B.3.x
- b. RATIONALE FOR THE SELECTION OF THE STRUCTURE TYPE:
MORE COMPACT STRUCTURES FOR DOUBLE CIRCUIT 230KV CONFIGURATION
- c. NUMBER OF EACH TYPE OF STRUCTURE AND LENGTH OF EACH PORTION OF THE R/W:
6 AND 0.6 MILES
- d. STRUCTURE MATERIAL AND RATIONALE FOR THE SELECTION OF SUCH MATERIAL:
DULLED GALVANIZED STEEL TO MATCH EXISTING COMPANY STANDARD STRUCTURES
- e. FOUNDATION MATERIAL: CONCRETE (REVEAL WILL VARY BASED ON TERRAIN)
- f. AVERAGE WIDTH AT CROSSARM: 44.5 FEET
- g. AVERAGE WIDTH AT BASE: 42.0 FEET
- h. MAX, MIN, AND AVERAGE STRUCTURE HEIGHTS: 105 FEET, 100 FEET, AND 102 FEET
MEASURED FROM GROUNDLINE AT STRUCTURE CENTERLINE AND DOES NOT INCLUDE
FOUNDATION REVEAL
- i. AVERAGE SPAN LENGTH: 520 FEET (RANGE 171 - 794 FEET)
- j. MINIMUM CONDUCTOR-GROUND CLEARANCE UNDER MAXIMUM OPERATING CONDITIONS:
22.5 FEET (230 KV) PER THE NATIONAL ELECTRICAL SAFETY CODE

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







II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: The approximate structure heights along the Mars-Wishing Star Lines Proposed and Alternative Routes and the Mars 230 kV Loop Proposed Route are provided in the table below, based on preliminary conceptual design, not including foundation reveal and subject to change based on final engineering design.

Route	Minimum (ft.)	Maximum (ft.)	Average (ft.)
Mars-Wishing Star Lines Proposed Route (Route 5)	90	190	148
Mars-Wishing Star Lines Alternative Route 1	90	190	146
Mars-Wishing Star Lines Alternative Route 2	90	190	147
Mars-Wishing Star Lines Alternative Route 3	90	190	145
Mars-Wishing Star Lines Alternative Route 4	90	190	146
Mars-Wishing Star Lines Alternative Route 6	90	190	147
Mars 230 kV Loop Proposed Route	100	115	103

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: Not applicable.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: [a] Two double circuit 500 kV and 230 kV galvanized lattice suspension towers, Structures #546/26 / 2094/220 and #590/1893 / 2045/25, will be removed at the Wishing Star Substation cut-in location for the Mars-Wishing Star Lines. See Attachment II.B.6.a.

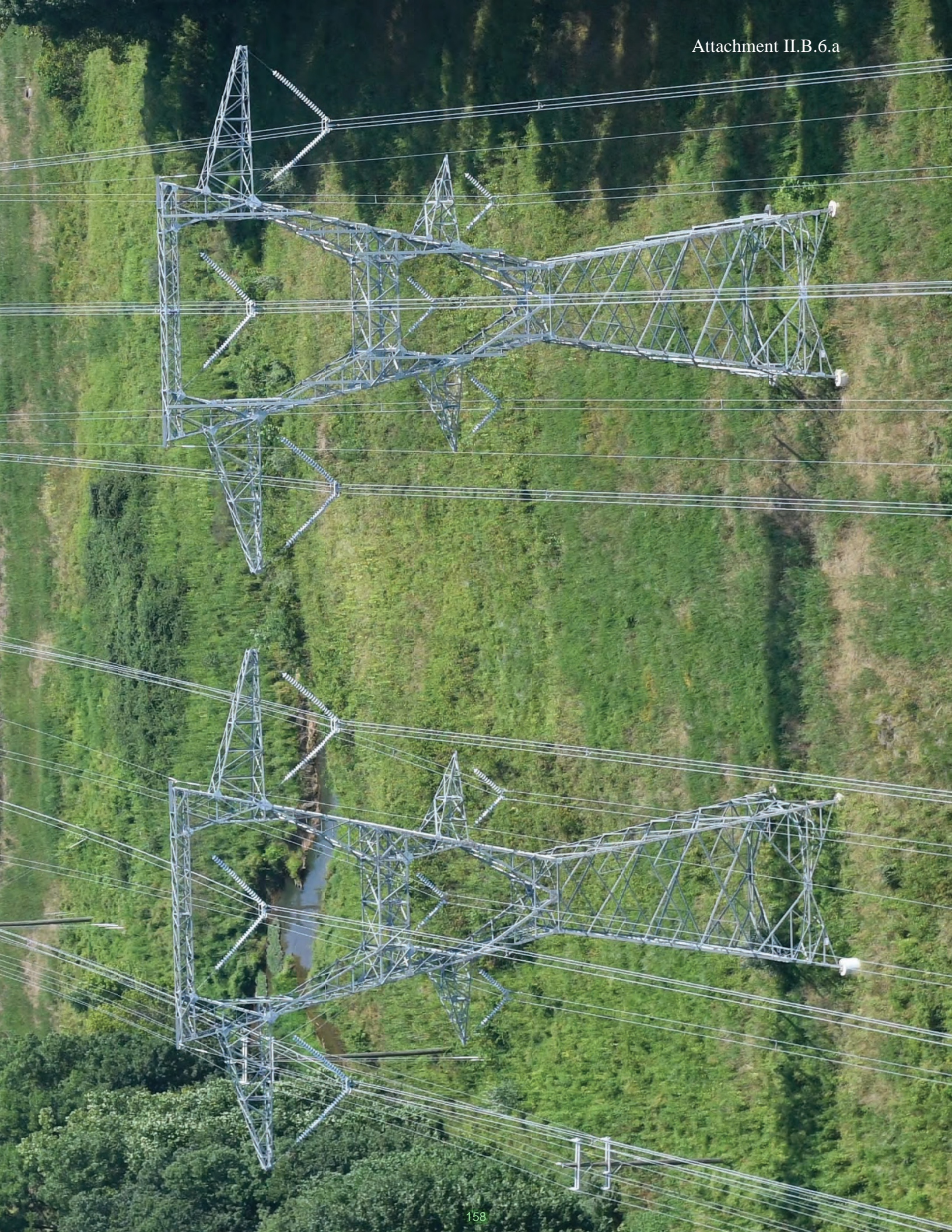
[b] See Attachment II.B.6.b.i-viii for representative photographs of the proposed structures.

[c] Visual simulations showing the appearance of the proposed transmission structures at identified historic locations within 1.0 mile of the proposed Project centerline are provided. See Attachment II.B.6.c for a map of the simulation locations, the existing views at the historic properties, and simulated proposed views from key observation points (KOPs”). These simulations were created using GIS modeling to depict whether the proposed structures will be visible from the identified historic property. One simulation was completed through 3D rendering, as the location of the simulation could not be accessed due to lack of permission from MWAA. The historic properties evaluated are described below. See also the Stage I Pre-Application Analysis Report contained in Appendix F of the Environmental Routing Study.

Historic Property	Viewpoint	Comments*
Dulles International Airport Historic District (VDHR ID# 053-0008)	KOP 3, 3D Rendering (VP 1)	Routes 1, 2, 3, 4, 5, 6, and the Mars Substation will have no more than a minimal impact on 053-0008.
Arcola Elementary School (VDHR ID# 053-0982)	KOP 1	Routes 1, 2, 3, 4, 5, 6, and the Wishing Star Substation will have no impact on 053-0982.
Arcola Slave Quarters (VDHR ID# 053-0984)	KOP 5	Routes 1, 2, 3, 4, 5, and 6 will have no impact on 053-0984.

* There are no historic resources within the VDHR study tiers of the Mars 230 kV Loop Proposed Route centerline.

See Attachment III.B.4 for visual simulations of key locations evaluated.





**Proposed Structure Type:
Galvanized 3-Pole Structure**





**Proposed Structure Type:
Galvanized 500kV/230kV H-Frame**





Proposed Structure Type:
Galvanized 500kV/230kV H-Frame Suspension



Attachment II.B.6.b.iii



**Proposed Structure Type:
Galvanized 500kV H-Frame**

Attachment II.B.6.b.iv



Proposed Structure Type:
Galvanized 230kV H-Frame

Attachment II.B.6.b.v





**Proposed Structure Type:
Galvanized 230kV 1-Pole with Arms**

Attachment II.B.6.b.vi





**Proposed Structure Type:
Galvanized 2-Pole Structure**

Attachment II.B.6.b.vii





**Proposed Structure Type:
Galvanized 1-Pole Structure**





PHOTOSIMULATIONS FOR MARS TO WISHING STAR LINES

Proposed Route (Route 5)

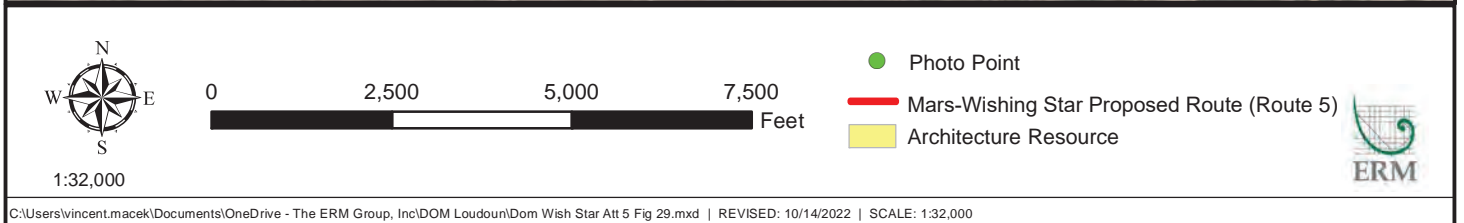


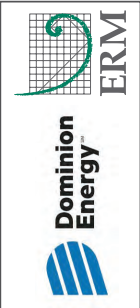
Figure 29: Aerial photograph depicting land use and photo view for 053-0008.



Existing View



Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 284701E 4316196N
 View Direction: 300 degrees
 Viewpoint Elevation: 276 feet
 Distance to Development: 1764 feet
 Horizontal Field of View: 90 degrees

Date of Photography: 12th August 2022 11:38
 Camera: Nikon D800
 Lens: Nikkor 50mm 1.4
 Camera Height: 5 feet



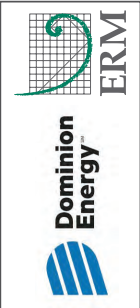
Viewpoint SP 03
 Beaver Meadow Rd NE of Rock Haven Way
 053-0008
 Pre-Application Analysis
 Wishing Star to Mars



Existing View

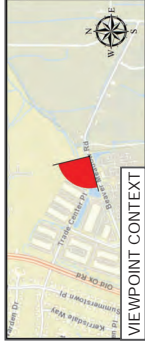


Proposed view showing location of transmission line structures



Viewpoint Location UTM Zone 18N: 284701E 4316196N
 View Direction: 300 degrees
 Viewpoint Elevation: 276 feet
 Distance to Development: 1764 feet
 Horizontal Field of View: 90 degrees

Date of Photography: 12th August 2022 11:38
 Camera: Nikon D800
 Lens: Nikkor 50mm 1.4
 Camera Height: 5 feet



Viewpoint SP 03
 Beaver Meadow Rd NE of Rock Haven Way
 053-0008
 Pre-Application Analysis
 Wishing Star to Mars



1:14,000

0 1,000 2,000 3,000 Feet

● Photo Point

— Mars-Wishing Star Proposed Route (Route 5)

■ Architecture Resource



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Figure 32: Aerial photograph depicting land use and photo view for 053-0982.



Existing View



Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 280095E 4314092N
 View Direction: 350 degrees
 Viewpoint Elevation: 337 feet
 Distance to Development: 5173 feet
 Horizontal Field of View: 100 degrees

Date of Photography: 12th August 2022 09:33
 Camera: Nikon D800
 Lens: Nikkor 50mm 1.4
 Camera Height: 5 feet



Viewpoint SP 0	tone
prings Blvd	W of I ex Dr
063-0982	
Pre-Application Analysis	
Wishing Star to Mars	



1:14,000

0 1,000 2,000 3,000 Feet

● Photo Point

— Mars-Wishing Star Proposed Route (Route 5)

■ Architecture Resource



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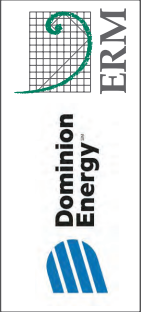
Figure 34: Aerial photograph depicting land use and photo view for 053-0984.



Existing View



Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 280927E 4313853N
 View Direction: 70 degrees
 Viewpoint Elevation: 307 feet
 Distance to Development: 9787 feet
 Horizontal Field of View: 100 degrees

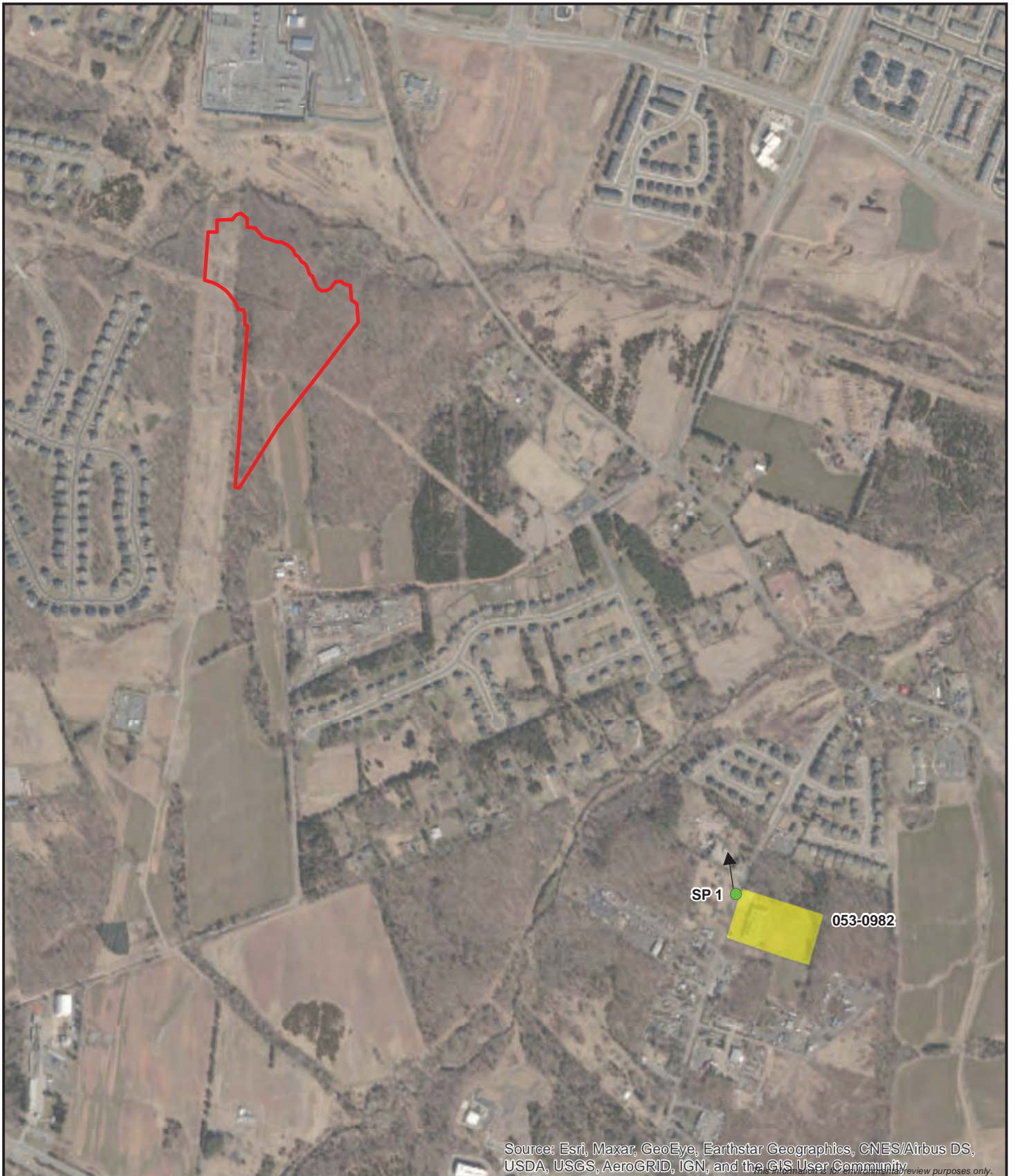
Date of Photography: 12th August 2022 10:34
 Camera: Nikon D800
 Lens: Nikkor 50mm 1.4
 Camera Height: 5 feet



Viewpoint SP 0
 Arcola Blvd N of rand
 053-0984
 Pre-Application Analysis
 Wishing Star to Mars

PHOTOSIMULATIONS FOR SUBSTATIONS

Wishing Star Substation



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
This document is for review purposes only.



1:14,000

0 1,000 2,000 3,000 Feet

- Photo Point
- Wishing Star Substation
- Architecture Resource



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Figure 43: Aerial photograph depicting land use and photo view for 053-0982.



Existing View



Proposed view showing location of hidden transmission line structures (yellow)



Viewpoint Location UTM Zone 18N: 280095E 4314092N
 View Direction: 350 degrees
 Viewpoint Elevation: 337 feet
 Distance to Development: 5173 feet
 Horizontal Field of View: 100 degrees

Date of Photography: 12th August 2022 09:33
 Camera: Nikon D800
 Lens: Nikkor 50mm 1.4
 Camera Height: 5 feet



Viewpoint SP 0	tone
prings Blvd	W of I ex Dr
063-0982	
Pre-Application Analysis	
Wishing Star to Mars	

PHOTOSIMULATIONS FOR SUBSTATIONS

Mars Substation

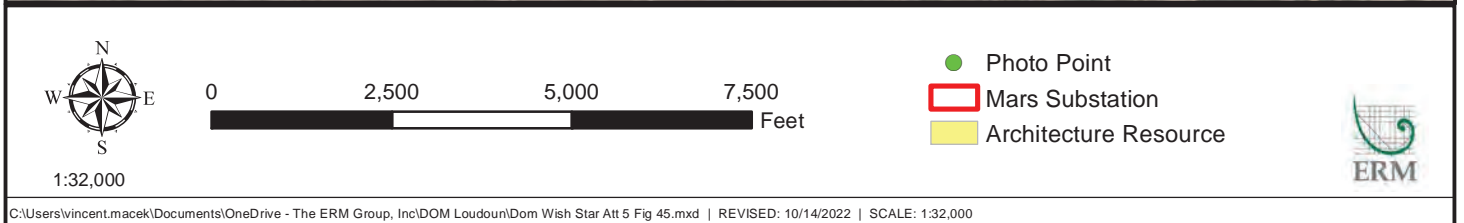
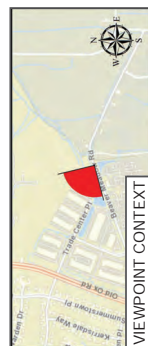


Figure 45: Aerial photograph depicting land use and photo view for 053-0008.



Viewpoint Location UTM Zone 18N: 284701E 4316196N
View Direction: 300 degrees
Viewpoint Elevation: 276 feet
Distance to Development: 1764 feet
Horizontal Field of View: 90 degrees

Date of Photography: 12th August 2022 11:38
Camera: Nikon D800
Lens: Nikkor 50mm 1.4
Camera Height: 5 feet



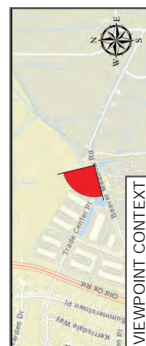
Viewpoint SP 03
Beaver Meadow Rd NE of Rock Haven Way
053-0008

Pre-Application Analysis Wishing Star to Mars



Viewpoint Location UTM Zone 18N: 284701E 4316196N
View Direction: 300 degrees
Viewpoint Elevation: 276 feet
Distance to Development: 1764 feet
Horizontal Field of View: 90 degrees

Date of Photography: 12th August 2022 11:38
Camera: Nikon D800
Lens: Nikkor 50mm 1.4
Camera Height: 5 feet



Viewpoint SP 03
Beaver Meadow Rd NE of Rock Haven Way
053-0008

Pre-Application Analysis Wishing Star to Mars

II. DESCRIPTION OF THE PROPOSED PROJECT

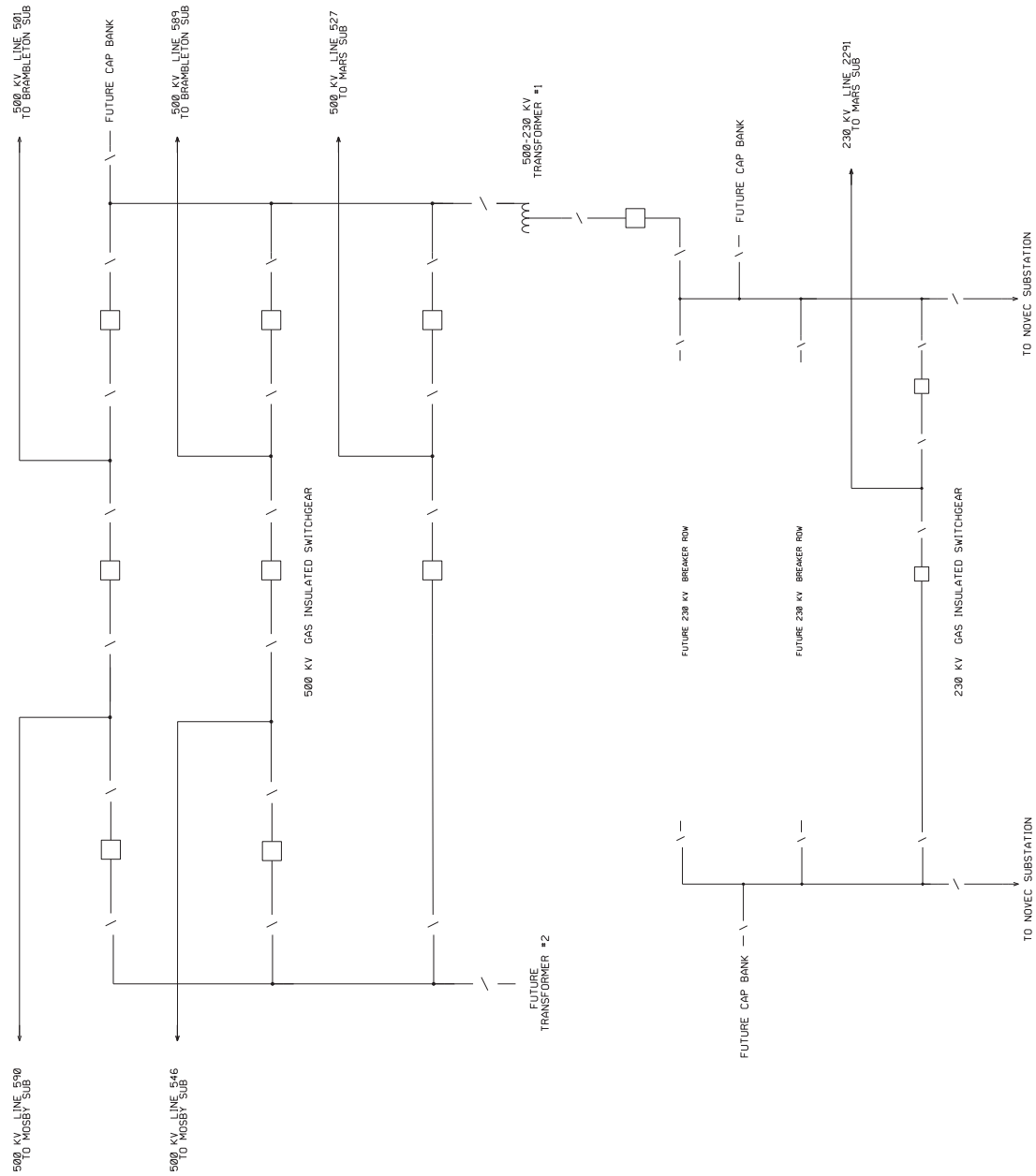
- C. Describe and furnish plan drawings of all new substations, switching stations, and other ground facilities associated with the proposed project. Include size, acreage, and bus configurations. Describe substation expansion capability and plans. Provide one-line diagrams for each.**

Response: The proposed Project requires construction of two new 500-230 kV substations in Loudoun County, Virginia—Wishing Star Substation and Mars Substation. In addition, the Project scope includes line protection upgrades at the Company's existing remote end substations, including Brambleton, Cabin Run, Mosby, Shellhorn Road Substations, as well as the future Celestial and Sojourner Substations.


The proposed Wishing Star Substation initially will be constructed with eight 500 kV 5000A circuit breakers, three 230 kV 4000A circuit breakers, five 500 kV line terminals, one 230 kV line terminal, two 230 kV feeds to NOVEC, one 500-230 kV transformer bank (4-480 MVA, single-phase units, including a spare) and other associated equipment. The Wishing Star Substation will be designed to accommodate future growth in the area with a build-out of seventeen 500 kV 5000A circuit breakers, thirteen 230 kV 4000A circuit breakers, five 500 kV line terminals, six 230 kV line terminals, two 500-230 kV transformer banks (7-480 MVA, single-phase units, including a spare), one 500 kV capacitor bank and two 230 kV capacitor banks. The 500 kV and 230 kV infrastructure will be GIS. Additionally, two control enclosures will be installed to accommodate the protective relay and communications cabinets. The total area of the Wishing Star Substation is approximately 41 acres.

The proposed Mars Substation initially will be constructed with three 500 kV 5000A circuit breakers, ten 230 kV 4000A circuit breakers, one 500 kV line terminal, five 230 kV line terminals, two 500-230 kV transformer banks (7-480 MVA, single-phase units, including a spare) and other associated equipment. The Mars Substation will be designed to accommodate future growth in the area with a build-out of thirteen 500 kV 5000A circuit breakers, nineteen 230 kV 4000A circuit breakers, two 500 kV line terminals, seven 230 kV line terminals, three 500-230 kV transformer banks (11-480 MVA, single-phase units, including two spares), one 500 kV capacitor bank and two 230 kV capacitor banks. The 500 kV and 230 kV infrastructure will be GIS. Additionally, two control enclosures will be installed to accommodate the protective relay and communications cabinets. The total area of the Mars Substation is approximately 22 acres.

The one-line and general arrangement for the proposed Wishing Star Substation are provided as Attachment II.C.1 and Attachment II.C.2, respectively. The one-line and general arrangement for the proposed Mars Substation are provided as Attachment II.C.3 and Attachment II.C.4, respectively.



PRELIMINARY
NOT FOR CONSTRUCTION

Drawn By: SB	Date: 10-18-2022	 One Line Diagram
Approval:	Date:	

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

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

Response: **MARS-WISHING STAR LINES⁵³**

Proposed Route (Route 5)

Land Use

The Proposed Route traverses 3.55 miles through Loudoun County in an area that is largely characterized by undeveloped industrial and commercial land, existing transmission line rights-of-way, the Broad Run riparian area and open space proffers, Dulles Airport, and VDOT rights-of-way. The area is surrounded by residential neighborhoods, and other industrial/commercial development including warehouses and data centers.

Dwellings

According to the Loudoun County Geographic Information Systems parcel and zoning data and aerial photo analysis, there are six dwellings located within 500 feet, one dwellings located within 250 feet, and no dwellings located within 100 feet of the Proposed Route. There are no dwellings located within the right-of-way of the Proposed Route.

Farmland/Forest

A review of Natural Resources Conservation Service Data (“NRCS”) soils data indicates that approximately 43.19 acres of the footprint of the Proposed Route are classified as prime farmland, 9.18 acres of prime farmland with mitigation (flood protection), and 5.35 acres are classified as farmland of statewide importance. According to a review of recent 2022 aerial photography, no land is being used for agricultural purposes within or near the right-of-way of the Proposed Route. The Proposed Route parallels an existing Company-owned transmission line rights-of-way for about 1.80 miles that is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. About 42.84 acres of existing forestland will be impacted by the construction of the Proposed Route. See Attachment III.A.1.

⁵³ Acreage calculations for alternative routes include acreage for proposed Mars Substation footprint, proposed Wishing Star Substation footprint, and proposed 230 kV split. The 230 kV split describes where the 230 kV underbuilt separates from the 500 kV lines for 0.34 mile before entering the Mars Substation.

Wetlands

Based on an analysis of the U.S. Geological Survey (“USGS”) 7.5-minute current (2014-2017) and historic (1988-2012) topographic mapping, USGS National Hydrography Dataset (“NHD”), Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), the Proposed Route crosses Broad Run, a perennial waterbody, in two locations. Approximately 6.70 acres of PEM, 6.50 acres of PFO, and 0.44 acre of palustrine scrub-shrub (“PSS”), and 3.35 acre of riverine type wetlands occur within the right-of-way of the Proposed Route.

Historic Features

A review of the VDHR, Virginia Cultural Resource Information System (“VCRIS”) indicates that five archaeological sites (44LD0168, 44LD0173, 44LD0174, 44LD0609, and 44LD0970) fall within or adjacent to the rights-of-way for the proposed route (see Table 1 below). Three of these sites (44LD0168, 44LD0173, and 44LD0174) have been determined not eligible for the NRHP and require no further consideration. 44LD0609 and 44LD0970 have not been formally evaluated for the NRHP. Because a formal archaeological survey has not been conducted as part of this Project, impacts have not yet been fully determined. However, it is anticipated that these sites will be avoided and no impacts are likely.

Three historic resources, defined in accordance with VDHR Guidelines, are associated with the Proposed Route. Arcola Elementary School (053-0982) is located approximately 0.64 mile to the south of the Proposed Route. Arcola Slave Quarters (053-0984) is located approximately 0.55 mile to the south of the Proposed Route. Neither the school nor slave quarters would have a view to the route due to distance and intervening vegetation. The Dulles International Airport Historic District (053-0008) is located approximately 0.38 mile to the south of the Proposed Route 230 kV line split. The area between the resource and the Proposed Route is densely wooded, so the route would not be visible from most of the resource. However, the Proposed Route would be visible from the airport runway. Here, only the tops of the poles would be visible from the tree line, and are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the Proposed Route would have a minimal impact on the Dulles International Airport Historic District.

Table 1. Previously recorded cultural resources within their respective tiered buffer zones for the Proposed Route (Route 5) as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register- Listed	053-0982	Arcola Elementary School
		053-0984	Arcola Slave Quarters
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	053-0008	Dulles International Airport Historic District
0.0 (Right-of-Way)	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	None	None
	Archaeology Sites	44LD0168	Temporary Camp (Pre-Contact)
		44LD0173	Temporary Camp and Lithic scatter (Pre-Contact)
		44LD0174	Temporary Camp (Pre-Contact)
		44LD0609	Base camp (Early Woodland)
		44LD0970	Lithic scatter (Late Archaic Period)

Wildlife

The U.S. Fish and Wildlife Service (“FWS”) Information for Planning and Consultation (“IPaC”) database query identified two federally listed species, Northern long-eared bat (*Myotis septentrionalis*) and Dwarf wedgemussel (*Alasmodonta heterodon*), that may potentially occur within the study area; however, neither have confirmed occurrences. The FWS IPaC also identified one candidate species, Monarch butterfly (*Danaus plexippus*), that may occur within the study area, but presence has also not been confirmed.

The Virginia Department of Conservation and Recreation (“DCR”) and Virginia Department of Wildlife Resources (“DWR”) database queries identified two state-listed species, Wood turtle (*Glyptemys insculpta*) and Henslow’s Sparrow

(*Ammodramus henslowii*), that have the potential to occur within 2 miles of the geographic center of the natural resources study area.

Based on landscape and vegetation within the study area, each alternative route crosses a variety of potential habitat types. These habitats include forested land, shrub land, grass land, and waterbodies with intermittent and perennial stream flow. Within the Proposed Route and Alternative Routes, these habitat types each could have potential to provide suitable habitat for one or more of the species listed above.

Of the five species identified, none have been documented by state agencies in areas adjacent to or crossed by any of the routes. No instream work will be performed for the Project; however forested floodplains will be cleared during construction. Dominion Energy Virginia will coordinate with state and federal agencies as needed to determine if any surveys, construction-timing windows, or other mitigation measures would be required for the Project.

Alternative Route 1

Land Use

Alternative Route 1 traverses 3.63 miles through Loudoun County in an area that is largely characterized by undeveloped industrial and commercial land, existing transmission line rights-of-way, the Broad Run riparian area and open space proffers, preservation areas, Dulles Airport, and VDOT rights-of-way. The area is surrounded by residential neighborhoods, and other industrial/commercial development including warehouses and data centers.

Dwellings

According to the Loudoun County Geographic Information Systems parcel and zoning data and aerial photo analysis, there are six dwellings located within 500 feet (including one multi-family unit), one dwelling located within 250 feet, and no dwellings located within 100 feet of Alternative Route 1. There are no dwellings located within the right-of-way of Alternative Route 1.

Farmland/Forest

A review of NRCS soils data indicates that approximately 49.01 acres of the footprint of Alternative Route 1 are classified as prime farmland, 7.20 acres of prime farmland with mitigation (flood protection), and 4.04 acres are classified as farmland of statewide importance. According to a review of recent 2022 aerial photography, no land is currently being used for agricultural purposes within or near the right-of-way of Alternative Route 1. Alternative Route 1 parallels an existing Company-owned transmission line rights-of-way for about 0.73 mile that is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. About 33.98 acres of existing forestland will be impacted by the construction of Alternative Route 1. See Attachment III.A.1.

Wetlands

Based on an analysis of the USGS 7.5-minute current (2014-2017) and historic (1988-2012) topographic mapping, USGS NHD, Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), Alternative Route 1 crosses Broad Run, a perennial waterbody, in two locations. Approximately 7.06 acres of PEM, 11.05 acres of PFO, 1.55 acres of PSS, and 1.20 acres of riverine type wetlands occur within the right-of-way of Alternative Route 1.

Historic Features

A review of the VDHR VCRIS indicates that two archaeological sites (44LD0167 and 44LD0168) fall within or adjacent to the rights-of-way for Alternative Route 1 (see Table 2 below). 44LD0168 has been determined not eligible for the NRHP and requires no further consideration. 44LD0167 has not been formally evaluated for the NRHP, but construction of the alternative route would include clearing of the right-of-way and the placement of a structure in the boundary of the site. Because the resource has not been formally evaluated, further survey would need to occur in order to determine NRHP eligibility of the resource. If the site is found to be eligible, the route or structure placement may need to be altered protect the site, or the site might require further archaeological investigation to recover information that could be lost as a result of construction impacts. Because a formal archaeological survey has not been conducted as part of this Project, impacts have not yet been fully determined.

Three historic resources, defined in accordance with VDHR Guidelines, are associated with the alternative route. Arcola Elementary School (053-0982) is located approximately 0.66 mile to the south of Alternative Route 1. Arcola Slave Quarters (053-0984) is located approximately 0.71 mile to the south of Alternative Route 1. Neither the school nor slave quarters would have a view to the route due to distance and intervening vegetation. The Dulles International Airport Historic District (053-0008) is located approximately 0.38 mile to the south of the Alternative Route 1 230 kV line split. The area between the resource and Alternative Route 1 is densely wooded, so the route would not be visible from most of the resource. However, Alternative Route 1 would be visible from the airport runway. Here, only the tops of the poles would be visible from the tree line, and are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that Alternative Route 1 would have a minimal impact on the Dulles International Airport Historic District.

Table 2. Previously recorded cultural resources within their respective tiered buffer zones for Alternative Route 1 as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register- Listed	053-0982	Arcola Elementary School
		053-0984	Arcola Slave Quarters
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	053-0008	Dulles International Airport Historic District
0.0 (Right-of-Way)	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	None	None
	Archaeology Sites	44LD0167	Temporary camp (Pre-Contact)
		44LD0168	Temporary camp (Pre-Contact)

Wildlife

Impacts on wildlife would be the same for Alternative Route 1 as those for the Proposed Route discussed above.

Alternative Route 2

Land Use

Alternative Route 2 traverses 3.64 miles through Loudoun County in an area that is largely characterized by undeveloped industrial and commercial land, existing transmission line rights-of-way, the Broad Run riparian area and open space proffers, preservation areas, Dulles Airport, and VDOT rights-of-way. The area is surrounded by residential neighborhoods, and other industrial/commercial development including warehouses and data centers.

Dwellings

According to the Loudoun County Geographic Information Systems parcel and zoning data and aerial photo analysis, there are six dwellings located within 500 feet, one dwelling located within 250 feet, and no dwellings located within 100 feet of Alternative Route 2. There are no dwellings located within the right-of-way of Alternative Route 2.

Farmland/Forest

A review of NRCS soils data indicates that approximately 44.52 acres of the footprint of Alternative Route 3 are classified as prime farmland, 10.10 acres of prime farmland with mitigation (flood protection), and 6.60 acres are classified as farmland of statewide importance. According to a review of recent 2022 aerial photography, no land is currently being used for agricultural purposes within or near the right-of-way of Alternative Route 2. See [Attachment III.A.1.](#)

Alternative Route 2 parallels an existing Company-owned transmission line rights-of-way for about 1.13 miles that is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. About 34.96 acres of existing forestland will be impacted by the construction of Alternative Route 2.

Wetlands

Based on an analysis of the USGS 7.5-minute current (2014-2017) and historic (1988-2012) topographic mapping, USGS NHD, Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), Alternative Route 2 crosses Broad Run, a perennial waterbody, in three separate locations. Approximately 6.89 acres of PEM, 9.78 acres of PFO, 1.55 acres of PSS, and 1.91 acres of riverine type wetlands occur within the right-of-way of Alternative Route 2.

Historic Features

A review of the VDHR VCRIS indicates that four archaeological sites (44LD0167, 44LD0168, 44LD0173, and 44LD0970) fall within or adjacent to the rights-of-way for Alternative Route 2 (see Table 3 below). Two of these sites (44LD0168 and 44LD0173) have been determined not eligible for the NRHP and require no further consideration. 44LD0970 has not been formally evaluated for the NRHP. Because a formal archaeological survey has not been conducted as part of this Project, impacts have not yet been fully determined. However, it is anticipated that this site will be avoided and no impacts are likely. 44LD0167 has not been formally evaluated for the NRHP, but construction of Alternative Route 2 would include clearing of the right-of-way and the placement of a structure in the boundary of the site. Because the resource has not been formally evaluated, further survey would need to occur in order to determine NRHP eligibility of the resource. If the site is

found to be eligible, the route or structure placement may need to be altered protect the site, or the site might require further archaeological investigation to recover information that could be lost as a result of construction impacts. Because a formal archaeological survey has not been conducted as part of this Project, impacts have not yet been fully determined.

Three historic resources, defined in accordance with VDHR Guidelines, are associated with Alternative Route 2. Arcola Elementary School (053-0982) is located approximately 0.66 mile to the south of Alternative Route 2. Arcola Slave Quarters (053-0984) is located approximately 0.64 mile to the south of Alternative Route 2. Neither the school nor slave quarters would have a view to the route due to distance and intervening vegetation. The Dulles International Airport Historic District (053-0008) is located approximately 0.38 mile to the south of the Alternative Route 2 230 kV line split. The area between the resource and Alternative Route 2 is densely wooded, so the route would not be visible from most of the resource. However, Alternative Route 2 would be visible from the airport runway. Here, only the tops of the poles would be visible from the tree line, and are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that Alternative Route 2 would have a minimal impact on the Dulles International Airport Historic District.

Table 3. Previously recorded cultural resources within their respective tiered buffer zones for Alternative Route 2 as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register- Listed	053-0982	Arcola Elementary School
		053-0984	Arcola Slave Quarters
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	053-0008	Dulles International Airport Historic District

Buffer(miles)	Considered Resources	VDHR #	Description
0.0 (Right-of-Way)	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	None	None
	Archaeology Sites	44LD0167	Temporary camp (Pre-Contact)
		44LD0168	Temporary camp (Pre-Contact)
		44LD0173	Temporary camp and Lithic scatter (Pre-Contact)
		44LD0970	Lithic scatter (Late Archaic Period)

Wildlife

Impacts on wildlife would be the same for Alternative Route 2 as those for the Proposed Route discussed above.

Alternative Route 3

Land Use

Alternative Route 3 traverses 3.62 miles through Loudoun County in an area that is largely characterized by undeveloped industrial and commercial land, existing transmission line rights-of-way, the Broad Run riparian area and open space proffers, preservation areas, Dulles Airport, and VDOT rights-of-way. The area is surrounded by residential neighborhoods, and other industrial/commercial development including warehouses and data centers.

Dwellings

According to the Loudoun County Geographic Information Systems parcel and zoning data and aerial photo analysis, there are six dwellings located within 500 feet (including one multi-family unit), one dwelling located within 250 feet, and no dwellings located within 100 feet of Alternative Route 3. There are no dwellings located within the right-of-way of Alternative Route 3.

Farmland/Forest

A review of NRCS soils data indicates that approximately 50.07 acres of the footprint of Alternative Route 3 are classified as prime farmland, 5.18 acres of prime farmland with mitigation (flood protection), and 1.74 acres are classified as farmland of statewide importance. According to a review of recent 2022 aerial photography, no land is currently being used for agricultural purposes within or near the right-of-way of Alternative Route 3. Alternative Route 3 parallels an existing Company-owned transmission line rights-of-way for about 1.06 miles that is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. About 40.69 acres of existing forestland

will be impacted by the construction of Alternative Route 3. See Attachment III.A.1.

Wetlands

Based on an analysis of the USGS 7.5-minute current (2014-2017) and historic (1988-2012) topographic mapping, USGS NHD, Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), Alternative Route 3 crosses Broad Run, a perennial waterbody, in two locations. Approximately 6.83 acres of PEM, 9.66 acres of PFO, 0.44 acre of PSS, and 1.32 acres of riverine type wetlands occur within the right-of-way of Alternative Route 3.

Historic Features

A review of the VDHR VCRIS indicates that one archaeological site (44LD0168) falls within or adjacent to the rights-of-way for Alternative Route 3 (see Table 4 below). 44LD0168 has been determined not eligible for the NRHP, it requires no further consideration.

Three historic resources, defined in accordance with VDHR Guidelines, are associated with Alternative Route 3. Arcola Elementary School (053-0982) is located approximately 0.64 mile to the south-southwest of Alternative Route 3. Arcola Slave Quarters (053-0984) is located approximately 0.55 mile to the south of Alternative Route 3. Neither the school nor slave quarters would have a view to the route due to distance and intervening vegetation. The Dulles International Airport Historic District (053-0008) is located approximately 0.38 mile to the south of the Alternative Route 3 230 kV line split. The area between the resource and Alternative Route 3 is densely wooded, so the route would not be visible from most of the resource. However, Alternative Route 3 would be visible from the airport runway. Here, only the tops of the poles would be visible from the tree line, and are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that Alternative Route 3 would have a minimal impact on the Dulles International Airport Historic District.

Table 4. Previously recorded cultural resources within their respective tiered buffer zones for Alternative Route 3 as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None

Buffer(miles)	Considered Resources	VDHR #	Description
1.0	National Register- Listed	053-0982	Arcola Elementary School
		053-0984	Arcola Slave Quarters
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	053-0008	Dulles International Airport Historic District
0.0 (Right-of-Way)	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	None	None
	Archaeology Sites	44LD0168	Temporary camp (Pre-Contact)

Wildlife

Impacts on wildlife would be the same for Alternative Route 3 as those for the Proposed Route discussed above.

Alternative Route 4

Land Use

Alternative Route 4 traverses 3.63 miles through Loudoun County in an area that is largely characterized by undeveloped industrial and commercial land, existing transmission line rights-of-way, the Broad Run riparian area and open space proffers, preservation areas, Dulles Airport, and VDOT rights-of-way. The area is surrounded by residential neighborhoods, and other industrial/commercial development including warehouses and data centers.

Dwellings

According to the Loudoun County Geographic Information Systems parcel and zoning data and aerial photo analysis, there are six dwellings located within 500 feet, one dwelling located within 250 feet, and no dwellings located within 100 feet of Alternative Route 4. There are no dwellings located within the right-of-way of Alternative Route 4.

Farmland/Forest

A review of NRCS soils data indicates that approximately 45.58 acres of the footprint of Alternative Route 4 are classified as prime farmland, 8.07 acres of prime farmland with mitigation (flood protection), and 4.30 acres are classified as farmland of statewide importance. According to a review of recent 2022 aerial photography, no land is currently being used for agricultural purposes within or near the right-of-way of Alternative Route 4. Alternative Route 4 parallels an existing Company-owned transmission line rights-of-way for about 1.46 miles that is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. About 41.66 acres of existing forestland will be impacted by the construction of Alternative Route 4. See Attachment III.A.1.

Wetlands

Based on an analysis of the USGS 7.5-minute current (2014-2017) and historic (1988-2012) topographic mapping, USGS NHD, Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), Alternative Route 4 crosses Broad Run, a perennial waterbody, in three separate locations. Approximately 6.66 acres of PEM, 8.40 acres of PFO, 0.44 acre of PSS, and 2.03 acres of riverine type wetlands occur within the right-of-way of Alternative Route 4.

Historic Features

A review of the VDHR VCRIS indicates that three archaeological sites (44LD0168, 44LD0173, and 44LD0970) fall within or adjacent to the rights-of-way for Alternative Route 4 (see Table 5 below). 44LD0168 and 44LD0173 have been determined not eligible for the NRHP and require no further consideration. However, 44LD0970 has not been formally evaluated for the NRHP. Because a formal archaeological survey has not been conducted as part of this Project, impacts have not yet been fully determined. However, it is anticipated that this site will be avoided and no impacts are likely.

Three historic resources, defined in accordance with VDHR Guidelines, are associated with Alternative Route 4. Arcola Elementary School (053-0982) is located approximately 0.64 mile to the south-southwest of Alternative Route 4. Arcola Slave Quarters (053-0984) is located approximately 0.55 mile to the south of Alternative Route 4. Neither the school nor slave quarters would have a view to the route due to distance and intervening vegetation. The Dulles International Airport Historic District (053-0008) is located approximately 0.38 mile to the south of the Alternative Route 4 230 kV line split. The area between the resource and Alternative Route 4 is densely wooded, so the route would not be visible from most of the resource. However, Alternative Route 4 would be visible from the airport runway. Here, only the tops of the poles would be visible from the tree line, and are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature

vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that Alternative Route 4 would have a minimal impact on the Dulles International Airport Historic District.

Table 5. Previously recorded cultural resources within their respective tiered buffer zones for Alternative Route 4 as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register- Listed	053-0982	Arcola Elementary School
		053-0984	Arcola Slave Quarters
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	053-0008	Dulles International Airport Historic District
0.0 (Right-of-Way)	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	None	None
	Archaeology Sites	44LD0168	Temporary camp (Pre-Contact)
		44LD0173	Temporary camp and Lithic scatter (Pre-Contact)
		44LD0970	Lithic scatter (Late Archaic Period)

Wildlife

Impacts on wildlife would be the same for Alternative Route 4 as those for the Proposed Route discussed above.

Alternative Route 6

Land Use

Alternative Route 6 traverses 3.56 miles through Loudoun County in an area that is largely characterized by undeveloped industrial and commercial land, existing transmission line rights-of-way, the Broad Run riparian area and open space

proffers, preservation areas, Dulles Airport, and VDOT rights-of-way. The area is surrounded by residential neighborhoods, and other industrial/commercial development including warehouses and data centers.

Dwellings

According to the Loudoun County Geographic Information Systems parcel and zoning data and aerial photo analysis, there are six dwellings located within 500 feet, one dwelling located within 250 feet, and no dwellings located within 100 feet of Alternative Route 6. There are no dwellings located within the right-of-way of Alternative Route 6.

Farmland/Forest

A review of NRCS soils data indicates that approximately 40.93 acres of the footprint of Alternative Route 6 are classified as prime farmland, 9.31 acres of prime farmland with mitigation (flood protection), and 5.35 acres are classified as farmland of statewide importance. According to a review of recent 2022 aerial photography, no land is currently being used for agricultural purposes within or near the right-of-way of Alternative Route 6. Alternative Route 6 parallels an existing Company-owned transmission line rights-of-way for about 1.81 miles that is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. About 42.96 acres of existing forestland will be impacted by the construction of Alternative Route 6. See Attachment III.A.1.

Wetlands

Based on an analysis of the USGS 7.5-minute current (2014-2017) and historic (1988-2012) topographic mapping, USGS NHD, Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), Alternative Route 6 crosses Broad Run, a perennial waterbody, in two separate locations. Approximately 7.03 acres of PEM, 7.71 acres of PFO, 0.44 acre of PSS, and 3.77 acres of riverine type wetlands occur within the right-of-way of Alternative Route 6.

Historic Features

A review of the VDHR VCRIS indicates that five archaeological sites (44LD0168, 44LD0173, 44LD0174, 44LD0609, and 44LD0970) fall within or adjacent to the rights-of-way for Alternative Route 6 (see Table 6 below). Three of these sites (44LD0168, 44LD0173, and 44LD0174) have been determined not eligible for the NRHP and require no further consideration. 44LD0609 and 44LD0970 have not been formally evaluated for the NRHP. Because a formal archaeological survey has not been conducted as part of this Project, impacts have not yet been fully determined. However, it is anticipated that these sites will be avoided and no impacts are likely.

Three historic resources, defined in accordance with VDHR Guidelines, are associated with Alternative Route 6. Arcola Elementary School (053-0982) is located approximately 0.66 mile to the south of Alternative Route 6. Arcola Slave Quarters (053-0984) is located approximately 0.57 mile to the south of Alternative Route 6. Neither the school nor slave quarters would have a view to the route due to distance and intervening vegetation. The Dulles International Airport Historic District (053-0008) is located approximately 0.38 mile to the south of the Alternative Route 6 230 kV line split. The area between the resource and Alternative Route 6 is densely wooded, so the route would not be visible from most of the resource. However, Alternative Route 6 would be visible from the airport runway. Here, only the tops of the poles would be visible from the tree line, and are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that Alternative Route 6 would have a minimal impact on the Dulles International Airport Historic District.

Table 6. Previously recorded cultural resources within their respective tiered buffer zones for Alternative Route 6 as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register- Listed	053-0982	Arcola Elementary School
		053-0984	Arcola Slave Quarters
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	053-0008	Dulles International Airport Historic District
0.0 (Right-of-Way)	National Register- Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register- Eligible	None	None
	Archaeology Sites	44LD0168	Temporary camp (Pre-Contact)
		44LD0173	Temporary camp and Lithic

Buffer(miles)	Considered Resources	VDHR #	Description
			scatter (Pre-Contact)
		44LD0174	Temporary camp (Pre-Contact)
		44LD0609	Base camp (Early Woodland)
		44LD0970	Lithic scatter (Late Archaic Period)

Wildlife

Impacts on wildlife would be the same for Alternative Route 6 as those for the Proposed Route discussed above.

MARS 230 kV LOOP

Mars 230 kV Loop Proposed Route

Land Use

The Mars 230 kV Loop Proposed Route traverses south 0.57 mile from the existing transmission corridor (Lines #2095/2137) along the edge of a large existing development consisting of warehouses (Data Center) and open parking lots to the west and substations and proposed data centers to the east. This area consists of 0.57 mile of industrial/commercial development including warehouses and data centers.

Dwellings

According to the Loudoun County Geographic Information Systems parcel and zoning data and aerial photo analysis, there are no residential dwellings located within 500 feet of the Mars 230 kV Loop Proposed Route, but six commercial properties.

Farmland/Forest

A review of NRCS soils data indicates that approximately 3.12 acres of the footprint of the Mars 230 kV Loop Proposed Route are classified as prime farmland, no prime farmland with mitigation (flood protection), and no land classified as farmland of statewide importance. According to a review of recent 2022 aerial photography, there is no land being used for agricultural purposes within or near the right-of-way of the Mars 230 kV Loop Proposed Route. The Mars 230 kV Loop Proposed Route parallels an existing Company-owned transmission line rights-of-way for about 0.05 mile that is regularly maintained to keep vegetation at the emergent and scrub-shrub level for the safe operation of the existing facilities. About 8.84 acres of existing forestland will be impacted by the construction of the Mars 230 kV Loop Proposed Route. See Attachment III.A.1.

Wetlands

Based on an analysis of the USGS 7.5-minute current (2014-2017) and historic (1988-2012) topographic mapping, USGS National Hydrography Dataset (“NHD”), Loudoun County Hydrology (water feature lines) and Hydrology (water feature polygons) Datasets (Loudoun County Streams), and Loudoun County Wetlands (wetland feature polygons) Dataset (Loudoun County Wetlands), approximately 2.24 acre of PFO and 0.11 acre of riverine type wetlands occur within the right-of-way of the Mars 230 kV Loop Proposed Route.

Historic Features

A review of the VDHR VCRIS indicates that one archaeological site (44LD1742) falls within or adjacent to the rights-of-way for the Mars 230 kV Loop Proposed Route (see Table 7 below). As the site has been determined not eligible for the NRHP, no further consideration is required.

No architectural resources were identified within the VDHR study tiers for the Mars 230 kV Loop Proposed Route.

Table 7. Previously recorded cultural resources within their respective tiered buffer zones for Mars 230 kV Loop Proposed Route as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register-Eligible	None	None
0.0 (Right-of-Way)	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register-Eligible	None	None

	Archaeology Sites	44LD1742	Carter Schoolhouse (World War I to World War II)
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Wildlife

Impacts on wildlife would be the same for the Mars 230 kV Loop Proposed Route as those for the Mars-Wishing Star Lines Proposed Route discussed above.

SUBSTATIONS

Wishing Star Substation

Historic Features

A review of the VDHR VCRIS indicates that one archaeological site (44LD1280) lies within the footprint of the proposed Wishing Star Substation (see Table 8 below). As the site has been determined not eligible for the NRHP, no further consideration is required.

One historic resource, defined in accordance with VDHR Guidelines, is associated with the Wishing Star Substation. Arcola Elementary School (053-0982) is located approximately 0.83 mile to the southeast of the proposed Wishing Star Substation. It would have no view to the route due to distance and intervening vegetation.

Table 8. Previously recorded cultural resources within their respective tiered buffer zones for Wishing Star Substation as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register-Listed	053-0982	Arcola Elementary School
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register-Eligible	None	None
0.0 (Right-of-Way)	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register-Eligible	None	None
	Archaeology Sites	44LD1280	Railroad bed (Antebellum Period, Civil War, Early National Period, Reconstruction and Growth)

Mars Substation

Historic Features

A review of the VDHR VCRIS indicates that no archaeological sites fall within the footprint of the proposed Mars Substation (see Table 9 below).

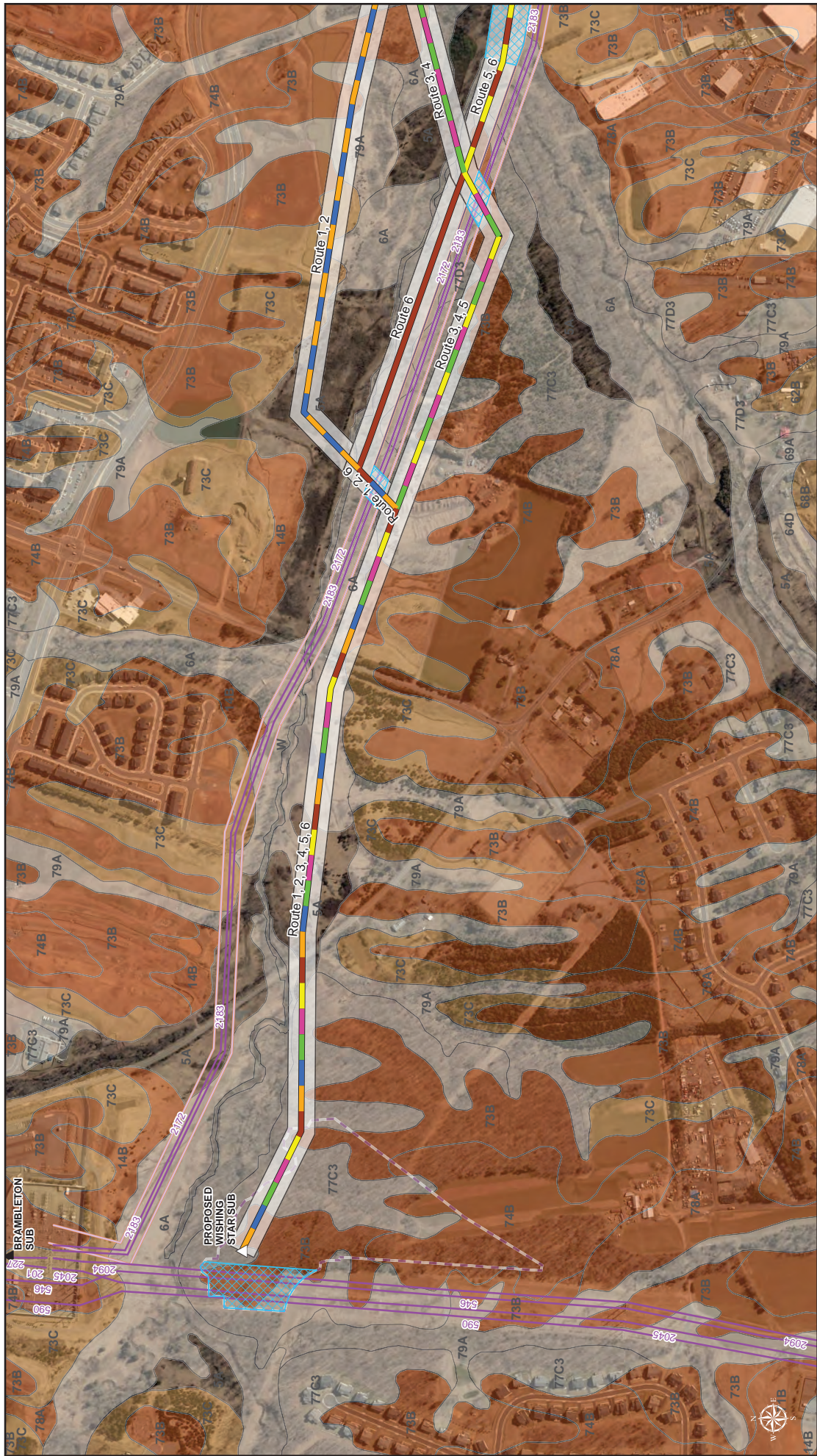
One historic resource, defined in accordance with VDHR Guidelines, is associated with the Mars Substation. The Dulles International Airport Historic District (053-0008) is located approximately 0.42 mile to the south of the proposed Mars Substation. The area between the resource and the alternative route's transmission line route is densely wooded, so the substation would not be visible from most of the resource. However, since the substation will be constructed along with one of

the proposed transmission line routes, both the substation and the associated line must be included in the analysis of viewshed impacts for the Project alternatives. Routes 1 through 6 all present equal, albeit minimal, potential for viewshed impacts. Only a portion of each alternative route (Routes 1 through 6) is visible from the airport runway. Here, only the tops of the poles would be visible from the tree line, and are likely to be visible only during leaf-off seasons. In addition, the recorded boundary for the resource encompasses 1,726.60 acres, and only a small portion of the district is located in the half-mile study tier for the route. Furthermore, mature vegetation surrounding the district blocks visibility of the transmission line structures from many vantage points. Thus, ERM recommends that the proposed Mars Substation would have a minimal impact on the Dulles International Airport Historic District.

Table 9. Previously recorded cultural resources within their respective tiered buffer zones for the Mars Substation as specified in the VDHR Guidelines for Assessing Impacts of Proposed Electric Transmission Lines and Associated Facilities on Historic Resources in the Commonwealth of Virginia

Buffer(miles)	Considered Resources	VDHR #	Description
1.5	National Historic Landmarks	None	None
1.0	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
0.5	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register-Eligible	053-0008	Dulles International Airport Historic District
0.0 (Right-of-Way)	National Register-Listed	None	None
	Battlefields	None	None
	Historic Landscapes	None	None
	National Register-Eligible	None	None
	Archaeology Sites	None	None





SSURGO Soils Farmland Class

- All areas are prime farmland
- Farmland of statewide importance
- Not prime farmland

Mars - Wishing Star Alternative Routes

- Route 1
- Route 2
- Route 3
- Route 4
- Route 5 (Proposed Route)
- Route 6
- Overlap with Existing Right-of-Way
- Proposed Right-of-Way

Existing Substation

- Existing Substation
- Proposed Substation
- Proposed Substation Area
- Existing Dominion Right-of-Way
- Existing Dominion Transmission Lines

BRAMBLETON SUB

PROPOSED WISHING STAR SUB

Route 1, 2, 3, 4, 5, 6

Route 3, 4, 5

Route 3, 4

Route 5, 6

Route 1, 2

Route 3, 4

Route 5, 6

0 250 500 Feet

1:6,000

Attachment III.A.1

Prime Farmland and Farmland of Statewide Importance

500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop Project

Dominion Energy Virginia

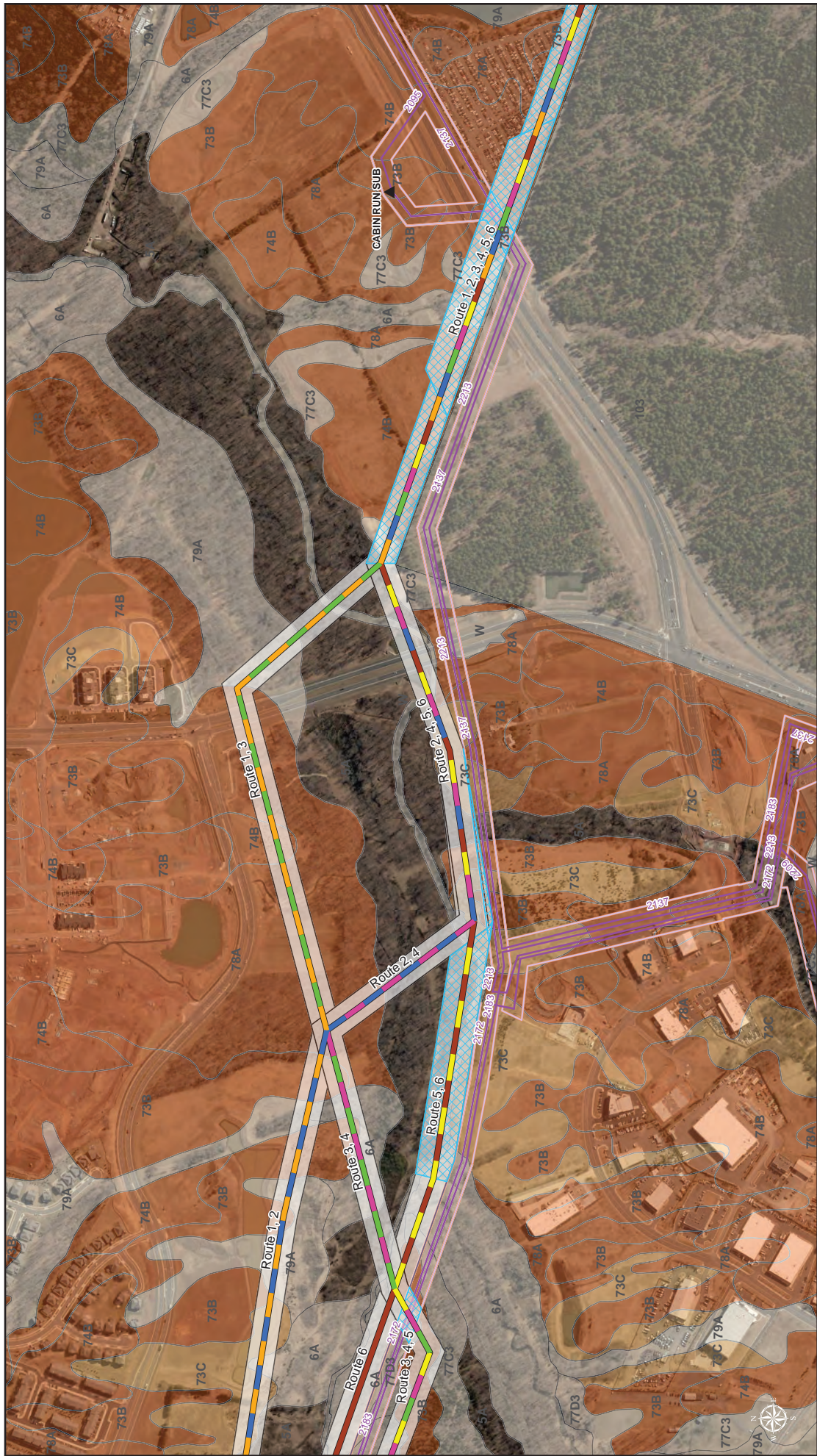
Loudoun County, Virginia

Page 1 of 3

ERM

DRAWN BY: matt.brown

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Attachment III.A.1
Prime Farmland and Farmland of Statewide Importance
 500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop Project
 Dominion Energy Virginia
 Loudoun County, Virginia

Page 2 of 3

ERM

SSURGO Soils Farmland Class

- All areas are prime farmland
- Farmland of statewide importance
- Not prime farmland

Legend

- Existing Substation
- Route 3
- Route 4
- Route 5 (Proposed Route)
- Route 6
- Overlap with Existing Right-of-Way
- Proposed Right-of-Way
- Route 1
- Route 2

Scale

0 250 500 Feet

1:6,000

Revisions

10/19/2022 | SCALE: 1:6,000 when printed at 11x17



SSURGO Soils Farmland Class

- All areas are prime farmland
- Farmland of statewide importance
- Not prime farmland

Page 3 of 3

Attachment III.A.1

Prime Farmland and Farmland of Statewide Importance

500-230 kV Wishing Star Substation, 500-230 kV Mars - Wishing Star Lines, 500-230 kV Mars Substation, and Mars 230 kV Loop Project

Dominion Energy Virginia
Loudoun County, Virginia

Mars - Wishing Star Alternative Routes

- Route 6
- Mars 230 kV Loop
- Proposed Route
- Overlap with Existing Right-of-Way
- Proposed Right-of-Way

Existing Substation

- Existing Substation
- Proposed Substation Area
- Existing Dominion Right-of-Way
- Existing Dominion Transmission Lines
- Route 5 (Proposed Route)

Scale

0 250 500
Feet
1:6,000

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

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

Response: Community and Stakeholder Engagement

At Dominion Energy Virginia, the Company believes stakeholder engagement is critical to the success of this Project. The data center industry has grown substantially in northern Virginia in recent years, and the Company has made significant investments in new infrastructure to meet the growing demand for electricity in a concentrated area. This Project is critical to the success of this industry in northern Virginia. Routing and siting this Project, in an accelerated timeline, would not have been possible without important partnerships with substantial community involvement, including environmental organizations, elected officials, governmental bodies, community leaders and community members. Outreach about the Project to County leaders, the data center industry, and the creation of an engagement group that consisted of individuals with a variety of expertise and knowledge of the area, began in March 2022. Many of these stakeholders remain engaged and are planning by representing their specialty as they participate in future electric transmission projects.

Feedback is critical as the Company considers all potential benefits and impacts of the Project—connecting two new substations in a densely populated area in Loudoun County, punctuated by the Dulles Airport.

Dominion Energy Virginia has and will continue to engage with a broad range of stakeholders that have interests across the Project components.

Stakeholder engagement includes both a statewide and regional approach in the following segments: cultural and historic resource stewardship organizations; the business community and workforce organizations; the environmental community; and organizations that represent the needs of underrepresented communities. These organizations agreed to combine into the Loudoun Reliability Engagement Group. Since July 2022, this group of more than 20 volunteers have met monthly to hear updates on the Project and provide input and feedback from their collective organizations. The Company remains committed to maintaining communications with this engagement group for other reliability projects proposed in Loudoun County.

The Company has also met with members of specific neighborhoods, including Brambleton, Birchwood and Willowsford, as well as individual property owners and community members.

Beginning in April 2022, the Company commenced coordinated community and stakeholder engagement with the Counties of Fairfax, Fauquier, Loudoun, and Prince William regarding the proposed transmission lines.

- On April 20, 2022, the Company hosted the Counties of Fairfax, Fauquier, Loudoun, and Prince William for a meeting on the need for new electric transmission lines to support large utility customers. On April 28, 2022, the Company hosted the data center community for a meeting to discuss loading constraints for large utility customers in a section of Loudoun County.
- The Company began monthly meetings with the newly formed Loudoun Reliability Engagement Group to address potential routing constraints, environmental concerns, concerns about visual impacts and any impacts to cultural or historic areas.
- On September 8, 2022, from 5 p.m. to 8 p.m., the Company hosted one public meeting in Loudoun County. The purpose of the meeting was to announce the Project and build community awareness about the Project. There were a total of 35 community members in attendance. A Spanish translator was available for the meeting.
- The Company conducted more than 150 individual and small group meetings with stakeholders across communities, organizations, individuals, faith-based organization and representatives from surrounding localities. Additionally, those stakeholder meetings are still ongoing.

In August 2022, the Company launched an internet website dedicated to the proposed Project: www.dominionenergy.com/NOVA. The website includes a description of the proposed Project, an explanation of the need, routing options, GeoVoice (an interactive mapping tool), photo renderings and simulations, recordings of the in-person community meeting presentations, and information on the Commission review process. Additionally, the website includes presentations made at various public meetings described above. The Company also made the website available to the public in Spanish (engage.erm.com/novareliability).

Since August 2022, the Company released one post card and one Project announcement letter totaling nearly 16,000 pieces of correspondence inviting the public to learn more about the Project and its development. The footers of the letters were translated in Hindi and Urdu inviting residents to the open house. Additionally, the letters were translated in Spanish. Templates of those two mailers are included as [Attachment III.B.1](#).

Newspaper print advertisements regarding the Project and community meetings were placed in the Loudoun Now, Washington Post (Local Loudoun Living), and Loudoun Times. The advertisements ran in the Loudoun Now and Washington Post (Local Loudoun Living) on September 1, 2022, and ran in the Loudoun Times on September 2, 2022. A copy of the newspaper advertisement is included as [Attachment III.B.2](#).

From August 26, 2022, to September 8, 2022, the Company used paid digital and social media campaigns, along with a video campaign, to drive awareness of the Project and ensure interested community members know that the Company is available to discuss their interests and concerns. A copy of those digital advertisements, in both English and Spanish, is included as Attachment III.B.3. The event campaigns ran within Facebook, Twitter, Nextdoor, and Google. The campaigns were to build awareness, to promote the Company's public events, and to ensure interested community members know that the Company is available to discuss their interests and concerns about the Project.

The digital campaign results for the Pre-Event Community Meeting as of October 5, 2022, include:

- 3,385,945 Impressions Delivered
- 65,921 Ad Clicks
- 1.95% Click Thru Rate
- 28,689 views on all platforms.

The video campaign results for the Pre-Event Community Meeting as of October 5, 2022, include:

- 414,914 Impressions Delivered
- 1,775 Ad Clicks
- 89,889 Video Views
- 21.66% Click Thru Rate

The digital campaign results for the Post-Event Community Meeting as of October 5, 2022, include:

- 2,378,876 Impressions Delivered
- 9,154 Ad Clicks
- 0.47% Click Thru Rate
- 61,090 views on all platform

The video campaign results for the Post-Event Community Meeting as of October 5, 2022, include:

- 291,946 Impressions Delivered
- 1,359 Ad Clicks
- 21.66% Click Thru Rate
- 35,280 views on all platforms

The Company deployed an online tool called GeoVoice on September 1, 2022, (embedded within the [dominionenergy.com/NOVA](https://geovoice.powereng.com/dominion/LoudounCounty/) website: <https://geovoice.powereng.com/dominion/LoudounCounty/>), which allows users to review the potential transmission routing options, and provide location-based comments to share insights. Users do not need to register before viewing the

routing details. This allowed stakeholders to provide their comments (after registering prior to routes being released) to help inform the routing process. GeoVoice was populated with routing options on September 1, 2022, and was subsequently updated with typical proposed structure drawings and photo simulations, which are included as Attachment III.B.4. Activity on GeoVoice includes more than 1,000 visits, 389 users, and 6 location-based comments from users.

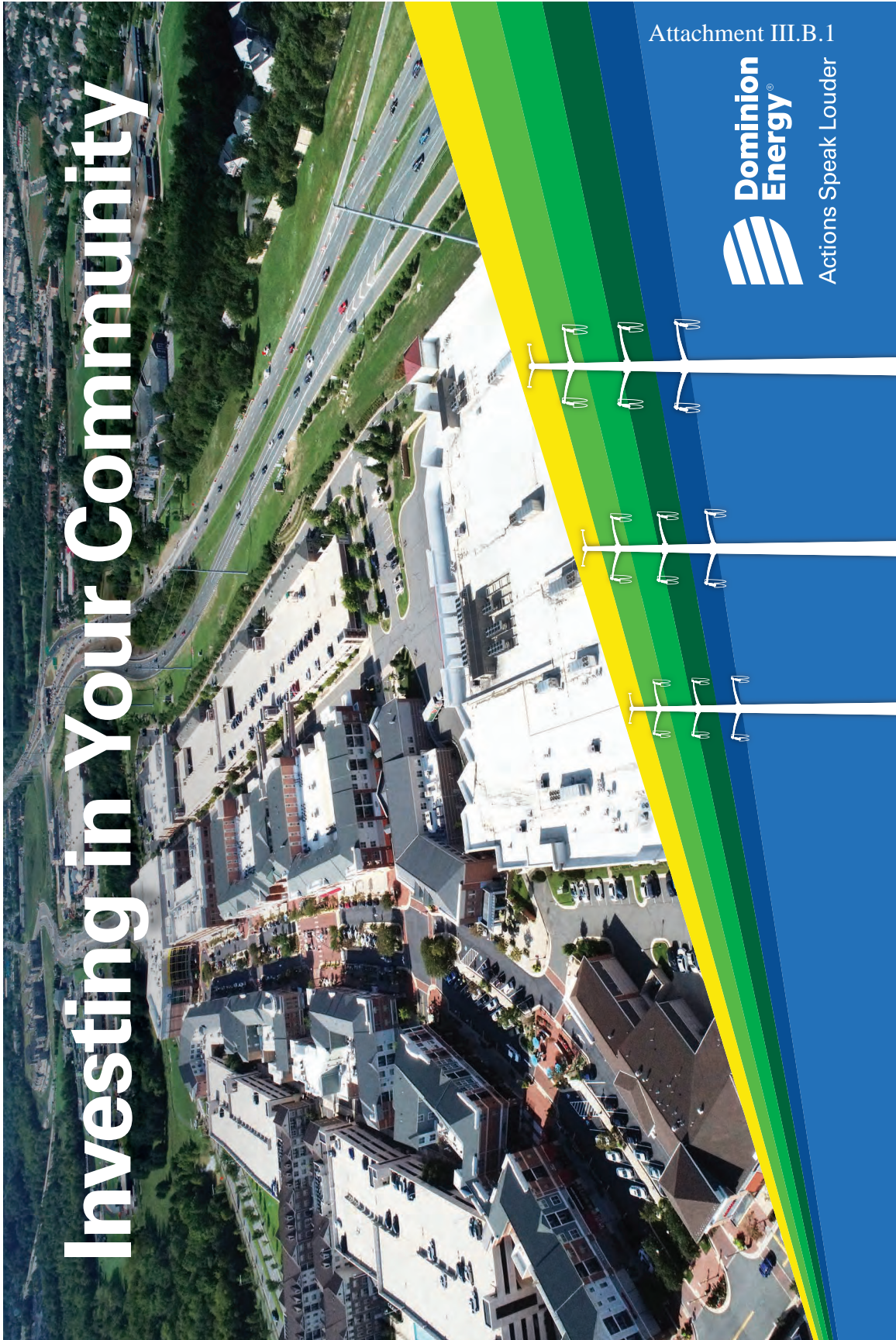
As part of preparing for the Project, the Company researched the demographics of the surrounding communities using the Environmental Protection Agency's Environmental Justice ("EJ") mapping and screening tool, EJScreen 2.0, and census data from the U.S. Census Bureau 2015-2019 American Community. This information revealed that eight Census Block Groups ("CBGs") are within the Project study area and are within one mile of the routing options. A review of census data for several demographic characteristics identified populations within the Project study area that meet the Virginia Environmental Justice Act-defined categories and thresholds for Environmental Justice Communities ("EJ Communities") (Va. Code § 2.2-234, 2.2-235).

Communities of color have been identified in seven of eight CBGs within the Project study area. None of the CBGs within the Project study area appear to be low income or have a significant percentage of households with language barriers.

The Company does not anticipate disproportionately high or adverse impacts to the surrounding community and the EJ Communities located within the study area, consistent with the requirement to reasonably minimize such impacts. See Sections 3.2 and 4.2 of the Environmental Routing Study for the results of the Company's EJ analysis.

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

Investing in Your Community



Attachment III.B.1



Actions Speak Louder

New 500-230kV Electric Transmission Project

At Dominion Energy, we are committed to providing safe, reliable, affordable, and sustainable energy to all our customers. As you know, electricity is fundamental to ensuring the health, safety, and economic vitality of your community. As such, we are moving forward with a series of projects designed to address the growing energy needs of Loudoun County.

The first project is to construct new 500 kV and 230 kV high voltage electric transmission lines in the Brambleton/Dulles area. Routing details will be released soon and before our planned in person open house in early September.

Northern Virginia is experiencing rapidly increasing demand for energy due to accelerated growth associated with Loudoun County's role as one of the world's leading innovation and technology hubs. We are committed to working in the public's best interest, working with county, state and community leaders, as we plan and propose new infrastructure to address these demands.

These investments will enhance the local electric grid and improve reliability for all customers. Stay tuned for more project details and our local public meeting where we want to hear your questions and input.

We will share details of the in-person open house in the coming weeks.

Contact Us

Visit our website at [DominionEnergy.com/NOVA](https://www.DominionEnergy.com/NOVA) for project updates. Or contact us by sending an email to powerline@dominionenergy.com or calling 888-291-0190.



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

New Electric Transmission Project in Brambleton/Dulles Area

August 25, 2022



Dear Neighbor:

At Dominion Energy, we are committed to providing safe, reliable, affordable, and sustainable energy to all our customers. As such, we are moving forward with a series of electric transmission infrastructure projects designed to address the growing energy needs of Loudoun County.

The first project is to construct two new substations – named Wishing Star and Mars – and new 500 kilovolt (kV) and 230 kV transmission lines, on the same structure, between the two new substations. The new right of way is proposed to be primarily along existing transmission corridors. Please see the enclosed map.

You are receiving this letter because we would like to invite you to attend a community meeting to learn more about our plans.

September 8, 2022, from 5 p.m. to 8 p.m.

John Champe High School, 41535 Sacred Mountain St, Aldie, VA 20105

Our subject matter experts will be available during the meeting to answer your questions about the need for this project, routing options, impacts, and construction timelines. We will also have preliminary route maps available for your feedback. These route options are not final but simply the next step in continuing the conversation with you and your neighbors. Ultimately, one route will be built based upon the Virginia State Corporate Commission's review and approval.

You can view our proposed routes for the project at [DominionEnergy.com/NOVA](https://www.dominionenergy.com/NOVA). Click on the GeoVoice interactive mapping tool to explore the routes and provide location-based comments.

This newly proposed transmission project represents an investment that will enhance the local electric grid and improve reliability for all customers. Dominion Energy is committed to our public engagement process which includes working with you, as well as county, state, and community leaders to meet future energy demands.

Please plan to join us on **September 8, 2022, from 5 p.m. to 8 p.m. at John Champe High School, 41535 Sacred Mountain St, Aldie, VA 20105** for this important meeting. We look forward to your attendance.

Sincerely,

The Electric Transmission Project Team

powerline@dominionenergy.com

888-291-0190



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

यदि आप हृदि मे अनुवादति सामग्री चाहते हैं, तो कृपया हमसे
888-291-0190 पर संपर्क करें।

و سے ایج ای کی سی مودراہم جرت اک داوم ہک سی ہ سے تہاچ پ آرگا
سی رک ہطبار پر 888-291-0190 سے س مہم رک ہارب

Nuevo proyecto de transmisión eléctrica en el área de Brambleton/Dulles

25 de agosto de 2022



Estimado vecino:

En Dominion Energy, tenemos el compromiso de proporcionarles energía de forma segura, confiable, asequible y sostenible a todos nuestros clientes. En este sentido, estamos llevando adelante una serie de proyectos de infraestructura de transmisión eléctrica diseñados para dar respuesta a las crecientes necesidades energéticas del condado de Loudoun.

El primer proyecto consiste en construir dos nuevas subestaciones, Wishing Star y Mars, e instalar nuevas líneas de transmisión de 500 kilovoltios (kV) y 230 kV en la misma estructura, entre las dos nuevas subestaciones. Se propone que la nueva servidumbre de paso se extienda principalmente por los corredores de transmisión existentes. Consulte el mapa adjunto.

Usted recibe esta carta porque nos gustaría invitarlo a una reunión de la comunidad para que conozca más sobre nuestros planes.

8 de septiembre de 2022, de 5 p. m. a 8 p. m.

John Champe High School, 41535 Sacred Mountain St, Aldie, VA 20105

Nuestros expertos en la materia estarán presentes en la reunión para responder sus preguntas sobre la necesidad de este proyecto, las opciones de ruta para la conexión, los impactos y los plazos de construcción. Los mapas de ruta preliminares también estarán a su disposición para que nos dé sus comentarios. Estas opciones de ruta no son definitivas, sino solo el siguiente paso para mantener la conversación con usted y sus vecinos. En última instancia, se construirá una ruta en función de la revisión y la aprobación de la Comisión Corporativa del estado de Virginia.

Puede ver las rutas propuestas para el proyecto en DominionEnergy.com/NOVA. Haga clic en la herramienta de mapa interactivo de GeoVoice para explorar las rutas y brindar comentarios en las ubicaciones.

Este proyecto de transmisión recientemente presentado es una inversión que mejorará la red eléctrica local y aumentará la fiabilidad para todos los clientes. Dominion Energy está comprometido con el proceso de participación pública, que incluye trabajar con usted y también con los líderes del condado, el estado y la comunidad para satisfacer futuras demandas energéticas.

Tenga previsto acompañarnos el **8 de septiembre de 2022, de 5 p. m. a 8 p. m. en John Champe High School, 41535 Sacred Mountain St, Aldie, VA 20105** para tener esta importante reunión. Esperamos contar con su asistencia.

Atentamente,

El equipo del proyecto de transmisión eléctrica

powerline@dominionenergy.com

888-291-0190



Utilice la cámara de su teléfono o la aplicación de lectura de códigos QR para visitar la página del proyecto directamente.

यदि आप हृदि मे अनुवादति सामग्री चाहते हैं, तो कृपया हमसे
888-291-0190 पर संपर्क करें।

و سے ایج ای کی سی مودرہم جرت اک داوم ہک سی ہ سے تہاچ پ آرگ
سی رک ہط باررپ 888-291-0190 سے س مہم رک ہارب

What matters to you, matters to us.

We're making improvements to ensure electric reliability in your area, and we want your input. Attend a community meeting about an upcoming project to learn more and join the discussion.

**September 8, 5-8 p.m. | John Champe High School
41535 Sacred Mountain Street, Aldie, VA 20105**

Learn more at DominionEnergy.com/NOVA



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

Attachment III.B.2



**Dominion
Energy®**

Actions Speak Louder

Community Meeting

John Champe High School
Sept. 8, 5-8 p.m.



**Dominion
Energy®**

Actions Speak Louder

Asista a nuestra reunión de la comunidad

Instituto John Champe
8 de septiembre, de 5 a 8 p.m.



Acciones Hablan Mas

Attend our **Community Meeting**

John Champe High School
Sept. 8, 5-8 p.m.



Actions Speak Louder

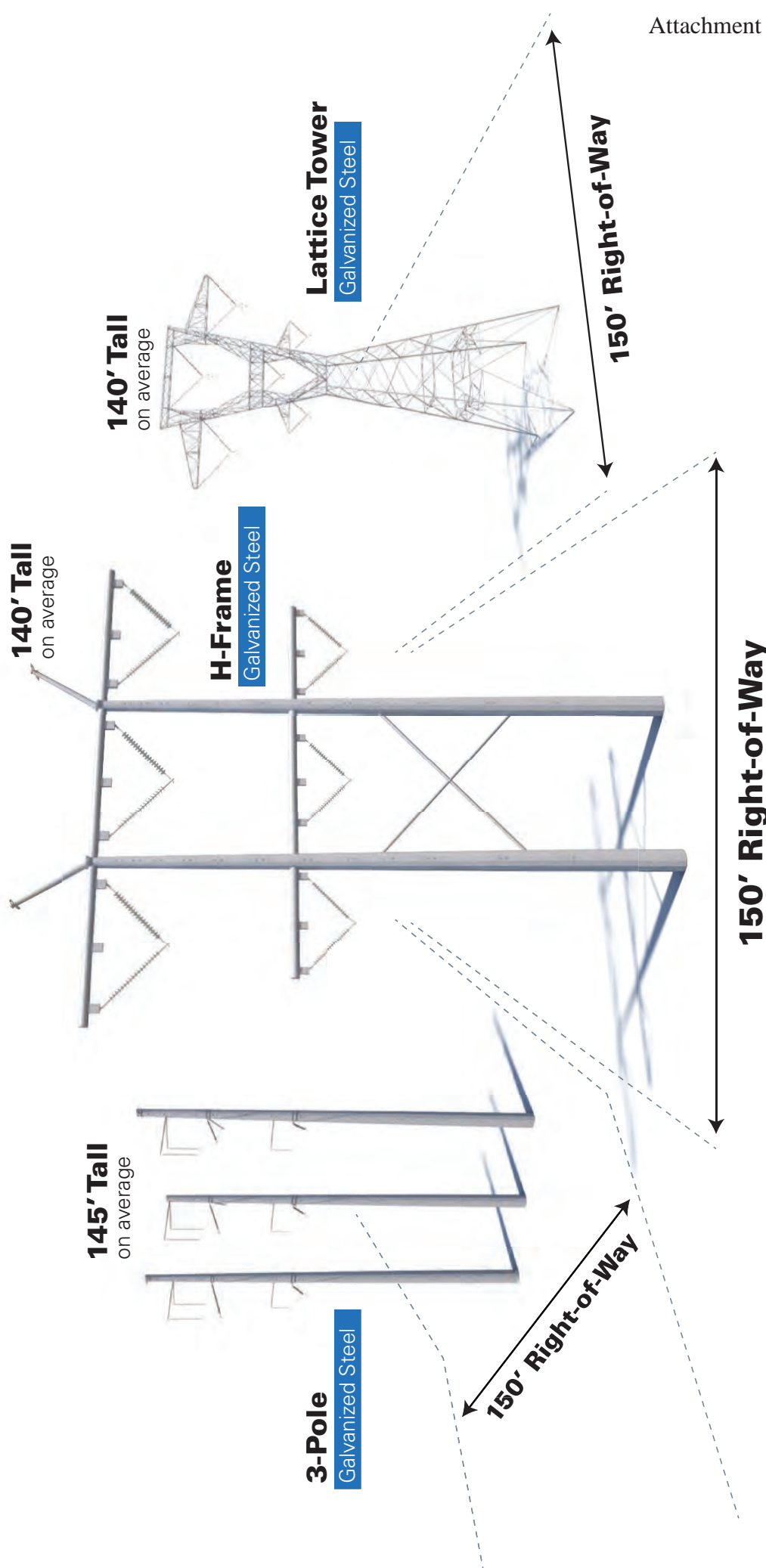


WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

Typical Proposed Structures

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



WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

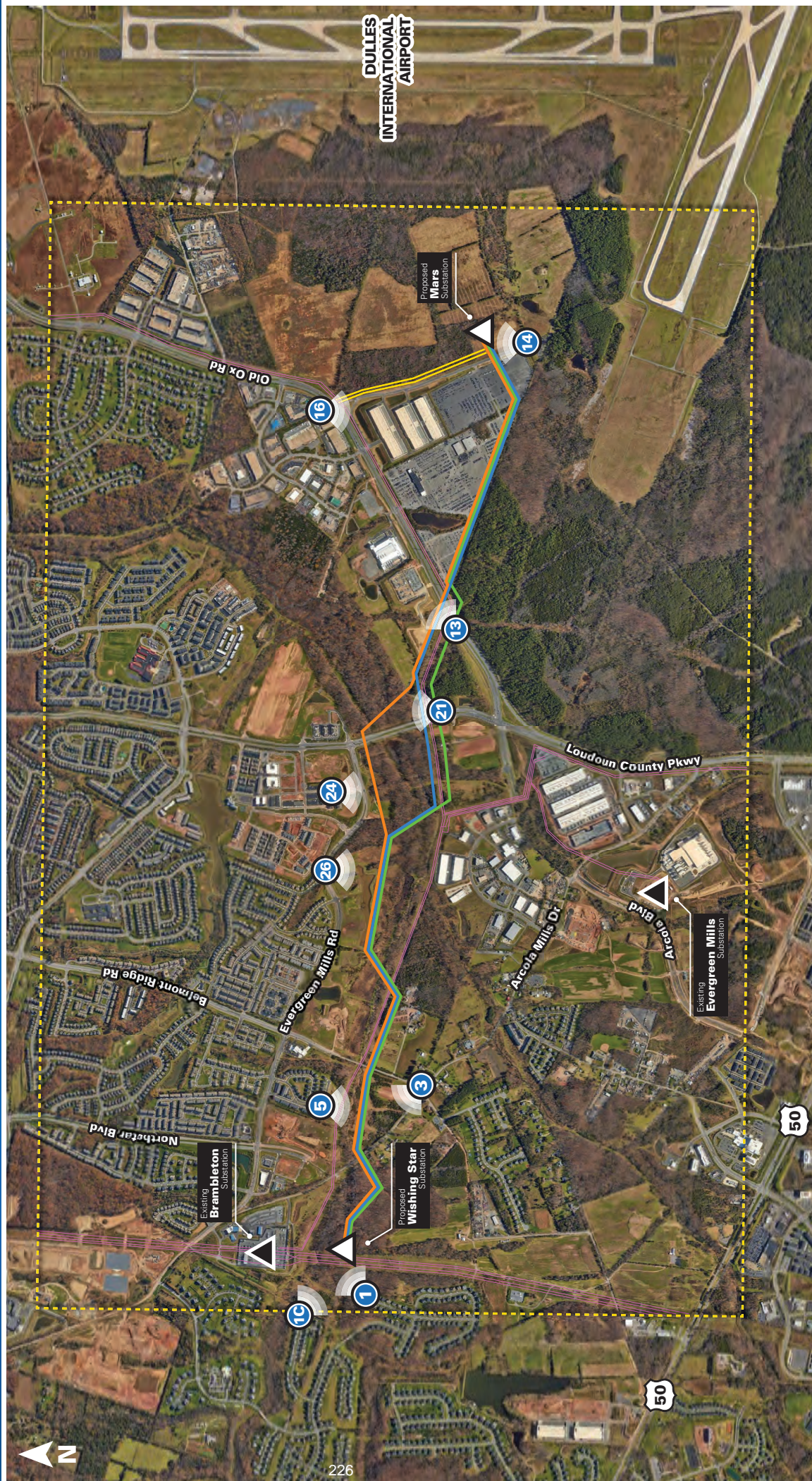


Visualization is for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.

① Photo Location

- Wishing Star to Mars Route 1
- Wishing Star to Mars Route 2
- Wishing Star to Mars Route 3
- Mars 230-kV Loop

- Study Area
- Existing Transmission Line
- Existing Substation
- Proposed Substation





EXISTING CONDITIONS



PROPOSED CONDITIONS

ROUTES DISPLAYED: 1 2 3

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 1C

Date: 8/11/2022

Time: 11:36 am

Direction: Southeast



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





EXISTING CONDITIONS



PROPOSED CONDITIONS

OVERLAY 1 2 3

ROUTES DISPLAYED:

Objects displayed in yellow are obscured by existing structures or vegetation.



SIMULATION 1

Date: 8/11/2022

Time: 11:48 am

Direction: Northeast

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

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





EXISTING CONDITIONS



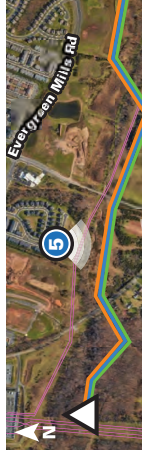
PROPOSED CONDITIONS

ROUTES DISPLAYED: 1 2 3

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 5
 Date: 8/11/2022
 Time: 10:58 am
 Direction: South



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





EXISTING CONDITIONS



PROPOSED CONDITIONS

ROUTES DISPLAYED: 1 2 3

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 3

Date: 8/11/2022

Time: 7:13 am

Direction: Northwest

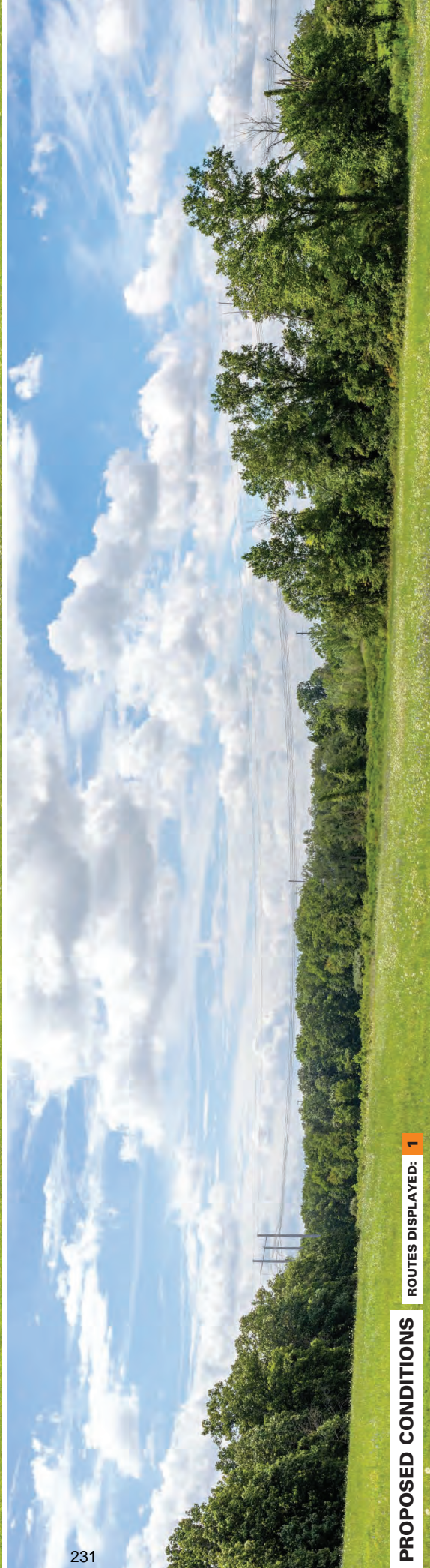


Visualization is for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.





EXISTING CONDITIONS



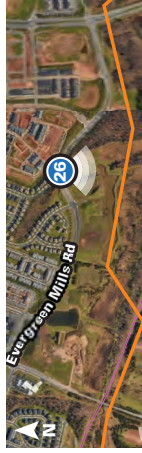
PROPOSED CONDITIONS

ROUTES DISPLAYED: **1**

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 26
 Date: 8/11/2022
 Time: 10:22 am
 Direction: South



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





EXISTING CONDITIONS

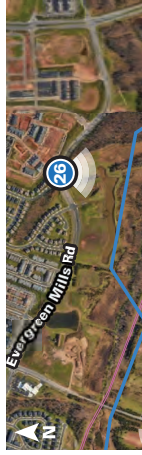


PROPOSED CONDITIONS

ROUTES DISPLAYED: **2**

WISHING STAR - MARS 500/230-kV Substation and Transmission Line Project

SIMULATION 26
 Date: 8/11/2022
 Time: 10:22 am
 Direction: South



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





EXISTING CONDITIONS



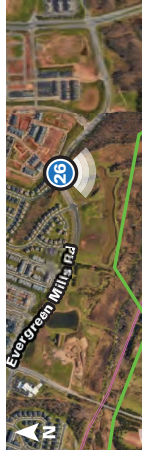
PROPOSED CONDITIONS

ROUTES DISPLAYED: 3

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 26
Date: 8/11/2022
Time: 10:22 am
Direction: South



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





EXISTING CONDITIONS



ROUTES DISPLAYED: 1

PROPOSED CONDITIONS



SIMULATION 24
 Date: 8/11/2022
 Time: 10:15 am
 Direction: South

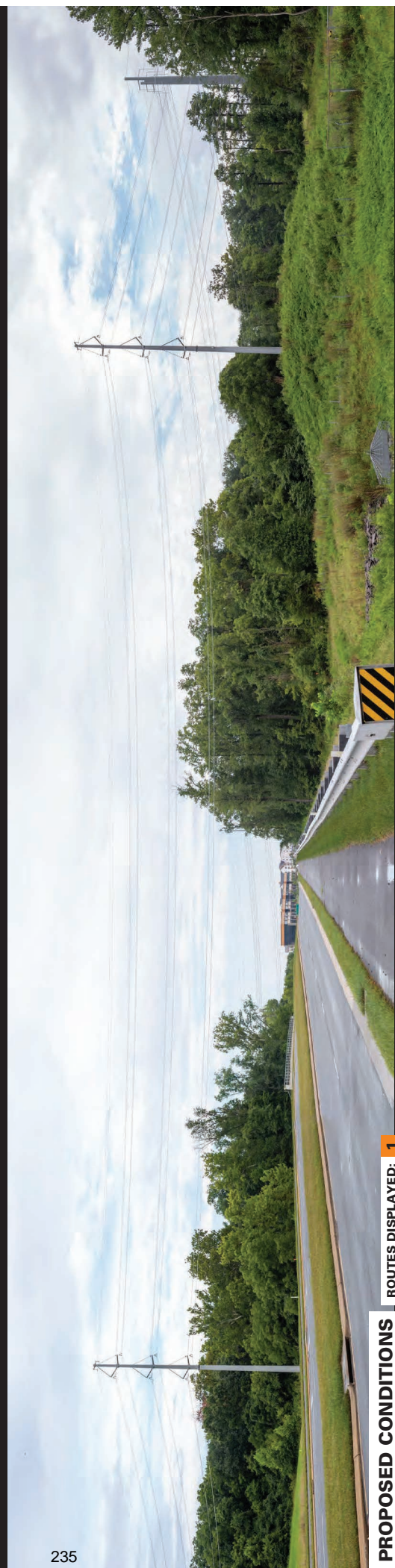
WISHING STAR - MARS 500/230-kV Substation and Transmission Line Project

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





EXISTING CONDITIONS



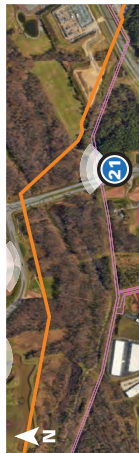
PROPOSED CONDITIONS

ROUTES DISPLAYED: 1

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 21
Date: 8/11/2022
Time: 8:03 am
Direction: North

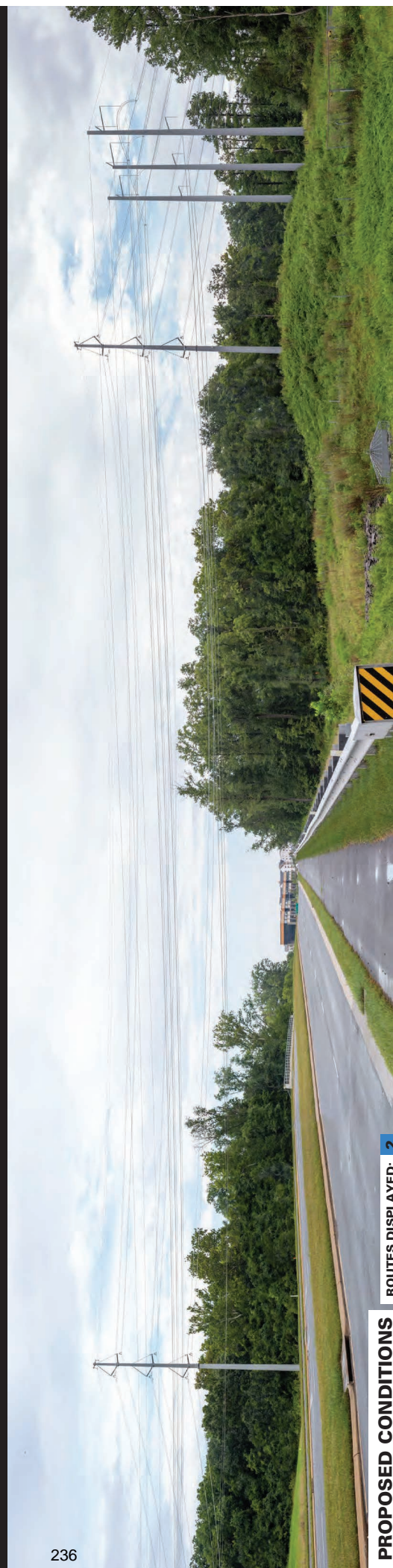


Visualization is for discussion purposes only. Final design is subject to change pending public, engineering, and regulatory review.





EXISTING CONDITIONS



PROPOSED CONDITIONS

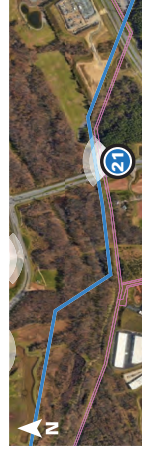
ROUTES DISPLAYED: **2**

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 21

Date: 8/11/2022
Time: 8:03 am
Direction: North



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





EXISTING CONDITIONS



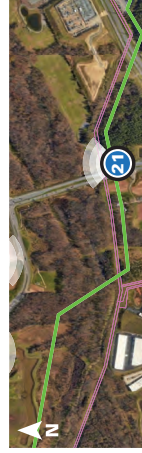
PROPOSED CONDITIONS

ROUTES DISPLAYED: 3

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 21
Date: 8/11/2022
Time: 8:03 am
Direction: North



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

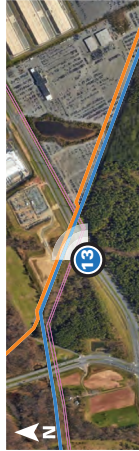




EXISTING CONDITIONS



PROPOSED CONDITIONS ROUTES DISPLAYED: 1 2



SIMULATION 13
 Date: 8/11/2022
 Time: 12:08 pm
 Direction: Northeast

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

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





EXISTING CONDITIONS

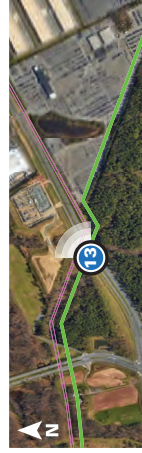


PROPOSED CONDITIONS ROUTES DISPLAYED: 3

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

SIMULATION 13
Date: 8/11/2022
Time: 12:08 pm
Direction: Northeast



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



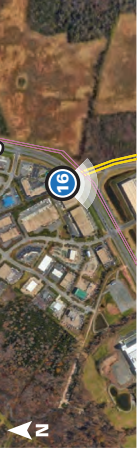


EXISTING CONDITIONS



PROPOSED CONDITIONS

ROUTES DISPLAYED: Mars 230kV Loop



SIMULATION 16
 Date: 8/11/2022
 Time: 8:57 am
 Direction: South

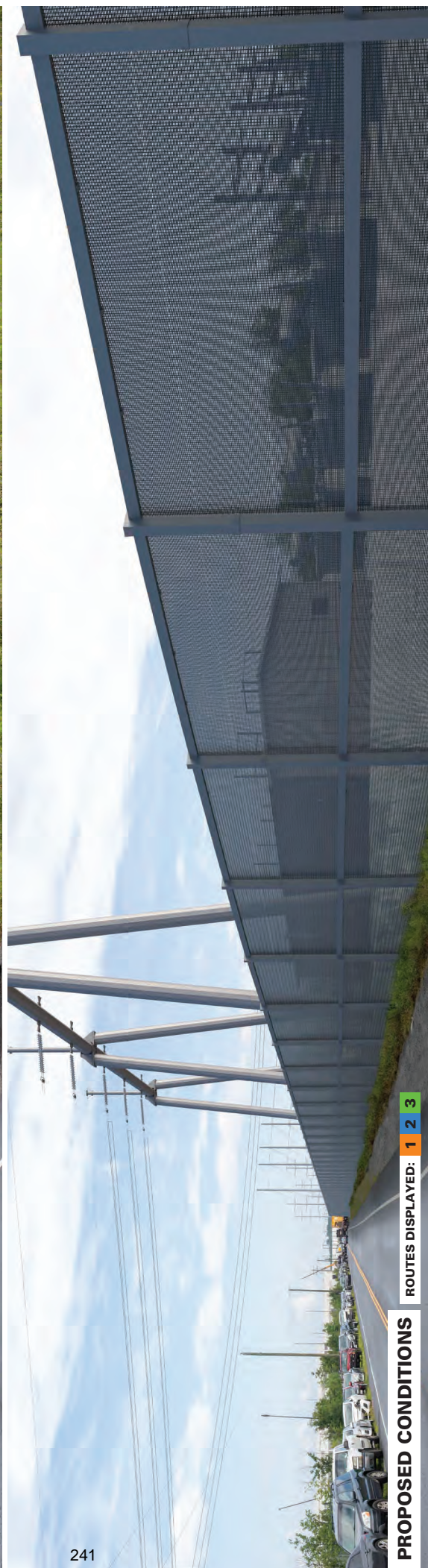
WISHING STAR - MARS 500/230-kV Substation and Transmission Line Project

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





EXISTING CONDITIONS



PROPOSED CONDITIONS

ROUTES DISPLAYED: 1 2 3



SIMULATION 14
 Date: 8/11/2022
 Time: 8:40 am
 Direction: North

WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

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



WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

Right-of-Way Visualization

Route 1

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



WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

Right-of-Way Visualization

Route 2

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



WISHING STAR - MARS

500/230-kV Substation and Transmission Line Project

Right-of-Way Visualization

Route 3

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





Environmental Justice: Ongoing Commitment to Our Communities

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

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

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

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

November 2018

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

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

Response: **Mars-Wishing Star Lines**

Proposed Route (Route 5): None.

Alternative Route 1: None.

Alternative Route 2: None.

Alternative Route 3: None.

Alternative Route 4: None.

Alternative Route 6: None.

Mars 230 kV Loop

Proposed Route: None.

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

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

Response: **Mars-Wishing Star Lines**

Proposed Route (Route 5)

The Proposed Route would be collocated for a total of about 1.8 miles along the existing Company-owned transmission line rights-of-way for Lines #2172 and #2183. The Company-owned rights-of-way currently are maintained cleared of large trees for their entire length. The Proposed Route also crosses Arcola Mills Drive, Belmont Ridge Road, Loudoun County Parkway, Old Ox Road, and Carters School Road. These are all public roads maintained by VDOT and consist of paved multi-lane roads.

Alternative Route 1

Alternative Route 1 would be collocated for a total of about 0.73 mile along the existing Company-owned transmission line rights-of-way for Lines #2172 and #2183. The Company-owned rights-of-way currently are maintained cleared of large trees for their entire length. Alternative Route 1 also crosses Arcola Mills Drive, Belmont Ridge Road, Loudoun County Parkway, Old Ox Road, and Carters School Road. These are all public roads maintained by VDOT and consist of paved multi-lane roads.

Alternative Route 2

Alternative Route 2 would be collocated for a total of about 1.13 miles along the existing Company-owned transmission line rights-of-way for Lines #2172 and #2183. The Company-owned rights-of-way currently are maintained cleared of large trees for their entire length. Alternative Route 2 also crosses Arcola Mills Drive, Belmont Ridge Road, Loudoun County Parkway, Old Ox Road, and Carters School Road. These are all public roads maintained by VDOT and consist of paved multi-lane roads.

Alternative Route 3

Alternative Route 3 would be collocated for a total of about 1.06 miles along the existing Company-owned transmission line rights-of-way for Lines #2172 and #2183. The Company-owned rights-of-way currently are maintained cleared of large trees for their entire length. Alternative Route 3 also crosses Arcola Mills Drive, Belmont Ridge Road, Loudoun County Parkway, Old Ox Road, and Carters

School Road. These are all public roads maintained by VDOT and consist of paved multi-lane roads.

Alternative Route 4

Alternative Route 4 would be collocated for a total of about 1.46 miles along the existing Company-owned transmission line rights-of-way for Lines #2172 and #2183. The Company-owned rights-of-way currently are maintained cleared of large trees for their entire length. Alternative Route 4 also crosses Arcola Mills Drive, Belmont Ridge Road, Loudoun County Parkway, Old Ox Road, and Carters School Road. These are all public roads maintained by VDOT and consist of paved multi-lane roads.

Alternative Route 6

Alternative Route 6 would be collocated for a total of about 1.81 miles along the existing Company-owned transmission line rights-of-way for Lines #2172 and #2183. The Company-owned rights-of-way currently are maintained cleared of large trees for their entire length. Alternative Route 6 also crosses Arcola Mills Drive, Belmont Ridge Road, Loudoun County Parkway, Old Ox Road, and Carters School Road. These are all public roads maintained by VDOT and consist of paved multi-lane roads.

Mars 230 kV Loop

Mars 230 kV Loop Proposed Route

Mars 230 kV Loop Proposed Route would be collocated for a total of about 0.5 mile along Route 857 (Carters School Road). This is a public, paved, multi-lane road maintained by VDOT.

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

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

Response: The Loudoun County 2019 General Plan (“General Plan”),⁵⁴ the Loudoun County 2019 Countywide Transportation Plan (“2019 CTP”)⁵⁵ and Linear Parks and Trails System Plan (2021 Trail Plan)⁵⁶ were reviewed to evaluate the potential effect the Proposed and Alternative Routes of the Mars-Wishing Star Lines and Mars 230 kV Loop could have on future development. The General Plan and 2019 CTP do not address electric transmission lines within their land use policies and strategies explicitly; however, the General Plan recognizes that the area in proximity to the Proposed Route west of Dulles Airport is expected to continue to be a key location for industrial uses, airport-related businesses, suburban neighborhoods, suburban mixed use, and data center development. Future demand for data centers will need to be accommodated in places that have access to utilities, including electricity. The General Plan acknowledges that electrical demand in the County has grown dramatically in recent years with the development of data centers in eastern Loudoun County. Demand is expected to continue to grow with new data center construction and other land development near the Proposed Route.

Additionally, the Company consulted with Loudoun County Planning and Zoning (“DPZ”) Staff, Loudoun County Natural Resources Staff, Loudoun County Department of Transportation and Capital Infrastructure (“DTCI”) Staff, Brambleton Group, Black Chamber Group (Tech Park developer), NOVEC, the Loudoun County Board of Supervisors Office, and Farah-Naples LP (“Farah-Naples”). The purpose of the consultations was to discuss the Project and determine if there were any constraints present that would conflict with existing or proposed land uses.

No conflicting land uses were identified by Loudoun County DPZ Staff or Natural Resources Staff; however, County Staff stated their land use planning objective of limiting development within the Broad Run floodplain and riparian area. Loudoun County is planning an interconnected, countywide linear parks and trails system to preserve natural habitat and provide recreational opportunities for residents. Portions of the existing and planned Countywide parks and trails system are located along the Broad Run riparian area. The Mars-Wishing Star Lines cross a private open space proffer, Stream Valley Park, which includes a trail system maintained by the Brambleton Community Association. County Staff supports paralleling existing road and transmission line corridors and mitigating impacts to Broad Run

⁵⁴ See <https://www.loudoun.gov/DocumentCenter/View/152285/General-Plan---Combined-with-small-maps-bookmarked>.

⁵⁵ See <https://www.loudoun.gov/DocumentCenter/View/152287/CTP---Combined-with-small-maps-bookmarked>.

⁵⁶ See https://www.loudoun.gov/DocumentCenter/View/167395/LPAT-Plan_211029_Full-Appendices-4.

by avoiding tree removal, particularly high-value deciduous hardwoods. The Proposed Route of the Mars-Wishing Star Lines attempts to mitigate visual and environmental impacts to Stream Valley Park and Broad Run by placing structures above the floodplain and using single span, perpendicular crossings of Broad Run.

Review of publicly available information (including the 2019 CTP) and consultations with Loudoun County DTCI Staff were completed to determine the impact of the Project routes on future road projects. Several future road projects were identified in the Project area which conflicted with routes that were subsequently dismissed. The Project's Proposed Routes and Alternative Routes for were further vetted with DTCI Staff to confirm the feasibility of road crossings along both existing and planned roads and VDOT dedicated rights-of-way.

Potentially conflicting land uses were identified by the Brambleton Group on parcels planned for residential development. Alternative Routes 1, 2, 3, and 4 of the Mars-Wishing Star Lines would conflict with the Brambleton Shreveport South development as currently proposed under an active zoning amendment petition. This zoning amendment is active and proposes high-density multi-family housing and townhomes, however, portions of development are within an area subject to a Comprehensive Plan Amendment that would impose an Airport Impact Overlay District. Adoption of this Comprehensive Plan amendment could prevent new residential development in areas within the planned development.⁵⁷ The site currently zoned Industrial and requires approval and adoption of the zoning amendment before any further site plan approvals would be reviewed and approved.

Potentially conflicting land uses were identified by Black Chamber Group (the Tech Park at Brambleton developer) on parcels planned for future data center development. Earlier iterations of the Proposed Route and Alternative Routes of the Mars-Wishing Star Lines were found to conflict with a data center development site plan filed with the County on September 22, 2022. The Company consulted with the Tech Park at Brambleton development team to adjust the routes and analyze route alternatives that would avoid conflicting with development plans, including the placement of a stormwater detention pond and area dedicated for a future NOVEC DP. As of September 30, 2022, the Company engaged with NOVEC and the developer to coordinate on siting to allow crossing of the future NOVEC DP site. Coordination is ongoing with a possible solution under evaluation.

A potentially conflicting land use was identified by NOVEC on a site planned for a second future DP located 0.34-mile northwest of the intersection of Loudoun County Parkway and Old Ox Road on NOVEC-owned substation site. The Proposed and Alternative Routes of the Mars-Wishing Star Lines would conflict with a DP site plan to be filed with the County in early 2023. The Company consulted with the NOVEC Staff to adjust the routes and avoid conflicts with the

⁵⁷ See <https://www.loudoun.gov/5657/Airport-Impact-Overlay-District-Comprehe>.

proposed equipment layout and terminal alignment.

The Company received a letter dated October 21, 2022, from the Loudoun County DPZ indicating the County's support for the construction of the Mars-Wishing Star Lines and Mars 230 kV Loop to help meet regional electric demand while ensuring the structural integrity and reliability of the transmission system. Based on its review, DPZ Staff identified Mars-Wishing Star Alternative Route 4, Route 5 (the Proposed Route) and Alternative Route 6 as providing the most direct route while limiting impacts on environmental features and surrounding land use. DPZ Staff also indicated its support of the Mars 230 kV Loop Proposed Route, which is collocated with an existing transmission corridor in an area designated for industrial uses. See Attachment III.E.1. Additionally, the Company received letters in support of the Proposed Route (Route 5) of the Mars-Wishing Star Lines from Brambleton Group, Black Chamber Group, and Farah-Naples. See Attachments III.E.2, III.E.3, and III.E.4, respectively.

See Appendix Section II.A.9 and Sections 3.1.6 and 4.1.6 of the Environmental Routing Study for additional discussion.



Planning and Zoning

1 Harrison Street, SE, PO Box 7000, Leesburg, VA 20177-7000
 703-777-0246 O | 703-777-0441 F | dpz@loudoun.gov
loudoun.gov/planningandzoning

October 21, 2022

Ms. Laura Meadows, Sr. Siting and Permitting Specialist
 Dominion Energy Virginia
 10900 Nuckols Rd, 4th Floor
 Glen Allen, VA 20177

Re: Dominion Energy Virginia's Proposed 500-230kV Wishing Star Substation, 500-230kV Mars-Wishing Star Line, 500-230kV Mars Substation, and Mars 230kV Loop, Loudoun County, Virginia, Notice Pursuant to VA Code 15.2-2202 E

Ms. Meadows,

Enclosed are Department of Planning and Zoning comments regarding Dominion Energy Virginia's Proposed 500-230kV Mars-Wishing Star Lines and Mars 230kV Loop.

Our understanding is that the proposed electrical transmission lines and substations are needed to meet current and future electrical demand for the area, and to comply with mandatory North American Electric Reliability Corporation Standards. Department of Planning and Zoning (DPZ) Staff along with Department of Building and Development Staff from the Natural Resources Team (NRT) participated in several virtual meetings beginning in May 2022 with representatives from Dominion Energy Virginia to review and discuss potential routes, existing and future land uses, visual impacts, and potential impacts to environmental and heritage resources.

DPZ Staff has reviewed the six potential 500-230kV Mars-Wishing Star routes and the Mars 230kV loop provided with your letter dated September 23, 2022. A Commission Permit is required for the proposed Mars and Wishing Star substations, which will be reviewed separately by the County through the legislative process. Loudoun County policies support the establishment of the proposed 500-230kV Mars-Wishing Star Lines and Mars 230kV Loop to meet electric demand for the area while ensuring the structural integrity and reliability of the transmission system. The County offers the following comments on the projects pertaining to land use and potential impacts to environmental and heritage resources.

COMPREHENSIVE PLAN CONFORMANCE

The subject property is governed under the policies of the *Loudoun County 2019 General Plan* (2019 GP). Loudoun County views electrical service as an essential component of daily life and supports the construction of necessary electrical transmission infrastructure to ensure the structural integrity and reliability of the electrical transmission system to support existing and future business and residential uses (2019 GP, Chapter 6, Energy and Communication). Specifically, the energy policies call for the County to work with electrical providers to identify potential high voltage transmission/distribution lines and substation locations to minimize impacts on key travel corridors, sensitive cultural and historic resources, and existing residential communities; and where possible, use existing transmission corridors to expand

capacity (2019 GP, Chapter 6, Electrical, Action 6.1.C). In keeping with the County's energy policies, the approximately 3.5 mile proposed 500-230kV Mars-Wishing Star Line, parallels an existing 230kV overhead high-voltage transmission corridor in an area identified as the Suburban Industrial/Mineral Extraction Place Type where general and heavy manufacturing, warehousing, contractor with outdoor storage, data center, **public utilities** [emphasis added] and outdoor manufacturing are identified as core uses (2019 GP, Chapter 2, Suburban Industrial/Mineral Extraction). The Mars 230kV Loop is an approximately half-mile route that connects the proposed Mars substation with the existing 230kV line adjoining Old Ox Road (Route 606), which is also in an area identified as the Suburban Industrial/Mineral Extraction Place Type. The location of the proposed Mars-Wishing Star and Mars Loop, which is within an area planned for industrial uses proximate to existing overhead high-voltage transmission corridors, is in keeping with the County's land use policies and minimizes the visual impact of the new construction on the surrounding area (2019 GP, Chapter 6, Electrical, Action 6.1.B-D).

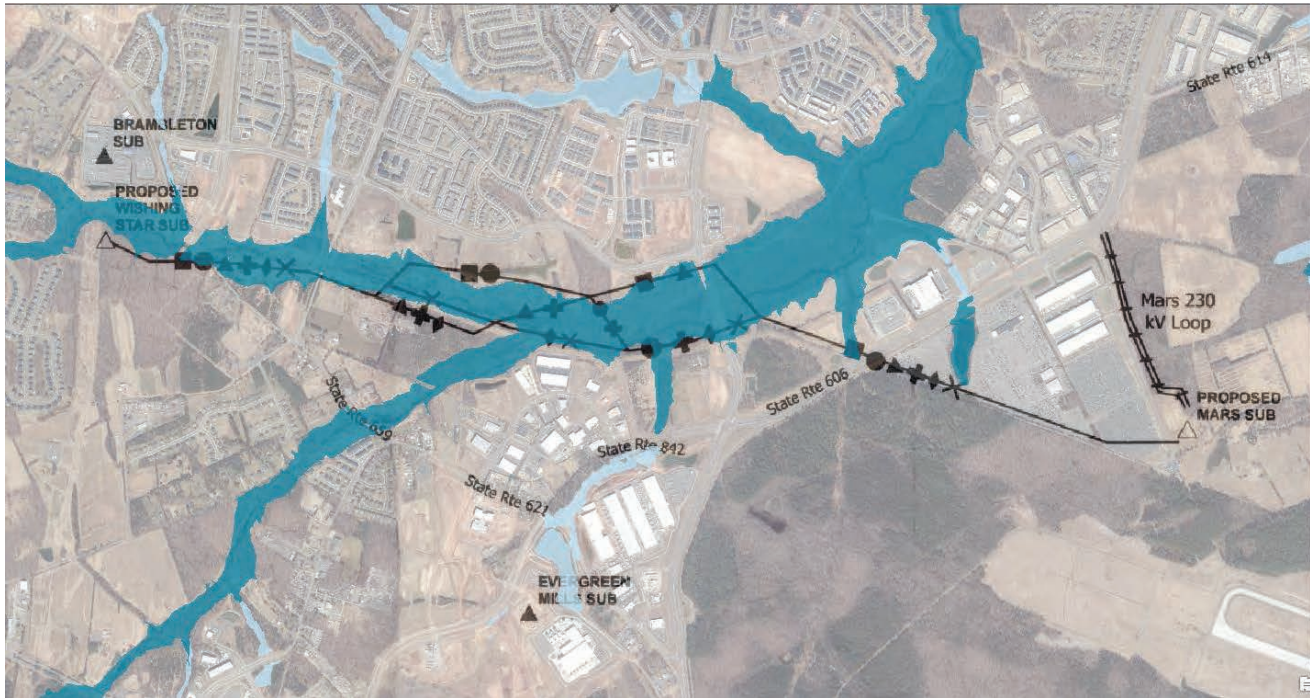
Construction of the proposed Mars-Wishing Star and Mars Loop transmission corridors will require additional clearing and grading for the construction right-of-way, access roads, foundation installation for the new towers, creation of material staging areas, and tower lacing areas that may temporarily or permanently impact river and stream corridor resources, wetlands, forest cover, vegetation, wildlife habitats, and heritage resources.

River and Stream Corridor Resources and Wetlands

County policies limit development and uses in river and stream corridors that support or enhance the biological integrity and health of the river and stream corridor. Permitted uses are intended to have minimal adverse effects on wildlife, aquatic life, and their habitats; riparian forests, wetlands, and historic and archaeological sites; and will complement the hydrologic processes of the river and stream corridors, including flood protection and water quality (2019 GP, Chapter 3, River and Stream Resources, Strategy 2.2 and Permitted Uses in the RSCR). The proposed Mars-Wishing Star transmission corridor is located proximate to the Broad Run, and therefore impacts to existing riparian forest, streams, drainage ways, steep and moderately steep slopes, and wetlands within the floodplain are anticipated. DPZ Staff notes that Routes 4, 5, and 6, which closely parallel portions of the existing 230 kV transmission corridor, provide the most direct route and may be the less impactful on river and stream corridor resources. The proposed utilization and expansion of the existing transmission corridor reduces impacts on existing forest cover and associated wildlife habitat and vegetation, while minimizing habitat fragmentation created by the establishment of new transmission corridors.

Routes 1, 2, and 3 will require the establishment of new transmission corridors and crossings of the Broad Run that will impact river and stream corridor resources and bisect a large wetland mitigation site that was created to offset development impacts within Brambleton. DPZ Staff recommends coordination with the U.S. Army Corps of Engineers and the Virginia Department of Environmental Quality to determine if impacts to the wetland mitigation site are required to be offset elsewhere. DPZ Staff also recommends coordination with FEMA regarding compliance with floodplain regulations.

DPZ Staff requests further coordination with Dominion Energy Virginia as potential routes and construction plans are refined to ensure protection of environmental resources, consistent with policy goals outlined above. New transmission poles should be sited outside the limits of the floodplain where possible to mitigate impact to the river and stream corridor resources. Areas impacted and disturbed by the proposed construction should be replanted and/or reforested with native species to support wildlife habitat and protect the water quality of the Broad Run from the harmful effects of increased stormwater runoff and sediment.



County GIS mapping depicting the extent of the Broad Run floodplain and proposed transmission corridor routes.

Forests, Vegetation, and Wildlife Habitat

County policies encourage the preservation, protection and management of existing forests, vegetation, and wildlife habitat for their economic and environmental benefits, such as improved air and water quality, offering important wildlife habitat, providing buffers between communities, reducing wind speeds and redirecting wind flow, and reducing stormwater runoff and soil erosion (2019 GP, Chapter 3, Forests, Trees, and Vegetation, Policy 4). Additionally, the County promotes the protection of wildlife habitats, wildlife travel corridors, and access to streams and water resources through the preservation of native vegetation, forest cover, woodlands, floodplains, streams, and stream corridors (2019 GP, Chapter 3, Wildlife Habitats, Strategy 6.2). The proposed establishment of the Mars-Wishing Star transmission corridor and Mars Loop will impact existing forests, vegetation, and wildlife habitat. DPZ Staff recommends that the transmission corridor rights-of-way be managed as natural habitat with actions to promote the growth of native vegetation to support wildlife habitat in keeping with the policies of the 2019 GP. These actions would necessitate further coordination between the County's NRT Staff and Dominion Energy Virginia as potential routes, and construction plans are refined.

Heritage Resources

The 2019 GP calls for the conservation and preservation of the County's cultural and scenic resources. Land development applications are expected to provide an archaeological and historic resources survey to identify resources, and if warranted, measures for recordation, preservation, mitigation, and adaptive reuse (2019 GP, Chapter 3, Historic, Archaeologic, and Scenic Resources, Action 5.1.C).

The County's Archaeologist has identified fourteen relevant Phase 1 studies and approximately twelve previously identified archaeological sites proximate to the proposed Mars-Wishing Star transmission corridor. The proposed route will also impact portions of the Loudoun Branch of the Manassas Gap Railroad and short-term Civil War encampments associated with the Army of the Potomac during the onset of the Gettysburg Campaign in June 1863. The proposed transmission corridor is also within the view shed of the

Arcola Quarter for the Enslaved (NR 053-0984), which is listed on the National Register of Historic Places. DPZ Staff recommends further coordination between the County's Archaeologist and Dominion Energy Virginia to mitigate impacts to heritage resources.

Pedestrian and Bicycle Accommodations

The County is committed to establishing an integrated trail system for pedestrians and cyclists, and will work to establish connections among pedestrian and bicycle sidewalk, paths, and trails (2019 GP, Chapter 2, Suburban Policy Area, Strategy 1.3). Currently, residents informally use segments of the existing 230kV transmission corridor for walking, hiking and mountain biking. The proposed construction of the 500-230kV Mars-Wishing Star route provides opportunities for the establishment of additional trails and connections to a future linear trail network identified as the "Broad Run Trail and Blueway" within the Countywide Linear Parks and Trail System Plan (LPAT) (LPAT, Chapter 7, Map 16-Eastern Loudoun). These types of trail networks often follow linear landscape features such as stream valleys, abandoned roadways, sewer easements, and natural gas and electrical transmission corridors, and require a number of years to assemble the necessary segments to form a complete network. The LPAT envisions the establishment of a network of trails that provides connectivity and access points to the linear parks and trail system throughout eastern Loudoun (LPAT, Chapter 7, Framework Trails in Eastern Loudoun County). DPZ Staff recommends that Dominion Energy Virginia work with the County to develop a linear trail system within the transmission corridor rights-of-way to provide pedestrian and bicycle access as outlined in the LPAT.

SUMMARY RECOMMENDATION

Loudoun County policies support the construction of the proposed 500-230kV Mars-Wishing Star Lines and 230kV Mars Loop to help meet regional electric demand while ensuring the structural integrity and reliability of the transmission system. The proposed routes bisect areas identified by the County's Comprehensive Plan as suitable for industrial uses where public utilities are envisioned as core uses. DPZ Staff has reviewed the proposed routes and has identified Routes 4, 5 and 6 associated with the Mars-Wishing Star transmission corridor as providing the most direct route while limiting impacts on environmental features and surrounding land uses. DPZ Staff also supports the Mars Loop, which is located proximate to an existing overhead high-voltage transmission corridor in an area designated for industrial uses. DPZ recommends that Dominion Energy Virginia continue to work with County Staff to achieve policy goals regarding the protection of environmental and heritage resources and the establishment of a linear trail network as outlined in the 2019 GP and discussed in this correspondence.

If you have any questions regarding these comments, please contact Pat Giglio, Planner III, Loudoun County Department of Planning and Zoning, at 703-737-8563 or patrick.giglio@loudoun.gov.

Thank you for the opportunity to provide comments.

Sincerely,



Joe Kroboth III, PE, Interim Director
Department of Planning and Zoning

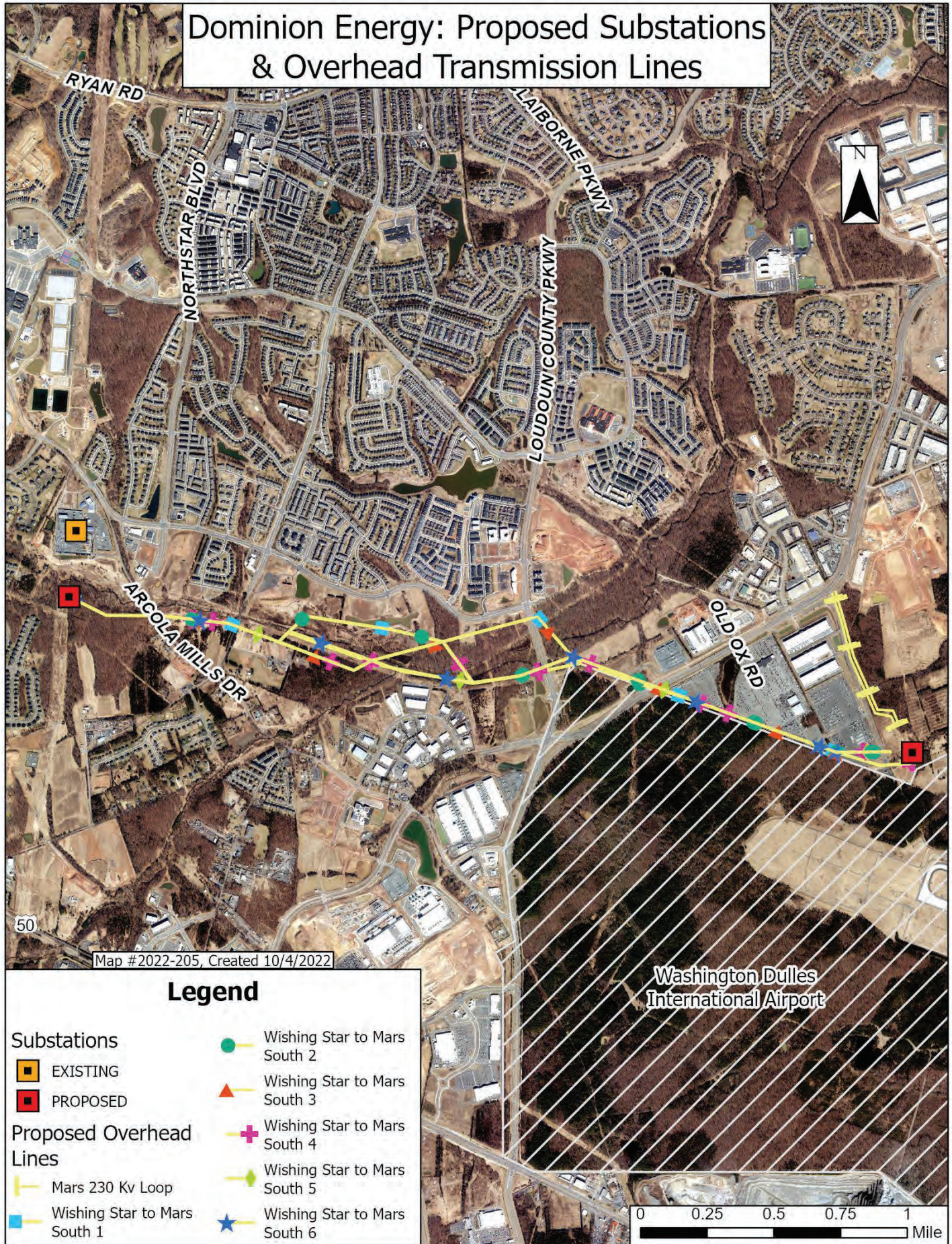
cc: *via email only*

Tim Hemstreet, County Administrator

Charles Yudd, AICP, Deputy County Administrator

Leo Rogers, County Attorney
Joe Kroboth, III, PE, Assistant County Administrator
Buddy Rizer, Director, Economic Development
Alan Brewer, Director, Building and Development

Enclosure: Vicinity map depicting proposed Transmission Routes and Substation, produced by DPZ.



BRAMBLETON GROUP L.L.C.

October 14, 2022

Mr. Greg Vozza
Electric Transmission Project Manager
2400 Grayland Ave.
Richmond, VA 23220

Re: Support for Dominion Energy Virginia's Application for the Mars to Wishing Star Transmission Line Project

Dear Mr. Vozza:

On behalf of Brambleton Group, I am writing to provide our support for Dominion's application to the Virginia State Corporation Commission for approval of the Mars to Wishing Star Transmission Line Project ("Project") along the route identified by Dominion as Route 5. As an established and long-time landowner and developer of commercial and residential projects in Loudoun County, we understand the need for the Project for continued economic growth in Loudoun County for many uses, including data centers..

Brambleton Group is pleased with Dominion's efforts to develop the project cooperatively with it, NOVEC, and the many landowners and stakeholders in the project area. As an owner of many parcels of land in the project area, Brambleton Group recognizes that there are many other ongoing, planned, and potential developments in this area, as well as environmental and other resource constraints, and thus, that transmission line routing opportunities can be limited and constrained.

Brambleton Group and Dominion have met numerous times, in person, in the field, and via electronic means and have shared ideas and worked cooperatively to develop transmission line routing alternatives for the Project. Brambleton Group understands that Dominion also has met repeatedly with other existing landowners and developers in this area, including members of the residential communities to the west of the proposed Wishing Star Substation and to the north of the project area, as well as local government officials, to gather as much information as possible to inform its possible routing alternatives.

Dominion has shared with Brambleton Group its review of potential impacts and the routing alternatives developed and evaluated. Brambleton Group agrees with Dominion that its proposed alternative, Route 5, is the best solution when all facts and circumstances are considered. Brambleton Group shared its initial concerns with Dominion about impacts on parcels under development and on the adjoining residential neighborhoods it previously

developed in Brambleton and Birchwood, which would be impacted by the proposed route of the Project. Dominion has been very responsive to Brambleton Group's concerns and we collaborated in order to identify a route that we believe will minimize impacts on Brambleton Group's development plans in the Project corridor, as well as minimize impacts on the residents of the Birchwood and Brambleton Communities located north of Evergreen Mills Road, which Brambleton Group developed.


Route 5 also minimizes impacts on the environmentally sensitive areas between Broad Run and Evergreen Mills Road, as well as the Stream Valley Park trail system therein that is utilized regularly by nearby residents. This stands in contrast to Routes 1-4, which all cut north through that area, causing greater visual impacts to the residents and greater environmental impacts to those resources. Keeping the new line as close to the existing transmission lines in the area appears to be the best choice for all involved. Route 6 is also close to the existing transmission lines, but it crosses to north of the existing lines sooner than Route 5 and would have greater visual and environmental impacts. For this reason, Brambleton Group prefers Route 5 over Route 6.

Brambleton Group also believes that Route 5 will minimize impacts to property it owns via a subsidiary on the eastern portion of the Project that is under development. Specifically, Brambleton Group owns land north of Arcola Boulevard and west of Loudoun County Parkway. Locating the proposed route north of the existing transmission lines along Route 5 (still on Brambleton Group land) should minimize impacts to the developable portion of this land.

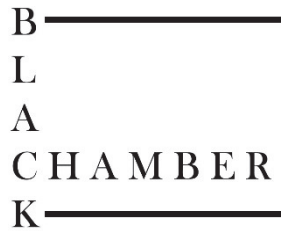
Brambleton Group supports Route 5 and looks forward to continuing to work with Dominion and its neighbors to ensure the Project is permitted and completed on schedule.

Please feel free to contact me with any questions and I look forward to our continued cooperation.

Sincerely,



Stephen T. Schulte, P.E.
Vice President, Brambleton Group



October 20, 2022

Mr. Greg Vozza
Electric Transmission Project Manager
2400 Grayland Ave.
Richmond, VA 23220

Re: Support for Dominion Energy Virginia's Application for the Mars to Wishing Star Transmission Line Project

Dear Mr. Vozza:

On behalf of BlackChamber Group ("BlackChamber"), I am writing to provide our support for Dominion's application to the Virginia State Corporation Commission for approval of the Mars to Wishing Star Transmission Line Project ("Project"). As landowner and developer of data center projects in Loudoun County, including one in the Project area, BlackChamber understands how important the Project is for the continued reliability of Dominion's existing transmission system, and in turn, for continued economic growth in Loudoun County in connection with the data center industry.

BlackChamber is pleased with Dominion's efforts to develop the Project cooperatively with it, NOVEC, and the many landowners and stakeholders in the project area. As an owner and developer of a parcel of land in the project area, currently being zoned and planned for data center use, BlackChamber recognizes that there are many other ongoing, planned, and potential developments in this area, as well as environmental and other resource constraints, and thus, transmission line routing opportunities are limited and constrained.

BlackChamber and Dominion have met numerous times regarding the Project, as well as the data center project BlackChamber currently is pursuing in the area. The parties have shared ideas and worked cooperatively to evaluate and develop transmission line routing alternatives for the Project in a manner that meets Dominion's, BlackChamber's, and NOVEC's (as the local retail provider) needs and planned development in the area.

Dominion has shared with BlackChamber its review of potential impacts and the routing alternatives developed and evaluated. Brambleton Group supports Dominion's Route 5. Route 5 will traverse BlackChamber's parcel east of Belmont Ridge Road until Route 5 jogs northeast and crosses the existing transmission lines that run along the north side of the parcel. The parties (Dominion, NOVEC, and BlackChamber) have worked closely together in developing their various projects to ensure that all projects can be build and operate in this area along Route 5

cooperatively. BlackChamber also would support Route 6. BlackChamber does not support Routes 1-4 in light of their proximity to its residential neighbors to the north as well as their divergence from the existing transmission line corridor.

BlackChamber looks forward to continuing to work with Dominion and its neighbors to ensure the Project is permitted and completed on schedule.

Please feel free to contact me with any questions., and I look forward to our continued cooperation.

Sincerely,

A handwritten signature in black ink that reads "Derek van Dijkum". The signature is fluid and cursive, with a long horizontal stroke at the end.

Derek van Dijkum
The BlackChamber Group

October 24, 2022

Mr. Greg Vozza
Electric Transmission Project Manager
Dominion Energy
2400 Grayland Ave.
Richmond, VA 23220

Re: Support for Dominion Energy's Application for the Mars to Wishing Star
Transmission Line Project

Dear Mr. Vozza:

On behalf of Farah-Naples LP ("Farah-Naples"), I am writing in support of Dominion's application to the Virginia State Corporation Commission for approval of the Mars to Wishing Star Transmission Line Project ("Project"). As a long-time landowner and developer in Loudoun County, including one in the Project area, Farah-Naples understands how important the Project is for the continued reliability of Dominion's transmission system and in turn, for continued economic growth in Loudoun County.

Having been involved in this area's development for decades, Farah-Naples recognizes that there are many other active ongoing, planned, and potential developments in this area, as well as environmental and other resource constraints, and thus, that transmission line routing options are likely highly limited and constrained. Given that one of our properties was and is in the midst of a sale and development process directly threatened by the Project, Farah-Naples has been pleased with the Dominion team's efforts to work timely and cooperatively with us and the other landowners in the project area to a common solution around Route 5.

Farah-Naples and Dominion have met many times regarding the Project as well as about the development Farah-Naples is currently pursuing in the area. The parties have shared ideas and have worked together to evaluate and develop transmission line routing alternatives for the Project in a manner that meets Dominion's and Farah-Naples' needs and planned development in the area.


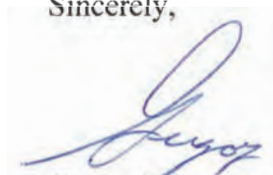
Dominion has shared with Farah-Naples its review of potential impacts and the routing alternatives that Dominion conceived and evaluated. Farah-Naples supports Dominion's Route 5 with an appropriate easement in place to protect both Dominion and Farah-Naples. Route 5 will cross Farah-Naples land east of Loudoun County Parkway and north of Old Ox Road, nearer the eastern end of the Project. Farah-Naples supports Route 5 because, with an appropriately compensated easement purchase by Dominion and an easement agreement that allows continued development of the Farah-Naples property without undue impediment by the easement, it can be constructed and operated in a manner consistent with Farah-Naples' (now adjusted, smaller) planned development of the site. Given the impending timing of Farah-Naples's development, it has engaged extensively with Dominion regarding the execution of an easement mutually agreed to by Dominion and Farah-Naples that would support and be utilized by Route 5. Farah-Naples

looks forward to concluding that transaction in the near future to support the Project and to the development of its project.

Farah-Naples looks forward to continuing to work with Dominion to ensure the Project is permitted and completed on schedule.

Please feel free to contact me with any questions and I look forward to our continued cooperation.

Sincerely,



General Partner
Farah-Naples, LP

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

F. Government Bodies

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

Response: (1) Coordination with Loudoun County has concluded that no land is designated as important farmlands within the Project study area.

(2) Not applicable.

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

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

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

Response: Mars-Wishing Star Lines and Mars 230 kV Loop Proposed and Alternative Routes

1. None.
2. None.
3. None.
4. The known archaeological sites in the right-of-way for the Mars-Wishing Star Lines Proposed and Alternative Routes, the Mars 230 kV Loop Proposed Route, and Wishing Star Substation are summarized in the table below. Of the eight resources located within the rights-of-ways, five have been determined not eligible for listing in the NRHP, while three are unevaluated. No archaeological sites fall within the footprint of the proposed Mars Substation.

Route Alternative/ Substation	Site Number	Description	NRHP Status
Project Facilities			
Mars-Wishing Star Lines Route 1	44LD0167	Temporary camp (Pre-Contact)	Not Evaluated
	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
Mars-Wishing Star Lines Route 2	44LD0167	Temporary camp (Pre-Contact)	Not Evaluated
	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
Mars-Wishing Star Lines Route 3	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
Mars-Wishing Star Lines Route 4	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
Mars-Wishing Star Lines Route 5	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
	44LD0174	Temporary camp (Pre-Contact)	Not Eligible
	44LD0609	Base camp (Early Woodland)	Not Evaluated
	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
Mars-Wishing Star Lines Route 6	44LD0168	Temporary camp (Pre-Contact)	Not Eligible
	44LD0173	Temporary camp and Lithic scatter (Pre-Contact)	Not Eligible
	44LD0174	Temporary camp (Pre-Contact)	Not Eligible
	44LD0609	Base camp (Early Woodland)	Not Evaluated
	44LD0970	Lithic scatter (Late Archaic Period)	Not Evaluated
Mars 230 kV	44LD1742	Carter Schoolhouse (World War I to	Not Eligible

Route Alternative/ Substation	Site Number	Description	NRHP Status
Loop		World War II)	
Wishing Star Substation	44LD1280	Railroad bed (Antebellum Period, Civil War, Early National Period, Reconstruction and Growth)	Not Eligible

5. None.

6. None.

7. None.

8. None.

9. A Restrictive Preservation Area is within the right-of-way of the Mars-Wishing Star Lines Proposed Route. The Restrictive Preservation Area was imposed under a Declaration of Restrictions and Covenants recorded with Loudoun County in 2012 (Instrument Number 20120601-0041455). The restrictive covenant requires that specific areas on the property be preserved in their natural state with certain exceptions. The Restrictive Preservation Area originated as a condition of Virginia Water Protection Permit Number 03-2118, issued by the DEQ, and Permit Number 2003-2655, issued by the USACE, during early development of the Brambleton Shreveport South property (PIN 161269137000).

10. None.

11. None.

12. Stream Valley Park and the Broad Run Trail are within the right-of-way of the Mars-Wishing Star Lines Proposed Route. The park and trail system are located on privately owned land but are conveyed for public use and access through local legislative proffers and conditional zoning approvals (Loudoun County Zoning Map Amendment ZMAP 2013-0002 and Zoning Concept Plan Amendment ZCPA 2013-0001). The proffers and easements establishing Stream Valley Park and the Broad Run Trail contribute to a planned countywide linear parks and trails system detailed in the Loudoun County *Linear Parks and Trails System Plan* (2021).

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

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

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

The Company has reviewed the FAA's website⁵⁸ to identify airports/heliports within 10 miles of the proposed Project. Based on this review, the following FAA-restricted airports/heliports are located within 10 miles of the Project:

- Dulles Airport, approximately 0.1 mile south of the Mars Substation;
- Stonesprings Heliport, approximately 1.2 miles south of Wishing Star Substation;
- Goose Hunt Farm Airport, 6.2 miles northwest of Wishing Star Substation;
- Reston Hospital Heliport, approximately 6.9 miles east of Mars Substation;
- Leesburg Executive Airport, 7.6 miles north of the Wishing Star Substation;
- Inova Fair Oaks Hospital, approximately 7.6 miles southeast of Mars Substation;
- Inova Loudoun Hospital Heliport, approximately 8.2 miles north of Routes 1 and 3
- Fairfax County Police Heliport, approximately 9.3 miles southeast of Mars Substation; and
- Crippen's Heliport, approximately 9.5 miles northeast of Mars Substation.

The Company reviewed the height limitation associated with FAA-defined imaginary surveys for all runways associated with the Dulles Airport, and all other public or private registered airfields to determine whether any of the tower heights associated with each specific tower location would penetrate any of the relevant flight surfaces for any of the runways. Dominion Energy Virginia conducted a preliminary evaluation of the tower heights and locations using the FAA-defined Civil and Department of Defense Airport Imaginary Surfaces and applying standard GIS tools, including ESRI's ArcMap 3D and Spatial Extension software. This software was used to create and geo-reference the imaginary surfaces in space and in relationship to the transmission towers.

⁵⁸ See <https://oeaaa.faa.gov/oeaaa/external/portal.jsp>.

Of these airports, it was determined only the Dulles Airport was in close enough proximity to potentially impact navigable airspace. The ground surface data for the Project area was derived by using USGS 2021 Geologic Map Database. Civil airport imaginary surfaces have been established by the FAA with relation to each airport and to each runway. The imaginary surfaces were developed to prevent existing or proposed objects from extending from the ground into navigable airspace.

The Project would be adjacent to airport property and within approximately 0.6 mile from the primary surface for Runway 12 at the Dulles Airport. The airport surveyed ground elevation is 313 feet above mean sea level (“AMSL”). The ground elevation along the Project footprint ranges from 265 AMSL to 315 AMSL. The most critical Part 77 surface is associated with the runway approach. Objects are prohibited from penetrating a 50:1 slope ration restricted surface that extends upward and outward from the end of the runway. Alternative Routes 2, 4, 5 and 6 would be below this surface approximately 8,600 feet from the end of the runway, limiting structure heights in this area to 188 feet. Height restrictions within 10,000 feet of Runway 12 are limited to 150 feet above the airport elevation, or 453 feet AMSL, by the runway’s horizontal surface. Ground elevations along all route alternatives are below that of the airport runway. Structures associated with the Project would range from 90 to 190 feet in height. Based on the ground elevation at the Project area and the distance from the end of the nearest runway, there would be no potential for penetration of any of the imaginary surfaces or terminal instrument procedures (“TERPS”) imaginary surfaces associated with the Dulles Airport, and therefore no impacts to the airport are anticipated.

On September 27, 2022, the Company received a response from the Virginia Department of Aviation (“DOAv”) indicating that the Project encompasses an area within 20,000 feet of the Dulles Airport and is required to submit FAA Form 7460, Notice of proposed Construction of Alteration. Provided the results of the airspace study determines there would be no increase in the approach minimums with any of the instrument approach procedures, DOAv would not object to the Project as submitted. Since the FAA manages air traffic in the United States, it will evaluate any physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. See Section 2.O of the DEQ Supplement.

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

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

Response: No scenic byways are in close proximity to the study area for the proposed Project and no scenic byways would be crossed by the transmission line routes. Perpendicular road crossings, which are preferred by VDOT and Loudoun County, will be utilized at other road crossings.

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

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

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

- Coordination with the Corps, DEQ, and VDOT will take place as appropriate to obtain necessary approvals for the Project.
- A letter dated September 23, 2022, was submitted to Loudoun County to describe the Project and request comments. See Section V.D.
- A letter was submitted to the agencies listed in Section V.C on September 23, 2022, describing the Project and requesting comment. See Attachment 2 to the DEQ Supplement.
- A Stage I Pre-Application Analysis has been prepared and was submitted to VDHR on October 27, 2022. See Attachment 2.I.1 to the DEQ Supplement.
- On August 31, 2022, the Company solicited comments via letter from several federally recognized Native American tribes, including:

Chief Walt “Red Hawk” Brown	Cheroenhaka (Nottoway) Indian Tribe
Mary Frances Wilkerson	Cheroenhaka (Nottoway) Indian Tribe
Chief Stephen Adkins	Chickahominy Indian Tribe
Assistant Chief Reginald Stewart	Chickahominy Indian Tribe
Chief Gerald A Stewart	Chickahominy Indian Tribe Eastern Division
Jessica Phillips	Chickahominy Indian Tribe Eastern Division
Chief Mark Custalow	Mattaponi Tribe
Chief Kenneth Branham	Monacan Indian Nation
Chief Keith Anderson	Nansemond Indian Nation
Chief Lynette Allston	Nottoway Indian Tribe of Virginia
SUB: Ms. Beth Roach	Nottoway Indian Tribe of Virginia
Chief Robert Gray	Pamunkey Indian Tribe
Shaleigh R. Howells	Pamunkey Indian Tribal Resource Office
Chief Charles (Bootsie) Bullock	Patawomeck Indian Tribe of Virginia
Chief G. Anne Richardson	Rappahannock Tribe
SUB: Assistant Chief	Rappahannock Tribe
Chief W. Frank Adams	Upper Mattaponi Indian Tribe
Dr. Wenonah G. Haire	Catawba Indian Nation

Chief Bill Harris	Catawba Indian Nation
Erin Paden	Delaware Nation, Oklahoma
Chief Deborah Dotson	Delaware Nation, Oklahoma
Paul Barton	Eastern Shawnee Tribe of Oklahoma
Chief Glenna Wallace	Eastern Shawnee Tribe of Oklahoma

A template of the letter, which included a Project overview map, is included as Attachment III.J.1.

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

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



August 30, 2022

New Electric Transmission Project in Loudoun County

Dear: _____:

At Dominion Energy, we are committed to providing safe, reliable, affordable, and sustainable energy to all our customers. As such, we are moving forward with a series of electric transmission infrastructure projects designed to address the growing energy needs of Loudoun County.

The first project is to construct two new substations – named Wishing Star and Mars – and new 500 kilovolt (kV) and 230 kV transmission lines, on the same structure, between the two new substations. The new right of way is proposed to primarily be along existing transmission corridors (please see the enclosed map). These route options are not final but simply the next step in continuing the conversation with the community.

You can also view our proposed routes for the project at [DominionEnergy.com/Nova](https://www.dominionenergy.com/nova). Click on the GeoVoice interactive mapping tool to explore the routes and leave a comment.

This newly proposed transmission project represents an investment that will enhance the local electric grid and improve reliability for all customers. We are committed to our public engagement process which includes working with you, as well as county, state, and community leaders to meet future energy demands.

You are welcome to attend a community meeting to learn more about our plans. This meeting is on **September 8, 2022, from 5p.m. to 8 p.m. at John Champe High School, 41535 Sacred Mountain St, Aldie, VA 20105**. Our subject matter experts will be available during the meeting to answer your questions about the need for this project, routing options, impacts, and construction timelines. We will also have preliminary route maps available for your feedback.

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

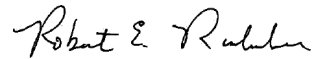
If you would like any additional information, have questions, or would like to set up a meeting to discuss the project, please do not hesitate to contact Ken Custalow, our

August 30, 2022

Wishing Star to Mars 500 kV- 230 kV Electric Transmission Line Project

Tribal Liaison. He can be reached by email at Ken.Custalow@DominionEnergy.com.
Thank you for your willingness to join us in our commitment to serving the community.

Sincerely,

A handwritten signature in cursive script that reads "Robert E. Richardson".

Robert Richardson
Electric Transmission Communications
[enclosure]