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January 24, 2025

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: 230 kV Nebula-Raines Line #2399, 230 kV Nebula Switching Station, and 230 kV Cloud-Nebula Line #2402
Case No. PUR-2025-00014

Dear Mr. Logan:

Please find enclosed for electronic filing in the above-captioned proceeding the application for approval of electric transmission facilities on behalf of Virginia Electric and Power Company (the "Company"). This filing contains the Application, Appendix, Direct Testimony, DEQ Supplement, and Environmental 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 Mecklenburg County, as well as the digital geographic information system ("GIS") map required by § 56-46.1 of the Code of Virginia, which is Attachment II.A.2 to the Appendix, were provided via an e-room to the Commission's Division of Public Utility Regulation on January 22, 2025.

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

Highest regards,

Vishwa B. Link

Enclosures

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

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

Before the State Corporation Commission of Virginia

230 kV Nebula-Raines Line #2399, 230 kV Nebula Switching Station, and 230 kV Cloud-Nebula Line #2402

Application No. 346

Case No. PUR-2025-00014

Filed: January 24, 2025

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

230 kV Nebula-Raines Line #2399, 230 kV Nebula Switching Station, and 230 kV Cloud-Nebula Line #2402

Application No. 346

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COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	Case No. PUR-2025-00014
	)	
For approval and certification of electric transmission facilities: 230 kV Nebula-Raines Line #2399, 230 kV Nebula Switching Station, and 230 kV Cloud-Nebula Line #2402	)	

APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY FOR APPROVAL AND CERTIFICATION OF ELECTRIC TRANSMISSION FACILITIES: 230 KV NEBULA-RAINES LINE #2399, 230 KV NEBULA SWITCHING STATION, AND 230 KV CLOUD-NEBULA LINE #2402

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 provide service requested by Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer") for MEC to provide service to its data center customer in Mecklenburg County, Virginia;[1] to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain the structural integrity and reliability of the transmission system, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Mecklenburg County, Virginia, to

(i) Construct a new overhead single circuit 230 kilovolt ("kV") transmission line from the Company's future Raines Substation[2] to a proposed switching station, resulting in 230 kV Nebula-Raines Line #2399 (or "Nebula-Raines Line"). Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor,[3] and utilizing three-phase twin-bundled 768.2 Aluminum Conductor

[1] For ease of reference, hereinafter the Application refers to MEC as the Company's Customer requesting service.

[2] In June 2023, the Company received a certificate of public convenience and necessity ("CPCN") from the Commission for construction and operation of new electric transmission facilities in Lunenburg and Mecklenburg Counties, which included among other things construction of the new 500-230 kV Unity Switching Station, the new 230-36.5 kV Tunstall, Evans Creek, and Raines Substations, and related transmission lines in the South Hill area of Mecklenburg County, Virginia (collectively, the "South Hill Project"). Accordingly, this filing refers herein to the future Tunstall, Evans Creek, or Raines Substation individually, or collectively as the "South Hill Substations," which are under construction. *See Application of Virginia Electric and Power Company for approval and certification of electric transmission facilities: 500-230 kV Unity Switching Station, 230 kV Tunstall-Unity Lines #2259 and #2262, 230-36.5 kV Tunstall, Evans Creek, Raines Substations, and 230 kV Substation Interconnect Lines*, Case No. PUR-2022-00167, Final Order (June 14, 2023).

[3] Given the significant load growth in the Boydton Load Area (as defined herein)—particularly as to data center load growth—the Company is proposing that Nebula-Raines Line #2399 be constructed utilizing 230 kV double circuit construction with an idle 230 kV conductor, which will be needed to prevent a future 300 MW N-1-1 load drop violation and provide thermal support for the lines connecting the Boydton Load Area to the east, without requiring new right-of-way or expansion of the transmission right-of-way corridors proposed herein when the need arises. *See* Section I.A of the Appendix submitted with this Application. To the extent that the Company's Project is approved as proposed, the Company believes that it is reasonable and prudent to construct the Nebula-Raines Line utilizing 230

Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[4]

(ii) Construct a new 230 kV switching station in Mecklenburg, County, Virginia on property owned by the Customer (the "Nebula Switching Station" or "Nebula Station").

(iii) Construct a new overhead single circuit 230 kV transmission line from the Company's existing 230-115 kV Cloud Switching Station to the proposed 230 kV Nebula Station, resulting in 230 kV Cloud-Nebula Line #2402 (or "Cloud-Nebula Line"). Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-way, supported by weathering steel double circuit monopoles with an idle conductor,[5] and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform minor station-related work at the future Raines Substation and existing Cloud Switching Station.

The Nebula-Raines Line, the Nebula Switching Station, the Cloud-Nebula Line, and station-related work are collectively referred to as the "Cloud-Nebula-Raines Transmission Project" or "Project."

4. The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia, and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the load area, which, for purposes of this Application, is defined

kV double circuit construction with an idle 230 kV conductor installed on the proposed double circuit monopoles to allow for the future energization of the idle 230 kV conductor when the need arises. *See* Attachment II.A.5.a of the Appendix. The Company will seek Commission approval to energize the idle 230 kV conductor in the future.

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

[5] *See supra*, n. 3. Similar to the Nebula-Raines Line, given the significant load growth in the Boydton Load Area (as defined herein), the Company is proposing that Cloud-Nebula Line #2402 be constructed utilizing 230 kV double circuit construction with an idle 230 kV conductor, which will be needed to prevent a future 300 MW N-1-1 load drop violation and provide thermal support for the lines connecting the Boydton Load Area to the east, without requiring new right-of-way or expansion of the transmission right-of-way corridors proposed herein when the need arises. See Section I.A of the Appendix. To the extent that the Company's Project is approved as proposed, the Company believes that it is reasonable and prudent to construct the Cloud-Nebula Line utilizing 230 kV double circuit construction with an idle 230 kV conductor installed on the proposed double circuit monopoles to allow for the future energization of the idle 230 kV conductor when the need arises. See Attachment II.A.5.a of the Appendix. The Company will seek Commission approval to energize the idle 230 kV conductor in the future.

as the area extending generally east from the Town of Boydton, Virginia (the "Boydton Load Area"), and also includes customers in the load area surrounding the Company's existing South Hill Substation, inclusive of the Town of South Hill in Mecklenburg County, Virginia (the "South Hill Load Area"), to the extent described herein.

5. As to the Customer's requested service, the proposed Project—including the Nebula-Raines Line, the Nebula Station, and the Cloud-Nebula Line—is needed to interconnect and serve MEC's Visor delivery point ("DP") located in Mecklenburg County, Virginia, and to maintain reliable service for the overall load growth in the Boydton Load Area, in compliance with mandatory NERC Reliability Standards. MEC's DP request projected a total of 221 MW of projected load in the first 10 years (*i.e.*, by 2035) and requested energization in 2028.

6. As to the identified violations, the proposed Project is needed to resolve three NERC reliability violations. In the Company's reliability analysis of the currently under construction South Hill Substations, the Company identified a 300 MW load drop violation under two scenarios that would impact the South Hill Load Area. Additionally, in consideration of MEC's three additional DP requests for service in the Project area, the Company identified an N-1-1 thermal violation and an N-1-1 voltage violation that would impact the Boydton Load Area. The N-1-1 thermal violation also was identified in the PJM Interconnection, L.L.C. ("PJM") 2024 Open Window #1, with the preferred solution being a new 230 kV line between Cloud Switching Station and Raines Substation. If not relieved by the Project, these NERC reliability violations would severely impact the transmission system's ability to provide reliable service to Dominion Energy Virginia's customers in the Boydton and South Hill Load Areas. Specifically, the proposed Project will bring a new 230 kV source from the east, which will resolve the identified NERC criteria violations and address the projected and future load growth anticipated in the Boydton and

South Hill Load Areas.

7. Accordingly, the Project as proposed herein—including the Nebula-Raines Line, the Nebula Station, and the Cloud-Nebula Line—is required to provide service requested by the Customer, mitigate identified NERC reliability violations, and maintain reliable service for overall load growth in the Project area.

8. For the Nebula-Raines Line, the Company identified an approximately 14.4-mile overhead proposed route ("Nebula-Raines Proposed Route" or "Nebula-Raines Route 5") as well as an approximately 15.4-mile overhead alternative route ("Nebula-Raines Alternative Route 1" or "Nebula-Raines Route 1"), an approximately 14.9-mile overhead alternative route ("Nebula-Raines Alternative Route 3" or "Nebula-Raines Route 3"), and an approximately 15.0-mile overhead alternative route ("Nebula-Raines Alternative Route 4" or "Nebula-Raines Route 4").[6]

9. The Nebula-Raines Proposed Route is the shortest of the Nebula-Raines Line route alternatives and would require correspondingly the least right-of-way acreage. While the Nebula-Raines Proposed Route would cross the most total wetlands of the four routes, it has the fewest impacts to forested wetlands, landowners crossed, and forested impacts, second fewest agricultural lands crossed, and tied for the fewest perennial stream crossings. The route also has the most collocation of any of the Nebula-Raines Line routes. The Nebula-Raines Proposed Route would also have the fewest residences within 500 feet of the centerline (11) compared to Alternative Route 1 (15), Alternative Route 3 (16), and Alternative Route 4 (17). Finally, the Proposed Route has the least impact on ecological cores (92.5 acres) and in particular to C2 ranked cores (31.1 acres). For these reasons, the Company selected Route 5 as the Nebula-Raines Proposed Route.

[6] The Company also studied but rejected early during the routing process an approximately 14.9-mile overhead alternative route, Nebula-Raines Alternative Route 2 or Nebula-Raines Route 2. After the Company eliminated that route from further study it did not rename or renumber the other routes sequentially. For additional information on rejected routes, see Section 3.8 of the Environmental Routing Study submitted with this Application.

10. For the Cloud-Nebula Line, the Company identified an approximately 0.9-mile overhead proposed route ("Cloud-Nebula Proposed Route").

11. In developing a route for the Cloud-Nebula Line, the Company aimed to reduce impacts to the one privately owned parcel located between the proposed Nebula Station and the existing Cloud Switching Station. To achieve this, the Company looked to route the line along the edges of the parcel. All other route options would have routed through the middle of this parcel or would have resulted in a longer route that impacted an additional parcel. Ultimately the Company identified only one viable overhead route alternative. For these reasons, the Company selected the Cloud-Nebula Proposed Route.

12. The Company is proposing all of these Proposed and Alternative Routes for Commission consideration and notice. Discussion of these Proposed and Alternative Routes, as well as other overhead routes that the Company studied but ultimately rejected, is provided in Section II of the Appendix and discussed in more detail in the Environmental Routing Study submitted with the Application.

13. The proposed 230 kV Nebula Switching Station will be constructed with fourteen 230 kV 4000 ampere ("A") breakers with an ultimate design of six rows of breakers arranged in a breaker-and-a-half configuration. The Nebula Switching Station will be designed to provide six 230 kV feeds to serve MEC's Visor DP. The total area of the Nebula Station is approximately 11.3 acres.

14. The desired in-service target date for the proposed Project is November 1, 2028. The Company estimates it will take approximately 37 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 September 30, 2025. Should the Commission issue a final order by September 30, 2025, to accommodate long-lead materials procurement, the Company estimates that construction should begin around June 2027, and be completed by November 1, 2028. This schedule is contingent upon obtaining the necessary permits, real estate, and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to labor shortages, or materials/supply issues. This schedule is also contingent upon the Company's ability to negotiate for easements with property owners along the approved routes without the need for additional litigation.

15. In addition, the Company is monitoring actively regulatory changes and requirements associated with the Northern long-eared bat ("NLEB") and how they could potentially impact construction timing associated with time of year restrictions ("TOYRs"). The U.S. Fish and Wildlife Service ("USFWS") previously indicated that it planned to issue final NLEB guidance to replace the interim guidance by April 1, 2024; however, the interim guidance has been extended by USFWS until late summer 2024. The Company is tracking actively updates from the USFWS with respect to the final guidance. Once issued, the Company plans to review and follow the final guidance to the extent it applies to the Company's projects. Until the final guidance is issued, the Company will continue following the interim guidance. For projects that may require additional coordination, the Company will coordinate with the USFWS.

16. The Company is also monitoring potential regulatory changes associated with the potential up-listing of the Tricolored bat ("TCB"). On September 14, 2022, the USFWS published

the proposed rule to the Federal Register to list the TCB as endangered under the Endangered Species Act. USFWS extended its Final Rule issuance target from September 2023 to September 2024. The Company is tracking actively this ruling and evaluating the effects of potential outcomes on Company projects' permitting, construction, and in-service dates, including electric transmission projects.

17. Any adjustments to this Project schedule resulting from these or similar challenges could necessitate a minimum of a six- to twelve-month delay in the targeted in-service date. Accordingly, for purposes of judicial economy, the Company requests that the Commission issue a final order approving both a desired in-service target date (*i.e.*, November 1, 2028) and an authorization sunset date (*i.e.*, November 1, 2029) for energization of the Project.

18. The total estimated conceptual cost of the Project as proposed is approximately $129.5 million, which includes approximately $107.0 million for transmission-related work and approximately $22.5 million for substation-related work (2024 dollars).[7]

19. 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.

20. 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

[7] These total Project costs include projected real estate costs that the Company anticipates will be required to acquire the property rights for the Project, and exclude excess facilities charges as described in Section I.I of the Appendix.

Energy Virginia's consideration of the health aspects of electric and magnetic fields.

21. 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.

22. 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 Samuel L. Carter, Chloe A. Genova, Mohammad M. Othman, Hannah Hurst, and Matt L. Teichert filed with this Application.

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

WHEREFORE, Dominion Energy Virginia respectfully requests that the Commission:

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

(b) approve pursuant to § 56-46.1 of the Code of Virginia the construction of the 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*_____
Counsel for Applicant

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January 24, 2025

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF

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230 kV Nebula-Raines Line #2399, 230 kV Nebula Switching Station, and 230 kV Cloud-Nebula Line #2402

Application No. 346

Appendix

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

Case No. PUR-2025-00014

Filed: January 24, 2025

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EXECUTIVE SUMMARY

In order to provide service requested by Old Dominion Electric Cooperative ("ODEC") on behalf of Mecklenburg Electric Cooperative ("MEC" or the "Customer") for MEC to provide service to its data center customer in Mecklenburg County, Virginia;[1] to relieve identified violations of mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards; and to maintain the structural integrity and reliability of the transmission system, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes in Mecklenburg County, Virginia, to:

(i) Construct a new overhead single circuit 230 kilovolt ("kV") transmission line from the Company's future Raines Substation[2] to a proposed switching station, resulting in 230 kV Nebula-Raines Line #2399 (or "Nebula-Raines Line"). Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported primarily by weathering steel double circuit monopoles with an idle conductor,[3] and utilizing three-phase twin-bundled 768.2 Aluminum Conductor Steel Supported/Trapezoidal Wire/High Strength ("ACSS/TW/HS") conductor with a summer transfer capability of 1,573 MVA.[4]

(ii) Construct a new 230 kV switching station in Mecklenburg, County, Virginia on property owned by the Customer (the "Nebula Switching Station" or "Nebula Station").

(iii) Construct a new overhead single circuit 230 kV transmission line from the Company's existing 230-115 kV Cloud Switching Station to the proposed 230 kV Nebula Station, resulting in 230 kV Cloud-Nebula Line #2402 (or "Cloud-Nebula Line"). Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-

[1] For ease of reference, hereinafter this Appendix refers to MEC as the Company's Customer requesting service.

[2] In June 2023, the Company received a certificate of public convenience and necessity ("CPCN") from the State Corporation Commission ("Commission") for construction and operation of new electric transmission facilities in Lunenburg and Mecklenburg Counties, which included among other things construction of the new 500-230 kV Unity Switching Station, the new 230-36.5 kV Tunstall, Evans Creek, and Raines Substations, and related transmission lines in the South Hill area of Mecklenburg County, Virginia (collectively, the "South Hill Project"). Accordingly, this Appendix refers herein to the future Tunstall, Evans Creek, or Raines Substation individually, or collectively as the "South Hill Substations," which are under construction. *See Application of Virginia Electric and Power Company for approval and certification of electric transmission facilities: 500-230 kV Unity Switching Station, 230 kV Tunstall-Unity Lines #2259 and #2262, 230-36.5 kV Tunstall, Evans Creek, Raines Substations, and 230 kV Substation Interconnect Lines*, Case No. PUR-2022-00167, Final Order (June 14, 2023).

[3] Given the significant load growth in the Boydton Load Area (as defined herein)—particularly as to data center load growth—the Company is proposing that Nebula-Raines Line #2399 be constructed utilizing 230 kV double circuit construction with an idle 230 kV conductor, which will be needed to prevent a future 300 MW N-1-1 load drop violation and provide thermal support for the lines connecting the Boydton Load Area to the east, without requiring new right-of-way or expansion of the transmission right-of-way corridors proposed herein when the need arises. *See* Section I.A. To the extent that the Company's Project is approved as proposed, the Company believes that it is reasonable and prudent to construct the Nebula-Raines Line utilizing 230 kV double circuit construction with an idle 230 kV conductor installed on the proposed double circuit monopoles to allow for the future energization of the idle 230 kV conductor when the need arises. *See* Attachment II.A.5.a. The Company will seek Commission approval to energize the idle 230 kV conductor in the future.

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

way, supported primarily by weathering steel double circuit monopoles with an idle conductor,[5] and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

(iv) Perform minor station-related work at the future Raines Substation and existing Cloud Switching Station.

The Nebula-Raines Line, the Nebula Switching Station, the Cloud-Nebula Line, and station-related work are collectively referred to as the "Cloud-Nebula-Raines Transmission Project" or "Project."

The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia, and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the load area, which, for purposes of this Application, is defined as the area extending generally east from the Town of Boydton, Virginia (the "Boydton Load Area"), and also includes customers in the load area surrounding the Company's existing South Hill Substation, inclusive of the Town of South Hill in Mecklenburg County, Virginia (the "South Hill Load Area"), to the extent described herein.

As to the Customer's requested service, the proposed Project—including the Nebula-Raines Line, the Nebula Station, and the Cloud-Nebula Line—is needed to interconnect and serve MEC's Visor delivery point ("DP") located in Mecklenburg County, Virginia, and to maintain reliable service for the overall load growth in the Boydton Load Area, in compliance with mandatory NERC Reliability Standards. MEC's DP request projected a total of 221 MW of projected load in the first 10 years (*i.e.*, by 2035) and requested energization in 2028.

As to the identified violations, the proposed Project is needed to resolve three NERC reliability violations. In the Company's reliability analysis of the currently under construction South Hill Substations, the Company identified a 300 MW load drop violation under two scenarios that would impact the South Hill Load Area. Additionally, in consideration of MEC's three additional DP requests for service in the Project area, the Company identified an N-1-1 thermal violation and an N-1-1 voltage violation that would impact the Boydton Load Area. The N-1-1 thermal violation also was identified in the PJM Interconnection, L.L.C. ("PJM") 2024 Open Window #1, with the preferred solution being a new 230 kV line between Cloud Switching Station and Raines Substation. If not relieved by the Project, these NERC reliability violations would severely impact the transmission system's ability to provide reliable service to Dominion Energy Virginia's customers in the Boydton and South Hill Load Areas. Specifically, the proposed Project will bring a new 230 kV source from the east, which will resolve the identified NERC criteria violations and

[5] *See supra*, n. 3. Similar to the Nebula-Raines Line, given the significant load growth in the Boydton Load Area (as defined herein), the Company is proposing that Cloud-Nebula Line #2402 be constructed utilizing 230 kV double circuit construction with an idle 230 kV conductor, which will be needed to prevent a future 300 MW N-1-1 load drop violation and provide thermal support for the lines connecting the Boydton Load Area to the east, without requiring new right-of-way or expansion of the transmission right-of-way corridors proposed herein when the need arises. *See* Section I.A. To the extent that the Company's Project is approved as proposed, the Company believes that it is reasonable and prudent to construct the Cloud-Nebula Line utilizing 230 kV double circuit construction with an idle 230 kV conductor installed on the proposed double circuit monopoles to allow for the future energization of the idle 230 kV conductor when the need arises. *See* Attachment II.A.5.a. The Company will seek Commission approval to energize the idle 230 kV conductor in the future.

address the projected and future load growth anticipated in the Boydton and South Hill Load Areas.

Accordingly, the Project as proposed herein—including the Nebula-Raines Line, the Nebula Station, and the Cloud-Nebula Line—is required to provide service requested by the Customer, mitigate identified NERC reliability violations, and maintain reliable service for overall load growth in the Project area.

For the Nebula-Raines Line, the Company identified an approximately 14.4-mile overhead proposed route ("Nebula-Raines Proposed Route" or "Nebula-Raines Route 5") as well as an approximately 15.4-mile overhead alternative route ("Nebula-Raines Alternative Route 1" or "Nebula-Raines Route 1"), an approximately 14.9-mile overhead alternative route ("Nebula-Raines Alternative Route 3" or "Nebula-Raines Route 3"), and an approximately 15.0-mile overhead alternative route ("Nebula-Raines Alternative Route 4" or "Nebula-Raines Route 4").[6]

For the Cloud-Nebula Line, the Company identified an approximately 0.9-mile overhead proposed route ("Cloud-Nebula Proposed Route").

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

The proposed 230 kV Nebula Switching Station will be constructed with fourteen 230 kV 4000 ampere ("A") breakers with an ultimate design of six rows of breakers arranged in a breaker-and-a-half configuration. The Nebula Switching Station will be designed to provide six 230 kV feeds to serve MEC's Visor DP. The total area of the Nebula Station is approximately 11.3 acres.

The total estimated conceptual cost of the Project as proposed is approximately $129.5 million, which includes approximately $107.0 million for transmission-related work and approximately $22.5 million for substation-related work (2024 dollars).[7]

The desired in-service target date for the proposed Project is November 1, 2028. The Company estimates it will take approximately 37 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 September 30, 2025. Should the Commission issue a final order by September 30, 2025, to accommodate long-lead materials procurement, the Company estimates that construction should begin around June 2027, and be completed by November 1, 2028. This schedule is contingent upon obtaining the necessary permits, real estate, and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable

[6] The Company also studied but rejected early during the routing process an approximately 14.9-mile overhead alternative route, Nebula-Raines Alternative Route 2 or Nebula-Raines Route 2. After the Company eliminated that route from further study it did not rename or renumber the other routes sequentially. For additional information on rejected routes, see Section 3.8 of the Environmental Routing Study.

[7] These total Project costs include projected real estate costs that the Company anticipates will be required to acquire the property rights for the Project, and exclude excess facilities charges as described in Section I.I (*see infra*, n. 34).

delays due to labor shortages, or materials/supply issues. This schedule is also contingent upon the Company's ability to negotiate for easements with property owners along the approved routes without the need for additional litigation.

In addition, the Company is monitoring actively regulatory changes and requirements associated with the Northern long-eared bat ("NLEB") and how they could potentially impact construction timing associated with time of year restrictions ("TOYRs"). The U.S. Fish and Wildlife Service ("USFWS") previously indicated that it planned to issue final NLEB guidance to replace the interim guidance by April 1, 2024; however, the interim guidance has been extended by USFWS until late summer 2024. The Company is tracking actively updates from the USFWS with respect to the final guidance. Once issued, the Company plans to review and follow the final guidance to the extent it applies to the Company's projects. Until the final guidance is issued, the Company will continue following the interim guidance. For projects that may require additional coordination, the Company will coordinate with the USFWS.

The Company is also monitoring potential regulatory changes associated with the potential up-listing of the Tricolored bat ("TCB"). On September 14, 2022, the USFWS published the proposed rule to the Federal Register to list the TCB as endangered under the Endangered Species Act. USFWS extended its Final Rule issuance target from September 2023 to September 2024. The Company is tracking actively this ruling and evaluating the effects of potential outcomes on Company projects' permitting, construction, and in-service dates, including electric transmission projects.

Any adjustments to this Project schedule resulting from these or similar challenges could necessitate a minimum of a six- to twelve-month delay in the targeted in-service date. Accordingly, for purposes of judicial economy, the Company requests that the Commission issue a final order approving both a desired in-service target date (*i.e.*, November 1, 2028) and an authorization sunset date (*i.e.*, November 1, 2029) for energization of the Project.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The Project is necessary to ensure that Dominion Energy Virginia can provide service requested by the Customer in Mecklenburg County, Virginia; to relieve identified violations of mandatory NERC Reliability Standards; and to maintain reliable electric service to customers in the Project area. See Attachment I.A.1 for an overview map of the proposed Project along the Proposed Routes for the Nebula-Raines Line and the Cloud-Nebula Line, which includes the general boundaries for the Boydton Load Area and the South Hill Load 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, ODEC, Northern Virginia Electric Cooperative, Central Virginia Electric Cooperative, and Virginia Municipal Electric Association for redelivery to their retail customers in Virginia; and (iii) to North Carolina Electric Membership Corporation and North Carolina Eastern Municipal Power Agency for redelivery to their customers in North Carolina (collectively, the "DOM Zone"). The Company needs to be able to maintain the overall, long-term reliability of its transmission system to meet its customers' evolving power needs in the future.

Dominion Energy Virginia is part of the PJM 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 165,563 MW for summer peak demand, of which Dominion Energy Virginia's load portion was approximately 19,256 MW. On December 24, 2022, the DOM Zone set a record high of 22,189 MW for winter peak demand. On July 16, 2024, the DOM Zone set a summer and all-time record demand of 23,127 MW. Based on the 2024 PJM Load Forecast, the DOM Zone is expected to grow with average growth rates of 5.6% summer and 5.1% winter over the next 10 years compared to the PJM average of 1.7% and 2.0% over the same period for the

summer and winter, respectively.[8]

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.[9]

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.[10] 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.[11] Projects identified through the RTEP process are developed by the TO in coordination with PJM, and are presented at the Transmission Expansion Advisory Committee ("TEAC") meetings prior to inclusion in the RTEP, which is then presented for approval to the PJM Board of Managers (the "PJM Board").

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

[9] *See* Facility Connection ("FAC") Standard FAC-001-4 (effective January 1, 2024), which can be found at https://www.nerc.com/pa/Stand/Reliability%20Standards/FAC-001-4.pdf.

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

[11] *See* PJM Manual 14B, Attachment D: PJM Reliability Planning Criteria. *See supra*, n. 10 for a link to PJM Manual 14B.

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

Mecklenburg, Virginia, has seen much data center development over the last decade. To address this significant load growth, the Company has constructed, is constructing, or plans to construct the following infrastructure in this area:

- The Company has three existing substations (Ridge Road Substation (90 MW existing), Boydton Plank Substation (48 MW existing), and Herbert Substation (34 MW existing)) that serve a current data center in the area.

- The Company received Commission approval in 2022 to convert the existing 115 kV Easters Switching Station (180 MW by 2027) to 230 kV in MEC's service territory in order to serve a new data center development.[12]

- The Company also received Commission approval in 2022 to expand the existing 115 kV Cloud Switching Station (322 MW by 2027) to include 230 kV in MEC's service territory in order to serve a new data center development.[13]

- The Company received Commission approval in 2023 to construct a new 500-230 kV Finneywood Switching Station and a new 230 kV Butler Farm Substation (318 MW by 2032) in Mecklenburg County to serve new data center development in this area.[14]

- The Company received Commission approval in 2023 to construct a new 500-230 kV Unity Switching Station, and 230-34.5 kV Tunstall (144 MW by 2032), Evans Creek (230 MW by 2031), and Raines (96 MW by 2031)

[12] *See Application of Virginia Electric and Power Company, For approval and certification of electric transmission facilities: Line #235 Extension to Cloud 230 kV Switching Station and related projects*, Case No. PUR-2021-00137, Final Order (Feb. 22, 2022).

[13] *See supra*, n. 12.

[14] *See Application of Virginia Electric and Power Company for approval and certification of electric transmission facilities: Butler Farm to Clover 230 kV line, Butler Farm to Finneywood 230 kV Line and Related Projects*, Case No. PUR-2022-00175, Final Order (May 31, 2023).

Substations to serve three new data center developments in this same area.[15]

- The Company received Commission approval in 2024 to build two new 230 kV lines and convert the115 kV Jeffress Switching Station to 230 kV (240 MW by 2030) in MEC's service territory in order to serve a new data center development.

- The 115 kV Bishop Switching Station will be connected March 2025 to serve a new data center development (45 MW projected in MEC's DP request by 2027).

- The 230 kV Allen Creek Switching Station will be connected December 2025 to serve a new data center development (135 MW projected in MEC's DP request by 2029).

All of these data center developments are in a rural area where additional load cannot be added without constructing additional transmission and distribution infrastructure.

NEED FOR THE PROJECT

The Project is needed to ensure that Dominion Energy Virginia can provide service requested by MEC to serve its data center customer in Mecklenburg County, Virginia, and to relieve identified violations of mandatory NERC Reliability Standards in order to maintain reliable electric service to customers in the Boydton Load Area, as well as in the South Hill Load Area, to the extent described herein.

Customer Requested Service

The Nebula-Raines Line, the Nebula Switching Station, and the Cloud-Nebula Line, as proposed, are needed to interconnect and serve MEC's Visor DP located in Mecklenburg County, Virginia, and to maintain reliable service for the overall load growth in the Boydton Load Area, in compliance with mandatory NERC Reliability Standards. See Attachment I.A.1 for an overview map of the proposed Project.

In April 2024, ODEC, on behalf of MEC, submitted a DP request to the Company's Transmission Planning group for construction of a new switching station (*i.e.*, the proposed Nebula Switching Station) to serve MEC's Visor DP in Mecklenburg County, Virginia. The DP request projected a winter load of 12 MW in 2028, growing to 221 MW in the first 10 years (*i.e.*, by 2035), and requested an energization date of December 1, 2028.

See Section I.C for discussion as to existing area infrastructure and why it is incapable of serving this need. See Section I.J for a discussion of the PJM process

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

as it relates to this Project.

NERC Reliability Violations

The proposed Project also is needed to resolve three NERC reliability violations.

In the Company's reliability analysis of the currently under construction South Hill Substations, the Company identified a 300 MW load drop violation under two scenarios. Additionally, in consideration of MEC's three additional DP requests for service in the Project area, the Company identified an N-1-1 thermal violation and an N-1-1 voltage violation that would impact the Boydton Load Area. The N-1-1 thermal violation also was identified in the PJM 2024 Open Window #1, with the preferred solution being a new 230 kV line between Cloud Switching Station and Raines Substation. If not relieved by the Project, these NERC reliability violations would severely impact the transmission system's ability to provide reliable service to Dominion Energy Virginia's customers in the Boydton and South Hill Load Areas. Specifically, the proposed Project will bring a new 230 kV source from the east, which will resolve the identified NERC criteria violations and address the projected and future load growth anticipated in the Boydton and South Hill Load Areas. See Section I.J.

300 MW Load Drop Violation (South Hill Load Area)

In 2022, the Company received DP requests for three new substations (*i.e.*, the South Hill Substations) to accommodate new data center developments in Mecklenburg, Virginia, including the Tunstall Substation (144 MW by 2032), Evans Creek Substation (230 MW by 2031), and Raines Substation (96 MW by 2031). As a result, the Company presented the need for the South Hill Substations to PJM at the May 10, 2022 TEAC Meeting, and the solution at the July 12, 2022 TEAC Meeting. See Attachment I.A.2 and Attachment I.A.3 for the South Hill Substations need and solution slides, respectively. See also Section I.J of the South Hill Project Appendix submitted in Case No. PUR-2022-00167. That project was classified as a supplemental project (Supplemental Project DOM-2022-0027, DOM-2022-0028, DOM-2022-0029) and was accepted into the 2024 Local Plan. In October 2022, the Company filed an application with the Commission for approval of the South Hill Project, which was necessary to ensure that the Company could maintain and improve reliable electric service to customers in the South Hill Load Area, in Mecklenburg County, Virginia. The South Hill Substations were approved by the Commission on June 14, 2023, in Case No. PUR-2022-00167.[16] Tunstall (144 MW by 2032), Evans Creek (230 MW by 2031), and Raines (96 MW by 2031)

Given that the Company's Distribution Planning group projected an aggregate load at the South Hill Substations in excess of 450 MW, the Company's reliability analysis identified a 300 MW N-1-1 load drop violation under two scenarios: (i)

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

the loss of Tunstall-Unity Line #2259 and Tunstall-Unity Line #2262, or (ii) the loss of Raines-Tunstall Line #2275 and Evans Creek-Tunstall Line #2274. The proposed Cloud-Nebula and Nebula-Raines Lines will resolve this potential NERC reliability violation identified by the Company's reliability analysis of the South Hill Substations by providing a new 230 kV source to the future Raines Substation.

N-1-1 Thermal and Voltage Violations (Boydton Load Area)

Between 2023 and 2024, MEC submitted new and/or updated DP requests to serve the following MEC data center load at the following DPs:

- MEC's Timber 1 DP: 180 MW projected load in MEC's DP request from the Company's Easters Switching Station by 2031;

- MEC's Timber 2 DP: 135 MW projected load in MEC's DP request from the Company's Allen Creek Switching Station by 2031; and

- MEC's Coleman Creek DP: 322 MW[17] total projected load in two MEC DP requests from the Company's Cloud Switching Station by 2026 (178 MW) and 2027 (144 MW).

Given this significant aggregate load growth in excess of 600 MW in the Boydton Load Area, the Company identified a thermal violation and a voltage violation overloading Cloud-Kerr Dam Line #38 (greater than 100% emergency rating) and low voltage at Cloud, Easters and Allen Creek Switching Stations (less than 0.90 per unit ("pu")) for the loss of Clover-Easters Line #2226 and Allen Creek-Finneywood Line #2258. The N-1-1 thermal violation also was identified in the PJM 2024 Open Window #1. See Section I.J. The proposed Cloud-Nebula and Nebula-Raines Lines resolve these identified NERC reliability violations and address the projected and future load growth anticipated in the Boydton Load Area by providing a new 230 kV source from the east.

Need for Double Circuit Construction and an Idle 230 kV Conductor

Constructing Nebula-Raines Line #2399 and Cloud-Nebula Line #2402 utilizing 230 kV double circuit construction with an idle 230 kV conductor installed on the proposed double circuit monopoles, as proposed, will, among other things, (i) allow the Company to address significant load growth in the future when the need arises, (ii) minimize constructability issues and impacts, which ultimately result in lower costs, (iii) limit required outage durations, and (iv) minimize additional impacts to property owners along the proposed transmission corridors. See also Section I.E.

[17] The Company will address the Cloud Switching Station load if it exceeds 300 MW in the future, which potentially may include new infrastructure in the area.

Significant Load Growth

As described above and in Section I.C, the Company has received DP requests in the Boydton Load Area with projected loads exceeding 1 GW in 10 years (see Attachment I.C.1). The projected load for the three new South Hill Substations in the South Hill Load Area is almost 500 MW in 10 years (see Attachment I.C.2). Additional DP requests in the Southside area, which includes both the Boydton and South Hill Load Areas (the "Southside Load Area"), impacting the 230 kV network exceed 1 GW in 10 years (see Attachment I.C.3). Together, these projected loads total approximately 2.5 GW in 10 years in the Southside Load Area.

In comparison, the historical load for the entire Southside Load Area is 872 MW Summer 2024 and 930 MW Winter 2024 (see Attachment I.C.4). The projected 2.5 GW includes 319 MW of existing load in the Boydton Load Area (see Attachment I.C.1 – Summer 2024) resulting in a net projected increase of approximately 2.2 GW in 10 years. The addition of an idle conductor would provide an additional 230 kV source from the east utilizing the future 500-230 kV Unity Switching Station, which could be used to support future load growth in the Boydton Load Area and future growth between Boydton and South Hill. Accordingly, constructing the Project in this manner is reasonable and prudent, as it will allow for the potential energization of the idle 230 kV conductor when the need arises in the future, without requiring new right-of-way or expansion of the transmission right-of-way corridors proposed herein. Further, the new 230 kV Cloud to Raines Line project selected by PJM in the 2024 Open Window #1 included a double circuit design with an idle conductor. See Attachment I.J.2 and Attachment I.J.4.

Constructability, Impacts, and Cost

In addition to the need to address significant future load growth in the Southside Load Area, it is reasonable and prudent to construct the Project on double circuit structures with an idle conductor now for constructability, impact, and cost reasons. As discussed in Section I.E, the Company considered, but rejected for the reasons detailed therein, an alternative design that would install double circuit-capable single circuit monopoles as part of the Project (referred to therein as the "Rejected Alternative Design"), instead of double circuit monopoles with an idle conductor as proposed. Importantly, as soon as the need arises in the future, the alternative design would require an additional separate project for the Nebula-Raines corridor and an additional separate project for the Cloud-Nebula corridor in order to convert the lines from single circuit to double circuit.

To determine a rough estimate of the costs of these projects to convert the alternative design in the future, the Company reviewed the longer of the two corridors—the 14.4-mile Nebula-Raines corridor. Converting a single circuit line to a double circuit line within the Nebula-Raines corridor would require the Company to return to the corridor for a second time in order to install a second set of three arms on the existing single circuit monopole structures and an additional 230 kV conductor. At a minimum, this would require the Company to repeat many of the same construction activities that were required for the initial construction of

the single circuit line, including installation of access roads for construction of the project, mobilization of crews for construction within the same corridor, and obtaining permits. See Section I.E for additional discussion. Based on estimates performed for the Nebula-Raines Line as proposed, the Company anticipates that this second project to convert the single circuit line to a double circuit line would cost approximately $17.0 million in transmission-related costs—which would be in addition to the costs of constructing the alternative design of approximately $86.5 million, as discussed in Section I.E. And because this project construction would be bid to a contractor, the Company anticipates that the costs will be even higher due to labor, although such costs cannot be quantified at this time.[18] Further, connecting and energizing the additional conductor would require the same substation-related work and costs at the Cloud and Nebula Switching Stations and Raines Substation as the proposed Project, which are described below.

In contrast, constructing the Project as proposed would allow the Company to energize the idle conductors upon Commission approval to address the future load growth with only minimal additional costs. Compared to approximately $17 million described above to later install and energize the idle conductor in the Nebula-Raines corridor, the Company anticipates that connecting and energizing the idle conductors in *both* the Nebula-Raines and the Cloud-Nebula corridors under the proposed Project would cost approximately $5.9 million, including approximately $1.7 million at each of the Cloud and Nebula Switching Stations for work similar in scope to the proposed work at the Cloud Switching Station described in Section II.C, and approximately $2.5 million at the Raines Substation for additional breaker and bus work. For comparison purposes, the cost to construct the Nebula-Raines Line as proposed and connect and energize the idle conductor in the Nebula-Raines corridor would total approximately $97.9 million, including approximately $93.7 million for installation of the Nebula-Raines Line as proposed plus $1.7 million at Cloud Switching Station and $2.5 million at Raines Substation for energization of the idle line. Additionally, there would be no additional impacts or permitting efforts required to energize the idle lines that are in place.

Outages

In addition to the constructability, impacts, and cost issues required to convert a single circuit line to a double circuit line, additional outages would be required for both of the separate projects. Specifically as to the Nebula-Raines Line, converting the 14.4-mile transmission line from single circuit to double circuit would require an outage of Line #2399 of up to one year in order to move the conductor from an alternating configuration (as shown in Attachment I.E.1) to vertical configuration (as shown in Attachment II.B.6.b.i) by adding three additional arms to the pole, and three additional phases of conductor. Additionally, converting the Nebula-Raines Line would require a second outage on the Line #137 and #38 corridor, estimated

[18] While the Company did not perform a similar calculation to convert a single circuit line to a double circuit line within the 0.9-mile Cloud-Nebula corridor, the Company assumes that there would be similar constructability and impacts issues, and that similar costs would be applicable on a per mile basis. *See* Section I.E.

to be less than five days. The Company conservatively estimates that an outage duration of up to two months would be required to convert the 0.9-mile Cloud-Nebula Line #2402 from single circuit to double circuit. These outages would be in addition to the outages required to install the single circuit lines initially.

In contrast, in order to energize the idle conductor as proposed in the Project, only short outages estimated to be five days or less in duration would be required at Nebula and Cloud Switching Stations upon Commission approval.

The Company notes that, as with all outage scheduling, these outages may change depending on whether PJM approves the outages and other relevant considerations allow for it. It is customary for PJM to hold requests for outages and approve only shortly before the outages are expected to occur and, therefore, the requested outages are subject to change.

Property Owner Impacts

Finally, installing the idle conductor now is a proactive planning approach to the unprecedented load growth that is already impacting property owners throughout the Mecklenburg region. Installing the idle conductor during the construction of the Nebula-Raines Line #2399 and Cloud-Nebula Line #2402 will ultimately reduce impacts on individual property owners by only being on their property one time. Importantly, the property owners in Mecklenburg County have seen rapid growth in the surrounding transmission infrastructure (as described above) and the Company is proactively trying to minimize that impact, where possible.

Area Transmission System

Attachment I.A.4 provides the existing one-line diagram of the area transmission system. Attachment I.A.5 provides a one-line diagram of the proposed area transmission system as of December 2025. Attachment I.A.6 provides a one-line diagram of the area transmission system after the proposed Project is energized in November 2028, which includes all baseline and supplemental projects in the Project area that have been submitted to PJM as of January 2025.[19] See Attachment II.A.2 for a map depicting the proposed Project area.

PROJECT DESCRIPTION

Nebula-Raines Line # 2399

As part of the Project, the Company proposes to construct a new overhead single circuit 230 kV transmission line from the Company's future Raines Substation[20] to the proposed Nebula Switching Station, resulting in Nebula-Raines Line #2399.

[19] As discussed in Section I.J, Supplemental Project DOM-2024-0054 solution (*i.e.*, Nebula Switching Station) will be presented at a PJM TEAC meeting in the second quarter of 2025 as a new switching station cutting into a new 230 kV Cloud to Raines Line.

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

Specifically, Line #2399 will extend approximately 14.4 miles within a new 100-foot-wide right-of-way, supported primarily by weathering steel double circuit monopoles with an idle conductor,[21] and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

The Company identified an approximately 14.4-mile overhead Nebula-Raines Proposed Route, as well as an approximately 15.4-mile overhead Nebula-Raines Alternative Route 1, an approximately 14.9-mile overhead Nebula-Raines Alternative Route 3, and an approximately 15.0-mile overhead Nebula-Raines Alternative Route 4, all of which are proposed for notice and Commission consideration. Discussion of the routes is provided in Section II of the Appendix and in the Routing Study included with the Application.

Nebula Switching Station

As part of the Project, the Company also proposes to construct the new 230 kV Nebula Switching Station in Mecklenburg, County, Virginia on property owned by the Customer. See Section II.C for a description of the proposed Nebula Station, as well as a one-diagram and general arrangement.

Cloud-Nebula Line # 2402

As part of the Project, the Company proposes to construct a new overhead single circuit 230 kV transmission line from the Company's existing Cloud Switching Station to the proposed Nebula Station, resulting in Cloud-Nebula Line #2402. Specifically, Line #2402 will extend approximately 0.9 mile within a new 100-foot-wide right-of-way, supported primarily by weathering steel double circuit monopoles with an idle conductor,[22] and utilizing three-phase twin-bundled 768.2 ACSS/TW/HS conductor with a summer transfer capability of 1,573 MVA.

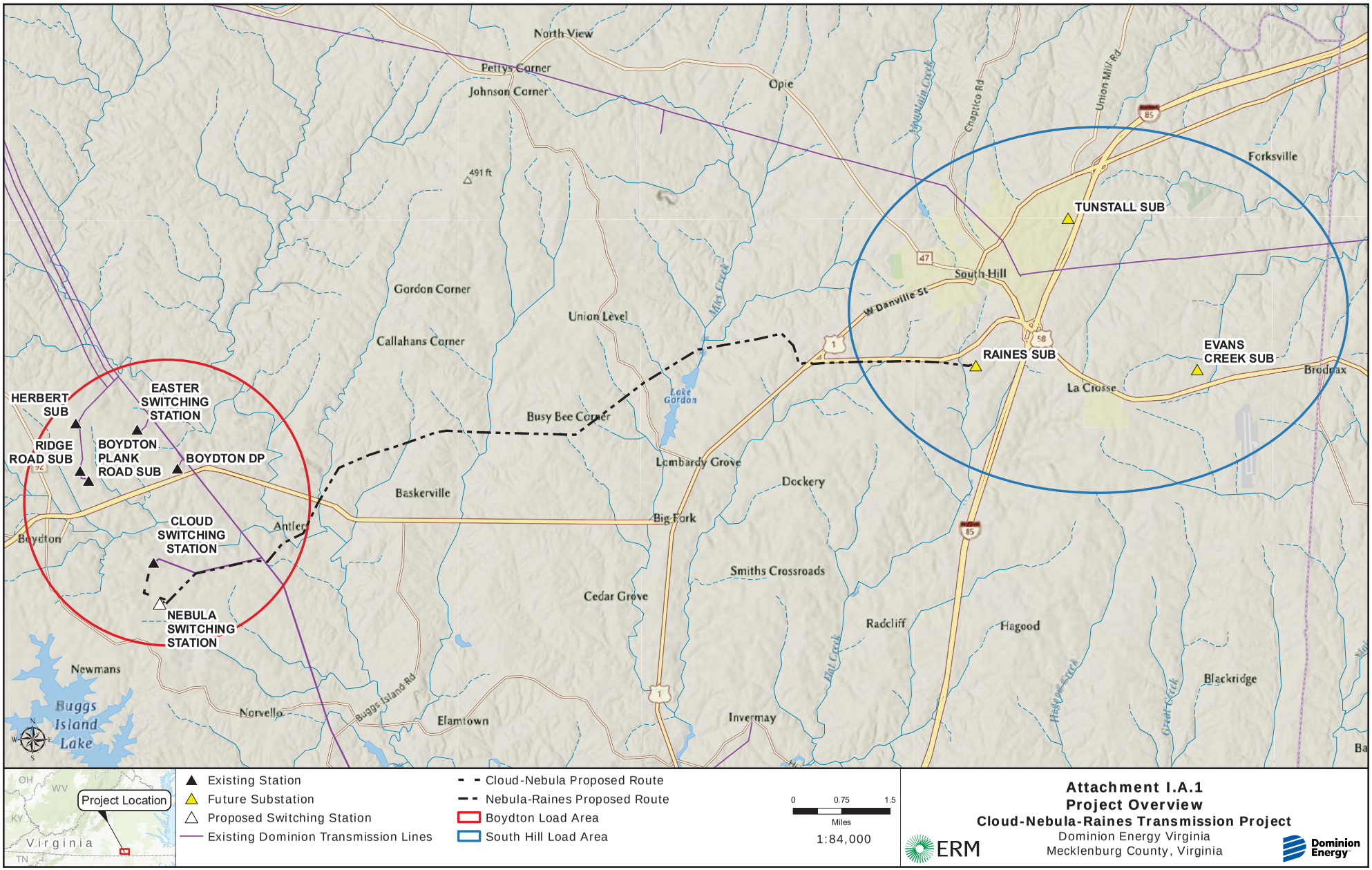
The Company identified an approximately 0.9-mile overhead Cloud-Nebula Proposed Route, which is proposed for notice and Commission consideration. Discussion of the route is provided in Section II of the Appendix and in the Routing Study included with the Application.

***

In summary, the proposed Project will provide service requested by the Customer, mitigate identified NERC reliability violations, and maintain reliable service for overall load growth in the Project area.

[21] *See supra*, n. 3.

[22] *See supra*, n. 5.



Attachment I.A.1
Project Overview
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy

Dominion Supplemental Projects

Transmission Expansion Advisory Committee
May 10, 2022

Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2022-0027

Process Stage: Need Meeting 05/10/2022

Project Driver: Customer Service

Specific Assumption References:

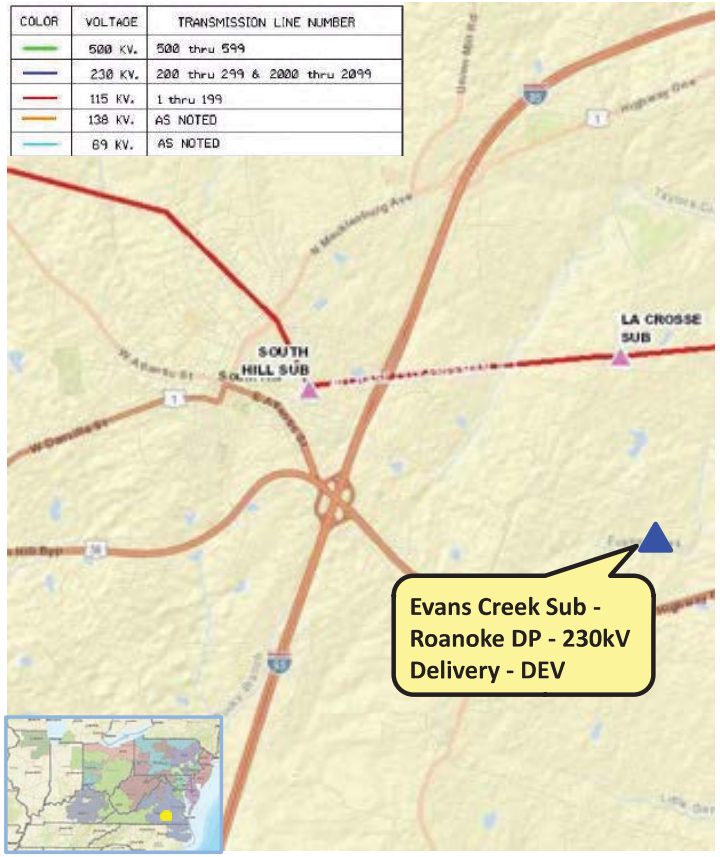
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

14

Problem Statement:

DEV Distribution has submitted a delivery point request (Roanoke DP) for a new delivery point to serve a data center customer in La Crosse, VA. The total load is in excess of 100 MW. The customer requests service by August 2025.

Initial In-Service Load	Projected 2027 Load
Summer: 50.0 MW	Summer: 126.0 MW



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2022-0028

Process Stage: Need Meeting 05/10/2022

Project Driver: Customer Service

Specific Assumption References:

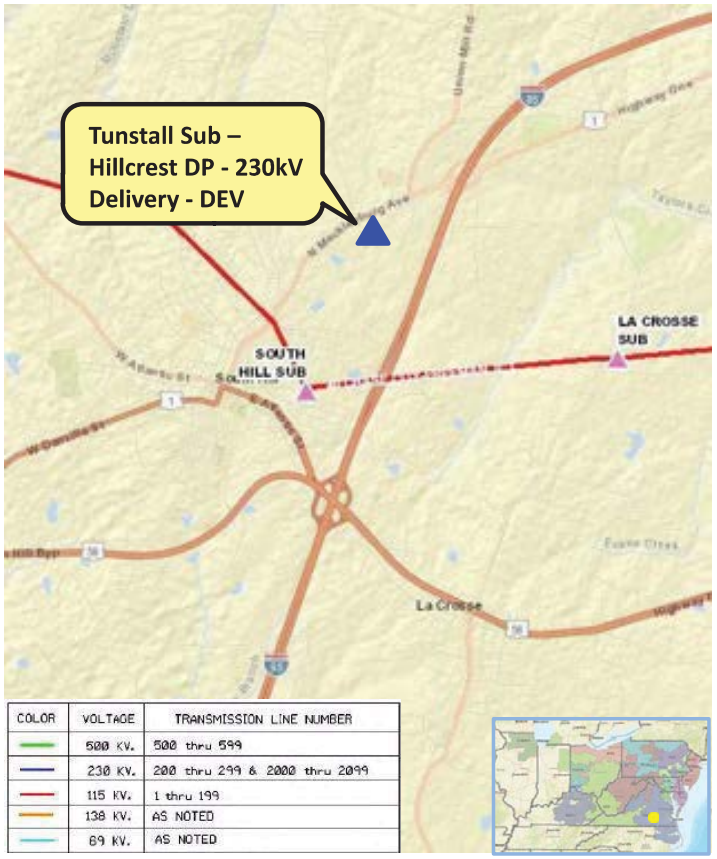
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

15

Problem Statement:

DEV Distribution has submitted a delivery point request (Hillcrest DP) for a new delivery point to serve a data center customer in South Hill, VA. The total load is in excess of 100 MW. The customer requests service by August 2025.

Initial In-Service Load	Projected 2027 Load
Summer: 41.0 MW	Summer: 113.0 MW



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2022-0029

Process Stage: Need Meeting 05/10/2022

Project Driver: Customer Service

Specific Assumption References:

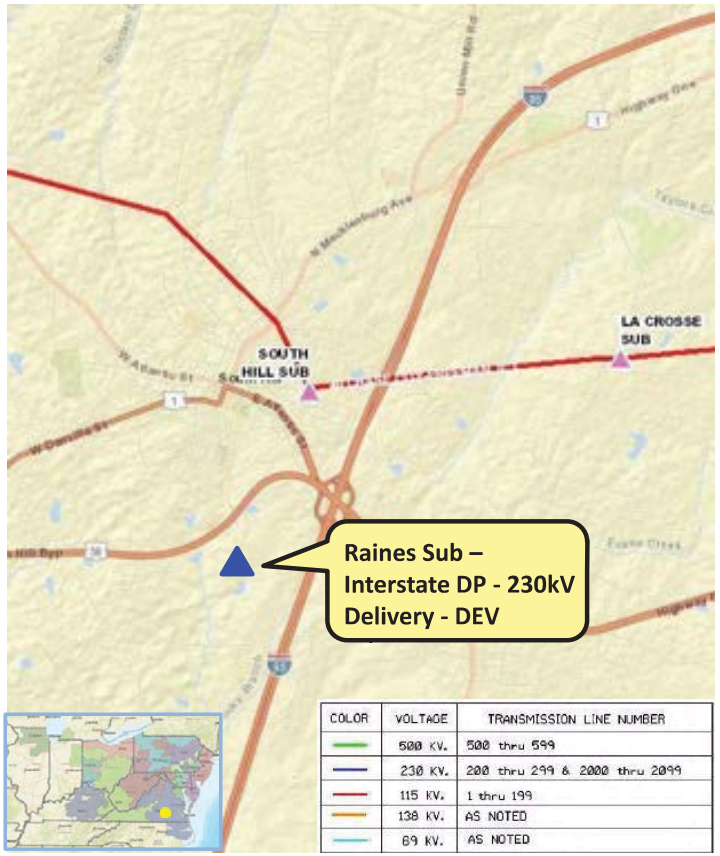
Customer load request will be evaluated per Dominion's Facility Interconnection Requirements Document and Dominion's Transmission Planning Criteria.

16

Problem Statement:

DEV Distribution has submitted a delivery point request (Interstate DP) for a new delivery point to serve a data center customer in La Crosse, VA. The total load is less than 100 MW. The customer requests service by July 2025.

Initial In-Service Load	Projected 2027 Load
Summer: 8.0 MW	Summer: 28.0 MW



Dominion Supplemental Projects

Transmission Expansion Advisory Committee
July 12, 2022

Solutions

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2022-0028

Process Stage: Solutions Meeting 07/12/2022

Previously Presented: Need Meeting 05/10/2022

Project Driver: Customer Service

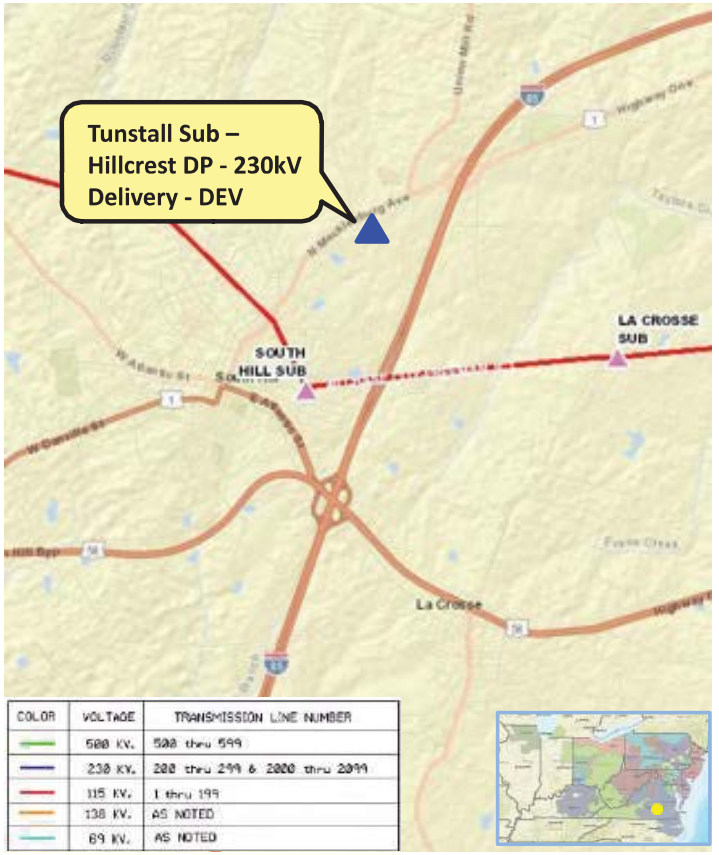
Specific Assumption References:

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

Problem Statement:

DEV Distribution has submitted a delivery point request (Hillcrest DP) for a new delivery point to serve a data center customer in South Hill, VA. The total load is in excess of 100 MW. The customer requests service by August 1, 2025.

Initial In-Service Load	Projected 2027 Load
Summer: 41.0 MW	Summer: 77.0 MW



Dominion Transmission Zone: Supplemental Tunstall 230kV Delivery - DEV

Need Number: DOM-2022-0028

Process Stage: Solutions Meeting 07/12/2022

Proposed Solution:

- Obtain land and build a new 500/230kV Unity switching station near the intersection of Line #593 (Finneywood-Rawlings) and Route 138.
- Cut and terminate Line #593 into Unity 500/230kV switching station. In the new Unity switching station, install two 840 MVA 500/230kV transformers, a 230kV ring bus with 6 breakers and a 500kV ring bus with 6 breakers.
- Construct Tunstall 230kV substation with four rows of 230kV breaker and half bus to terminate four 230kV lines.
- Construct two new 230kV single circuit transmission lines for approximately 11 miles from Unity Sub to Tunstall Substation.
- New right-of-way will be needed for both transmission lines. New conductor to have a minimum summer normal rating of 1573 MVA.

Estimated Project Cost: $140.0 M (Total)

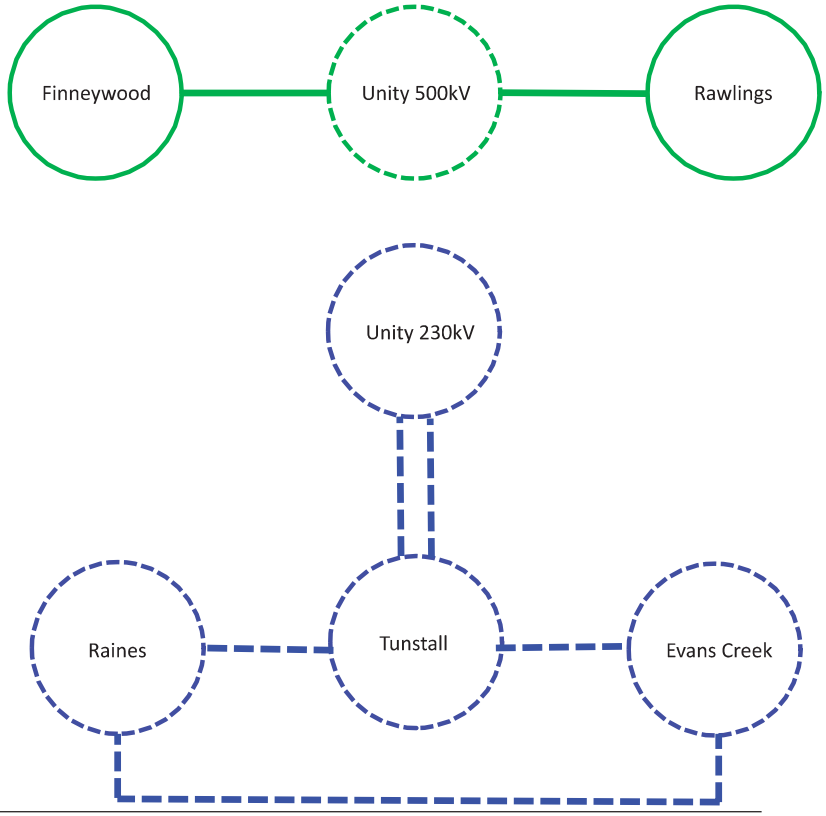
Transmission Line	$40M
500kV Substation	$80M
230kV Substation	$20M

Alternatives Considered:

No feasible alternatives

Projected In-service Date: 08/01/2025

Project Status: Engineering



Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2022-0027

Process Stage: Solutions Meeting 07/12/2022

Previously Presented: Need Meeting 05/10/2022

Project Driver: Customer Service

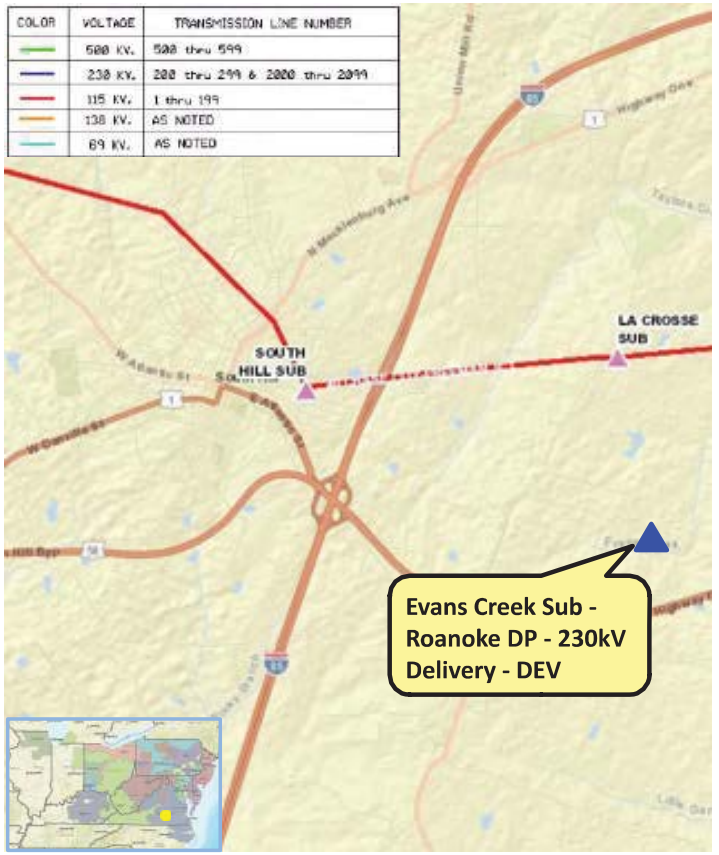
Specific Assumption References:

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

Problem Statement:

DEV Distribution has submitted a delivery point request (Roanoke DP) for a new delivery point to serve a data center customer in La Crosse, VA. The total load is in excess of 100 MW. The customer requests service by August 1, 2025.

Initial In-Service Load	Projected 2027 Load
Summer: 50.0 MW	Summer: 126.0 MW



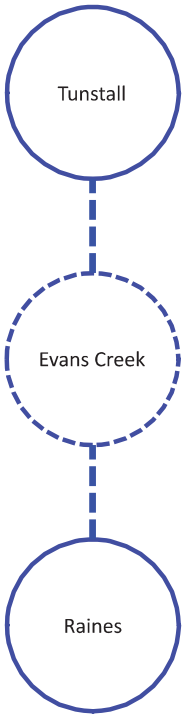
Dominion Transmission Zone: Supplemental
Evans Creek 230kV Delivery - DEV

Need Number: DOM-2022-0027

Process Stage: Solutions Meeting 07/12/2022

Proposed Solution:

Construct Evans Creek 230kV substation with four breaker 230kV breaker ring bus to terminate two 230kV lines. Construct one new 230kV transmission line for approximately 5 miles from Tunstall Sub to Evans Creek Substation. Construct one new 230kV transmission line for approximately 3 miles from Raines Sub to Evans Creek Substation. New right-of-way will be needed for both transmission lines. New conductor to have a minimum summer normal rating of 1573 MVA.



22

Estimated Project Cost: $30.0 M (Total)

Transmission Line	$15M
230kV Substation	$15M

Alternatives Considered:

No feasible alternatives

Projected In-service Date: 08/01/2025

Project Status: Engineering

Model: 2025 RTEP

Dominion Transmission Zone: Supplemental Customer Load Request

Need Number: DOM-2022-0029

Process Stage: Solutions Meeting 07/12/2022

Previously Presented: Need Meeting 05/10/2022

Project Driver: Customer Service

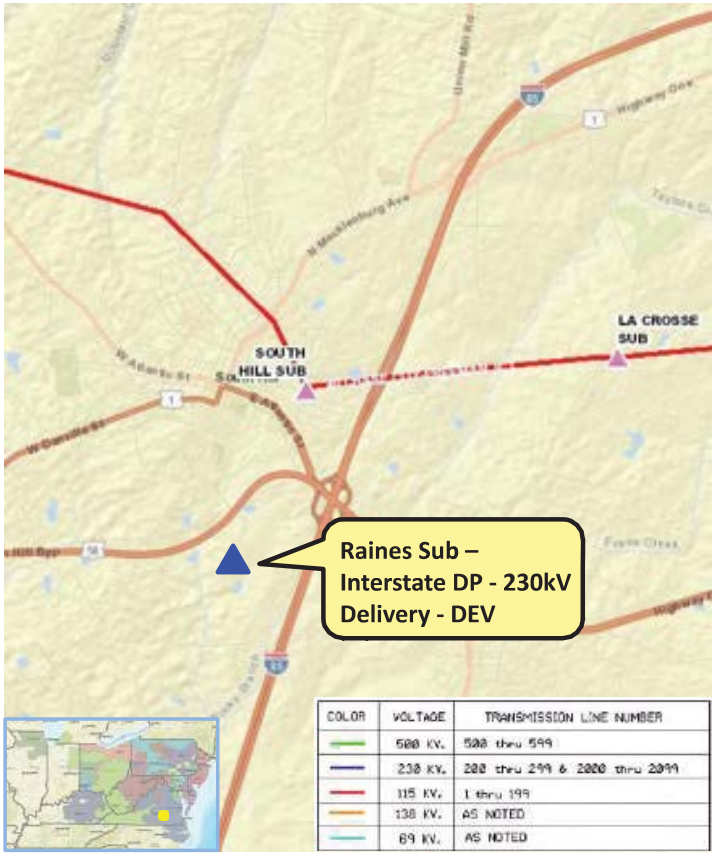
Specific Assumption References:

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

Problem Statement:

DEV Distribution has submitted a delivery point request (Interstate DP) for a new delivery point to serve a data center customer in La Crosse, VA. The total load is less than 100 MW. The customer requests service by August 1, 2025.

Initial In-Service Load	Projected 2027 Load
Summer: 8.0 MW	Summer: 37.0 MW



Dominion Transmission Zone: Supplemental Raines 230kV Delivery - DEV

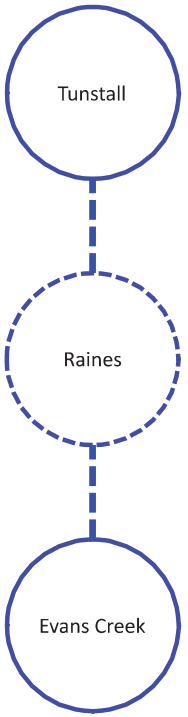
Need Number: DOM-2022-0029

Process Stage: Solutions Meeting 07/12/2022

Proposed Solution:

Construct Raines 230kV substation with four breaker 230kV breaker ring bus to terminate two 230kV lines. Construct one new 230kV transmission line for approximately 8 miles from Tunstall Sub to Raines Substation. New right-of-way will be needed for the transmission line. New conductor to have a minimum summer normal rating of 1573 MVA.

Due to the total load requested less than 100 MW, the data center customer will be required to pay excess facilities for all equipment required for the ring bus configuration above a T-tap.



Estimated Project Cost: $20.0 M (Total)

Transmission Line	$15M
230kV Substation	$5M

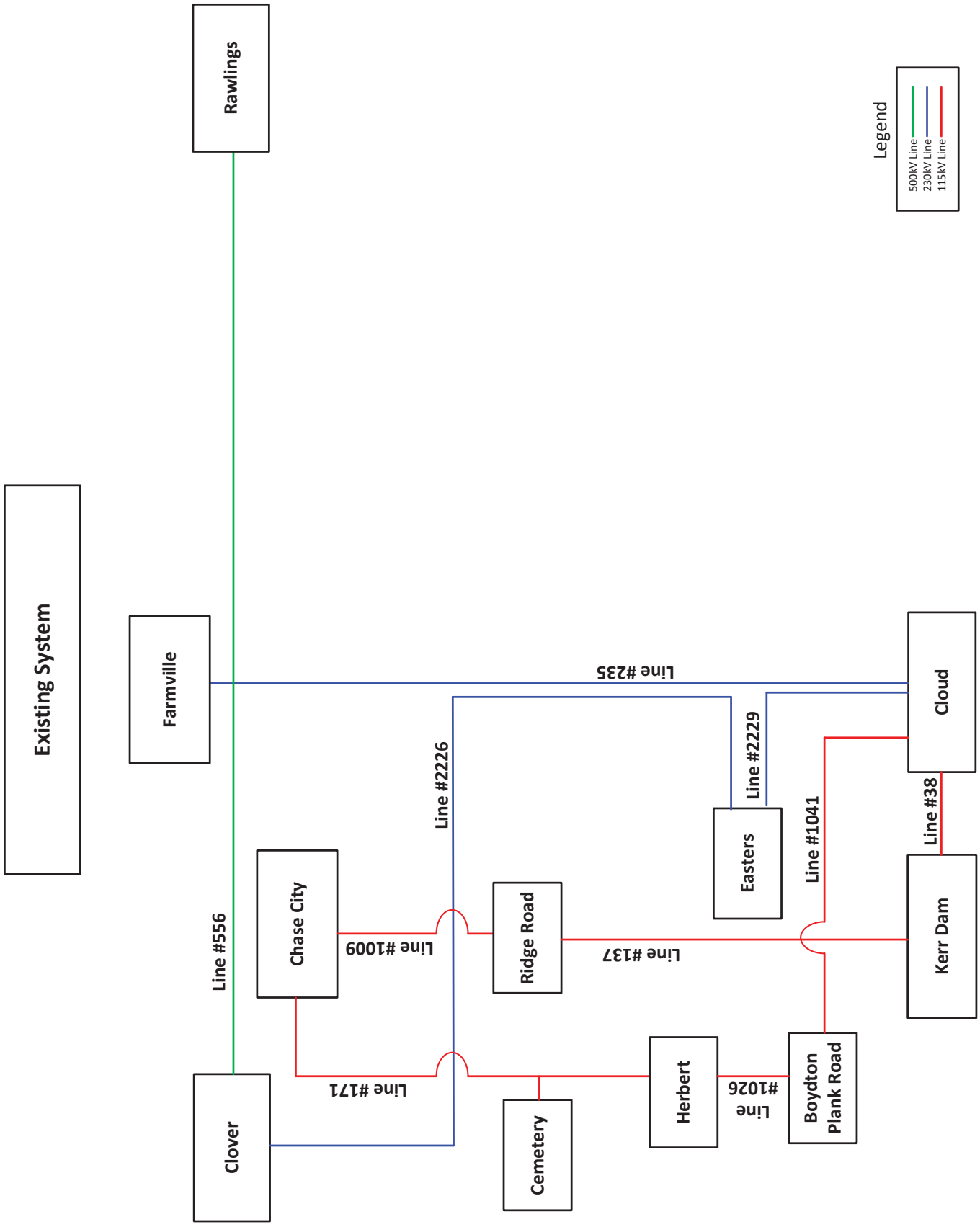
Alternatives Considered:

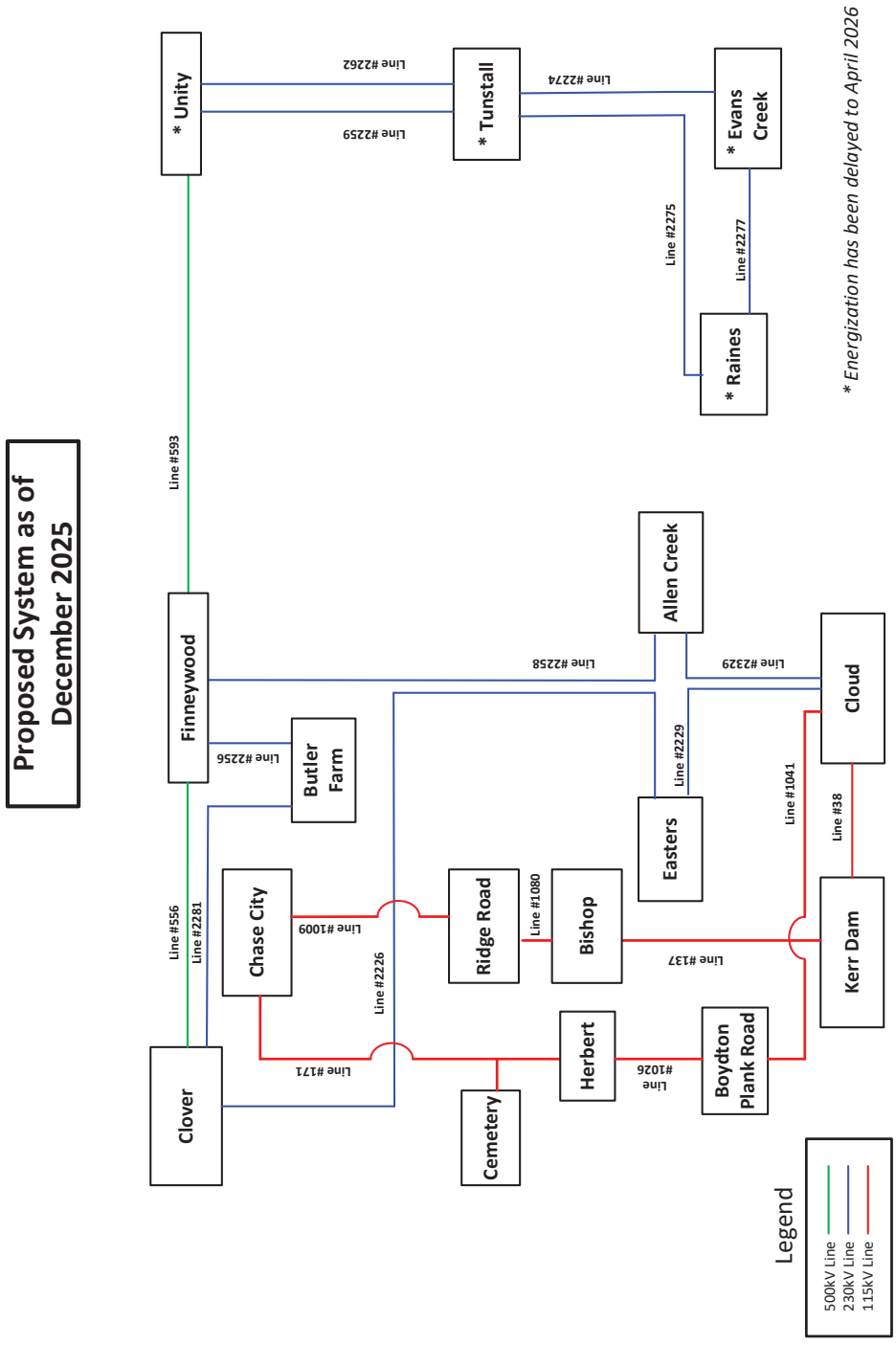
No feasible alternatives

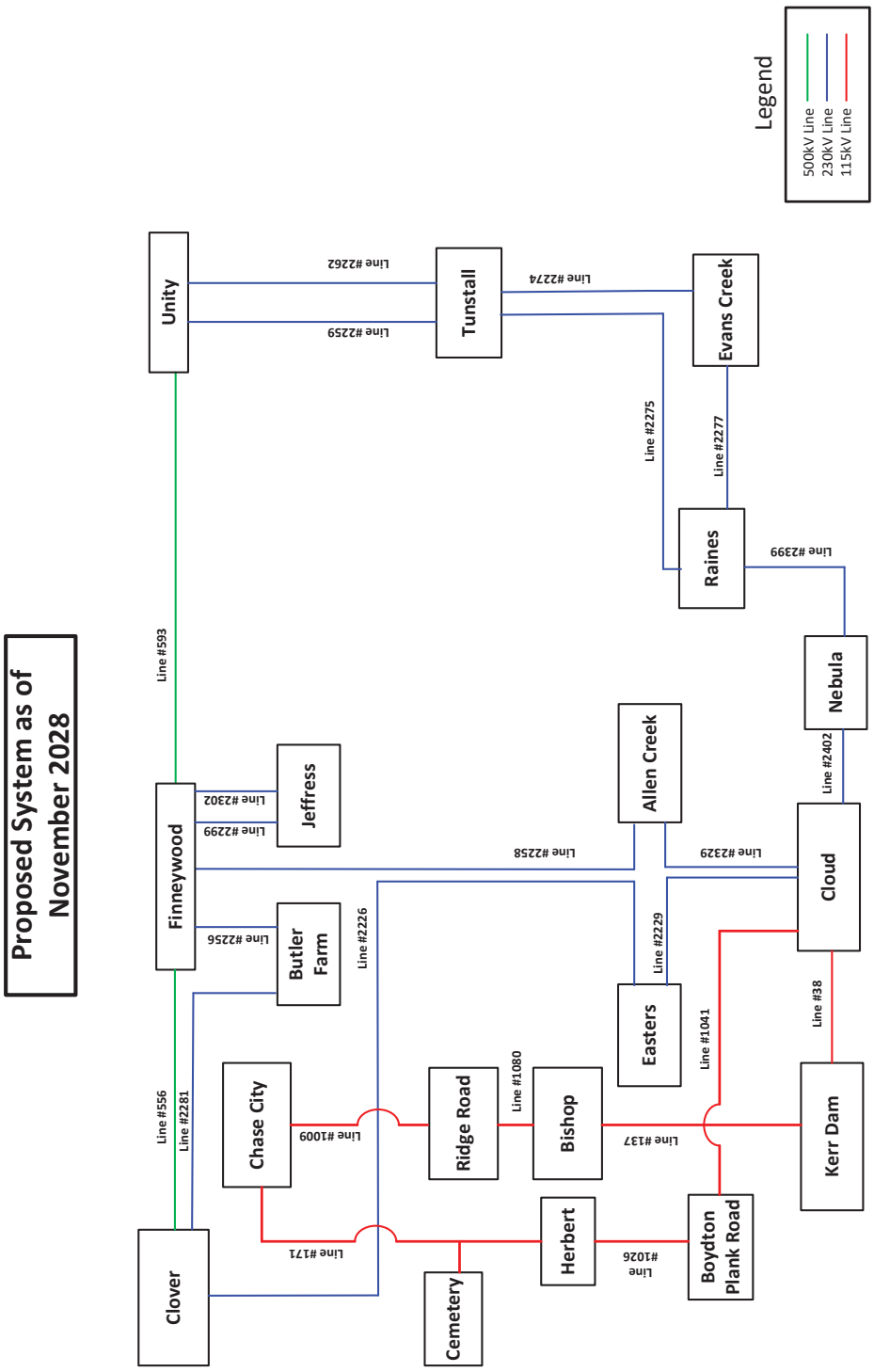
Projected In-service Date: 08/01/2025

Project Status: Engineering

Model: 2025 RTEP


Existing System
Rawlings
Farmville
Clover
Chase City
Ridge Road
Easters
Cloud
Kerr Dam
Cemetery
Herbert
Boydton Plank Road
Line #556
Line #1009
Line #2226
Line #2229
Line #235
Line #1041
Line #38
Line #137
Line #171
Line #1026
Legend
500kV Line
230kV Line
115kV Line


Proposed System as of December 2025
* Unity
* Tunstall
* Evans Creek
* Raines
Line #2262
Line #2259
Line #2274
Line #2275
Line #2277
Line #593
Finneywood
Allen Creek
Cloud
Butler Farm
Easters
Chase City
Ridge Road
Bishop
Kerr Dam
Clover
Herbert
Boydton Plank Road
Cemetery
Line #2258
Line #2329
Line #2256
Line #2229
Line #1041
Line #38
Line #556
Line #2281
Line #1009
Line #1080
Line #137
Line #2226
Line #171
Line #1026
Legend
500kV Line
230kV Line
115kV Line
* Energization has been delayed to April 2026


Proposed System as of November 2028
Legend
500kV Line
230kV Line
115kV Line
Unity
Tunstall
Evans Creek
Raines
Nebula
Allen Creek
Cloud
Jeffress
Finneywood
Butler Farm
Easters
Kerr Dam
Chase City
Ridge Road
Bishop
Herbert
Boydton Plank Road
Clover
Cemetery
Line #2262
Line #2259
Line #2274
Line #2275
Line #2277
Line #2399
Line #593
Line #2402
Line #2302
Line #2299
Line #2258
Line #2329
Line #2256
Line #2226
Line #2229
Line #38
Line #1041
Line #556
Line #2281
Line #1009
Line #1080
Line #137
Line #171
Line #1026

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) <u>Engineering Justification for Project</u>**

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) <u>Known Future Projects</u>

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 provide service requested by the Customer, mitigate identified NERC reliability violations, and maintain reliable service for overall load growth in the Project area, as described in Section I.A. Load growth primarily at the Cloud, Easters and Allen Creek Switching Stations, as described in Sections I.A and I.C, require construction of the proposed Project in order to resolve the identified NERC reliability violations resulting from those projects.

(3) <u>Planning Studies</u>

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.

Dominion Energy Virginia's Electric Transmission Planning group performs planning studies to ensure delivery of bulk power to a continuously changing customer demand under a wide variety of operating conditions. Studies are performed in coordination with the Company's RTO (*i.e.*, PJM) and in accordance with NERC Reliability Standards. In completing these studies, the Company

considered all other known generation and transmission facilities impacting the affected load area.

In order to maintain reliable service to customers and to comply with mandatory NERC Reliability Standards, specifically FAC-001, the Company's FIR document addresses the interconnection requirements of generation, transmission, and electricity end-user facilities.[23] The purpose of the NERC FAC standards is to avoid adverse impacts on reliability by requiring that each TO establish facility connection and performance requirements in accordance with FAC-001, and the TO's and end-users meet and adhere to the established facility connection and performance requirements in accordance with FAC-002.[24]

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

The major criteria considered as part of this Project were the following:

1) Four breaker ring bus arrangement is required for load interconnections in excess of 100 MW (Company's FIR V21.0, Section 4.3.2);

2) Amount of direct-connected load at any substation is limited to 300 MW (Company's Transmission Planning Criteria Attachment 1, Section C.2.8);

3) N-1-1 contingencies' load loss is limited to 300 MW (PJM Manual 14B Section 2.3.8, Attachment D, Attachment D-1, Attachment F); and

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

The Project is being constructed in a network configuration with two 230 kV lines instead of a single circuit tap to comply with Section 4.3.2 of the Company's FIR, which requires a four-breaker ring bus arrangement for load interconnections in excess of 100 MW.

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

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

The Project is being constructed as a breaker and a half switching station and two transmission lines terminated at the station, to comply with Section 4.3.2 of the Company's FIR, which requires a four-breaker ring bus arrangement for load interconnections in excess of 100 MW.

In addition to the need to connect the Customer's Visor DP, three NERC reliability violations were identified, a 300 MW N-1-1 load drop violation in the South Hill Load Area, an N-1-1 thermal violation in the Boydton Load Area, and an N-1-1 voltage violation in the Boydton Load Area.

300 MW N-1-1 Load Drop Violation (South Hill Load Area)

Attachment I.C.2 shows the Customer's DP request forecasted loads for the Evans Creek, Tunstall, and Raines Substations. There are two scenarios that will cause a 300 MW N-1-1 load drop violation based on the forecasted loads: (i) loss of Tunstall-Unity Line #2259 and Tunstall-Unity Line #2262 and (ii) the loss of Raines-Tunstall Line #2275 and Evans Creek-Tunstall Line #2274. The first N-1-1 scenario causes the violation in 2029 and the second one in 2031. This will require another 230 kV line to either the Raines Substation or the Evans Creek Substation.

N-1-1 Thermal and Voltage Violations (Boydton Load Area)

The Company identified N-1-1 thermal and voltage violations in the 2029 RTEP in the Boydton Load Area. Loss of Allen Creek-Finneywood Line #2258 and Clover-Easters Line # 2226 results in a thermal overload on Cloud-Kerr Dam Line #38 (exceeds 100 percent of emergency rating) and the voltage at the Cloud, Easters and Allen Creek buses are in violation (less than 0.90pu). This thermal overload was additionally identified by PJM during its 2024 Open Window #1. See Section I.J.

(4) Facilities List

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

See Attachment I.A.4 and Attachment I.A.6, respectively, for the existing and planned transmission infrastructure in the Boydton and South Hill Load Areas, which includes all baseline and supplemental projects in the Project area that have been submitted to PJM as of January 2025.[25] See Attachment I.A.1 for existing and future transmission facilities in the proposed Project area.

[25] *See supra*, n. 19.

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: For purposes of this Application, there are two separate load areas—the Boydton Load Area and the South Hill Load Area—both of which are included within the broader Southside Load Area. The Boydton Load Area extends from the Town of Boydton on the west, with Baskerville to the east, Muck Cross to the north, and Newmans to the south. The South Hill Load Area primarily includes the Town of South Hill. See Attachment I.A.1 for a map of the general load area boundaries of the Boydton and South Hill Load Areas and an overview of the Project area. See Attachment I.G.1 and Attachment I.G.2 for the portion of the Company's existing transmission facilities in the area of the Project.

The Boydton Load Area is served by the 115 kV Boydton Plank Road (48 MW), Ridge Road (90 MW), and Herbert (34 MW) Substations, the 230 kV Easters Switching Station (180 MW), and the 230-115 kV Cloud Switching Station (322 MW) networked through two autotransformers. As noted in Section I.A, the new 115 kV Bishop Switching Station (45 MW) will be connected in March 2025 by cutting existing Kerr Dam-Ridge Road Line #137. The new 230 kV Allen Creek Switching Station (135 MW) will be connected in December 2025 by cutting a future 230 kV line between Finneywood and Cloud Switching Stations. Without Nebula Station, the combined projected loads in 10 years for the customers served by these stations is 854 MW based on the customers' load ramps as projected in the DP requests. See Attachment I.C.1. This results in N-1-1 thermal and voltage violations as described in Sections I.A and I.B.

Nebula Switching Station will have an ultimate load of 221 MW requiring two 230 kV sources per the Company's FIR requirements described in Section I.B. See Attachment I.C.1. Connecting Nebula Switching Station to the 230 kV system via Cloud Switching Station (or any other location on the 230 kV system in the Boydton Load Area) with two 230 kV lines would increase the severity of the two reliability violations just described. The combined projected loads in 10 years for the customers served by the stations just mentioned plus the Nebula load exceeds 1 GW (see Attachment I.C.1). Therefore, the first 230 kV source to Nebula Switching Station should come from Cloud Switching Station, about one mile away, and the second 230 kV source should come from a different area of the system.

The South Hill Load Area, approximately 14 miles east of the Boydton Load Area, is served by the Company's existing 115 kV South Hill and La Crosse Substations. La Crosse Substation serves bridging power for a customer while 230 kV infrastructure is under construction for three new substations, *i.e.*, the Evans Creek (230 MW), Tunstall (144 MW) and Raines (96 MW) Substations approved by the Commission in Case No. PUR-2022-00167.[26] The projected loads for these three substations (almost 500 MW in 10 years) will result in a 300 MW load drop violation based on the Customer's DP request in the year 2029 as described in Section I.A. See Attachment I.C.2.

Additional DP requests impacting the 230 kV network in the Southside Load Area in 10 years is provided in Attachment I.C.3, and the historical load for the entire Southside Load Area is shown in Attachment I.C.4. See Section I.A.

Connecting Nebula Switching Station with one 230 kV transmission line from Cloud Switching Station and one 230 kV transmission line from Raines Substation as proposed meets the Company's requirements for two transmission sources and resolves the three violations previously described in Section I.A. 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 Boydton Load Area and the South Hill Load Area. The Project, as proposed, will provide the most comprehensive solution to provide service to the requested Customer, allow for future load growth and mitigate the projected NERC reliability violations by November 2028.

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

Historical and Forecast MW Loads - Boydton Load Area

Summer	Historical					Projected									
Station / Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Ridge Road	76	89	94	90	100	90	90	90	90	90	90	90	90	90	90
Herbert	5	27	33	34	31	34	34	34	34	34	34	34	34	34	34
Boydton Plank	44	46	47	48	48	48	48	48	48	48	48	48	48	48	48
Cloud**	0	0	38	64	109	215	282	317	322	322	322	322	322	322	322
Easters	0	0	1	18	31	96	158	180	180	180	180	180	180	180	180
Allen Creek	0	0	0	0	0	0	24	50	107	135	135	135	135	135	135
Bishop	0	0	0	0	0	12	23	45	45	45	45	45	45	45	45
Nebula***	0	0	0	0	0	0	0	0	0	0	28	76	105	153	199
Total Load before Nebula	125	162	213	254	319	495	659	764	826	854	854	854	854	854	854
Total Load with Nebula	125	162	213	254	319	495	659	764	826	854	882	930	959	1007	1053

Winter	Historical					Projected									
Station / Year	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
Ridge Road	64	78	88	90	86	90	90	90	90	90	90	90	90	90	90
Herbert	1	18	30	30	31	34	34	34	34	34	34	34	34	34	34
Boydton Plank	41	42	44	46	47	48	48	48	48	48	48	48	48	48	48
Cloud**	0	0	13	47	76	173	251	307	322	322	322	322	322	322	322
Easters	0	0	0	15	28	90	138	180	180	180	180	180	180	180	180
Allen Creek	0	0	0	0	0	0	12	30	81	129	135	135	135	135	135
Bishop	0	0	0	0	0	12	13	37	45	45	45	45	45	45	45
Nebula***	0	0	0	0	0	0	0	0	0	12	28	68	105	145	181
Total Load before Nebula	106	138	175	228	268	447	586	726	800	848	854	854	854	854	854
Total Load with Nebula	106	138	175	228	268	447	586	726	800	860	882	922	959	999	1035

** Historical loads are coincident with the Company's system peak*

*** Additional infrastructure will be needed to serve the Cloud load if it exceeds 300MW in the station.*

**** The final load buildout for Nebula is 221 MW by 2035*

Historical and Forecast MW Loads - South Hill Load Area

Summer	Historical					Projected									
Station / Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Tunstall	0	0	0	0	0	34	37	61	82	106	125	137	144	144	144
Raines	0	0	0	0	0	3	25	33	57	80	92	96	96	96	96
Evans Creek	0	0	0	0	0	27	48	83	118	164	201	230	230	230	230
TOTAL LOAD	0	0	0	0	0	64	110	177	257	350	418	463	470	470	470

Winter	Historical					Projected									
Station / Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029 *	2030	2031**	2032	2033	2034
Tunstall	0	0	0	0	0	0	28	51	73	96	120	132	144	144	144
Raines	0	0	0	0	0	0	8	23	47	71	87	96	96	96	96
Evans Creek	0	0	0	0	0	0	49	79	114	144	186	216	230	230	230
TOTAL LOAD	0	0	0	0	0	0	85	153	234	311	393	444	470	470	470

** 300 MW's exceeded in 2029. (Loss of Line #2259 Unity-Tunstall and Line 2262 Unity-Tunstall drops Tunstall, Raines & Evans Creek - 311 MW)*

*** 300 MW's exceeded in 2031 (Loss of Line #2275 Tunstall-Raines and Line #2274 Tunstall-Evans Creek drops Raines & Evans Creek - 312 MW)*

Forecast based on Customer DP requests

Forecast MW Loads - Other Southside Loads Impacting the 230kV Network

Summer	Projected									
Station / Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Jeffress	12	37	100	185	227	240	240	240	240	240
Millan	0	0	0	2	28	76	122	144	144	144
Lenhart/Alderwood	0	0	0	18	84	178	301	361	369	369
Butler Farm	0	12	34	80	179	267	313	318	318	318
TOTAL LOAD	12	49	134	285	518	761	976	1063	1071	1071

Winter	Projected									
Station / Year	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Jeffress	0	31	75	161	214	240	240	240	240	240
Millan	0	0	0	12	28	68	104	136	144	144
Lenhart/Alderwood	0	0	0	12	42	134	255	344	369	369
Butler Farm	0	0	12	72	153	230	296	318	318	318
TOTAL LOAD	0	31	87	257	437	672	895	1038	1071	1071

Historical MW Loads - Southside Load Area

Summer	**Historical**				
Year	**2020**	**2021**	**2022**	**2023**	**2024**
MW Load	656	666	776	799	872
Winter	**Historical**				
Year	**2020**	**2021**	**2022**	**2023**	**2024**
MW Load	713	681	839	976	930

** Historical loads are coincident with the Company's system peak*

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: **Power Flow Studies Performed by the Company**

The following TPL critical contingencies result in NERC criteria violations for the proposed system (see Attachment I.A.5). Please see screenshots and descriptions as follows:

Contingency Name: Loss of Tunstall-Unity Line #2259 and Tunstall-Unity Line #2262
Contingency Type: N-1-1
Violations Season and Year: Winter 2029
NERC Criteria Violation: 311 MW load loss (Greater than 300 MW)

See Attachment I.C.2 showing loads exceeding 300 MW beginning in Winter 2029.

Contingency Name: Loss of Clover-Easters Line #2226 and Allen Creek-Finneywood Line #2258
Contingency Type: N-1-1 SCD
Violations Season and Year: Summer 2029
NERC Criteria Violation: Thermal Overload of Cloud-Kerr Dam Line #38 (Greater than 100%)

The Tara screenshot below shows the thermal overload.

			Scenario	SCD AC %Loading	
Monitored Facility	Areas	Cont Name	First Level Scenario	BASE	NEBULA
313757 3CLOUD 115 314702 3KERR 115 1	345	DVP_P1-2: LN 2258	DVP_P1-2: LN 2229_SRT-A	96.57	
		DVP_P1-2: LN 2226_SRT-A	DVP_P1-2: LN 2258	109.86	
		DVP_P1-2: LN 2229_SRT-A	DVP_P1-2: LN 2258	88.17	
		DVP_P1-2: LN 2258	DVP_P1-2: LN 2226_SRT-A	109.86	

Contingency Name: Loss of Clover-Easters Line #2226 and Allen Creek-Finneywood Line #2258
Contingency Type: N-1-1
Violations Season and Year: Summer 2029
NERC Criteria Violation: Low voltages at Easters 230 kV, Cloud 230 kV and Allen Creek 230 kV buses (Less than 0.90pu)

The Tara screenshot below shows buses with low voltage.

						Scenario	Cont Volt BASE
Bus #	Bus Name	Base kV	Area	Zone	Cont Name	First Level Scenario	
313785	6CLOUD	230	345	358	DVP_P1-2: LN 2226_SRT-A	DVP_P1-2: LN 2258	0.842
					DVP_P1-2: LN 2229_SRT-A	DVP_P1-2: LN 2258	0.8431
					DVP_P1-2: LN 2258	DVP_P1-2: LN 2226_SRT-A	0.842
						DVP_P1-2: LN 2229_SRT-A	0.8431
313786	6EASTERS	230	345	358	DVP_P1-2: LN 2226_SRT-A	DVP_P1-2: LN 2258	0.8442
					DVP_P1-2: LN 2258	DVP_P1-2: LN 2226_SRT-A	0.8442
313787	6EASTERS_1	230	345	358	DVP_P1-2: LN 2226_SRT-A	DVP_P1-2: LN 2258	0.8456
					DVP_P1-2: LN 2258	DVP_P1-2: LN 2226_SRT-A	0.8456
313988	ALLEN CREEK	230	345	358	DVP_P1-2: LN 2226_SRT-A	DVP_P1-2: LN 2258	0.8407
					DVP_P1-2: LN 2229_SRT-A	DVP_P1-2: LN 2258	0.8418
					DVP_P1-2: LN 2258	DVP_P1-2: LN 2226_SRT-A	0.8407
						DVP_P1-2: LN 2229_SRT-A	0.8418

All of the above violations are mitigated with the construction of the Project by November 2028.

Power Flow Studies Performed by PJM

Contingency Name: Loss of Clover-Easters Line #2226 and Allen Creek-Finneywood Line # 2258
Contingency Type: N-1-1 SCD
Violations Season and Year: Summer 2029
NERC Criteria Violation: Thermal Overload of Cloud-Kerr Dam Line #38 (Greater than 100%)

The Tara screenshot below shows the thermal overload.

PJM 2024 Open Window #1 Results – Without New 230kV Cloud – Raines Line

Fr Bu	Fr Name	To Bus	To Name	CI	KVs	SCD AC (%	Contingency 1	Contingency 2
314702	3KERR	313757	3CLOUD	1	115/115	108.96	'DVP_P1-2: LN 2226_SRT-A'	'DVP_P1-2: LN 2258_SRT-A'
314702	3KERR	313757	3CLOUD	1	115/115	108.96	'DVP_P1-2: LN 2258_SRT-A'	'DVP_P1-2: LN 2226_SRT-A'
270716	DRESDEN ; B	275179	DRESDEN ;1M	1	345/138	97.23	'DVP_P1-2: LN 2226_SRT-A'	'COMED_P1-2_345-L10805_B-S_SRT-A'
270716	DRESDEN ; B	275179	DRESDEN ;1M	1	345/138	97.23	'DVP_P1-2: LN 2258_SRT-A'	'COMED_P1-2_345-L10805_B-S_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	2	138/138	94.12	'DVP_P1-2: LN 2226_SRT-A'	'AEP_P1-2_#5194_759_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	2	138/138	94.12	'DVP_P1-2: LN 2258_SRT-A'	'AEP_P1-2_#5194_759_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	1	138/138	94.08	'DVP_P1-2: LN 2226_SRT-A'	'AEP_P1-2_#5195_760_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	1	138/138	94.08	'DVP_P1-2: LN 2258_SRT-A'	'AEP_P1-2_#5195_760_SRT-A'
270717	DRESDEN ; R	275180	DRESDEN ;3M	1	345/138	91.03	'DVP_P1-2: LN 2226_SRT-A'	'COMED_P1-2_138-L0903__R-S_SRT-A'
270717	DRESDEN ; R	275180	DRESDEN ;3M	1	345/138	91.03	'DVP_P1-2: LN 2258_SRT-A'	'COMED_P1-2_138-L0903__R-S_SRT-A'

PJM 2024 Open Window #1 Results – With New 230kV Cloud – Raines Line

Fr Bu	Fr Name	To Bus	To Name	CI	KVs	SCD AC (%	Contingency 1	Contingency 2
270716	DRESDEN ; B	275179	DRESDEN ;1M	1	345/138	97.24	'DVP_P1-2: LN 2226_SRT-A'	'COMED_P1-2_345-L10805_B-S_SRT-A'
270716	DRESDEN ; B	275179	DRESDEN ;1M	1	345/138	97.24	'DVP_P1-2: LN 2258_SRT-A'	'COMED_P1-2_345-L10805_B-S_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	2	138/138	94.12	'DVP_P1-2: LN 2226_SRT-A'	'AEP_P1-2_#5194_759_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	2	138/138	94.12	'DVP_P1-2: LN 2258_SRT-A'	'AEP_P1-2_#5194_759_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	1	138/138	94.08	'DVP_P1-2: LN 2226_SRT-A'	'AEP_P1-2_#5195_760_SRT-A'
243347	05TIDD 3-4	243779	05WHELGS	1	138/138	94.08	'DVP_P1-2: LN 2258_SRT-A'	'AEP_P1-2_#5195_760_SRT-A'
270717	DRESDEN ; R	275180	DRESDEN ;3M	1	345/138	91.05	'DVP_P1-2: LN 2226_SRT-A'	'COMED_P1-2_138-L0903__R-S_SRT-A'
270717	DRESDEN ; R	275180	DRESDEN ;3M	1	345/138	91.05	'DVP_P1-2: LN 2258_SRT-A'	'COMED_P1-2_138-L0903__R-S_SRT-A'

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 did not identify any transmission or distribution electrical alternatives to the proposed Project. Due to the identified N-1-1 thermal and voltage violations in the Boydton Load Area, space constraints at Finneywood Substation, and absence of transmission lines in proximity to the Customer interconnect, the Company determined that there are no feasible transmission or distribution electrical alternatives.

Rejected Alternative Design

As an alternative to the Project as proposed, the Company considered but rejected an alternative design that would install double circuit-capable single circuit monopoles[27] within an entirely new 100-foot-wide right-of-way (the "Rejected Alternative Design"). As noted in Section I.A, this alternative design would require an entirely separate project for the Nebula-Raines corridor and an entirely separate project for the Cloud-Nebula corridor when the need arises in the future. A description of the design alternatives and the projects required to convert the lines in the future is provided below.

Nebula-Raines Line #2399

The Rejected Alternative Design of the Nebula-Raines Line would require installation of a single circuit 230 kV overhead transmission line on double circuit-capable monopoles within an entirely new 100-foot-wide right-of-way following the 14.4-mile Nebula-Raines Proposed Route. See Attachment I.A.1. The single circuit monopoles would be designed to be double circuit-capable in strength and height identical to the proposed double circuit monopoles; accordingly, the structure design and operational features of the Rejected Alternative Design are identical to those presented in Attachment II.B.3.ii.[28] Additionally, as the structure geometry of the double circuit-capable single circuit monopoles would have a staggered arm arrangement, as represented in the photograph in Attachment I.E.1, the right-of-way width and conductor placements are identical to those depicted in Attachment II.A.5.a.

The Company estimates that the Rejected Alternative Design would cost

[27] Consistent with prudent planning and engineering design, it is the Company's standard practice to construct all new single circuit lines utilizing single circuit monopoles that are double circuit capable if needed, in the future, unless otherwise required by a specific project.

[28] Note that the Rejected Alternative Design would also require installation of the same structures with the same design and operational features as shown in Attachment II.B.3.i and Attachment II.B.3.iii.

approximately $86.5 million to construct along the Nebula-Raines Proposed Route.

As discussed in Section I.A, the Company anticipates 2.2 GW of load growth in the Southside Load Area over the next 10 years. When the need arises, an additional separate project would be required in the Nebula-Raines corridor to convert the Nebula-Raines Line from single circuit to double circuit. At a minimum, this conversion would require the Company to repeat many of the same construction activities that were required for the initial construction of the single circuit line, including:

- Costs and impacts associated with installing access roads for construction activities in the same corridor;

- Costs associated with mobilizing crews to install a second set of three double circuit arms and a second 230 kV conductor on the Nebula-Raines Line;

- Costs and impacts associated with forestry activities;

- An outage on Line #2399 for up to one year in order to move the conductor from an alternating configuration (as shown in Attachment I.E.1) to vertical configuration (as shown in Attachment II.B.6.b.i) by adding three additional arms to the pole, and three additional phases of conductor; and an outage up to five days on the Line #137 and #38 corridor, estimated to be less than five days;

- Impacts to property owners for a second time along the same right-of-way corridor;

- Additional resource impacts associated with work within the corridor and access roads and related costs associated with obtaining necessary permits; and

- Additional costs associated with completing additional Wetland Delineations, Archeological and Cultural Resources, and Threatened and Endangered species surveys.

Based on estimates performed for the Nebula-Raines Line as proposed, the Company anticipates that this second project to convert the single circuit line to a double circuit line would cost approximately $17.0 million in transmission-related costs—which would be in addition to the approximately $86.5 million in transmission-related cost to initially construct the single circuit line along the Nebula-Raines Proposed Route. And because this project construction would be bid to a contractor, the Company anticipates that the costs potentially could be even higher, although such costs cannot be quantified at this time. Further, connecting and energizing the additional conductor would require the same substation-related

work and costs at the Cloud and Nebula Switching Stations and Raines Substation as the proposed Project, which are described below.

Based on the significant area load growth and issues related to constructability, impacts, costs, and outages, and consistent with prudent planning and engineering design as discussed herein and in Section I.A, the Company rejected the double circuit-capable single circuit monopole alternative design for the Nebula-Raines Line.

Cloud-Nebula Line #2402

The Rejected Alternative Design of the Cloud-Nebula Line would require installation of a single circuit 230 kV overhead transmission line on double circuit-capable monopoles within an entirely new 100-foot-wide right-of-way following the 0.9-mile Cloud-Nebula Proposed Route. See Attachment I.A.1. The single circuit monopoles would be designed to be double circuit-capable in strength and height identical to the proposed double circuit monopoles; accordingly, the structure design and operational features of the Rejected Alternative Design are identical to those presented in Attachment II.B.3.ii.[29] Additionally, as the structure geometry of the double circuit-capable single circuit monopoles would have a staggered arm arrangement, as represented in the photograph in Attachment I.E.1, the right-of-way width and conductor placements are identical to those depicted in Attachment II.A.5.a.

Based on its analysis of the Rejected Alternative Design for the Nebula-Raines Line, the Company assumes that there would be similar constructability and impacts issues to convert the Cloud-Nebula Line from single circuit to double circuit, and that similar costs would be applicable on a per mile basis. Based on the significant area load growth and issues related to constructability, impacts, costs, and outages, and consistent with prudent planning and engineering design as discussed herein and in Section I.A, the Company rejected the double circuit-capable single circuit monopole alternative design for the Cloud-Nebula Line.

Analysis of Demand-Side Resources:

Pursuant to the Commission's November 26, 2013, Order entered in Case No. PUE-2012-00029,[30] and its November 1, 2018, Final Order entered in Case No. PUR-2018-00075,[31] the Company is required to provide analysis of demand-side

[29] *See supra*, n. 28.

[30] *Application of Virginia Electric and Power Company d/b/a Dominion Virginia Power for approval and certification of electric facilities: Surry-Skiffes Creek 500 kV Transmission Line, Skiffes Creek-Whealton 230 kV Transmission Line, and Skiffes Creek 500 kV-230 kV-115 kV Switching Station*, Case No. PUR-2012-00029, Final Order (Nov. 26, 2023).

[31] *Application of Virginia Electric and Power Company for approval and certification of electric transmission facilities under Va. Code § 56-46.1 and the Utility Facilities Act, Va. Code § 56-265.1 et seq.*, Case No. PUR-2018-00075, Final Order (Nov. 1, 2018).

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 to provide requested service and to address violations of mandatory NERC Reliability Standards, thereby enabling the Company to maintain the overall long-term reliability of the transmission system.[32] Notwithstanding, when performing an analysis based on PJM's 50/50 load forecast, there is no adjustment in load for DR programs because PJM only dispatches DR when the system is under stress (*i.e.*, a system emergency). Accordingly, while existing DSM is considered to the extent the load forecast accounts for it, DR that has been bid previously into PJM's capacity market is not a factor in this particular application because of the identified need for the Project. Based on these considerations, the evaluation of the Project demonstrated that despite accounting for DSM consistent with PJM's methods, the Project is necessary.

Incremental DSM also will not eliminate the need for the Project. As discussed in Sections I.A and I.C, the need for the proposed Project is based in part on the Company's obligation to interconnect MEC's Visor DP, consistent with the Company's FIR and mandatory NERC Reliability Standards. As reflected in Section I.A, the ultimate projected load at the Nebula Station will be approximately 221 MW. By way of comparison, the Company achieved demand savings of 276.5 MW (net) / 350.0 MW (gross) from its DSM Programs in 2023.

[32] 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.

Rejected Alternative Design:
230 kV Single Circuit Steel Monopole

I. NECESSITY FOR THE PROPOSED PROJECT

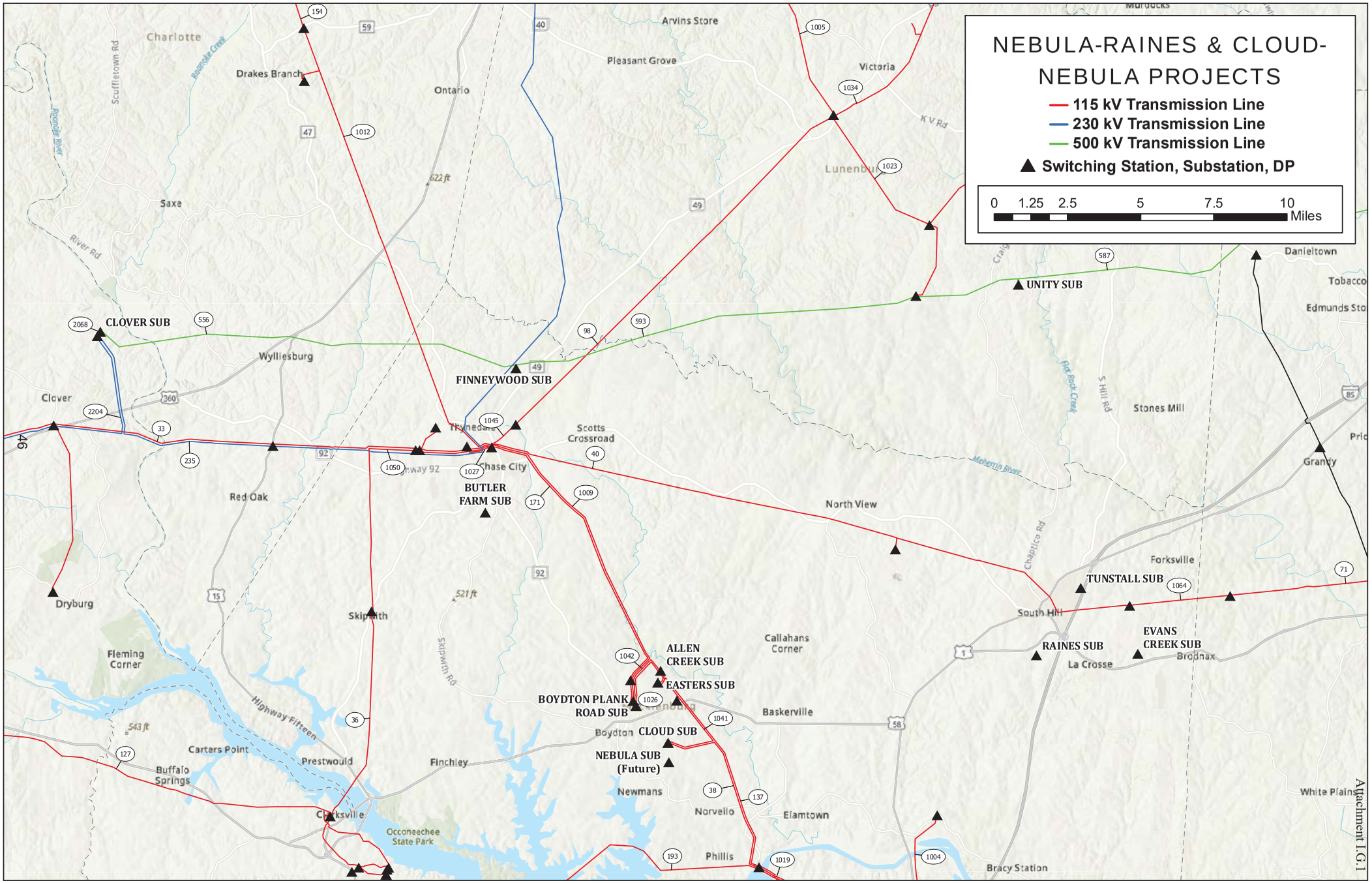
F. Describe any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project, including the number of circuits and normal and emergency ratings of the facilities.

Response: Not applicable.

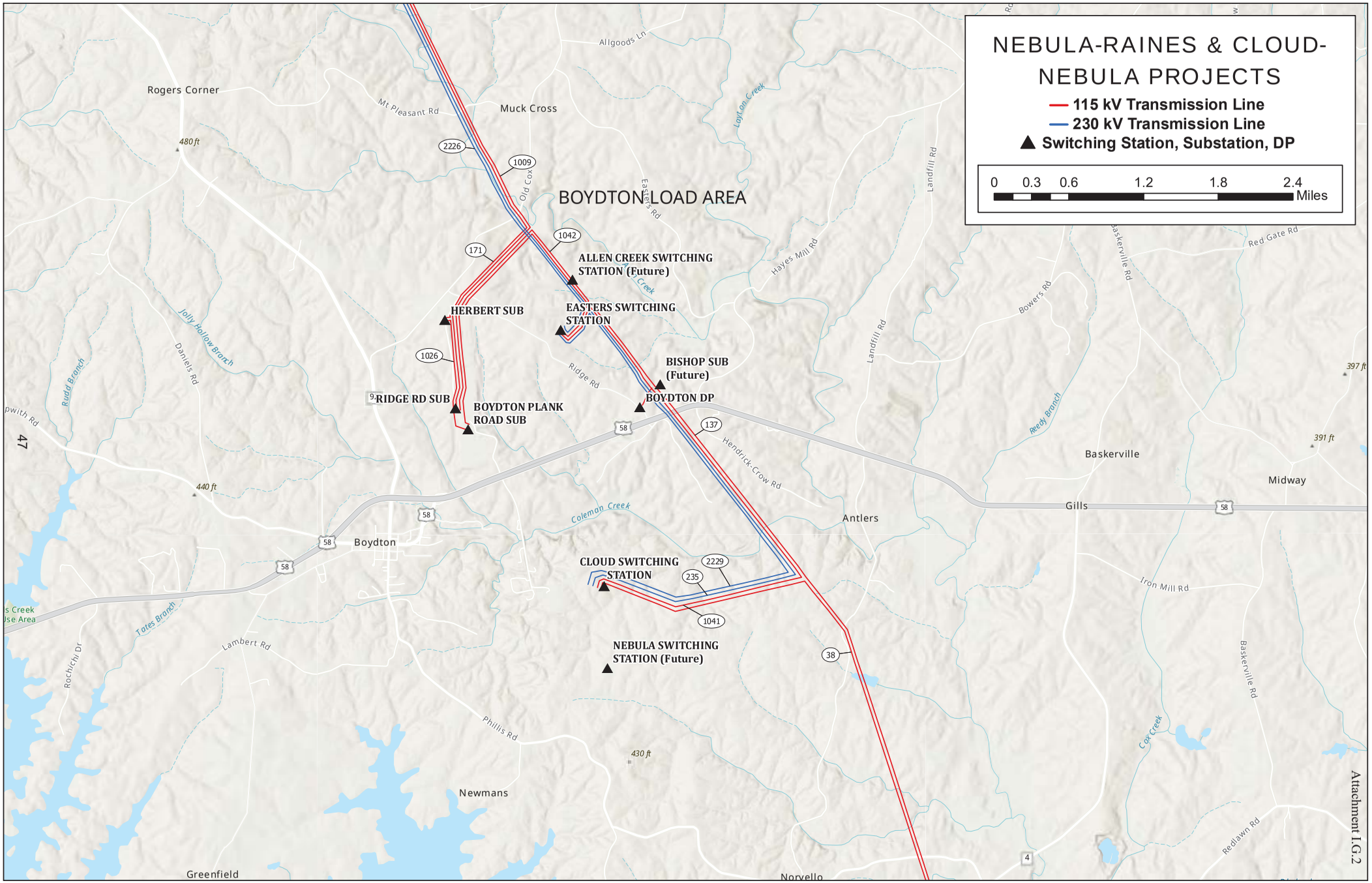
I. NECESSITY FOR THE PROPOSED PROJECT

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 for an overview of the system map and Attachment I.G.2 for a zoomed-in map of the Boydton Load Area.



Attachment I.G.1



Attachment I.G.2

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 November 1, 2028.

The Company estimates it will take approximately 37 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 September 30, 2025. Should the Commission issue a final order by September 30, 2025, to accommodate long-lead materials procurement, the Company estimates that construction should begin around June 2027, and be completed by November 1, 2028. This schedule is contingent upon obtaining the necessary permits, real estate, and outages, the latter of which may be particularly challenging due to the amount of new load growth, rebuilds, and new builds scheduled to occur in this load area. Dates may need to be adjusted based on permitting delays or design modifications to comply with additional agency requirements identified during the permitting application process, as well as the ability to schedule outages, and unpredictable delays due to labor shortages or materials/supply issues. This schedule also is contingent upon the Company's ability to negotiate for easements with property owners along the approved routes without the need for additional litigation.

In addition, the Company is monitoring actively regulatory changes and requirements associated with the NLEB and how they could potentially impact construction timing associated with TOYRs. The USFWS previously indicated that it planned to issue final NLEB guidance to replace the interim guidance by April 1, 2024; however, the interim guidance has been extended by USFWS until late summer 2024. The Company is tracking actively updates from the USFWS with respect to the final guidance. Once issued, the Company plans to review and follow the final guidance to the extent it applies to the Company's projects. Until the final guidance is issued, the Company will continue following the interim guidance. For projects that may require additional coordination, the Company will coordinate with the USFWS.

The Company is also monitoring potential regulatory changes associated with the potential up-listing of the TCB. On September 14, 2022, the USFWS published the proposed rule to the Federal Register to list the TCB as endangered under the Endangered Species Act. USFWS extended its Final Rule issuance target from September 2023 to September 2024. The Company is tracking actively this ruling and evaluating the effects of potential outcomes on Company projects' permitting, construction, and in-service dates, including electric transmission projects.

Any adjustments to this Project schedule resulting from these or similar challenges could necessitate a minimum of a six- to twelve-month delay in the targeted in-

service date. Accordingly, for purposes of judicial economy, the Company requests that the Commission issue a final order approving both a desired in-service target date (*i.e.*, November 1, 2028) and an authorization sunset date (*i.e.*, November 1, 2029) for energization of the Project.

I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The estimated conceptual cost of the Project as proposed is approximately $129.5 million, which includes approximately $107.0 million for transmission-related work and approximately $22.5 million for substation-related work (2024 dollars).[33]

The following is a breakdown of the approximate costs.

Transmission-Related Costs

Nebula-Raines Line #2399	**Cost**
Proposed Route (Route 5)	$93.7 million
Alternative Route1	$106.3 million
Alternative Route 3	$101.2 million
Alternative Route 4	$105.7 million
Cloud-Nebula Line #2402	**Cost**
Proposed Route	$13.3 million

Substation-Related Costs

Substation	**Cost**
Nebula Switching Station	$29.8 million[34]
Raines Substation	$1.5 million
Cloud Switching Station	$1.7 million

[33] *See supra*, n. 7, and *infra*, n. 34.

[34] The Customer has requested excess transmission facilities at the Nebula Station—namely, additional breakers and feeds—for redundancy. The approximately $29.8 million in total substation-related costs at Nebula Station are inclusive of approximately $10.6 million in excess facilities charges that will be paid upfront by the Customer. Accordingly, these excess facilities charges have been excluded from the total substation-related costs for the Project as proposed.

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: As initially submitted to PJM, the Project was classified as a supplemental project (Supplemental Project DOM-2024-0054) initiated by the TO in order to interconnect a new customer load (*i.e.*, MEC's Visor DP). The Company presented the need for the Project to PJM at the July 9, 2024 TEAC Meeting. See Attachment I.J.1.

Subsequently, the Company identified N-1-1 thermal and voltage violations in the 2029 RTEP in the Boydton Load Area. Loss of Allen Creek-Finneywood Line #2258 and Clover-Easters Line # 2226 results in a thermal overload on Cloud-Kerr Dam Line #38 (exceeds 100 percent of emergency rating) and the voltage at the Cloud, Easters and Allen Creek buses in violation (less than 0.90pu). In addition, the Company identified a 300 MW N-1-1 load drop violation in the South Hill Load Area described in Section I.A.

The thermal overload identified by the Company was additionally identified by PJM during its 2024 Open Window #1 process, with a new 230 kV line between the Cloud Switching Station and Raines Substation identified as the solution and assigned Baseline Project nos. b4000.331, b4000.332 and b4000.333. The solution selected by PJM uses double circuit structure construction with an idle conductor, as described in the PJM Executive Abstract. See Attachment I.J.2 for a highlighted and redacted excerpt. The first read of the solution was presented at the December 3, 2024 TEAC Meeting. See Attachment I.J.3. The second read was presented at the January 7, 2025 TEAC Meeting. See Attachment I.J.4.[35] The Company has every reason to believe that this baseline component of the proposed Open Window Project will receive PJM Board approval in February 2025.

After this expected approval, the Supplemental Project DOM-2024-0054 solution will be presented at a PJM TEAC meeting in the second quarter of 2025 as a new switching station cutting into the new 230 kV Cloud to Raines Line solution. The Company anticipates that PJM's do-no-harm ("DNH") analysis will not result in any harm created and that the Project will be submitted for acceptance into the 2025 Local Plan.

In summary of the PJM process, the Project is a PJM baseline project (a new 230 kV Cloud to Raines Line) to resolve reliability violations and a PJM supplemental project (new 230 kV Nebula Switching Station) to interconnect MEC's Visor DP.

[35] Note that the cover page of Attachment I.J.4 is incorrectly dated January 6, 2025. The referenced TEAC Meeting occurred on January 7, 2025, as indicated herein.

The Project is presently 100% cost allocated to the DOM Zone.[36]

[36] *See supra*, n. 34. Note that the Customer will be responsible for any applicable excess facilities charges, which have been excluded from the total Project costs.

Dominion Supplemental Projects

Transmission Expansion Advisory Committee
July 9, 2024

Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Dominion Transmission Zone: Supplemental Customer Load Request

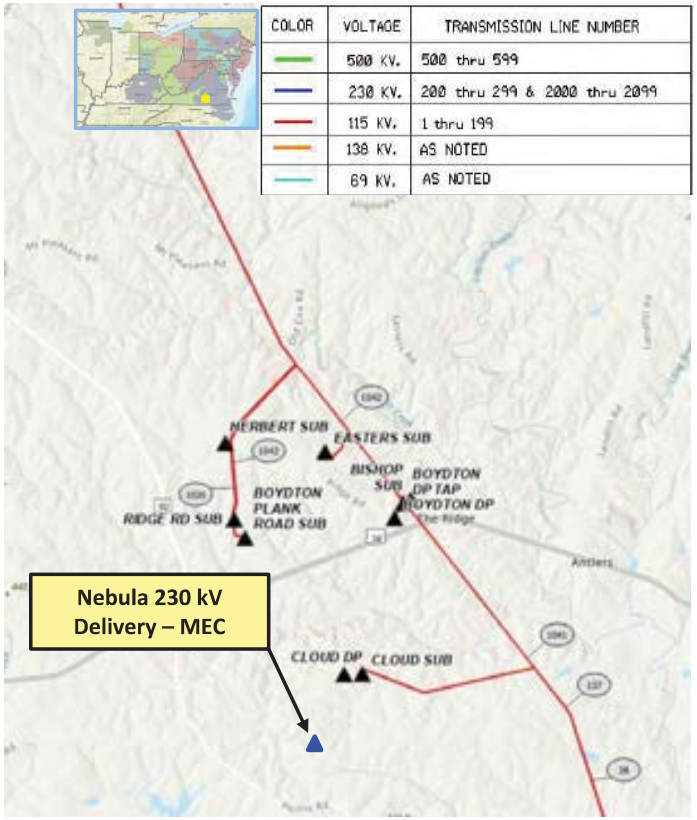
Need Number: DOM-2024-0052
Process Stage: Need Meeting 07/09/2024
Project Driver: Customer Service

Specific Assumption References:

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

Problem Statement:

ODEC on behalf of Mecklenburg Electric Coop (MEC) has submitted a DP request for a new 230 kV delivery point (Nebula Sub) to serve a data center customer in Mecklenburg County with a total load in excess of 100 MW. Requested in-service date is 12/01/2028.



Initial In-Service Load	Projected 2029 Load
Summer: 0 MW Winter: 12 MW	Summer: 12 MW Winter: 26 MW

230kV and 115kV Solutions for Portfolios

General Information

Proposing entity name	VEPCO
Does the entity who is submitting this proposal intend to be the Designated Entity for this proposed project?	Yes
Company proposal ID	Proposal 1.4
PJM Proposal ID	24
Project title	230kV and 115kV Solutions for Portfolios
Project description	This proposal includes the following projects: 1. 99-3154 - Line 229 Rebuild - Remington CT to Marsh Run 2. 99-3203 - Line 2161 Uprate - Gainesville to Wheeler 3. 99-3258 - New 230 kV Line - Cloud to Raines 4. 99-3398 - New 230 kV Line - Ox to Cloverhill 5. 99-3407 - New 230 kV Line - Elmont to Ladysmith 6. 99-3412 - New 230 kV Line - Thelma - Lakeview 7. 99-3415 - Line 238 Uprate - Carson to Clubhouse 8. 99-3416 - Line 2003 Uprate - Poe to Chesterfield 9. 99-3435 - Line 119 Uprate - Elkton to AE2-029 10. 99-3444 - Line 121 Reconductoring - Poe to Prince George 11. 99-3457 - Second 230 kV - Nokesville to Hornbaker 12. 99-3460 - Line 2002 Uprate - Carson to Poe 13. 99-3461 - Line 1031 Uprate - Pantego-Terra 14. New 230kV Line Morrisville to Anderson Branch
Email	ETAreaPlanning@dominionenergy.com
Project in-service date	12/2029
Tie-line impact	No
Interregional project	No
Is the proposer offering a binding cap on capital costs?	No
Additional benefits	Refer to Executive Abstract for more information. Below, is a list of references to associated Proposal: 2024-W1-262 - Portfolio #1A 2024-W1-759 - Portfolio #1B 2024-W1-636 - Portfolio #2 2024-W1-610 - Portfolio #3 2024-W1-114 - Portfolio #4B
Supporting Documents	

Project Components

1. Line 299 Rebuild - Marsh Run to Remington CT (99-3154)
2. Marsh Run Substation (99-3154)
3. Remington CT (99-3154)
4. Line 2161 Upgrade - Gainesville to Wheeler (99-3203)
5. Gainesville Substation Terminal Equipment Uprate (99-3203)
6. Trident Substation Relay Reset (99-3203)
7. Wheeler Substation Terminal Equipment Upgrade (99-3203)
8. Lines 213/225 Rebuild - Thelma to Lakeview (99-3412)
9. Thelma Substation Terminal Equipment Upgrade (99-3412)
10. Lakeview Substation Terminal Equipment Upgrade (99-3412)
11. Line 238 Rebuild - Carson to Clubhouse (99-3415)
12. Carson Substation Terminal Equipment Upgrade (99-3415)
13. Clubhouse Substation Terminal Equipment Upgrade (99-3415)
14. Line 2003 Reconductoring - Chesterfield to Tyler & Locks to Poe (99-3416)
15. Chesterfield Substation Relay Reset (99-3416)
16. Poe Substation Terminal Equipment Upgrade (99-3416)
17. Tyler Substation Terminal Equipment Upgrade (99-3416)
18. Line 119 Rebuild - Merck #5 to Port Republic (99-3435)
19. Merck #5 Substation Equipment Upgrade (99-3435)
20. Line 2002 Reconductoring - Carson to Poe (99-3460)
21. Carson Substation Terminal Equipment Upgrade (99-3460)
22. Poe Substation Terminal Equipment Upgrade (99-3460)
23. New 230 kV Line - Nokesville to Hornbaker (99-3457)
24. Nokesville Substation Terminal Equipment Upgrade (99-3457)
25. Hornbaker Substation Terminal Equipment Upgrade (99-3457)

26. New 230 kV Line - Elmont to Ladysmith (99-3407)
27. Elmont Substation Terminal Equipment Upgrade (99-3407)
28. Ladysmith Substation Terminal Equipment Upgrade (99-3407)
29. New 230 kV Line - Ox to Cloverhill (99-3398)
30. Ox Substation Terminal Equipment Upgrade (99-3398)
31. Cloverhill Substation Terminal Equipment Upgrade (99-3398)
32. New 230 kV Line - Raines to Cloud (99-3258)
33. Cloud Substation Terminal Equipment Upgrade (99-3258)
34. Raines Substation Terminal Equipment Upgrade (99-3258)
35. Line 121 Reconductoring - Poe to Prince George (993444)
36. Poe Substation Upgrade (99-3444)
37. Prince George Substation Upgrade (99-3444)
38. Line 1031 Rebuild - Terra to Pantego (99-3461)
39. New 230 kV Line 9491 (Temp) - Morrisville to Anderson Branch
40. Morrisville Substation Terminal Equipment Upgrade
41. Anderson Branch Substation Terminal Equipment Upgrade

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Greenfield Transmission Line Component

Component title	New 230 kV Line - Raines to Cloud (99-3258)
Project description	This project serves to install one 230kV single circuit line from Raines Substation to Cloud Substation to solve electrical violations cause by the significant load growth in South Hill, Virginia. This scope also includes an idle 230kV circuit being installed between these stations.
Point A	Raines
Point B	Cloud
Point C	

	Normal ratings	Emergency ratings
Summer (MVA)	1573.000000	1573.000000
Winter (MVA)	1648.000000	1648.000000
Conductor size and type	2-768.2 ACSS/TW/HS (20/7) 250°C MOT	
Nominal voltage	AC	
Nominal voltage	230	

Line construction type	Overhead
General route description	FACILITIES TO BE INSTALLED 1. Install twenty-three (23) 230kV DC Engineered Monopole DDE Structures. (12.614) 2. Install ninety (90) 230kV DC Engineered Monopole Suspension Structures with arms. (12.610) 3. Install two (2) 230kV DC Engineered H-Frame Structures. (12.221) 4. Install four (4) 230kV DC Engineered Backbone Structures (12.901) 5. Install two (2) Engineered Static Poles (9.008) 6. Install two circuits of approximately 15.5 miles of 3-phase 2-768.2 ACSS/TW/HS "Maumee" conductor. 7. Install approximately 15.5 miles of (2) DNO-11410 fiber optic wire. 8. This estimate includes ten (12) splice points.
Terrain description	The project is in the southwest region of Virginia, specifically Mecklenburg. The eastern end is mostly suburban, but as it moves west the more rural. There are numerous stream and wetlands crossing as well as minor arterial roads. There are elevation changes along the route with the highest being approximately 400 feet and the lowest being approximately 264 feet.
Right-of-way width by segment	This project requires the acquisition of new ROW as follows: 1. Additional 100ft width required for 15.5 miles.
Electrical transmission infrastructure crossings	To be determined in detailed design.
Civil infrastructure/major waterway facility crossing plan	Refer to section A.5 of 993203 Real Estate and Permitting Summary.
Environmental impacts	Refer to section A.4 of 993203 Real Estate and Permitting Summary.
Tower characteristics	FACILITIES TO BE INSTALLED 1. Install twenty-three (23) 230kV DC Engineered Monopole DDE Structures. (12.614) 2. Install ninety (90) 230kV DC Engineered Monopole Suspension Structures with arms. (12.610) 3. Install two (2) 230kV DC Engineered H-Frame Structures. (12.221) 4. Install four (4) 230kV DC Engineered Backbone Structures (12.901) 5. Install two (2) Engineered Static Poles (9.008) 6. Install two circuits of approximately 15.5 miles of 3-phase 2-768.2 ACSS/TW/HS "Maumee" conductor. 7. Install approximately 15.5 miles of (2) DNO-11410 fiber optic wire. 8. This estimate includes ten (12) splice points.
Construction responsibility	Dominion
Benefits/Comments	For this proposal, Dominion seeks to be the designated entity to construct, own, operate, maintain and finance the Project.
Supporting Documents	
Land acquisition plan by segment	993258 Real Estate and Permitting summary.pdf
Proposed route	o2399_99-3258.pdf

Reliability Analysis Update

Sami Abdulsalam, Director
PJM Transmission Planning

Transmission Expansion Advisory Committee
December 3, 2024

Outline
2024 RTEP Window 1 Update

- Window Timeline and Status
- Needs Summary, Proposals and Evaluation Criteria
- Recommended Solutions – Summary and Rationale
  - 15 Year Analysis
- 2024 RTEP W1 - Second Read (Local projects/clusters)
- 2024 RTEP W1 – First Read (Local projects/clusters)
- 2024 RTEP W1 – First Read(Regional cluster)
- 2024 RTEP W1 – First Read Short Circuit Evaluation
- Next Steps

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2024W1 – Regional Cluster
Preferred Solution: 2024-W1-24

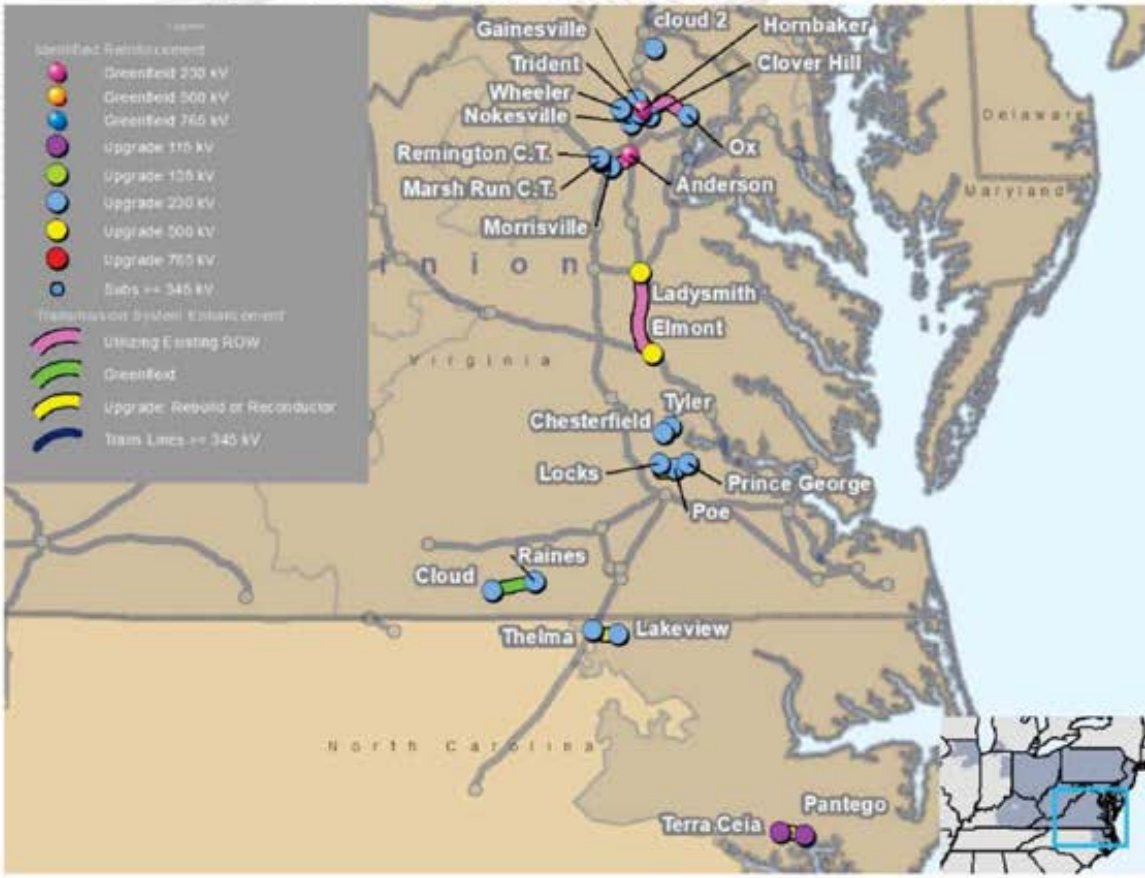
Proposed Solution: 2024-W1-24 **Revised**

- Build a new 230kV Line from Elmont – Ladysmith on the existing 5-2 structures between the two stations
  - Terminal equipment upgrades at Elmont & Ladysmith
- Build a new 230kV Line from Cloverhill – Ox
  - Terminal equipment upgrades at Ox and Cloverhill
- Build a new 230kV Line from Raines – Cloud
  - Terminal equipment upgrades at Cloud and Raines
- Reconductor and convert 115kV Line #121 to 230kV between Poe – Prince George
  - Terminal equipment upgrades at Poe & Prince George
- Build a new 230kV Line #9491 from Morrisville – Anderson using existing tower structures supporting 500kV Line #545 Bristers – Morrisville
  - Terminal equipment upgrades at Morrisville and Anderson Branch

Estimated Cost: $672.43 M

Required IS Date: 6/1/2029
Projected IS Date: 6/1/2029

Continued on next slide...



2024W1 – Regional Cluster
Preferred Solution: 2024-W1-24

Existing Facility Rating:

#	Branch	SN/SE/WN/WE (MVA)
1	230kV Line #280 Marsh Run – Remington 230kV Line #299 Marsh Run - Remington CT	1202/1202/1332/1332 608/608/769/769
2	230kV Line #2161 Gainesville – Wheeler	808/808/895/895
3	230kV Line #213 Thelma – Lakeview 230kV Line #225 Thelma – Lakeview	470/470/596/596 470/470/550/555
4	230kV Line #2003 Chesterfield – Tyler 230kV Line #2003 Tyler – Locks – Poe	1047/1047/1160/1160 470/470/596/596
5	230kV Line #2002 Carson – Poe	722/722/914/914
6	230kV Line from Nokesville – Hornbaker	NA
7	230kV Line from Elmont – Ladysmith	NA
8	230kV Line from Cloverhill – Ox	NA
19	230kV Line from Raines – Cloud	NA
10	115kV Line #121 to 230kV between Poe – Prince George	262/262/290/290
11	230kV Line #9491 from Morrisville – Anderson	NA

Preliminary Facility Rating:

#	Branch	SN/SE/WN/WE (MVA)
1	230kV Line #280 and #299 Marsh Run - Remington CT	1573/1573/1648/1648
2	230kV Line #2161 Gainesville – Wheeler	1573/1573/1648/1648
3	230kV Line #213 and #225 from Thelma – Lakeview	1573/1573/1648/1648
4	230kV Line #2003 Chesterfield – Tyler – Locks – Poe	1573/1573/1648/1648
5	230kV Line #2002 Carson – Poe	1573/1573/1648/1648
6	230kV Line from Nokesville – Hornbaker	1573/1573/1648/1648
7	230kV Line from Elmont – Ladysmith	1573/1573/1648/1648
8	230kV Line from Cloverhill – Ox	1573/1573/1648/1648
9	230kV Line from Raines – Cloud	1573/1573/1648/1648
10	115kV Line #121 to 230kV between Poe – Prince George	1573/1573/1648/1648
11	230kV Line #9491 from Morrisville – Anderson	1573/1573/1648/1648

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Contact

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Reliability Analysis Update

Member Hotline

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(866) 400-8980

custsvc@pjm.com

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Reliability Analysis Update

Sami Abdulsalam, Director
PJM Transmission Planning

Transmission Expansion Advisory Committee
January 6, 2025

Resources Available to PJM Stakeholders

(Transmission Planning)

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Reference Resources

- PJM Learning Center – Overviews on PJM's priorities and responsibilities, including Planning responsibilities

- Process to build a new facility – Overview of the steps and parties involved in the process to build a new facility from the need to completion.

- PJM Manual 14B – Details on how PJM conducts analysis (web or pdf)

- PJM Manual 14F – Overview of the competitive process (web or pdf)

Reference Resources

- Generation interconnection queue – List of all projects for proposed generation. PJM does not solicit these requests, but PJM will ensure each project can operate reliably.
  - Serial process – Historic view of all projects submitted prior to 2022
  - Cluster process – Progress of all projects processed with the reformed interconnection process

- PJM Manual 14H – Overview of the generation interconnection process (web or pdf)

Reference Resources

- General PJM training – A variety of training resources on various aspects of PJM, including overviews such as PJM Introduction and PJM 101: The Basics.

- 2022 RTEP Window 3 FAQ – A lot of great background that applies to the current body of work.

- PJM's Client Management team – Single point of contact for any questions about PJM.
  - Phone: (610) 666-8980 or (866) 400-8980
  - E-mail: custsvc@pjm.com

2024 RTEP Window 1 Updates

Outline
2024 RTEP Window 1 Update

- Window Timeline and Status
- Needs Summary, Proposals and Evaluation Criteria
- Recommended Solutions – Summary and Rationale
  - 15 Year Analysis
  - Total cost summary
- Required In Service Date Adjustments
- 2024 RTEP W1 – 2nd Read (Local projects/Clusters)
- 2024 RTEP W1 – 2nd Read(Regional Cluster)
- 2024 RTEP W1 – 2nd Read (Short Circuit Evaluation)
- 2024 RTEP W1 – Regional Cluster Shortlist Cost Review

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2024W1 – Regional Cluster Recommended Solution: 2024-W1-24

Upgrade Id	Description	Cost Estimate ($M)
b4000.300	Rebuild approximately 1.71 miles of 230kV line 299 from the Marsh Run substation to the Remington CT substation. New conductor has a summer rating of 1573 MVA.	$5.35
b4000.301	Reconductor approximately 1.24 miles of 230kV line 280 from Remington - the Marsh Run CT substation to the Remington substation. New conductor has a summer rating of 1573 MVA.	$3.88
b4000.302	Uprate line #299 terminal equipment, line leads, and bus at Marsh Run substation to be rated to 4000A.	$2.53
b4000.303	Uprate line #299 terminal equipment, line leads, and bus at Remington CT substation to be rated to 4000A.	$2.44
b4000.304	Partial reconductor/partial wreck & rebuild of 230kV Line #2161 Gainesville – Wheeler. New conductor has a summer rating of 1573 MVA. (Wheeler - Linton Tap segment)	$17.72
b4000.305	Partial reconductor/partial wreck & rebuild of 230kV Line #2161 Gainesville – Wheeler. New conductor has a summer rating of 1573 MVA. (Linton Tap - Atlantic segment)	$3.49
b4000.306	Partial reconductor/partial wreck & rebuild of 230kV Line #2161 Gainesville – Wheeler. New conductor has a summer rating of 1573 MVA. (Atlantic - Trident segment)	$1.72
b4000.307	Partial reconductor/partial wreck & rebuild of 230kV Line #2161 Gainesville – Wheeler. New conductor has a summer rating of 1573 MVA. (Trident - Gainesville segment)	$6.16
b4000.308	Upgrade all line #2161 terminal equipment at Gainesville to 4000A. A CCVT will also be replaced due to aging.	$1.78
b4000.309	Upgrade all line #2161 terminal equipment Wheeler substation to 4000A.	$2.25
b4000.310	Revise relay settings at Trident substation.	$0.03
b4000.311	Rebuild 230kV Line #213 and #225 from Thelma – Lakeview. New conductor has a summer rating of 1573 MVA.	$44.69
b4000.312	At Thelma subsation, upgrade line lead, wave traps (213WT & 225WT), circuit breaker leads to 4000A. CB switches 22535, 23235, 23238 and 21335 will also be upgrade to 4000A DEB switches. CCVTs 213P1, 213P2 and 213P3 will be replaced due to aging.	$2.30
b4000.313	At Lakeview substation, upgrade wave traps 213WT and 225WT, line leads, and circuit breaker leads to 4000A. Upgrade CB switches 22565 and 22564 to 4000A double-end break switches. Replace CCVTs 225P1, 225P2, and 225P3 due to aging.	$1.72
b4000.314	Reconductor 230kV Line #2003 Chesterfield – Tyler segment. New conductor has a summer rating of 1573 MVA.	$3.16
b4000.315	Reconductor 230kV Line #2003 Tyler – Poe segment. New conductor has a summer rating of 1573 MVA.	$20.61
b4000.316	At Poe substation, uprate all Line #2003 terminal equipment, line leads, and bus to be rated to 4000A.	$1.79
b4000.317	At Tyler substation, upgrade the necessary line terminal equipment to maintain 4000A at Tyler substation.	$0.54
b4000.318	Revise relay settings at Chesterfield substation.	$0.02
b4000.319	Reconductor 230kV Line #2002 Carson – Poe. New conductor has a summer rating of 1573 MVA.	$30.29
b4000.320	At Carson substation, upgrade all line #2002 terminal equipment at Carson to 4000A. CCVTs will also be replaced due to aging.	$0.89
b4000.321	At Poe substation, upgrade all line #2002 terminal equipment at Carson to 4000A. CCVTs will also be replaced due to aging.	$0.81
b4000.322	Build a new 230kV Line from Nokesville – Hornbaker using the vacant arms of the double circuit monopole structures installed as part of previous project 993027. New conductor has a summer rating of 1573 MVA.	$15.28
b4000.323	Upgrade terminal equipment at Nokesville substation. The project adds one more line to Nokesville, including the installation of one 230kV breaker and two 230kV switches.	$1.43
b4000.324	Upgrade terminal equipment at Hornbaker substation. This project provides for installing a new 230kV 4000A rated line terminal at Hornbaker to accommodate the new line to Nokesville.	$1.43
b4000.325	Build a new 26.38mi 230kV Line from Elmont – Ladysmith on the existing S-2 structures between the two stations. New conductor has a summer rating of 1573 MVA.	$26.09
b4000.326	At Elmont substation, install/upgrade associated equipment to accommodate a 4000A line rating for the new 230kV line between Elmont - Ladysmith.	$2.19
b4000.327	Upgrade/install equipment at Ladysmith substation to 4000A. Expansion will be required to accommodate a total of three (3) new 230kV strings of breaker and a half scheme.	$8.72
b4000.328	Construct a new 24.5-mile 230 kV line 2XXX from Cloverhill substation to Ox substation.	$287.54
b4000.329	At Ox substation, install the necessary associated equipment to accomdate the new line between Cloverhill - Ox. This project also includes expanding the substation with associated security level 1 fencing and super post structure needed.	$6.37
b4000.330	At Cloverhill substation, install the necessary associated equipment to accomdate the new line between Cloverhill - Ox. This project also includes demolishing and reconstructing the existing bus system and roadway.	$2.27
b4000.331	Construct a new 230kV single circuit line from Raines substation to Cloud substation to solve electrical violations cause by the significant load growth in South Hill, Virginia. The scope also includes an idle 230kV circuit being installed between these stations.	$77.50
b4000.332	At Cloud substation, upgrade substation terminal equipment to 4000A.	$1.43
b4000.333	At Raines substation, upgrade substation terminal equipment to 4000A.	$1.32
b4000.334	Reconductor 115kV line #121 from Poe - Prince George. Specifically, line #121 will be reconductored and converted to 230kV from Poe substation to Prince George substation.	$14.62
b4000.335	At Poe substation, install a new 230kV six breaker ultimate ring bus which will fit the station to current 230kV standards. The substation scope includes the installation of 230kV breaker and half GIS bus. Work at Poe substation is associated with line #121 reconductor.	$38.28
b4000.336	Build a new 230-115kV Prince George substation along the existing 115 or 230kV corridor. The substation scope includes the installation of 230kV breakers & 1-115kV breaker along with its associated terminal equipment initially but will have provision for making it a 6-breaker ring (both 230 & 115kV) in future. The existing 230-115kV transformer at Prince George will be relocated to serve this new substation.	$26.62
b4000.337	Extend a new 230 kV line approximately 7.85 miles between the existing Morrisville and Anderson Branch substations. The existing tower structures currently supporting the Bristers to Morrisville 500 kV Line #545 will be used to support this new line as shared tower structures.	$5.26
b4000.338	At Morrisville substation, install/upgrade substation terminal equipment to 4000A.	$0.95
b4000.339	At Anderson Branch substation, install/upgrade substation terminal equipment to 4000A.	$0.95

Continued on next slide…

2024W1 – Regional Cluster
Recommended Solution: 2024-W1-24

Existing Facility Rating:

#	Branch	SN/SE/WN/WE (MVA)
1	230kV Line #280 Marsh Run – Remington 230kV Line #299 Marsh Run - Remington CT	1202/1202/1332/1332 608/608/769/769
2	230kV Line #2161 Gainesville – Wheeler	808/808/895/895
3	230kV Line #213 Thelma – Lakeview 230kV Line #225 Thelma – Lakeview	470/470/596/596 470/470/550/555
4	230kV Line #2003 Chesterfield – Tyler 230kV Line #2003 Tyler – Locks – Poe	1047/1047/1160/1160 470/470/596/596
5	230kV Line #2002 Carson – Poe	722/722/914/914
6	230kV Line from Nokesville – Hornbaker	NA
7	230kV Line from Elmont – Ladysmith	NA
8	230kV Line from Cloverhill – Ox	NA
19	230kV Line from Raines – Cloud	NA
10	115kV Line #121 to 230kV between Poe – Prince George	262/262/290/290
11	230kV Line #9491 from Morrisville – Anderson	NA

Preliminary Facility Rating:

#	Branch	SN/SE/WN/WE (MVA)
1	230kV Line #280 and #299 Marsh Run - Remington CT	1573/1573/1648/1648
2	230kV Line #2161 Gainesville – Wheeler	1573/1573/1648/1648
3	230kV Line #213 and #225 from Thelma – Lakeview	1573/1573/1648/1648
4	230kV Line #2003 Chesterfield – Tyler – Locks – Poe	1573/1573/1648/1648
5	230kV Line #2002 Carson – Poe	1573/1573/1648/1648
6	230kV Line from Nokesville – Hornbaker	1573/1573/1648/1648
7	230kV Line from Elmont – Ladysmith	1573/1573/1648/1648
8	230kV Line from Cloverhill – Ox	1573/1573/1648/1648
9	230kV Line from Raines – Cloud	1573/1573/1648/1648
10	115kV Line #121 to 230kV between Poe – Prince George	1573/1573/1648/1648
11	230kV Line #9491 from Morrisville – Anderson	1573/1573/1648/1648

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Reliability Analysis Update

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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. 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 Section I.A.

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 proposed Nebula Switching Station will serve the Boydton Load Area described in Section I.C and generally depicted in Attachment I.A.1. The Project also could be used to support future load 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 Project's Proposed and Alternative Routes are as follows:

Nebula-Raines Line #2399

Proposed Route (Route 5): 14.4 miles

Alternative Route 1: 15.4 miles

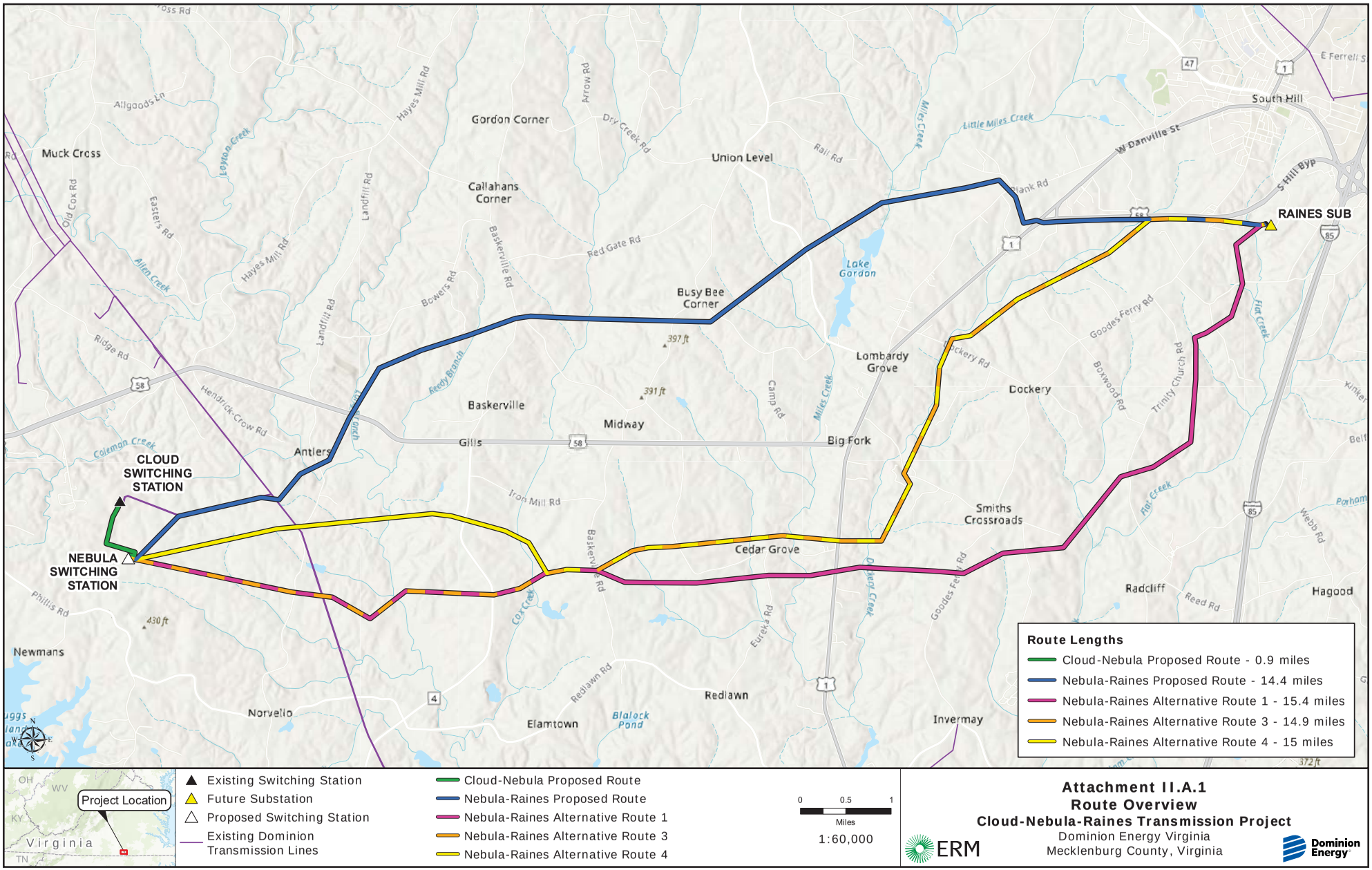
Alternative Route 3: 14.9 miles

Alternative Route 4: 15.0 miles

Cloud-Nebula Line #2402

Proposed Route: 0.9 mile

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



Attachment II.A.1
Route Overview
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy

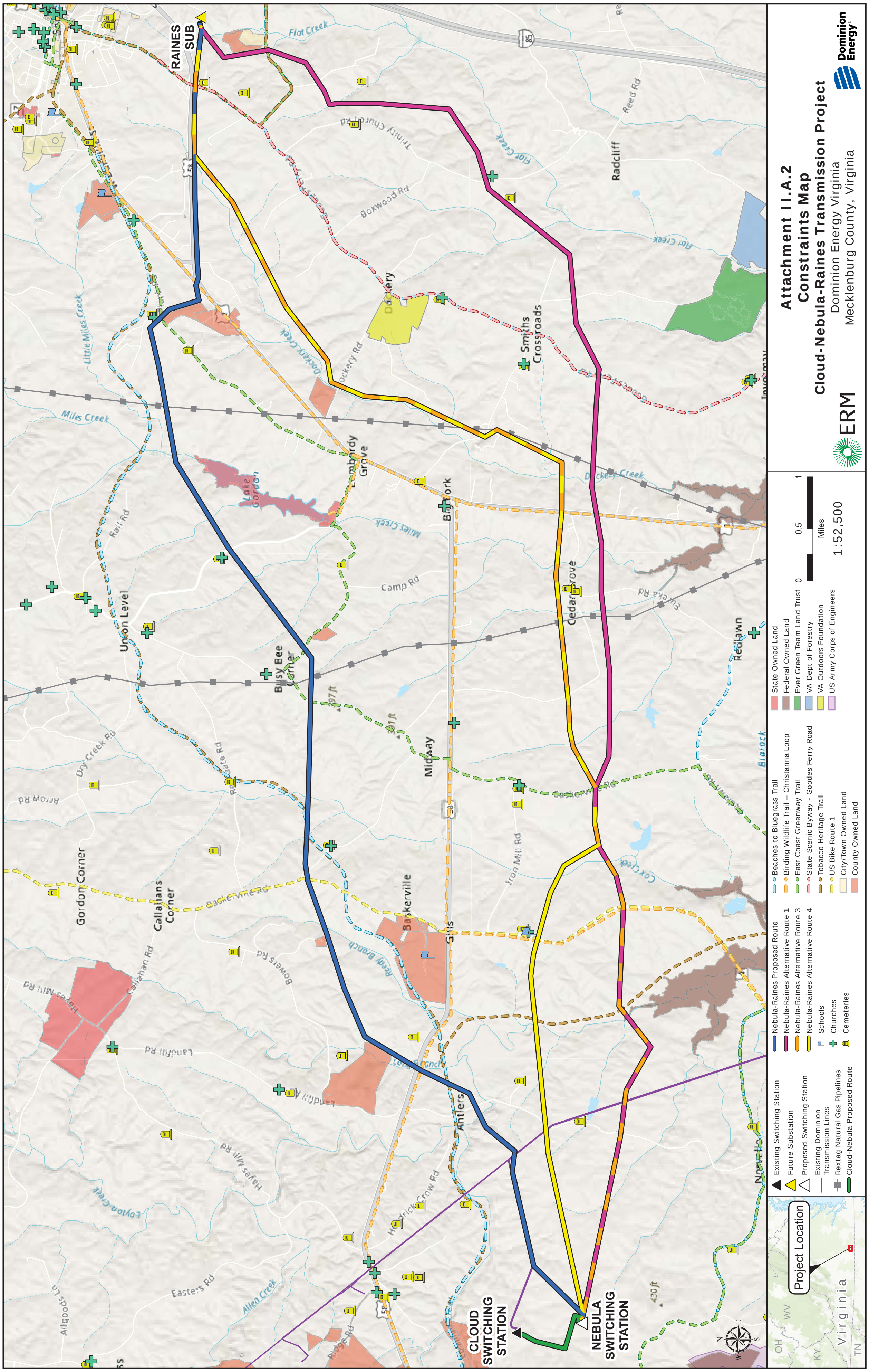
II. DESCRIPTION OF THE PROPOSED PROJECT

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 shapefile available to interested persons upon request to the Company's legal counsel as listed in the Project Application.


Attachment II.A.2
Constraints Map
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia
ERM
Dominion Energy
1:52,500
0
0.5
1
Miles
Project Location
Virginia
Existing Switching Station
Future Substation
Proposed Switching Station
Existing Dominion Transmission Lines
Rextag Natural Gas Pipelines
Cloud-Nebula Proposed Route
Nebula-Raines Proposed Route
Nebula-Raines Alternative Route 1
Nebula-Raines Alternative Route 3
Nebula-Raines Alternative Route 4
Schools
Churches
Cemeteries
Beaches to Bluegrass Trail
Birding Wildlife Trail - Christianna Loop
East Coast Greenway Trail
State Scenic Byway - Goodes Ferry Road
Tobacco Heritage Trail
US Bike Route 1
City/Town Owned Land
County Owned Land
State Owned Land
Federal Owned Land
Ever Green Team Land Trust
VA Dept of Forestry
VA Outdoors Foundation
US Army Corps of Engineers
RAINES SUB
CLOUD SWITCHING STATION
NEBULA SWITCHING STATION
Union Level
Busy Bee Corner
Baskerville
Antlers
Midway
Cedar Grove
Smiths Crossroads
Radcliff
Redlawn
Gordon Corner
Callahans Corner
Lake Gordon
Miles Creek
Flat Creek
Dockery Creek
Allen Creek
Layton Creek
Little Miles Creek

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 for an overview map of the existing transmission line rights-of-way and Attachment II.B.3.iv for the proposed transmission line rights-of-way in the Project area.

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: Nebula-Raines Line #2399

There is no existing Company-owned right-of-way located between the Company's future Raines Substation and the Company's proposed Nebula Station to accommodate Nebula-Raines Line #2399. However, the Nebula-Raines Proposed Route will make use of portions of existing Company-owned right-of-way associated with Cloud-Kerr Dam Line #38 and Boydton Plank Road-Cloud Line #1041.

The existing right-of-way for Lines #1041 and #38 is 220 feet wide. At the west end of the Nebula-Raines Proposed Route, after the route crosses the Company's existing transmission line right-of-way for Kerr Dam-Ridge Road Line #137 and Line #38, the Nebula-Raines Proposed Route parallels the right-of-way for Lines #1041 and #38. In this area, the entire 100-foot-wide right-of-way for the Nebula-Raines Proposed Route would overlap the existing right-of-way for Lines #1041 and #38 for a total of 0.9 mile, thereby requiring no additional new right-of-way along this segment.

Cloud-Nebula Line #2402

There is no existing Company-owned right-of-way located between the Company's existing Cloud Switching Station and the Company's proposed Nebula Station to accommodate the Cloud-Nebula Line #2402.

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

a. ROW width for each cross section drawing;

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

c. Existing utility facilities on the ROW; and

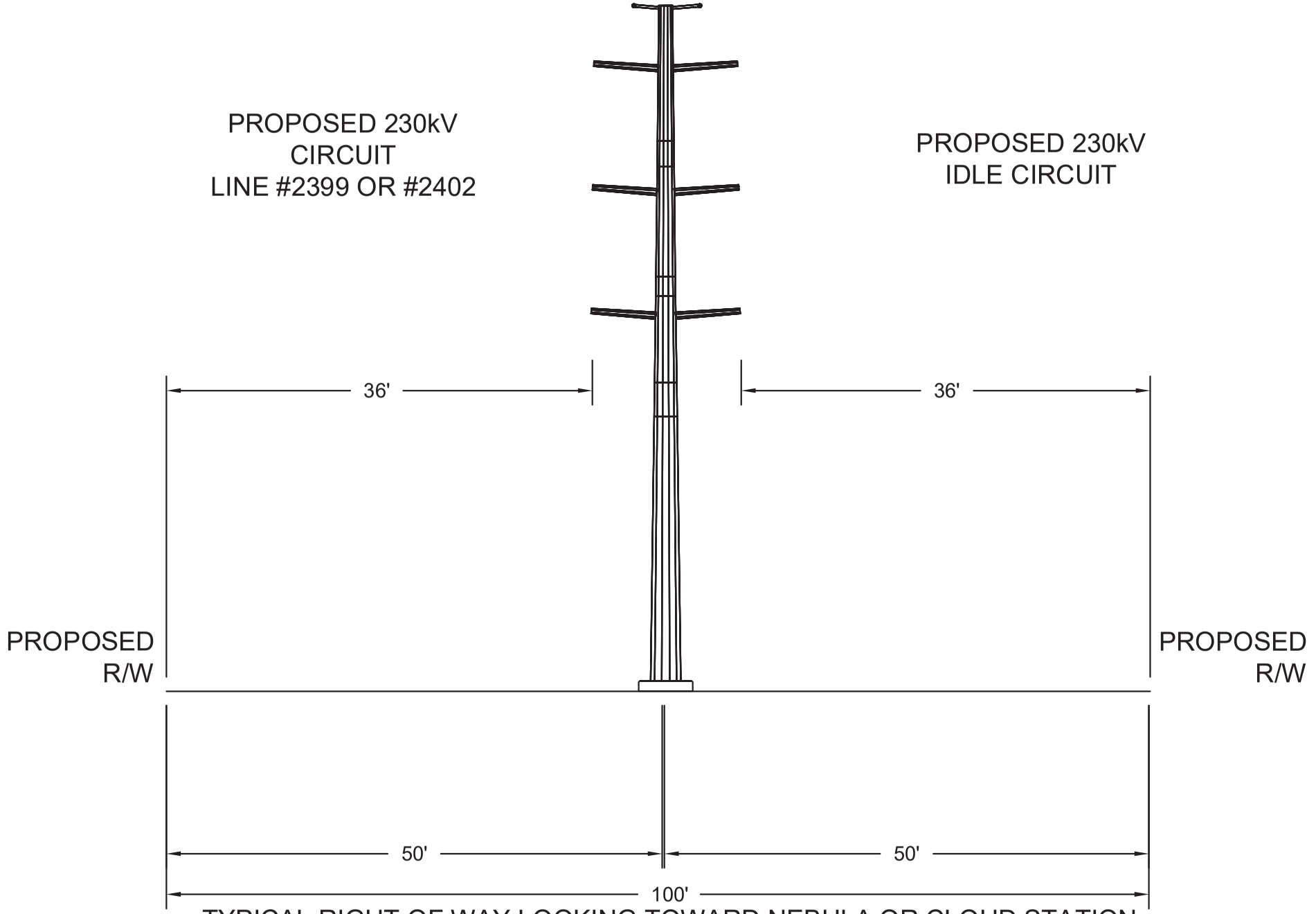
d. For lines being rebuilt in existing ROW, provide all of the above (i) as it currently exists, and (ii) as it will exist at the conclusion of the proposed project.

Response: See Attachment II.A.5.a.[37]

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

[37] Note that the information provided in this cross-section represents the structures along both the Nebula-Raines Proposed Route (looking toward Nebula Switching Station) and the Cloud-Nebula Proposed Route (looking toward Cloud Switching Station).

NEBULA - RAINES, LINE #2399
CLOUD - NEBULA, LINE #2402
PROPOSED CONFIGURATION



TYPICAL RIGHT OF WAY LOOKING TOWARD NEBULA OR CLOUD STATION

NOTE: INFORMATION CONTAINTED ON DRAWING IS CONSIDERED PRELIMINARY IN NATURE AND SUBJECT TO CHANGE BASED ON FINAL DESIGN

Attachment II.A.5.a

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: **Nebula-Raines Line #2399**

As discussed in Section II.A.4, there is no existing Company-owned right-of-way located between the Company's future Raines Substation and the Company's proposed Nebula Station to accommodate the Nebula-Raines Line.

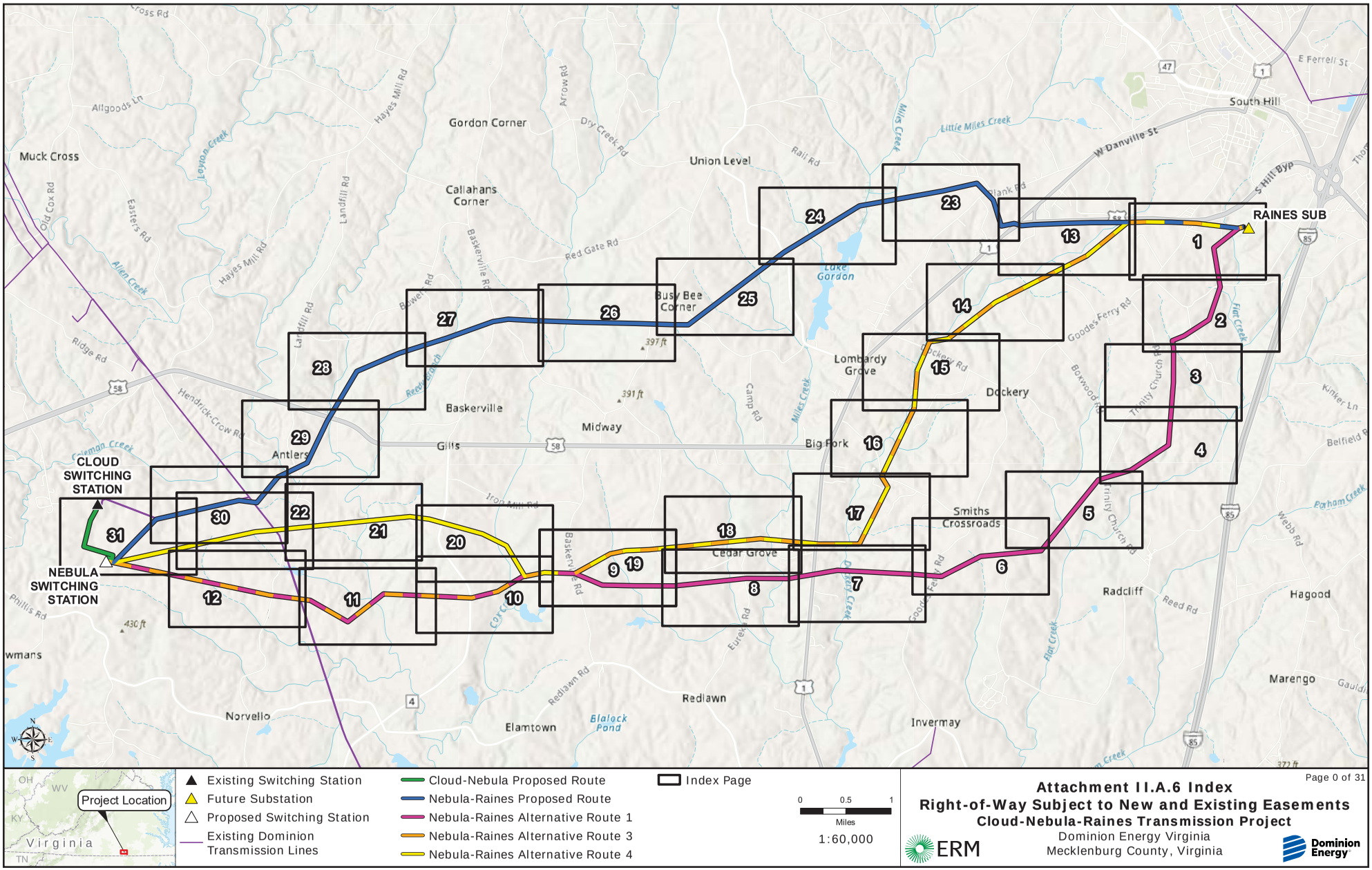
Accordingly, the right-of-way for the Proposed Route will require easements for a new-build transmission line. Portions of the Proposed Route will overlap the existing Dominion Energy Virginia overhead electric transmission line rights-of-way for Lines #1041 and #38. For 0.9 mile, from milepost ("MP") 12.6 to 13.5, the Nebula-Raines Proposed Route will be located entirely within the existing right-of-way for Lines #1041 and #38. The existing right-of way for Lines #1041 and #38 is 220 feet wide and the Nebula-Raines Proposed Route would be located in the southern portion of the right-of-way.

See Attachment II.A.6.

Cloud-Nebula Line #2402

As discussed in Section II.A.4, there is no existing Company-owned right-of-way located between the Company's existing Cloud Switching Station and the Company's proposed Nebula Station to accommodate the Cloud-Nebula Line. Accordingly, the right-of-way for the Proposed Route will require easements for a new-build transmission line.

See Attachment II.A.6.



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Attachment II.A.6 Index

Right-of-Way Subject to New and Existing Easements

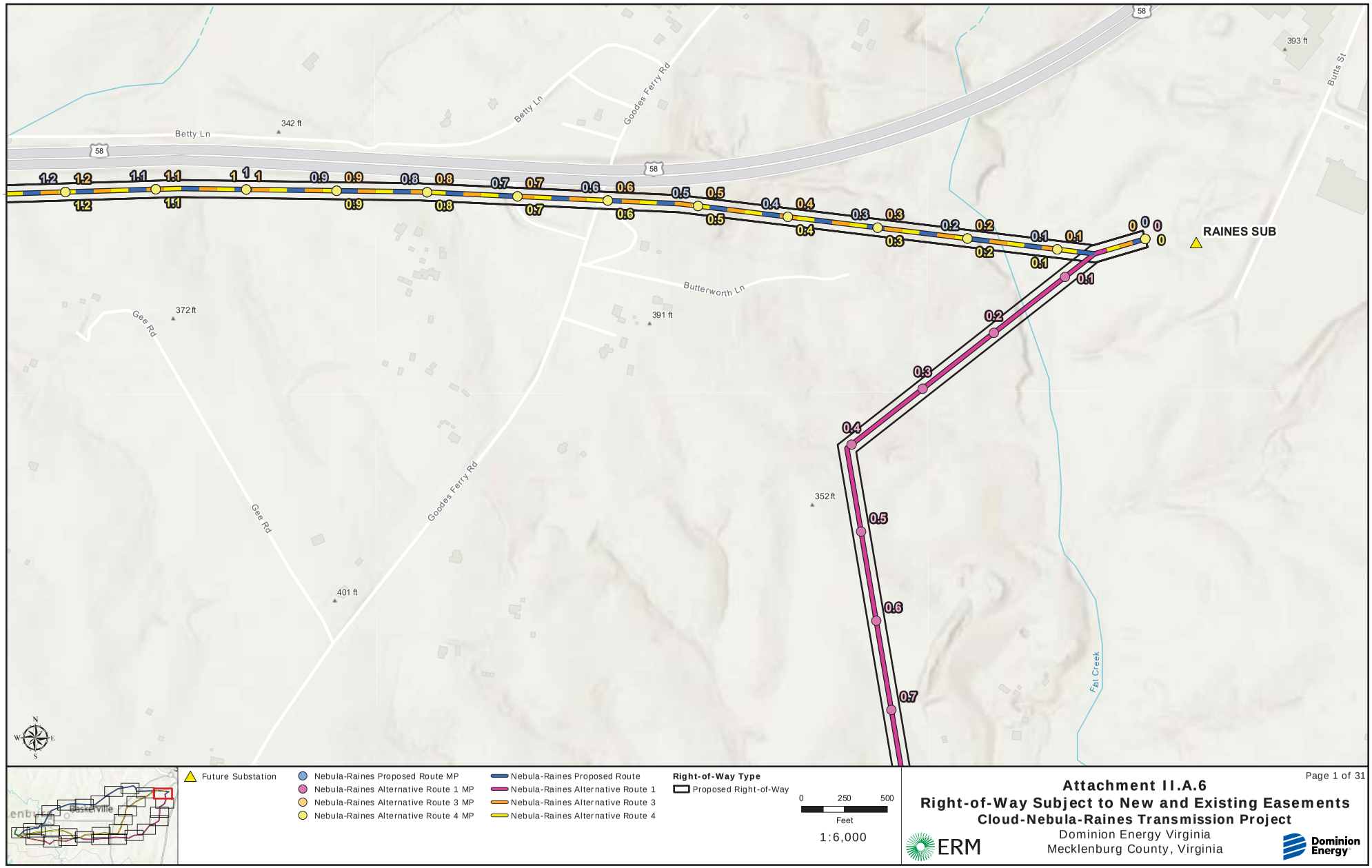
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

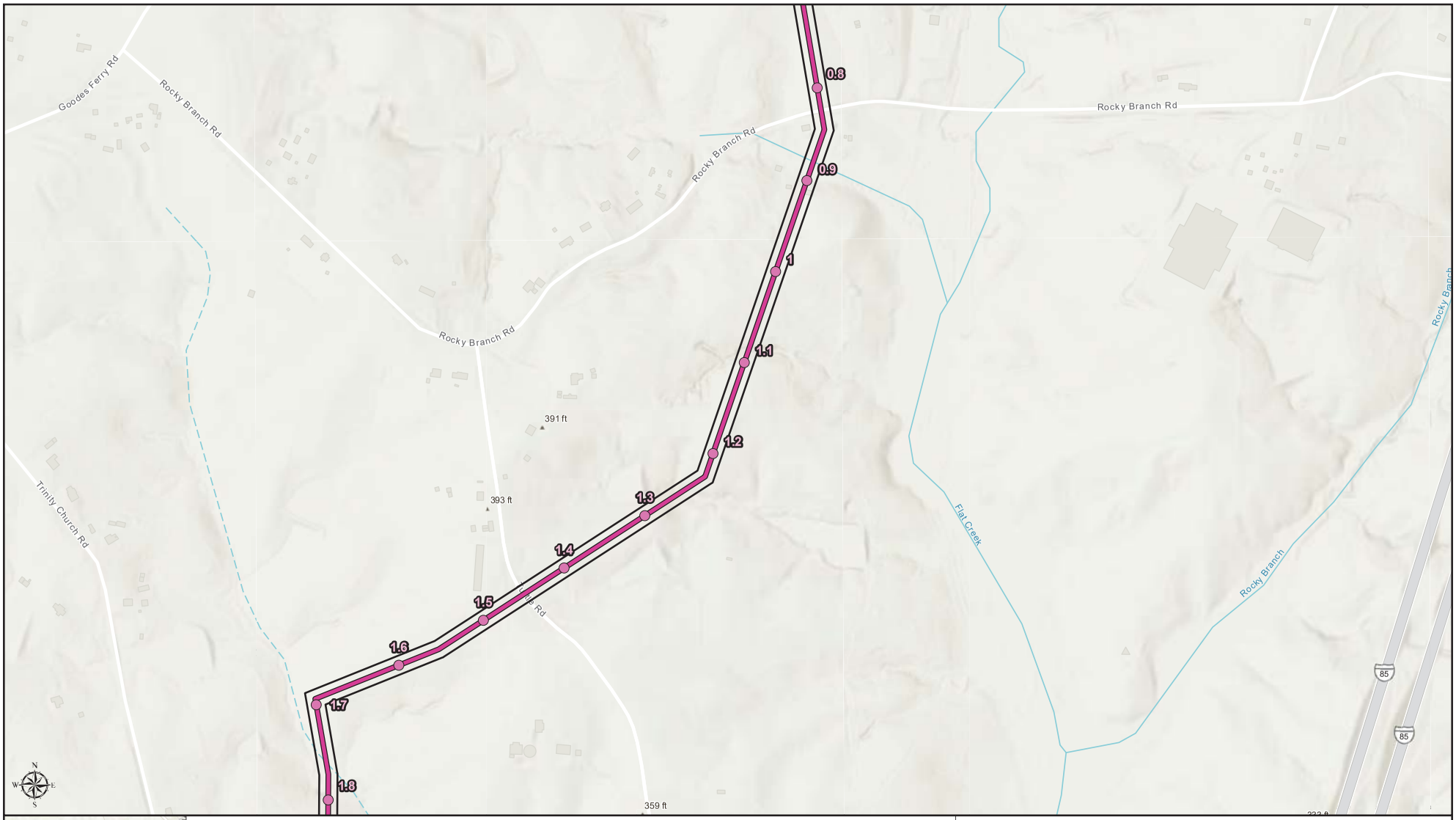
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

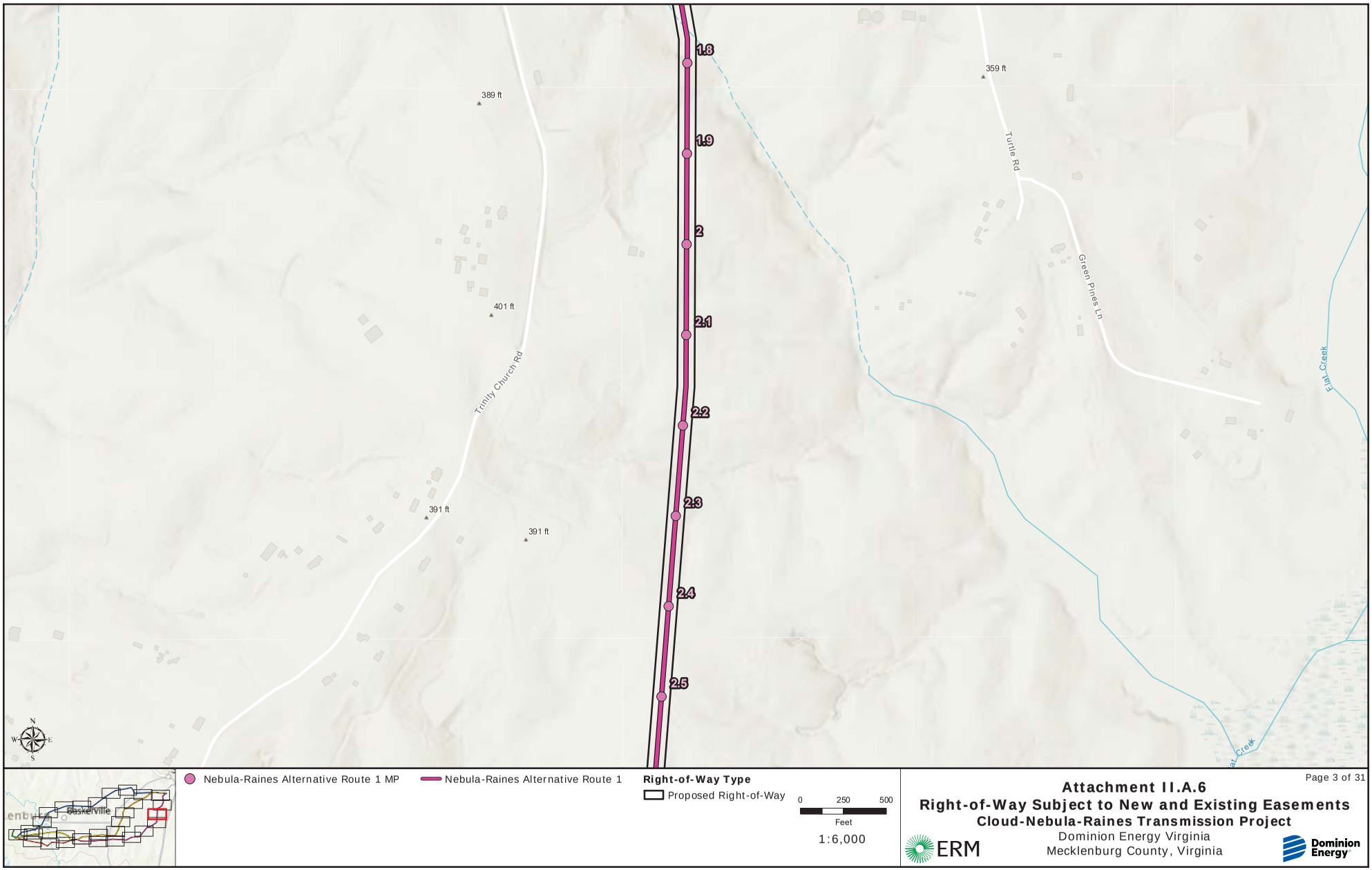
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



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Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

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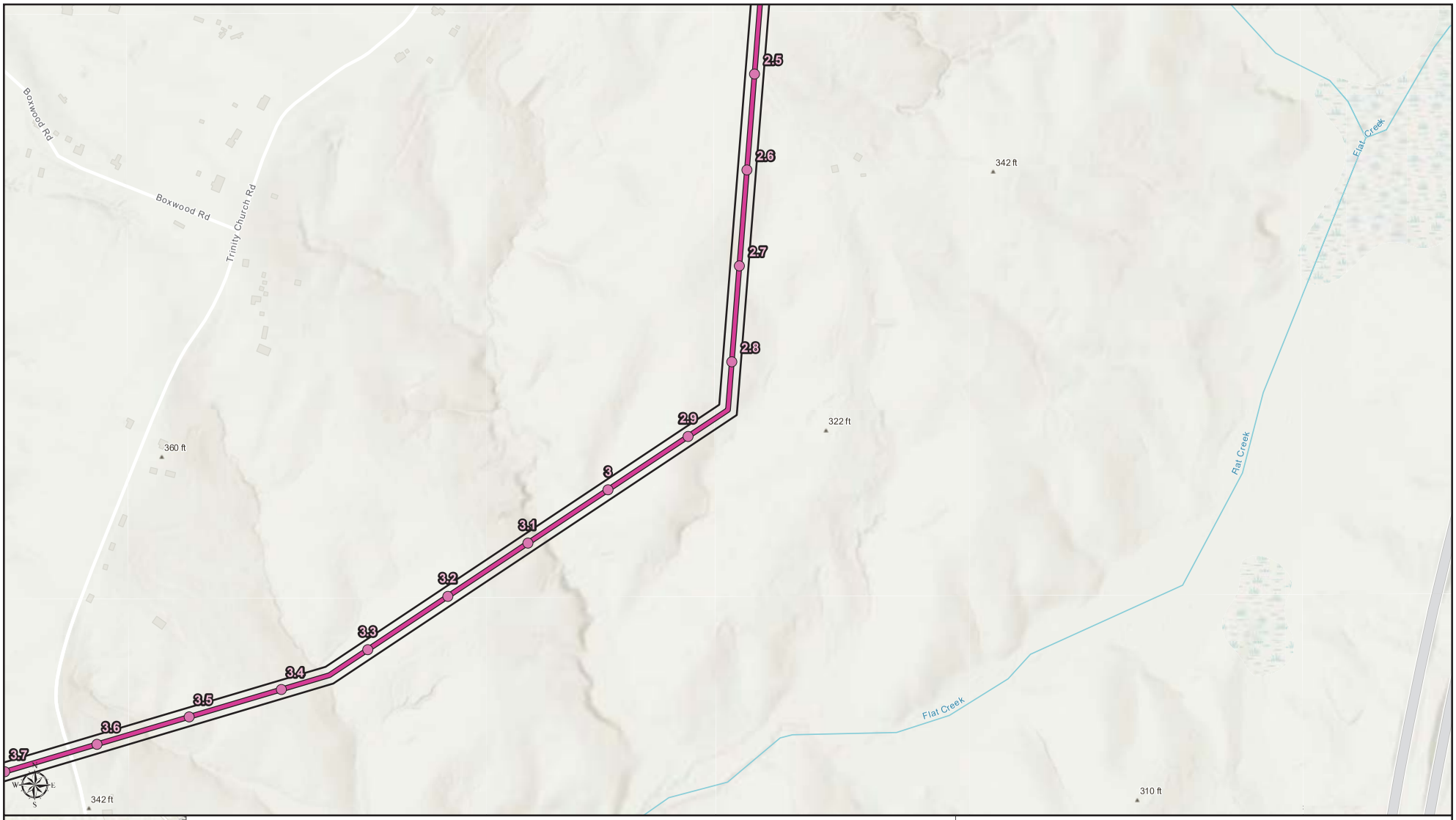


Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

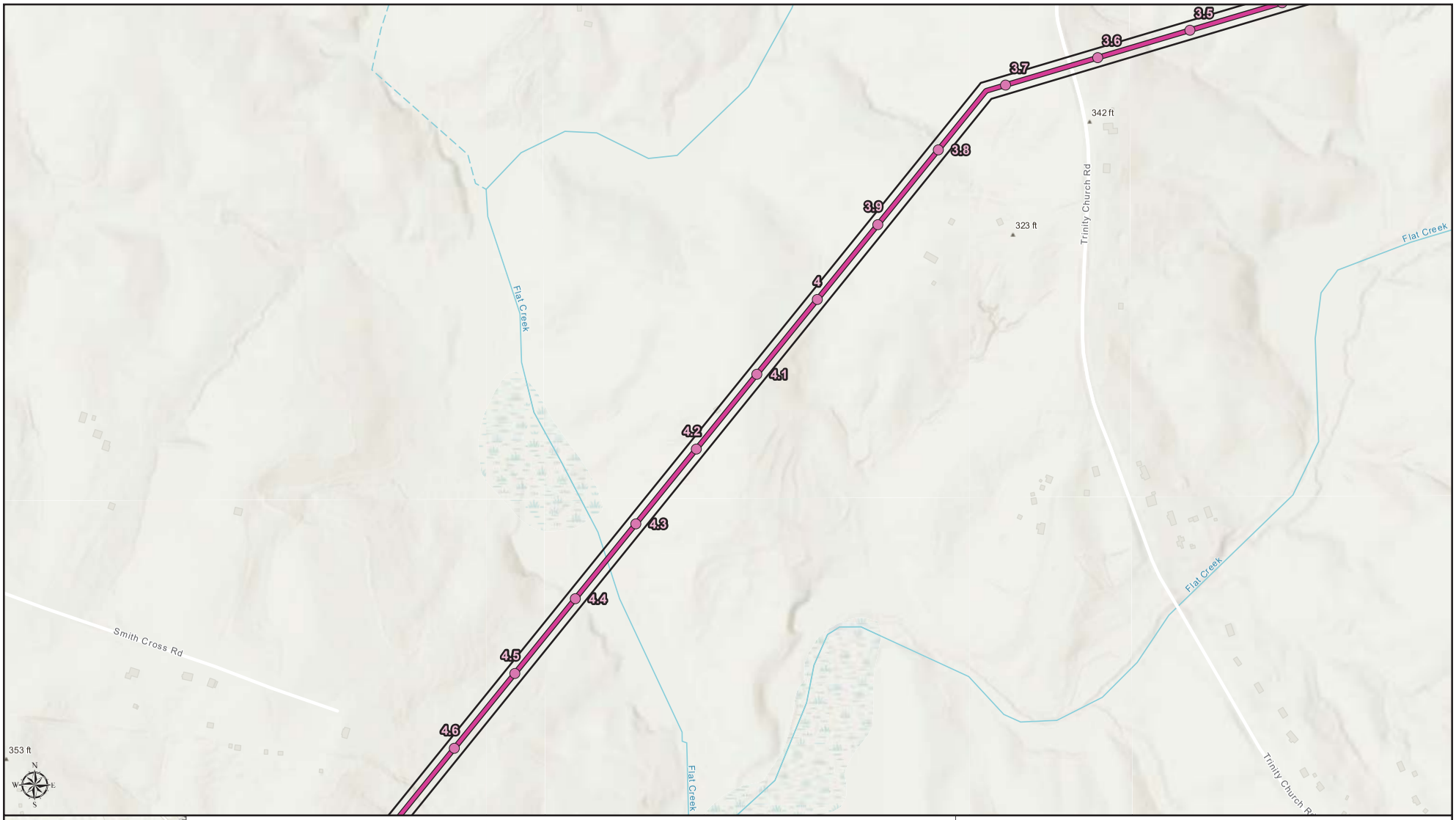
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

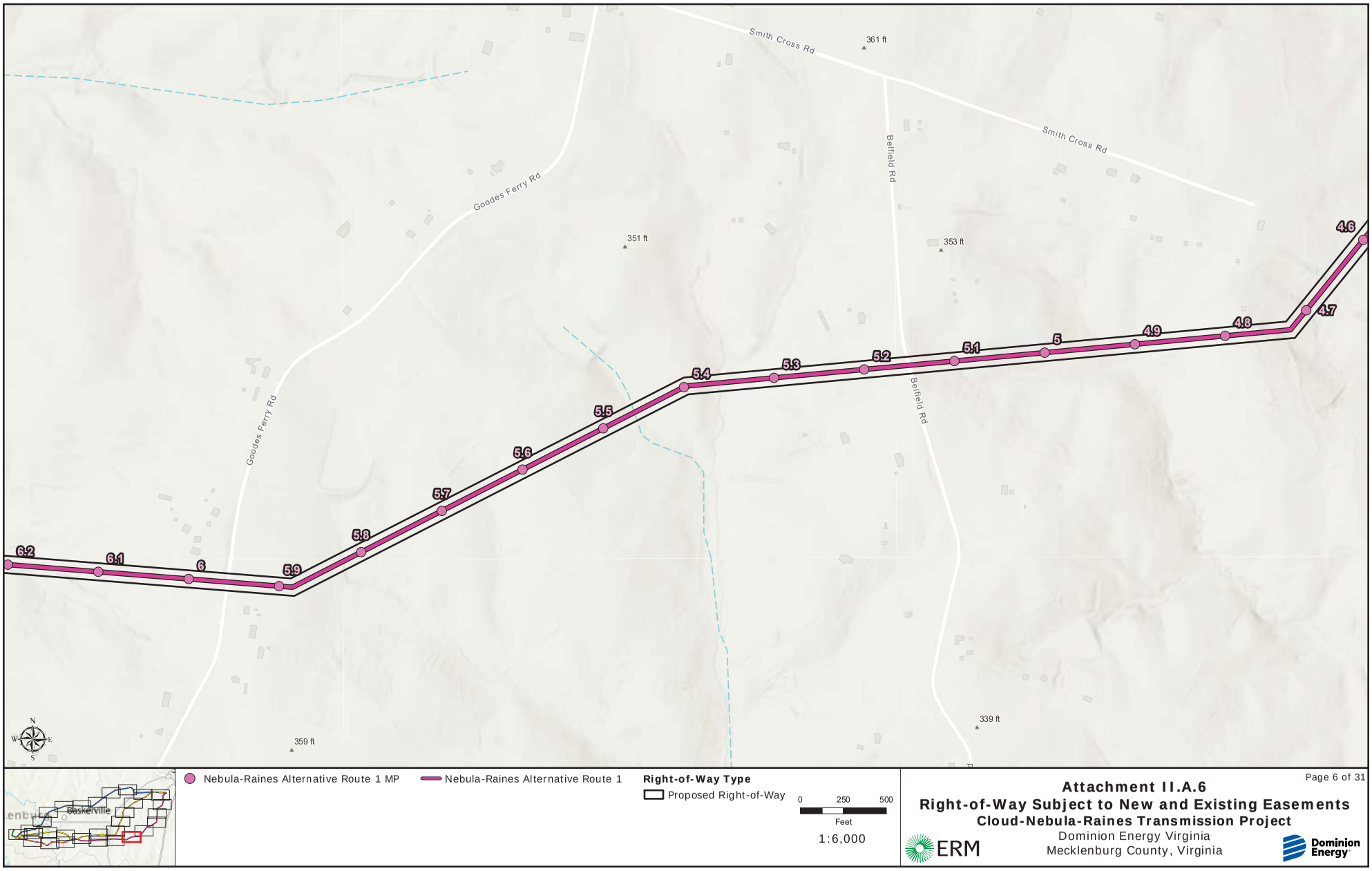
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

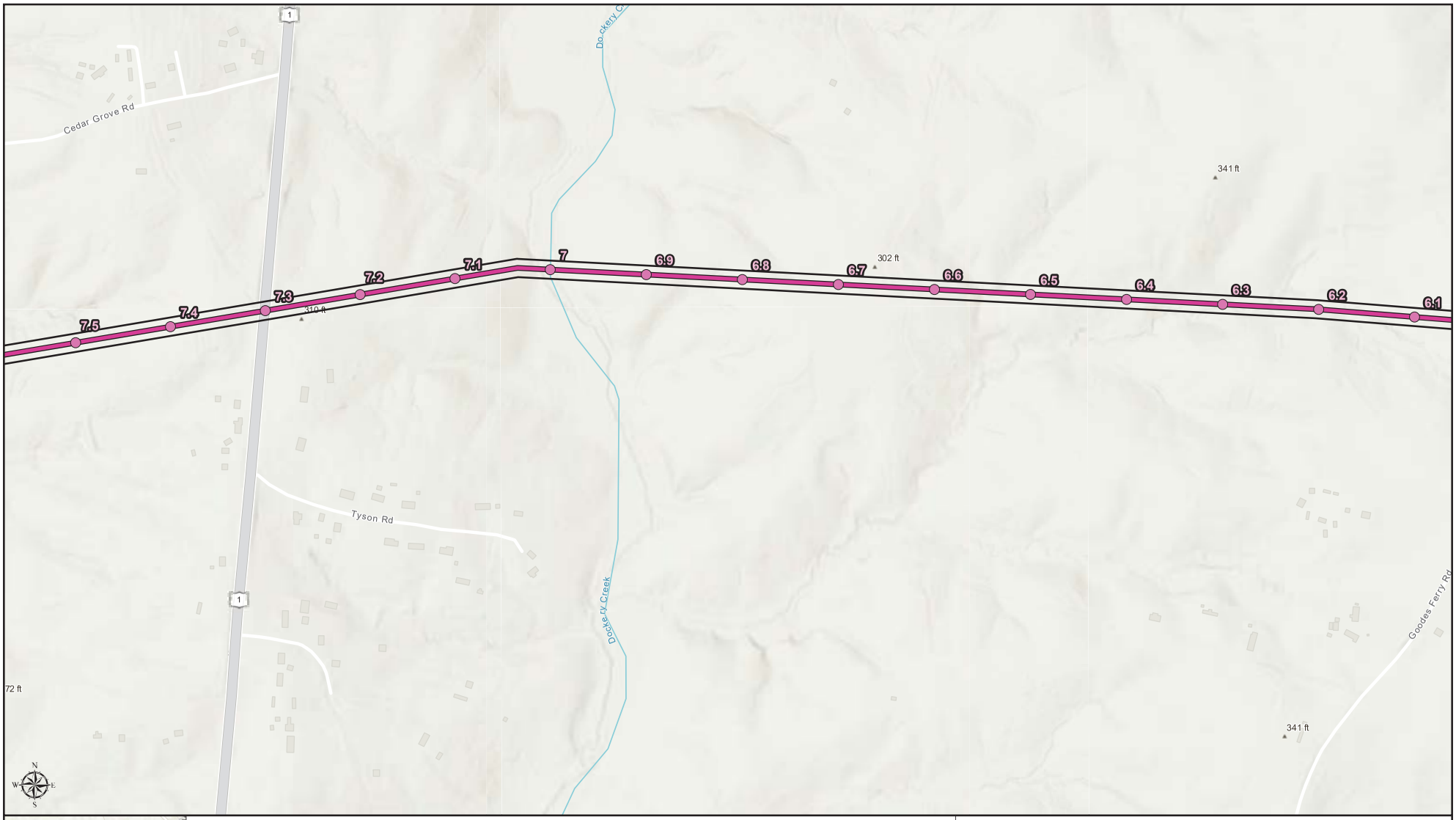
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

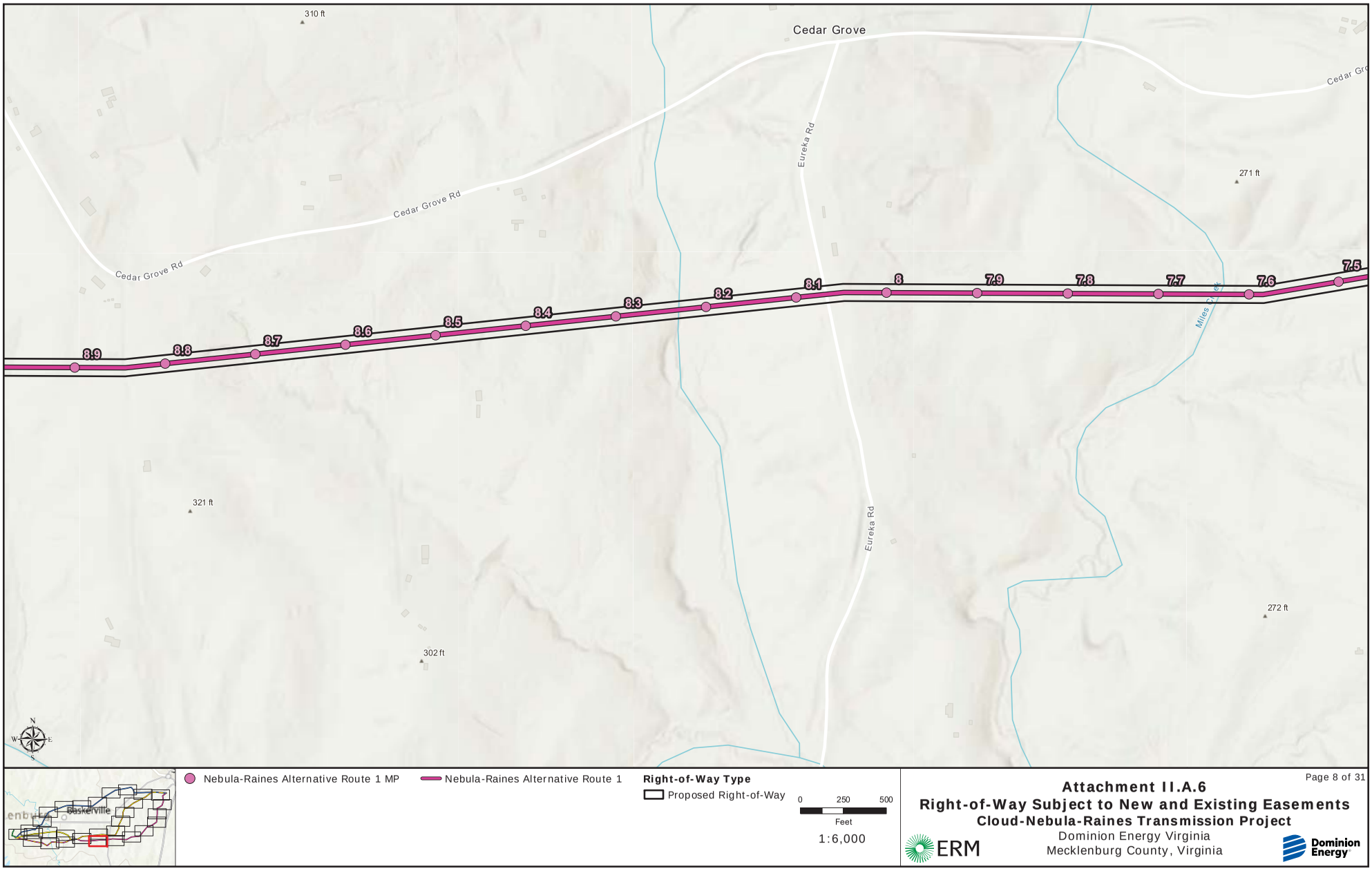
Dominion Energy



Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

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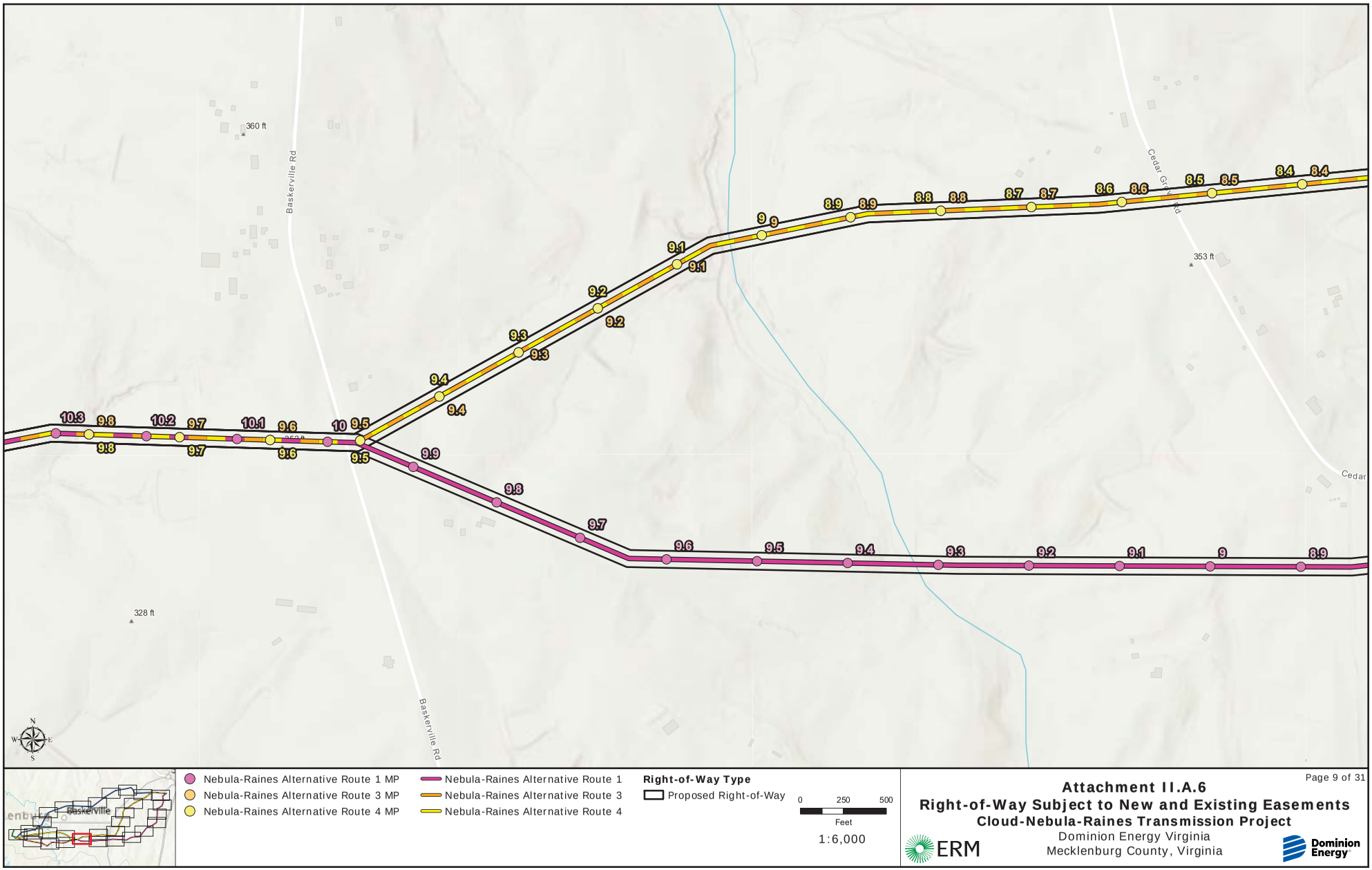
Dominion Energy



Nebula-Raines Alternative Route 1 MP
Nebula-Raines Alternative Route 3 MP
Nebula-Raines Alternative Route 4 MP
Nebula-Raines Alternative Route 1
Nebula-Raines Alternative Route 3
Nebula-Raines Alternative Route 4

Right-of-Way Type
Proposed Right-of-Way

0 250 500
Feet
1:6,000

Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

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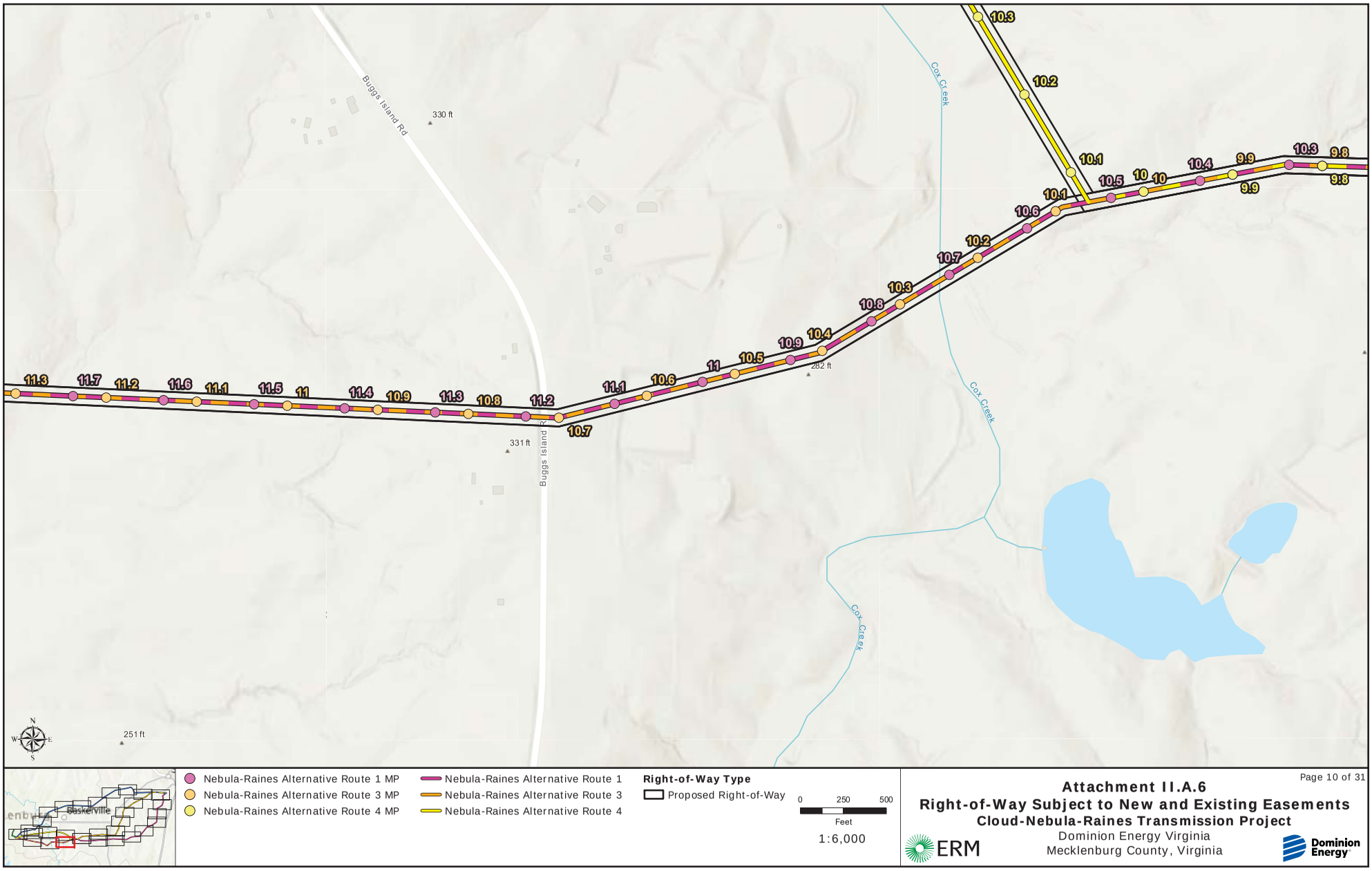

Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

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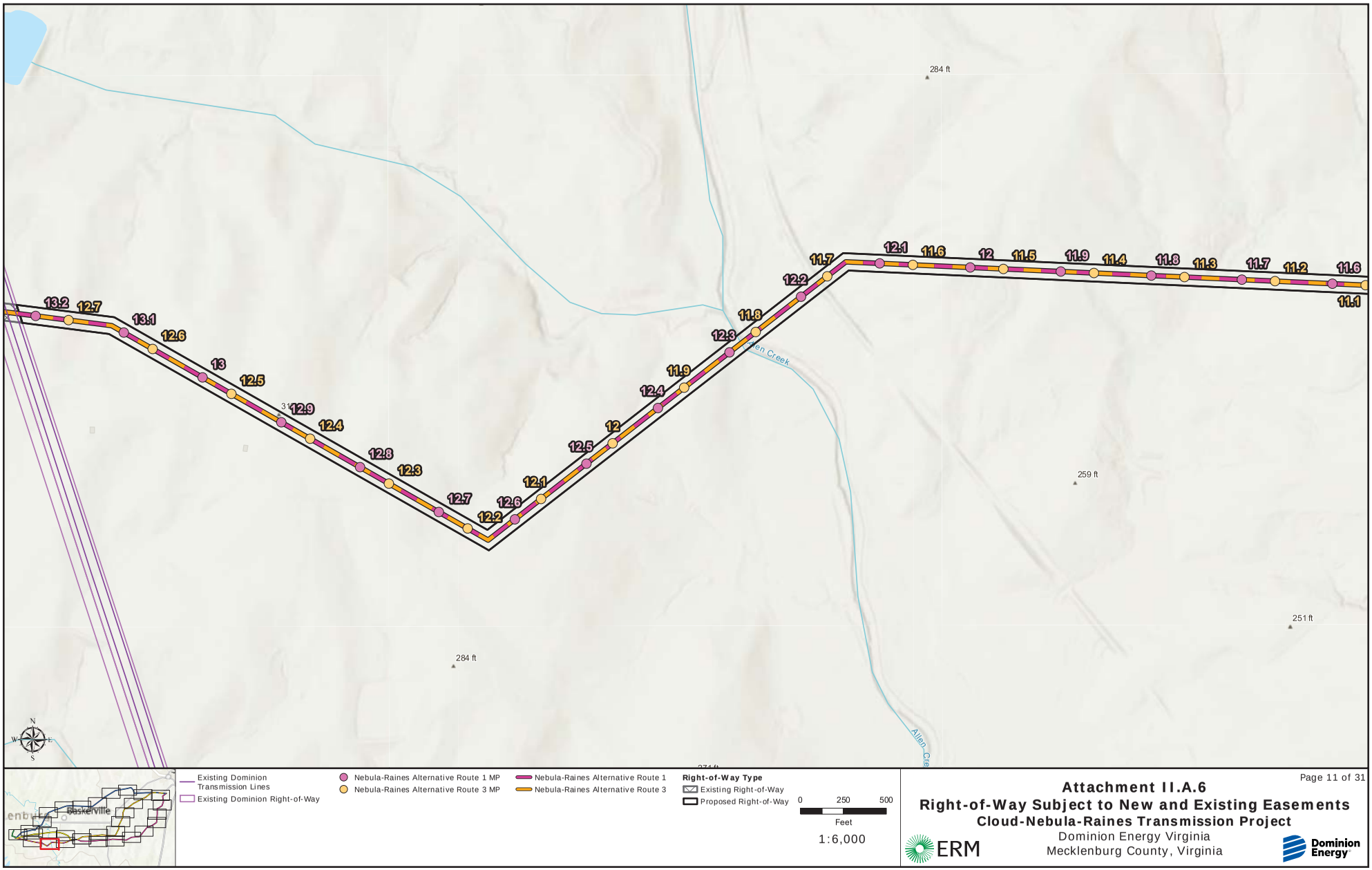
Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

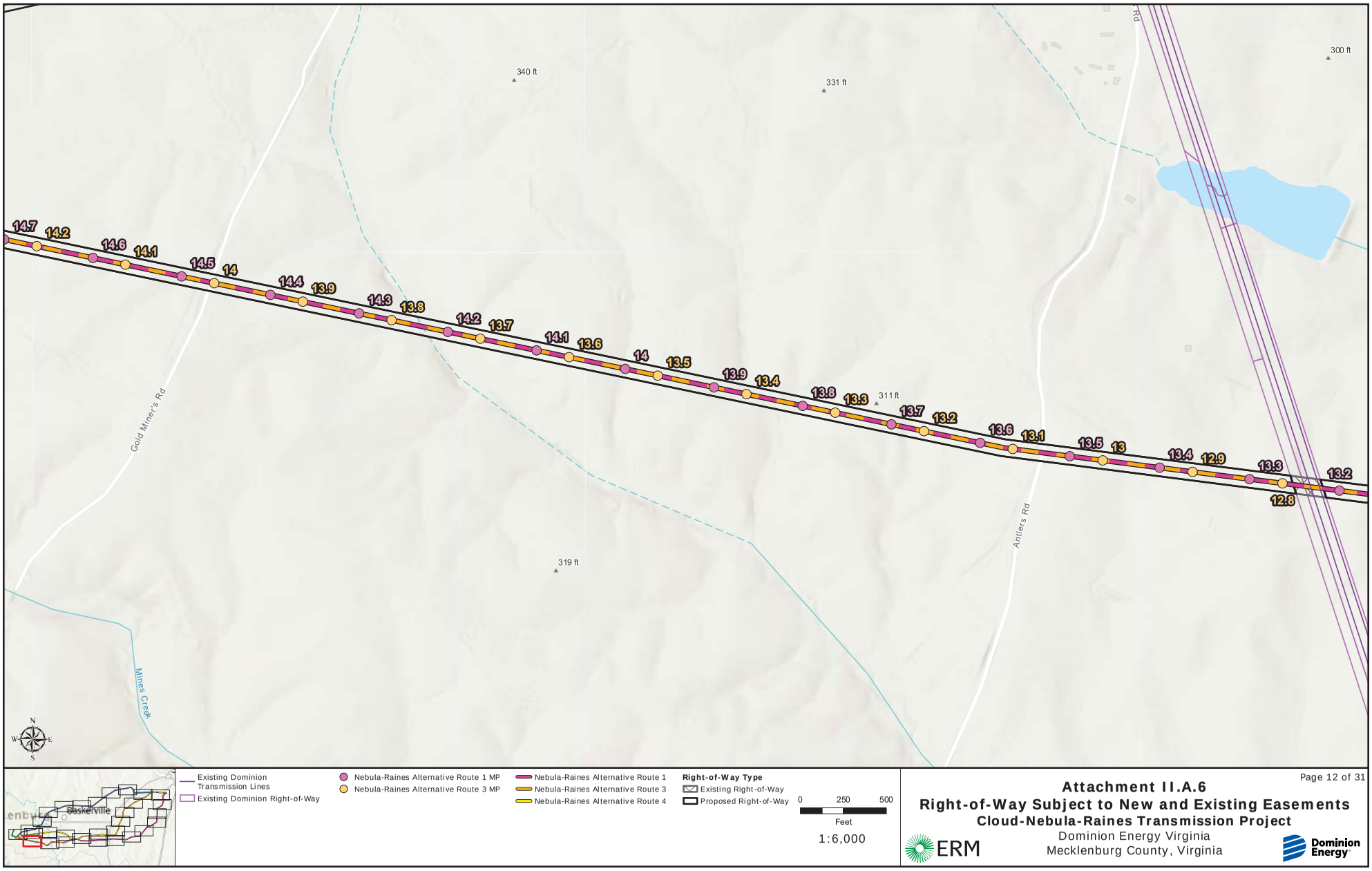
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

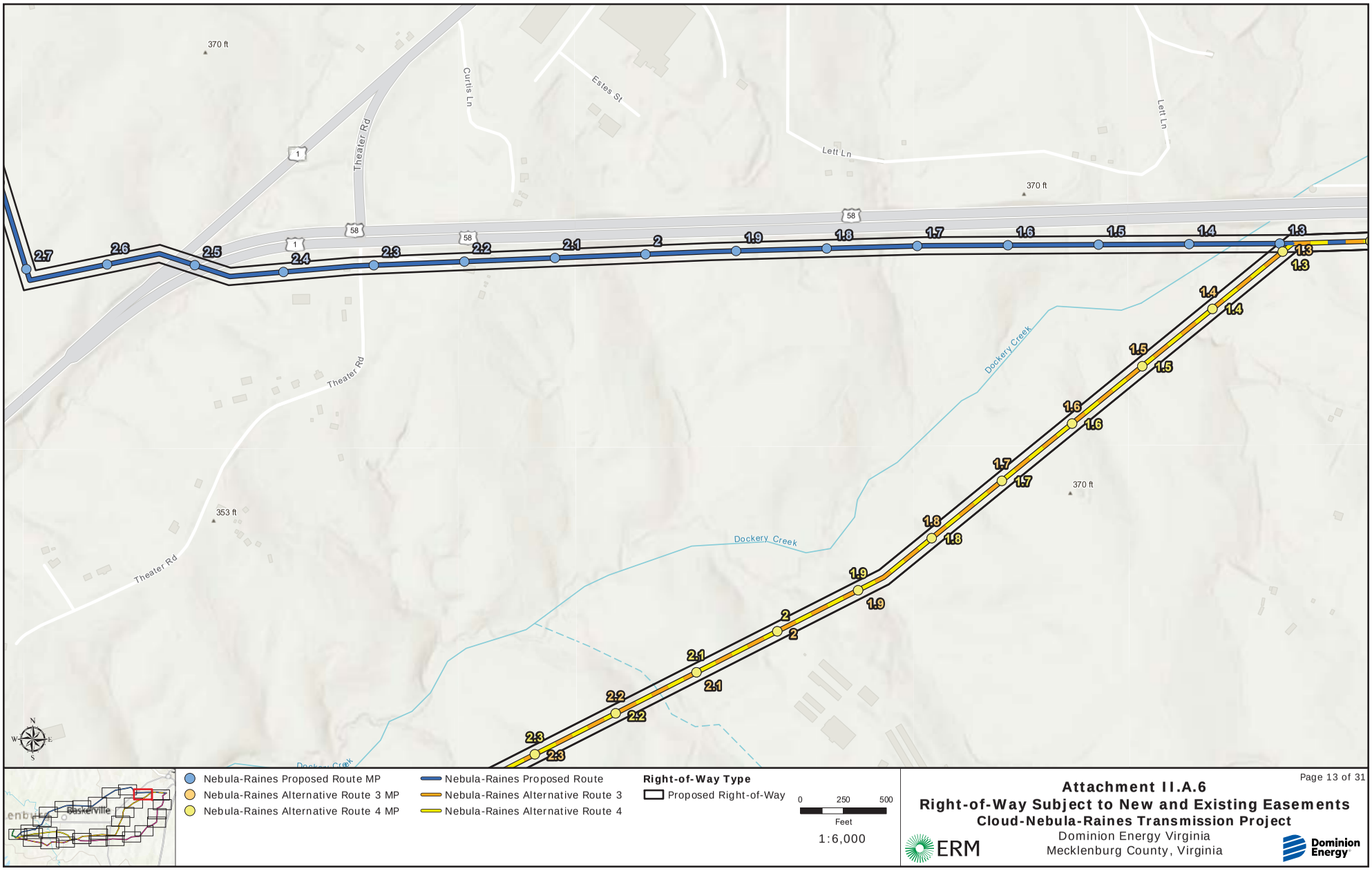
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

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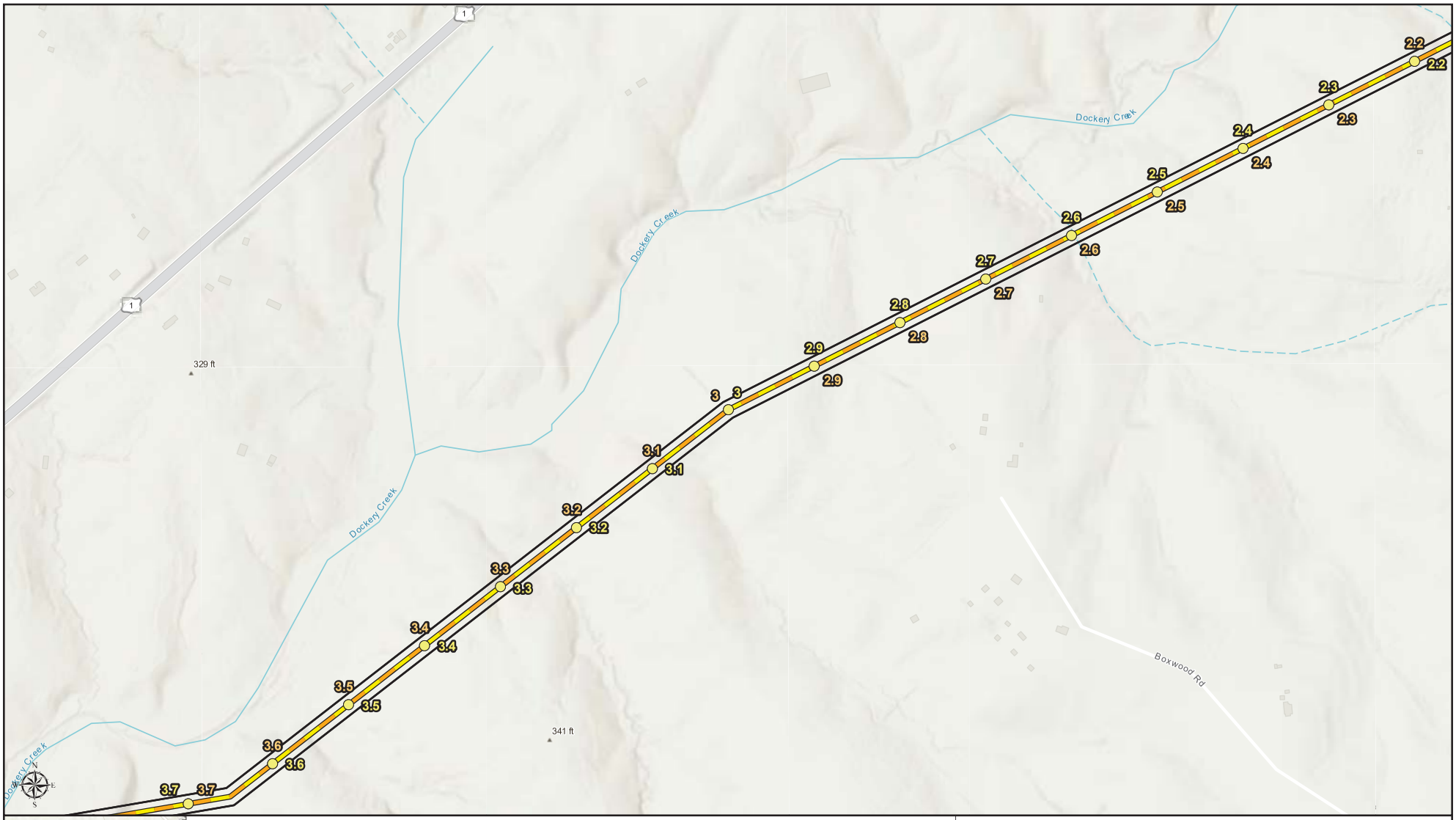

Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

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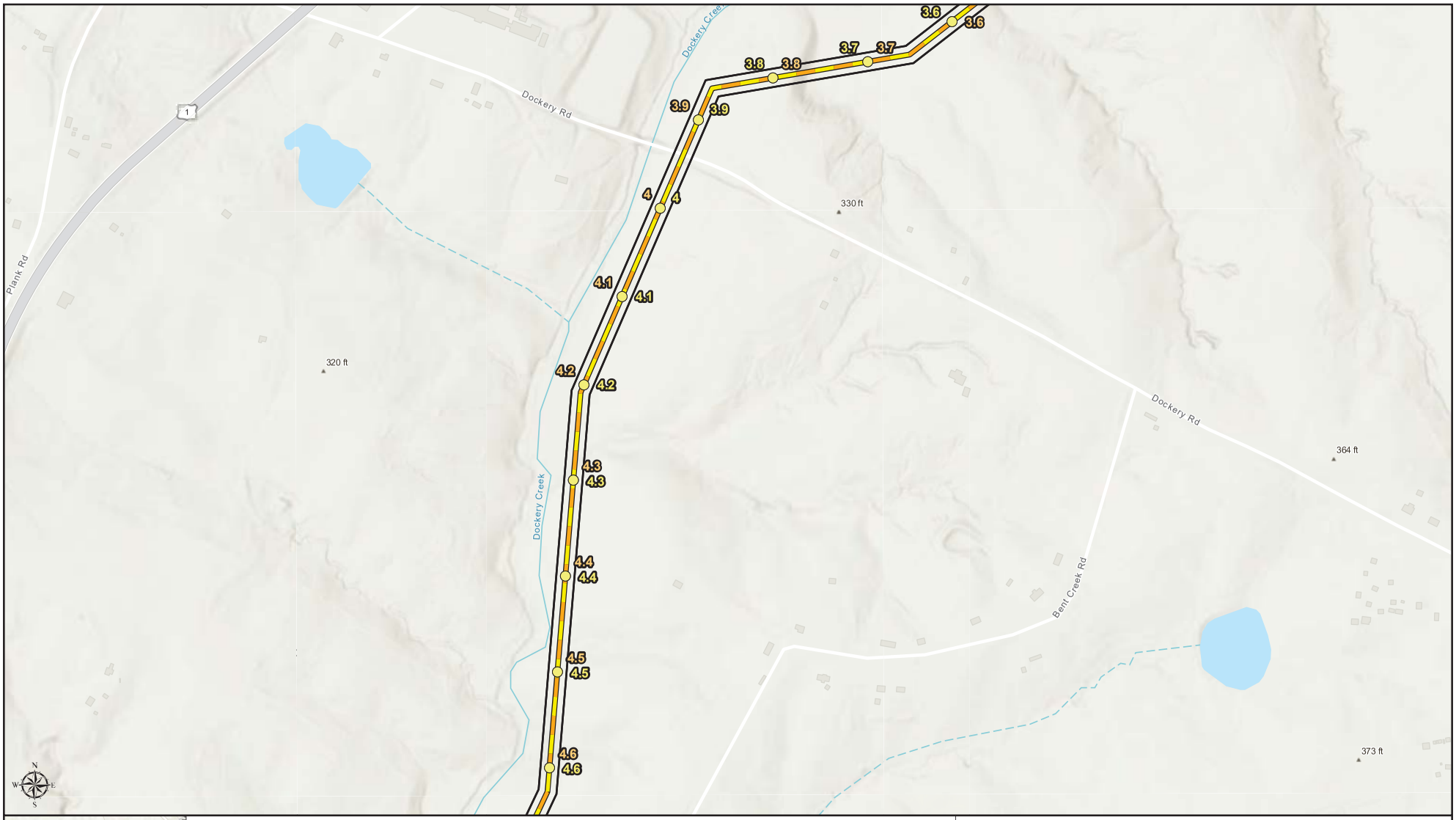
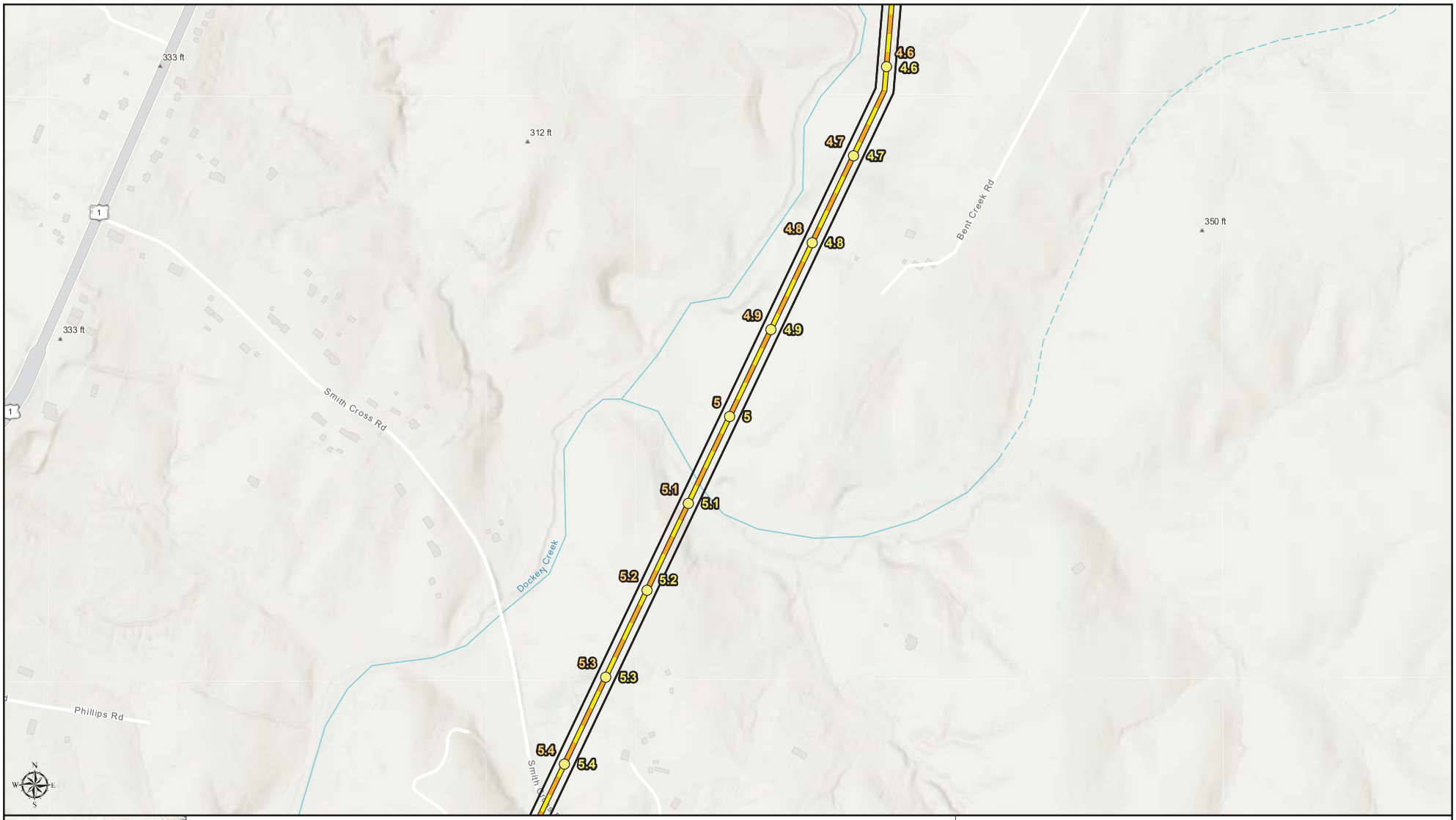


Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

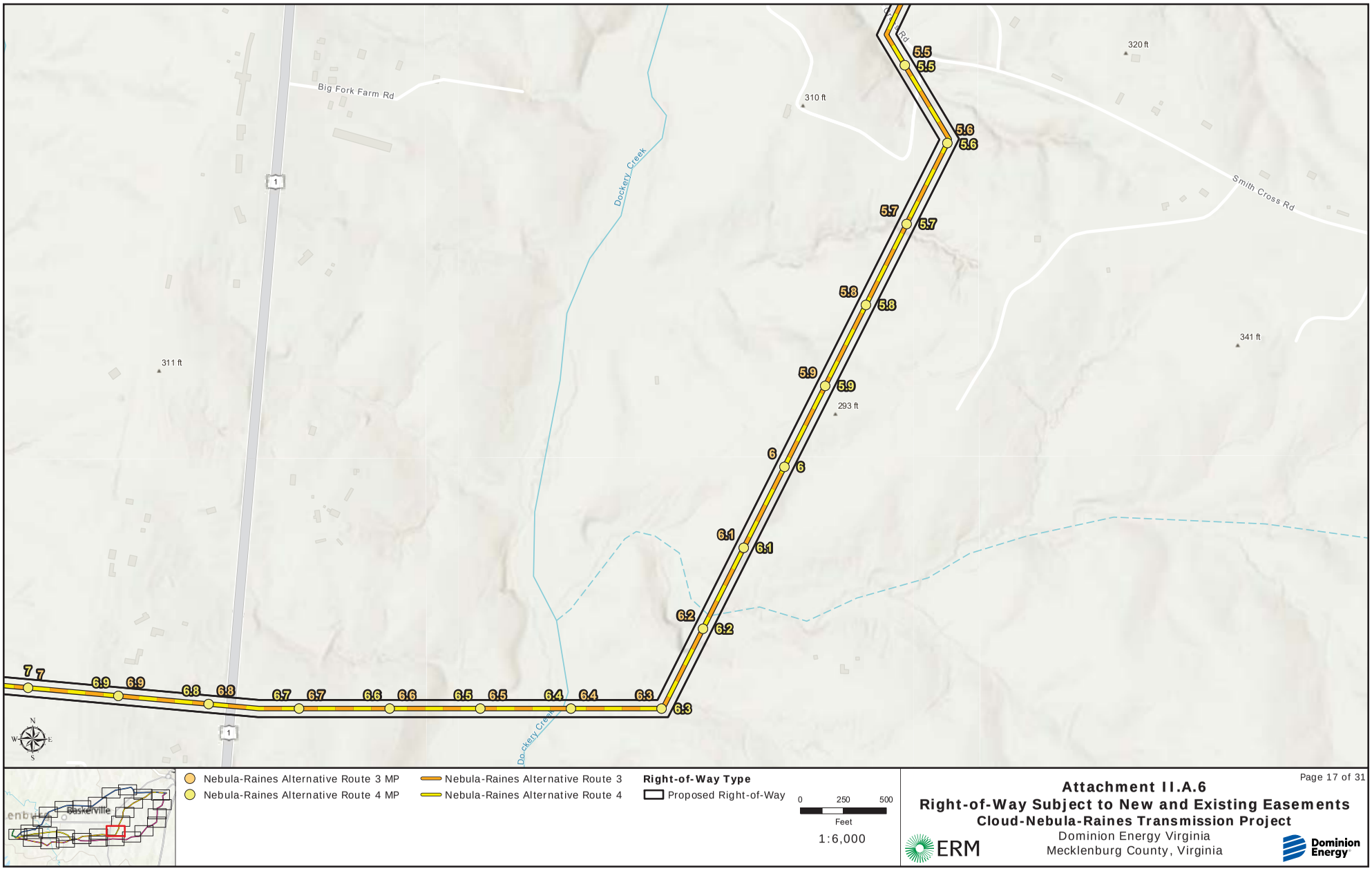
Dominion Energy



Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

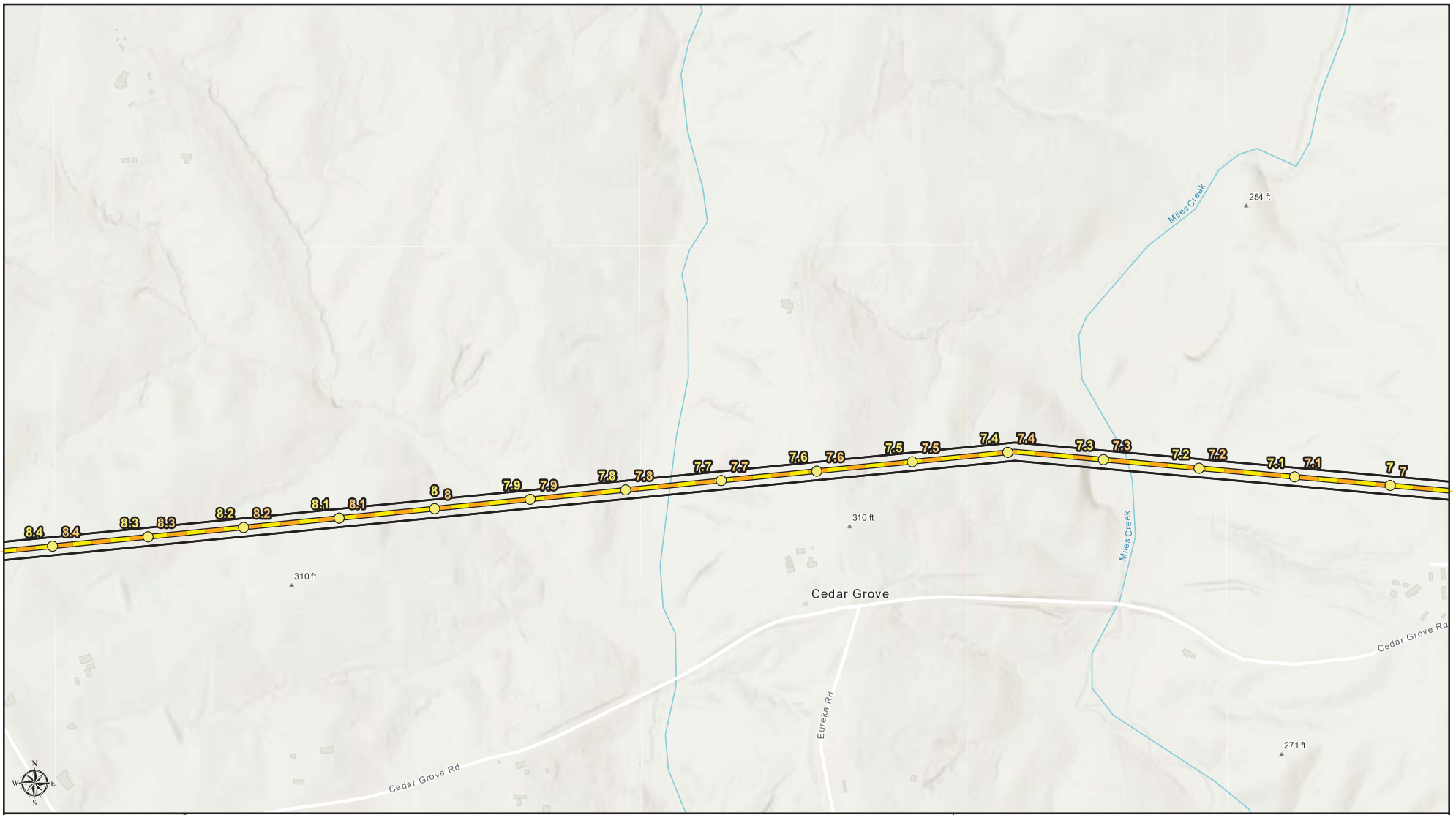
Dominion Energy



Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

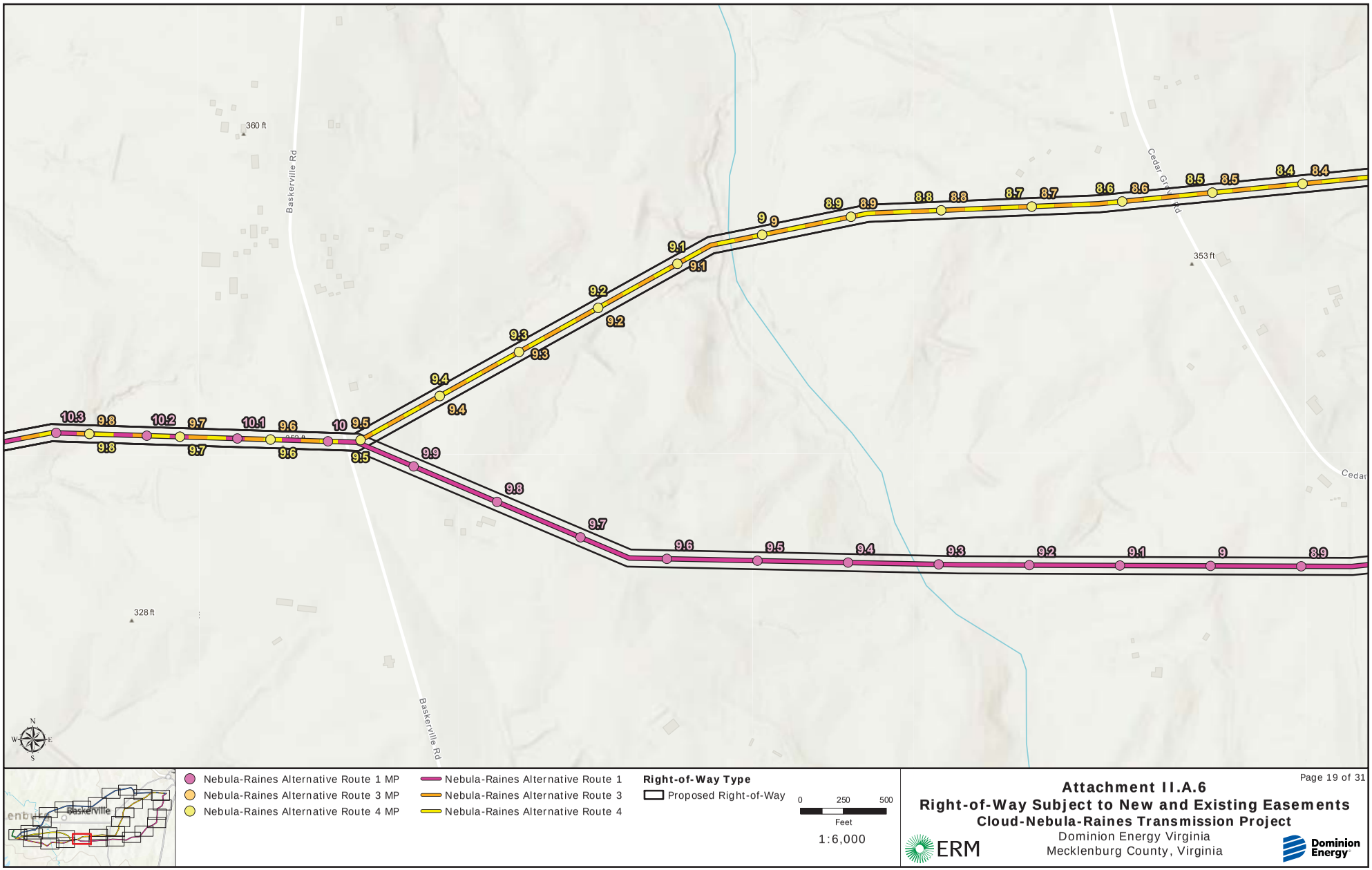
Dominion Energy



Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

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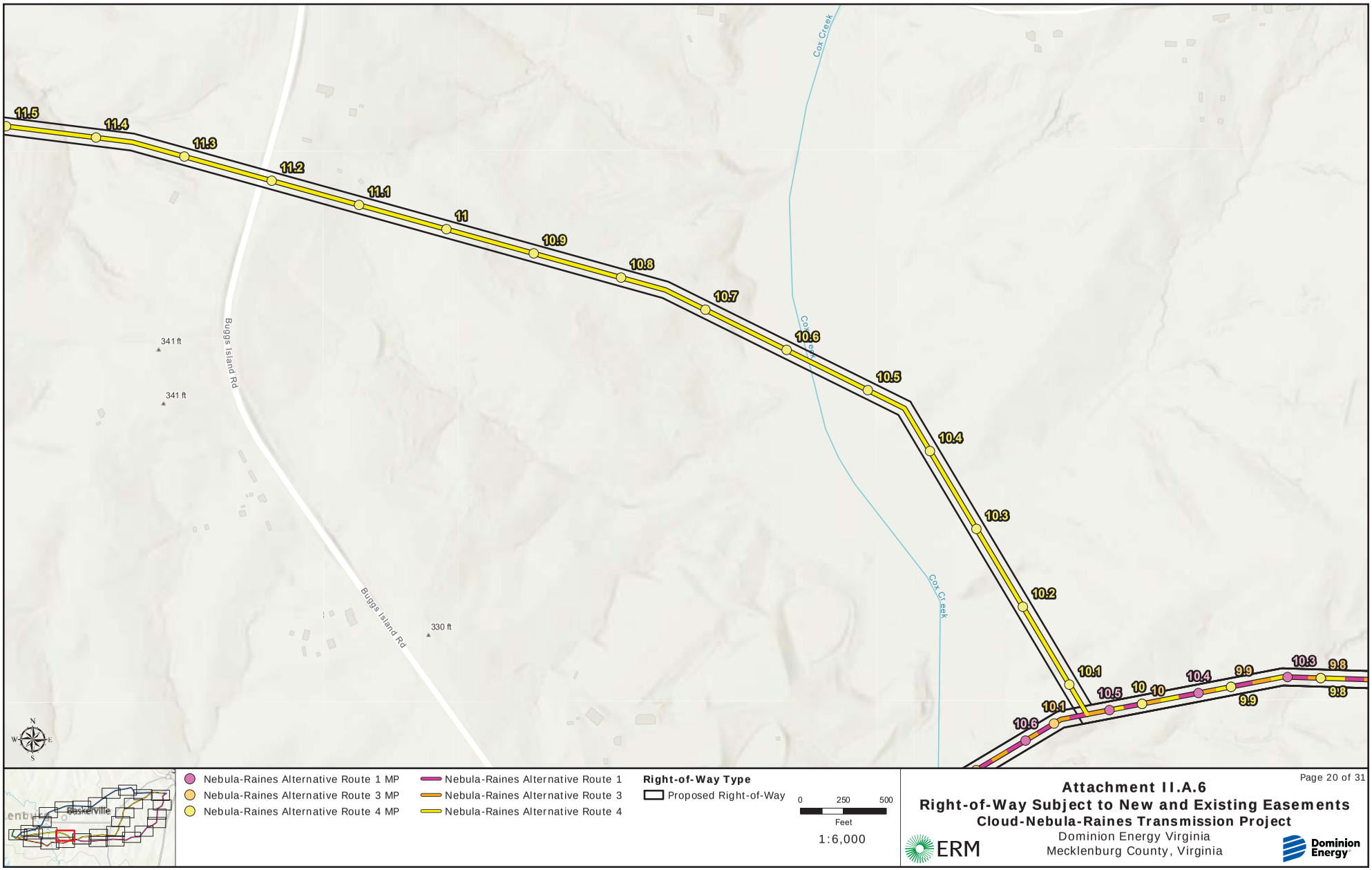


Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

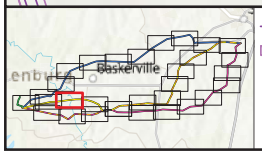
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



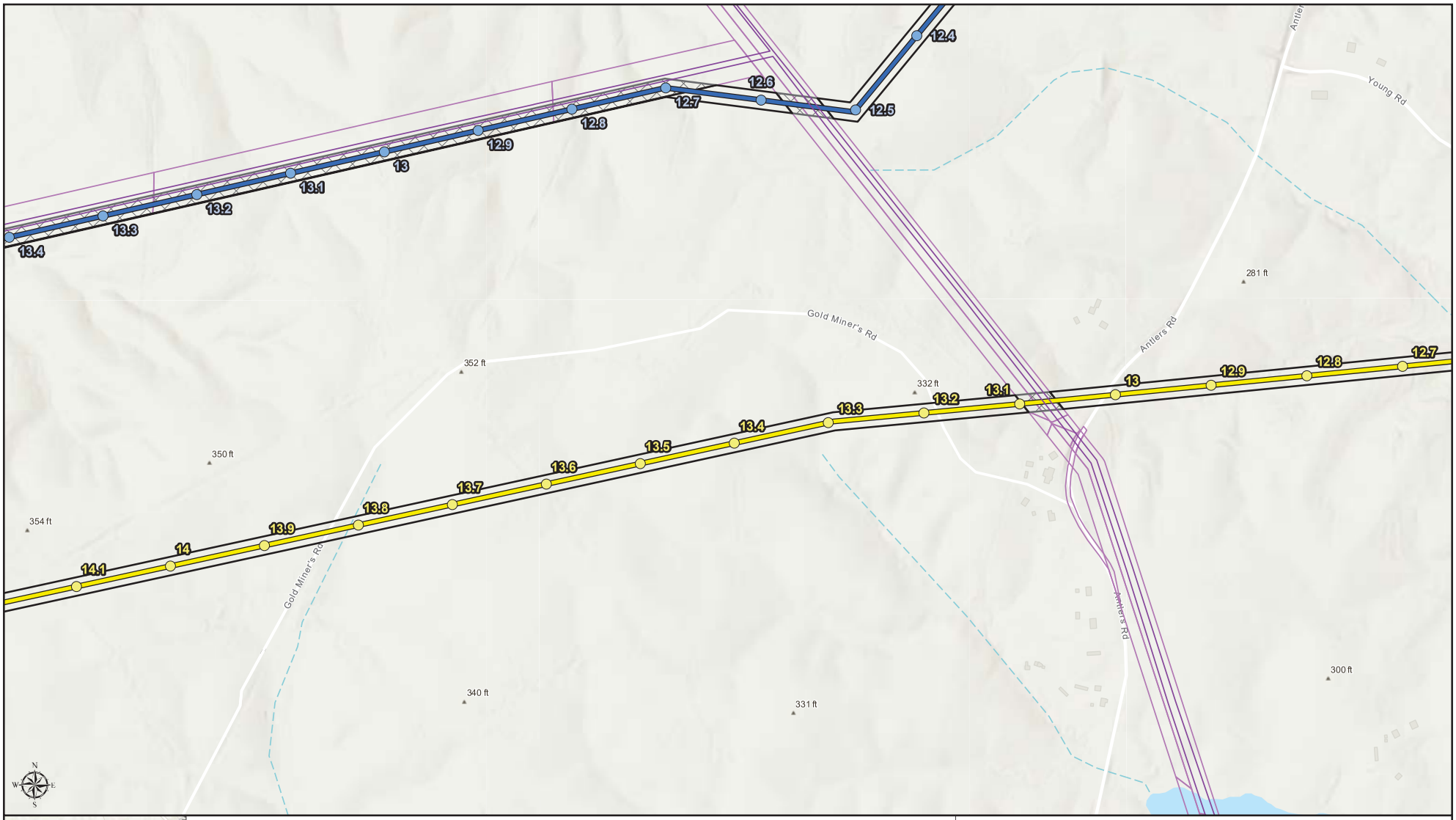
Existing Dominion Transmission Lines
Existing Dominion Right-of-Way
Nebula-Raines Alternative Route 4 MP
Nebula-Raines Alternative Route 4
Right-of-Way Type
Proposed Right-of-Way

0 250 500
Feet
1:6,000

Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

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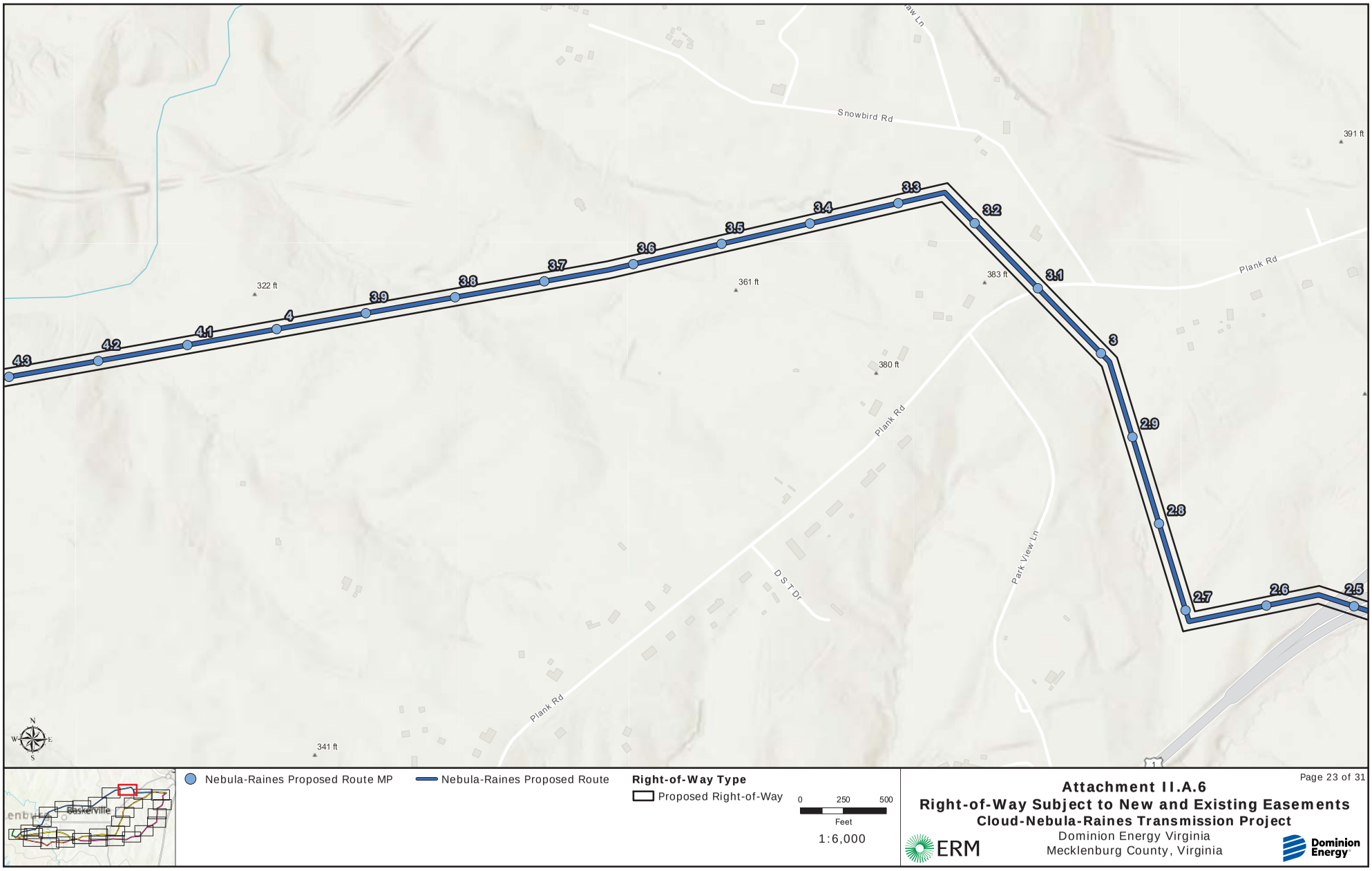
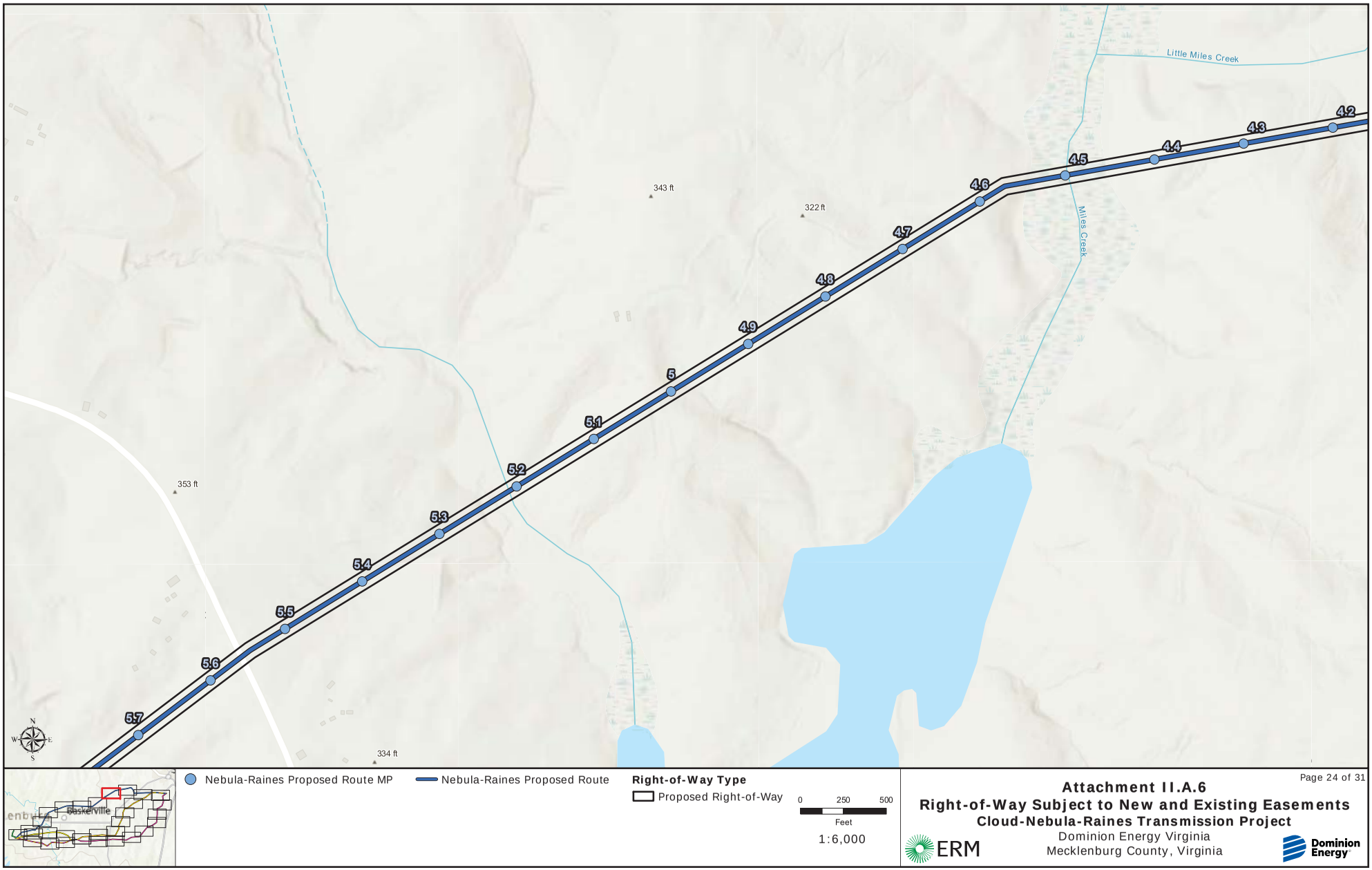
Dominion Energy



Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

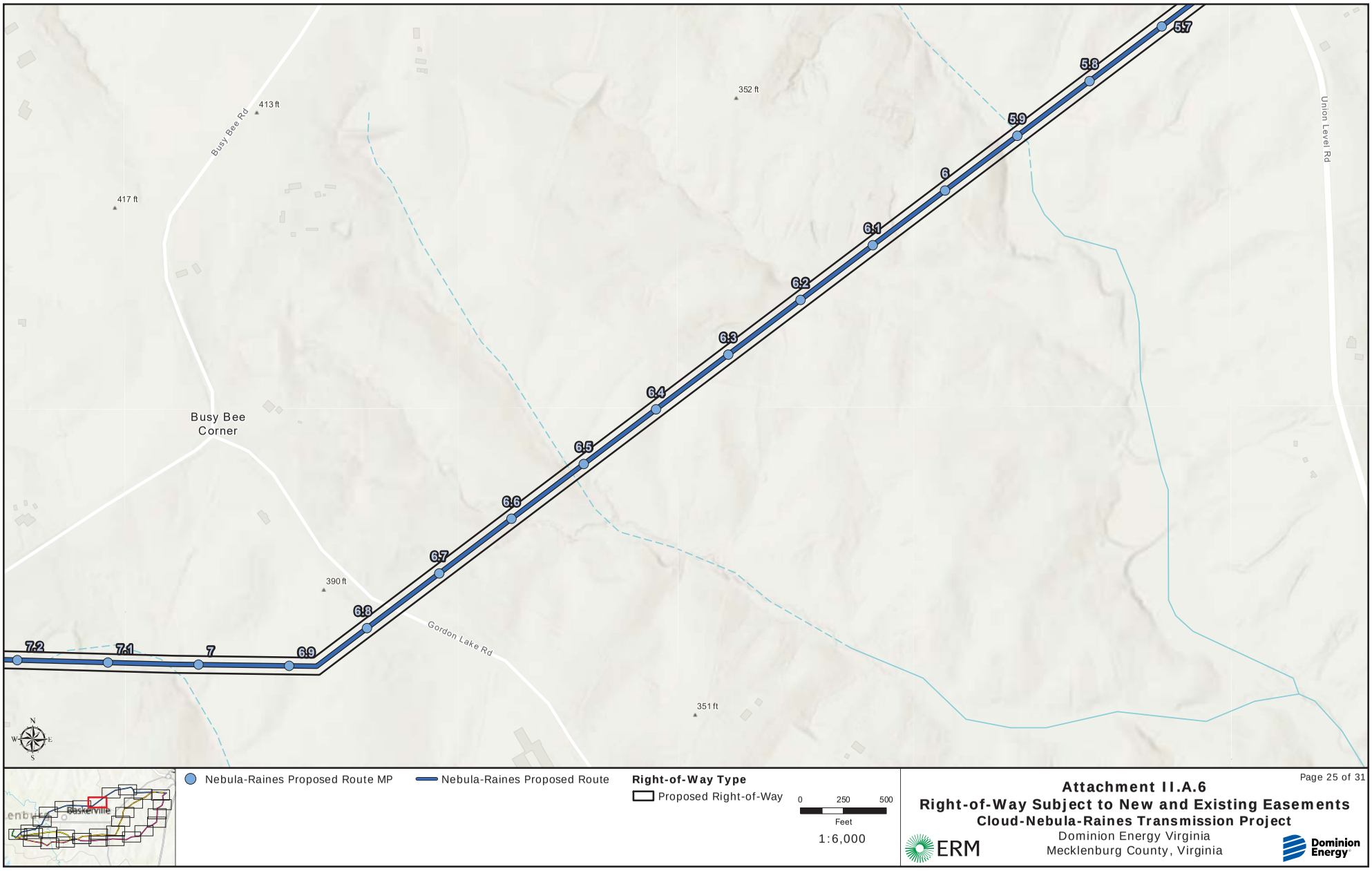
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

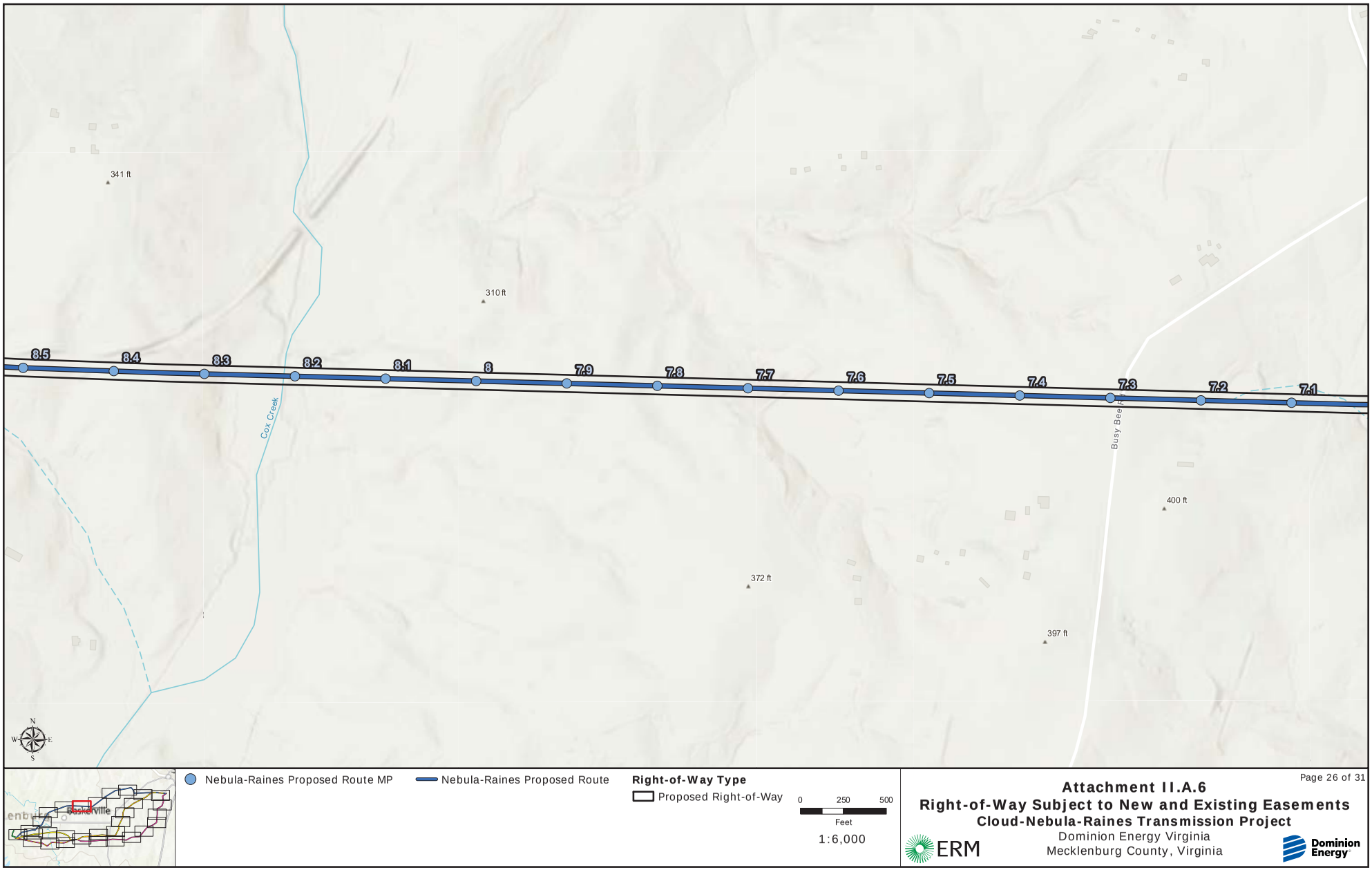
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

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Dominion Energy

Attachment II.A.6
Right-of-Way Subject to New and Existing Easements
Cloud-Nebula-Raines Transmission Project
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Mecklenburg County, Virginia

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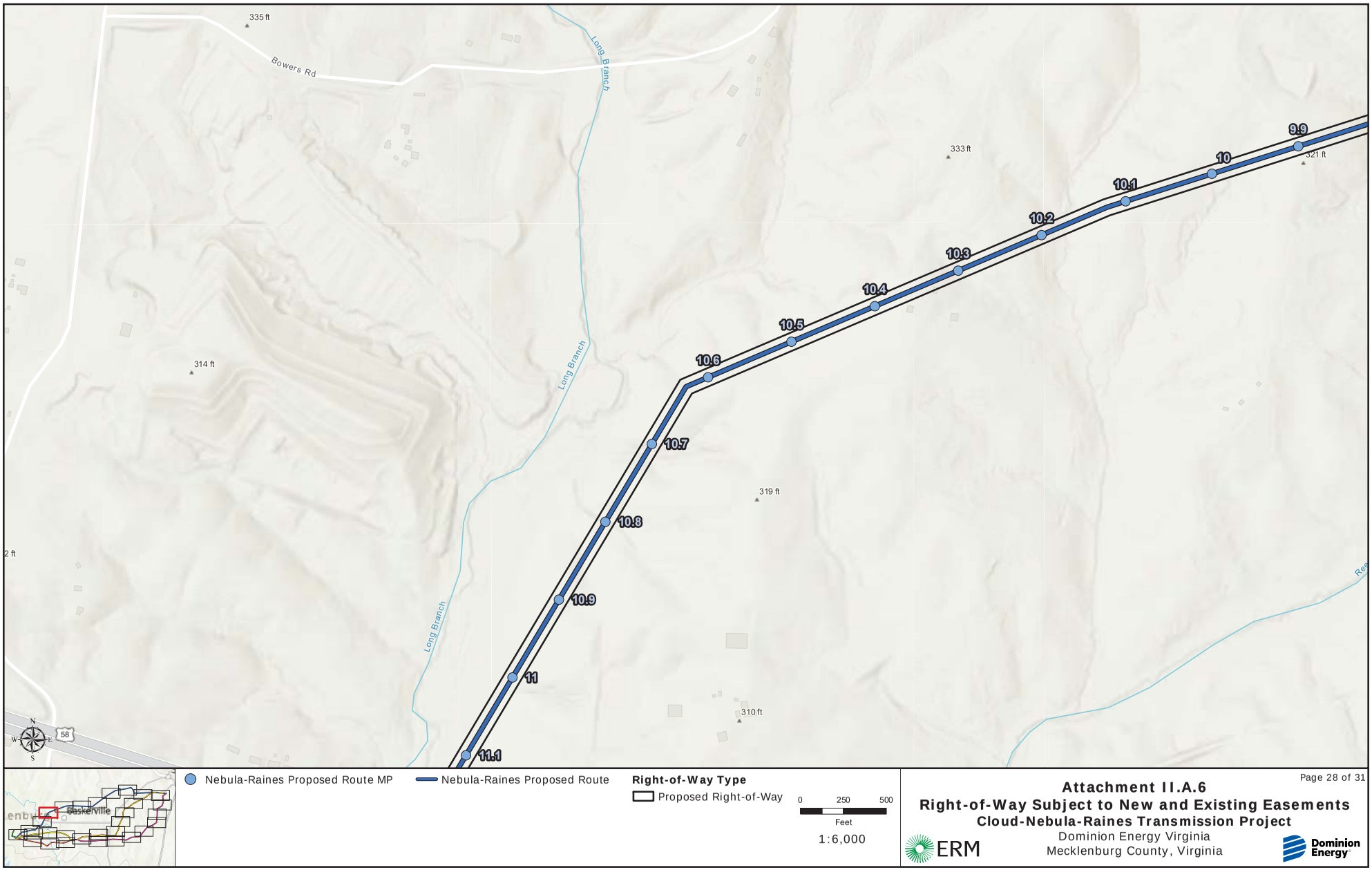


Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

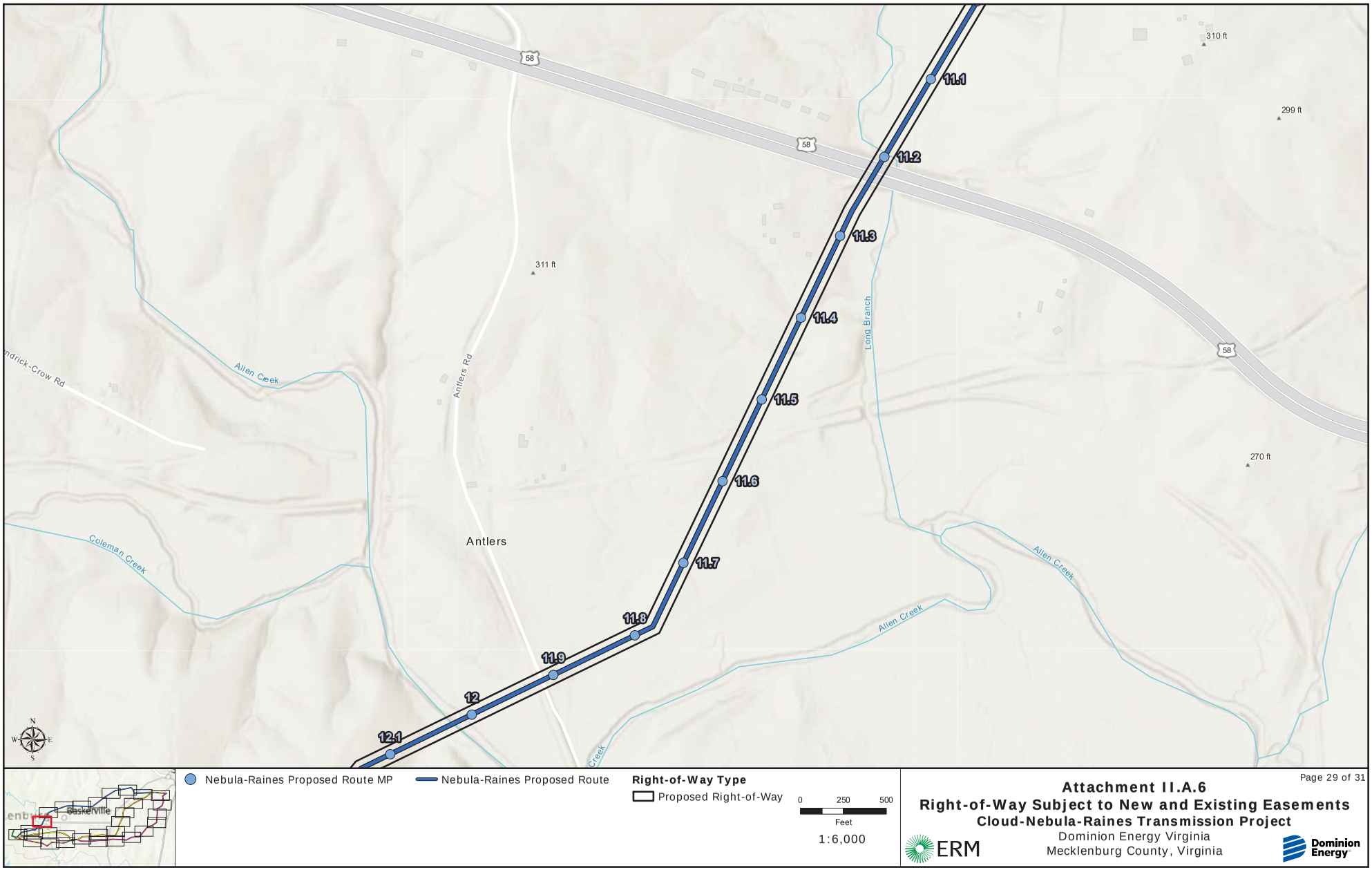
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

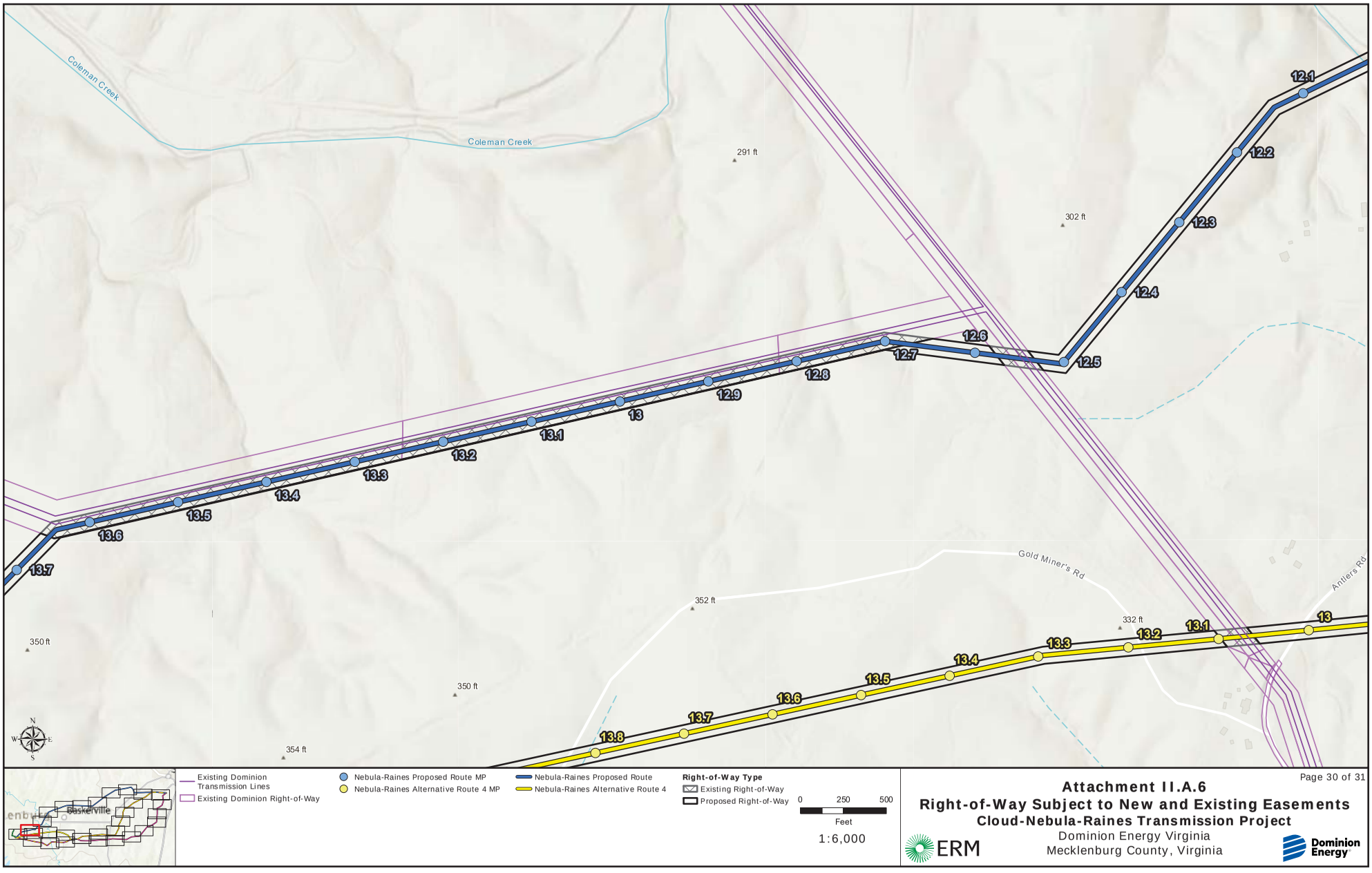
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

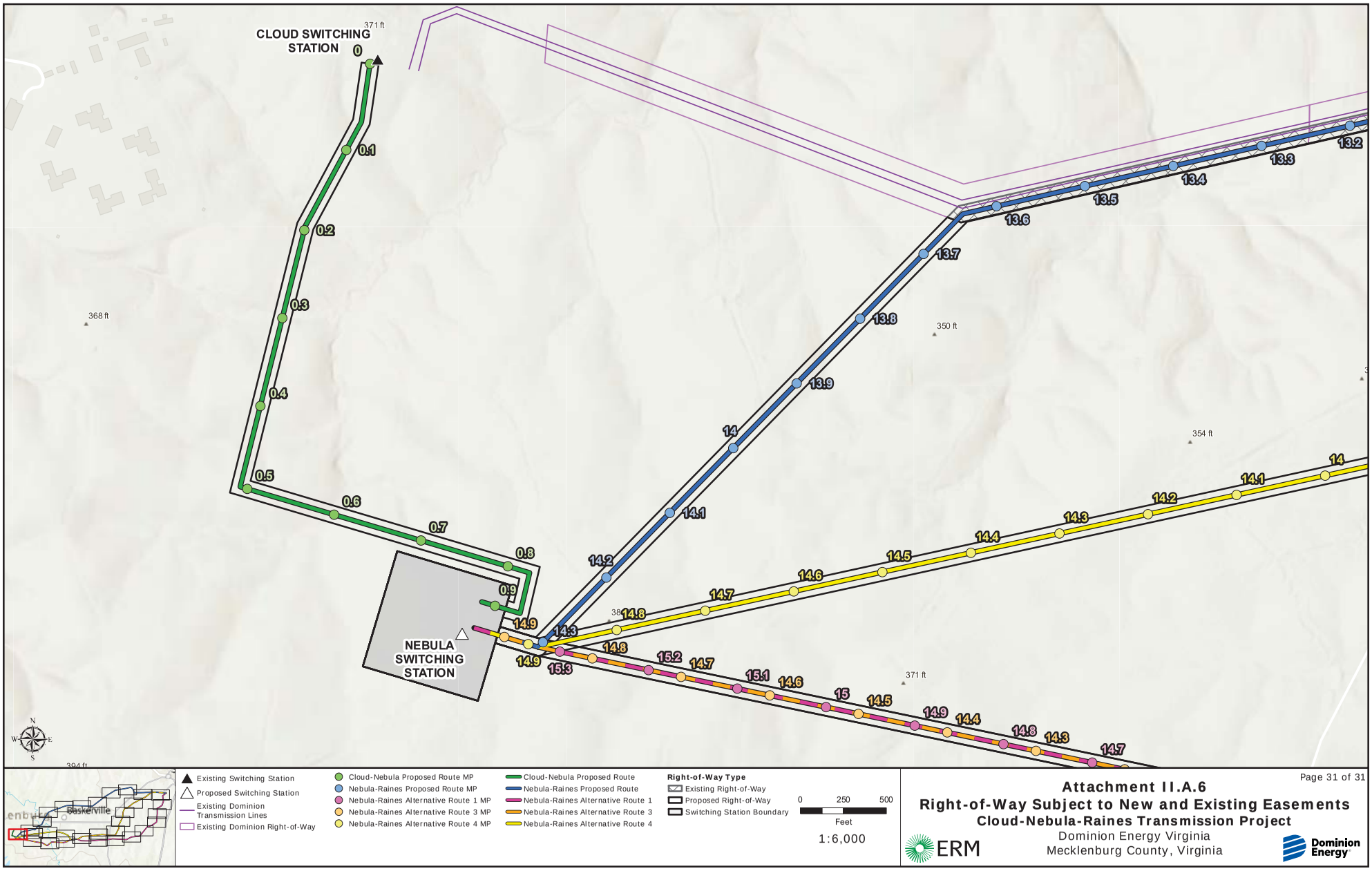
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.A.6

Right-of-Way Subject to New and Existing Easements

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy

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 rights-of-way for the Nebula-Raines Proposed Route and the Cloud-Nebula Proposed Route will be approximately 100 feet in width. Based on existing conditions, the Company anticipates tree clearing will be required along a portion of these Project routes.

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 where applicable on an ongoing basis during all clearing and construction activities accompanied by weekly Virginia Stormwater Management Program inspections.

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

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

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

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

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

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

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

Response: The Company's route selection for a new transmission line typically begins with identification of the project "origin" and "termination" points provided by the Company's Transmission Planning group. 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 determined there was only one viable electrical solution, which is located entirely within Mecklenburg County, Virginia.

The study area encompasses an area containing the Project origin and termination points and is bounded by the following features:

- An area east of Interstate 85 to the east;
- The unincorporated community of Gordon Corner to the north;
- The eastern extend of the Town of Boydton to the west; and
- The unincorporated communities of Norvello, Elamtown, and Invermay to the south.

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.

In developing the potential route alternatives for the Nebula-Raines Line, ERM also studied multiple other routes that were subsequently rejected from further consideration. There are no railroads or pipelines and minimal existing transmission lines within the study area for the routes to collocate with. The predominant linear features within the study area are roads, particularly US 1 and US 58. ERM reviewed the potential to collocate with these roadways early in the routing process. Due to substantial commercial and residential development along US 1, ERM determined that collocating with this roadway could not occur without removal of several buildings. ERM also reviewed the potential to collocate with US 58. Similar to US 1, multiple residential and commercial buildings are located in close proximity to the roadway. These buildings could only be avoided through route deviations from the roadway, which would have resulted in a "boxing-in" effect for these buildings, with the transmission line and highway surrounding the buildings on all sides, which is not preferred by the Company. Additionally, the recently constructed Mecklenburg Middle/High School borders the north side of US 58 in an area where homes border the south side of the road. As a result, a route alternative collocated with this segment of US 58 would need to divert through school property. For these reasons, routes entirely (or primarily) collocated with US 1 and US 58 were eliminated from consideration for the Nebula-Raines Line.

The Company also identified and ultimately rejected a route segment (labeled Eliminated Route 6 in the Routing Study), which routed south from the Raines Substation, down to Interstate 85, paralleling the west side of the interstate right-of-way. Approximately 3.8 miles south of the Raines Substation, the route turned to the west until it intersected Nebula-Raines Alternative Route 1. Due to increased overall length and significant impacts to wetlands, in particular forested wetlands, the route was determined not viable and was rejected from further consideration. Additionally, the Company identified and ultimately rejected Nebula-Raines Route Alternative 2, which routed southwest from the future Raines Substation and was located north of Alternative Route 1 and south of Alternative Route 3, until it approaches US 1 where it then generally followed the same alignment as Alternative Route 1. Due to the increased number of residences within 500 feet of the route centerline, increased agricultural land impacts, and negative feedback the Company received from the public at the initial open house, this route was ultimately dismissed from consideration.

As discussed in more detail in the Routing Study, the Company identified four viable overhead route alternatives for the Nebula-Raines Line. Of these four routes, the northern route was identified as the Proposed Route and Alternative Routes 1, 3 and 4 were identified as viable alternatives to the Proposed Route.

For the Cloud-Nebula Line, the Company aimed to reduce impacts to the one privately owned parcel located between the proposed Nebula Station and the existing Cloud Switching Station. To achieve this, the Company looked to route

the line along the edges of the parcel. All other route options would have routed through the middle of this parcel or would have resulted in a longer route that impacted an additional parcel. Ultimately the Company identified only one viable overhead route alternative, as discussed in more detail in the Routing Study.

The route development process for the Project is described in more detail in the Environmental Routing Study.

Nebula-Raines Proposed and Alternative Routes

Nebula-Raines Proposed Route (Route 5)

The Nebula-Raines Proposed Route would construct one overhead single circuit 230 kV transmission line supported primarily by double circuit monopoles with an idle conductor from the future Raines Substation to the proposed Nebula Station. As noted in Section I.I, the estimated conceptual cost of the Nebula-Raines Proposed Route is approximately $93.7 million.

The Nebula-Raines Proposed Route is approximately 14.4 miles in length. Starting at the future Raines Substation, the Nebula-Raines Proposed Route heads west for about 0.5 mile through forested areas before continuing west and collocating with the south side of US 58 for 1.9 miles. The route then turns to the northwest, crossing US 58 and Highway 1 at MP 2.5, then back west and then north for 0.6 mile, crossing Plank Road at MP 3.1. The route then turns to the west for 1.3 miles and then southwest for 2.3 miles, crossing Miles Creek at approximately MP 4.5, Union Level Road at MP 5.6 and Gordon Lake Road at MP 6.8. At this point the route turns to the west for 2.0 miles, crossing Busy Bee Road at MP 7.3. The route turns to the west/southwest for 1.7 miles, crossing Baskerville Road and Wooden Bridge Road at approximately MP 9.0 and then running through mainly forested areas. The route then heads southwest for 1.9 miles, across agricultural land east of the County landfill and crossing US 58 at MP 11.2, and Antlers Road at MP 11.9. At MP 12.5 the route turns to the west, crosses the Company's existing right-of-way for Lines #137 and #38, and shares right-of-way with the south side of the Company's existing right-of-way for Lines #1041 and #38 for 0.9 mile. The route then turns to the southwest away from Lines #1041 and #38 for 0.6 mile across managed timber lands before turning west for 0.1 mile and terminating at the proposed Nebula Station.

The Nebula-Raines Proposed Route crosses a total of 14.4 miles of land affecting 185.2 acres of right-of-way, including the proposed Nebula Station. All 56 parcels crossed are privately owned. Land use along the Proposed Route right-of-way consists of 99.5 acres of forested land, 34.3 acres of agricultural land, 46.7 acres of open space, 3.3 acres of open water, and 1.4 acres of developed area. Where the route crosses agricultural or open lands, impacts would be limited to structure placement and land use activities could resume post construction. The 99.5 acres

of forested land crossed would be cleared, which is the least amount of forest clearing required for any of the Nebula-Raines Line route alternatives.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of the Nebula-Raines Proposed Route will encompass approximately 12.2% (22.5 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these 22.5 acres, the majority (15.8 acres) consist of forested wetlands. The route has a total of 32 waterbody crossings: 8 perennial stream crossings, 21 intermittent stream crossings, and 3 perennial lake/pond crossings.

The Nebula-Raines Proposed Route will run parallel adjacent with existing routing opportunities for 2.9 miles, including 0.9 mile with the Company's existing transmission lines and 1.9 miles with existing roads.

The Nebula-Raines Proposed Route is the shortest of the route alternatives and would require correspondingly the least right-of-way acreage. While the Nebula-Raines Proposed Route would cross the most total wetlands of the four routes, it has the fewest impacts to forested wetlands, landowners crossed, and forested impacts, second fewest agricultural lands crossed, and tied for the fewest perennial stream crossings. The route also has the most collocation of any of the Nebula-Raines Line routes. The Nebula-Raines Proposed Route would also have the fewest residences within 500 feet of the centerline (11) compared to Alternative Route 1 (15), Alternative Route 3 (16), and Alternative Route 4 (17). Finally, the Proposed Route has the least impact on ecological cores (92.5 acres) and in particular to C2 ranked cores (31.1 acres). For these reasons, the Company selected Route 5 as the Proposed Route.

Nebula-Raines Alternative Route 1

Nebula-Raines Alternative Route 1 would construct one overhead single circuit 230 kV transmission line supported primarily by double circuit monopoles with an idle conductor from the future Raines Substation to the proposed Nebula Station. As noted in Section I.I, the estimated conceptual cost of the Nebula-Raines Alternative Route 1 is approximately $106.3 million.

Nebula-Raines Alternative Route 1 is approximately 15.4 miles in length. Starting at the future Raines Substation, Nebula-Raines Alternative Route 1 heads southwest for about 0.4 mile through forested areas and crosses Flat Creek before turning south for an additional 0.8 mile, crossing Rocky Branch Road at MP 0.8. The route then turns to the southwest for 0.5 mile, crossing Turtle Road at MP 1.5. The route then turns to the south for 1.1 miles, crossing through mostly forested areas (including managed timber land). At this point, the route turns southwest for 1.9 miles, crossing Trinity Church Road at MP 3.6. This segment of the route crosses through mostly dense forested areas. The route then turns to the west then southwest then west for 1.2 miles, crossing Belfield Road at MP 5.2. The route then turns west and continues for 3.7 miles, crossing Goodes Ferry Road at MP 6.0, Highway 1 at MP 7.3, and Eureka Road at MP 8.1. This segment of the route

crosses primarily through heavily forested land up to approximately MP 8.4, at which point the route crosses through mixed forest and agricultural land. At approximately MP 9.6, the route turns northwest and crosses Baskerville Road at approximately MP 10.0. The route then turns to the west and then southwest for 1.2 miles across forested and agricultural land before crossing Buggs Island Road at MP 11.2. The route continues to the west for 1.0 mile, crossing mostly recently cleared timber lands and some agricultural grazing fields before turning southwest for 0.5 mile, and then northeast for 0.5 mile through primarily agricultural and grazing land. At this point, the route turns to the west-northwest for the remaining 2.3 miles, crossing the Company's existing Kerr Dam-Ridge Road Line #137 and Cloud-Kerr Dam Line #38 at approximately MP 13.2 and Antlers Road at approximately MP 13.5, before terminating at the proposed Nebula Station.

Nebula-Raines Alternative Route 1 crosses a total of 15.4 miles of land encompassing 197.6 acres of right-of-way, including the proposed Nebula Station. All 50 parcels crossed are privately owned. Land use along the right-of-way consists of 103.1 acres of forested land, 48.7 acres of agricultural land, 44.7 acres of open space, 0.3 acre of open water, and 0.7 acre of developed area. Where the route crosses agricultural or open lands, impacts would be limited to structure placement and land use activities could resume post construction. The 103.1 acres of forested land crossed would be cleared, which is the second least amount of forest clearing required for any of the Nebula-Raines Line routes.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Nebula-Raines Alternative Route 1 will encompass approximately 9.1% (17.9 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these 17.9 acres, the majority (16.1 acres) consist of forested wetlands. The route has a total of 26 waterbody crossings: 10 perennial stream crossings, 15 intermittent stream crossings, and 1 perennial lake/pond crossing.

Nebula-Raines Alternative Route 1 will run parallel adjacent with existing routing opportunities (roads) for 0.3 mile. The route does not collocate with any of the Company's existing transmission lines.

Nebula-Raines Alternative Route 1 is the longest of the routes and would require correspondingly the most right-of-way acreage. In addition, the route has the second most crossing of agricultural land, has the fewest parcels crossed, fewest amount of collocation with routing opportunities, and the fewest amount of total wetlands crossed when compared to the other three routes. Alternative Route 1 would also have the second fewest residences within 500 feet of the centerline (15), second fewest road crossings, and second fewest total number of waterbodies crossed. Finally, Nebula-Raines Alternative Route 1 has the largest impact on ecological cores (113.7 acres) and second largest impact to C2 ranked cores (31.6 acres). While acknowledging the impacts of Nebula-Raines Alternative Route 1, the Company proposes Nebula-Raines Alternative Route 1 for notice and the Commission's consideration as a viable alternative to the Proposed Route.

Nebula-Raines Alternative Route 3

Nebula-Raines Alternative Route 3 would construct one overhead single circuit 230 kV transmission line supported primarily by double circuit monopoles with an idle conductor from the future Raines Substation to the proposed Nebula Station. As noted in Section I.I, the estimated conceptual cost of the Nebula-Raines Alternative Route 3 is approximately $101.2 million.

Nebula-Raines Alternative Route 3 is approximately 14.9 miles in length. Starting at the future Raines Substation, Nebula-Raines Alternative Route 3 heads west for about 0.5 mile through forested areas before continuing west and collocating with the south side of US 58 for 0.8 mile. The route then turns to the southwest and crosses through mostly forested areas for 2.4 miles. At this point, the route turns to the west for 0.2 mile and then southwest for 0.3 mile across forested land, crossing Dockery Road at MP 3.9. The route then turns south for 0.4 mile, crossing through dense forested areas before turning southwest for 0.8 mile and crossing Smith Cross Road at MP 5.5. After crossing Smith Cross Road, the route turns southeast for 0.1 mile and then southwest for 0.7 mile, crossing through mostly dense forested areas. The route then turns to the west, crossing through a mix of forested areas and cleared agricultural lands for 2.7 miles and crossing Highway 1 at MP 6.8 and Cedar Grove Road at MP 8.5. At this point, the route heads southwest for 0.4 mile, crossing through open agricultural lands. At MP 9.5, Nebula-Raines Alternative Route 3 intersects Nebula-Raines Alternative Route 1. From this point, Alternative Route 3 follows the same alignment as Alternative Route 1 for the remaining 5.4 miles to the proposed Nebula Station.

Nebula-Raines Alternative Route 3 will cross a total of 14.9 miles of land affecting 192.0 acres of right-of-way, including the proposed Nebula Station. All 60 parcels crossed are privately owned. Land use along the right-of-way consists of 109.6 acres of forested land, 50.0 acres of agricultural land, 30.9 acres of open space, 0.7 acre of open water and 0.7 acre of developed area. Where the route crosses agricultural or open lands, impacts would be limited to structure placement and land use activities could resume post construction. The 109.6 acres of forested land crossed would be cleared, which is the second most amount of forest clearing required for any of the Nebula-Raines Line routes.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Nebula-Raines Alternative Route 3 will encompass approximately 10.2% (19.5 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these 19.5 acres, the majority (16.9 acres) consist of forested wetlands. Alternative Route 3 has a total of 25 waterbody crossings: 8 perennial stream crossings, 15 intermittent stream crossings, and 2 perennial lake/pond crossings.

Nebula-Raines Alternative Route 3 will run parallel adjacent with existing routing opportunities (roads) for 0.8 mile. The route does not collocate with any of the Company's existing transmission lines.

Nebula-Raines Alternative Route 3 is the second shortest of the routes and would require correspondingly the second least right-of-way acreage. In addition, the route has the second most crossing of forested land and the most agricultural land crossed, has the second most parcels crossed, and the second fewest amount of total wetlands crossed and second most forested wetlands crossed when compared to the other three routes. Alternative Route 3 also would have the second most residences within 500 feet of the centerline (16), tied for the fewest road crossings, and fewest total number of waterbodies crossed. Finally, Nebula-Raines Alternative Route 3 has the second smallest impact on ecological cores (97.2 acres) and second largest impact to C2 ranked cores (31.6 acres). While acknowledging the impacts of Nebula-Raines Alternative Route 3, the Company proposes Nebula-Raines Alternative Route 3 for notice and the Commission's consideration as a viable alternative to the Proposed Route.

Nebula-Raines Alternative Route 4

Nebula-Raines Alternative Route 4 would construct one overhead single circuit 230 kV transmission line supported primarily by double circuit monopoles with an idle conductor from the future Raines Substation to the proposed Nebula Station. As noted in Section I.I, the estimated conceptual cost of Nebula-Raines Alternative Route 4 is approximately $105.7 million.

Nebula-Raines Alternative Route 4 is approximately 15.0 miles in length. Nebula-Raines Alternative Route 4 follows the same alignment as Nebula-Raines Alternative Route 3 for the first 10.1 miles from the future Raines Substation to a point 0.6 mile west of Baskerville Road. At this point, the route turns to the northwest for 0.8 mile crossing through mostly forested lands., then turns to the west/northwest for 0.8 mile, crossing Buggs Island Road at MP 11.2. The route then turns to the west/southwest for 3.7 miles, crossing Antlers Road at MP 13.0, the Company's existing right-of-way for Lines #137 and #38 at MP 13.1, and Gold Miners Road at approximately MP 13.2. The route then turns northwest for 0.1 mile and terminates at the proposed Nebula Station.

Nebula-Raines Alternative Route 4 will cross a total of 15.0 miles of land affecting 192.3 acres of right-of-way, including the proposed Nebula Station. All 68 parcels crossed are privately owned. Land use along the right-of-way consists of 132.8 acres of forested land, 33.0 acres of agricultural land, 25.0 acres of open space, 0.7 acre of open water and 0.7 acre of developed area. Where the route crosses agricultural or open lands, impacts would be limited to structure placement and land use activities could resume post construction. The 132.8 acres of forested land crossed would be cleared, which is the most amount of forest clearing required for any of the Nebula-Raines Line routes.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of Nebula-Raines Alternative Route 4 will encompass approximately 10.3% (19.8 acres) of land with a medium or higher probability of containing wetlands and waterbodies. Of these 19.8 acres, the majority (17.3 acres) consist of forested

wetlands. Nebula-Raines Alternative Route 4 has a total of 25 waterbody crossings: 8 perennial stream crossings, 15 intermittent stream crossings, and 2 perennial lake/pond crossings.

Nebula-Raines Alternative Route 4 will run parallel adjacent with existing routing opportunities (roads) for 0.8 mile. The route does not collocate with any of the Company's existing transmission lines.

Nebula-Raines Alternative Route 4 is the second longest of the routes and would require correspondingly the second most right-of-way acreage. In addition, the route has the most crossing of forested land, has the most parcels crossed, and the second greatest amount of total wetlands crossed and most forested wetlands crossed when compared to the other three routes. Alternative Route 4 would also have the most residences within 500 feet of the centerline (17), tied for the fewest road crossings, and fewest total number of waterbodies crossed. Finally, Nebula-Raines Alternative Route 4 has the second largest impact on ecological cores (109.7 acres) and largest impact to C2 ranked cores (32.5 acres). While acknowledging the impacts of Nebula-Raines Alternative Route 4, the Company proposes Nebula-Raines Alternative Route 4 for notice and the Commission's consideration as a viable alternative to the Proposed Route.

Cloud-Nebula Proposed Route

Cloud-Nebula Proposed Route

The Cloud-Nebula Proposed Route would construct one overhead single circuit 230 kV transmission line supported primarily by double circuit monopoles with an idle conductor from the existing Cloud Switching Station to the proposed Nebula Station. As noted in Section I.I, the estimated conceptual cost of the Cloud-Nebula Proposed Route is approximately $13.3 million.

The Cloud-Nebula Proposed Route is approximately 0.9 mile in length. The Cloud-Nebula Proposed Route begins at the existing Cloud Switching Station and extends south for 0.5 mile, paralleling parcel lines. The route then turns to the east for 0.3 mile across managed timber land before turning south and then east for 0.1 mile and terminating at the proposed Nebula Station.

The Cloud-Nebula Proposed Route will cross a total of 0.9 mile of land affecting 10.8 acres of right-of-way. The route crosses three privately owned parcels. Land use along the right-of-way consists of 4.6 acres of forested land, 5.7 acres of open space, and 0.4 acre of developed area. The route has no residences within 500 feet of the centerline. Where the route crosses open lands, impacts would be limited to structure placement and land use activities could resume post construction. The 4.6 acres of forested land crossed would be cleared.

Based on ERM's desktop wetland and waterbody analysis, the right-of-way of the Cloud-Nebula Proposed Route will encompass approximately 6.2% (0.7 acre) of

land with a medium or higher probability of containing wetlands and waterbodies. Of these, approximately 0.4 acre consists of forested wetlands. The Cloud-Nebula Proposed Route would cross one intermittent waterbody.

The Cloud-Nebula Proposed Route is not collocated with any physical linear features; however, the route does follow parcel lines for the majority of the route (0.8 mile) and, therefore, was selected by the Company as the Proposed Route.

Summary of Routes

For all the reasons stated above and in the Routing Study, ERM and the Company support the Nebula-Raines Proposed Route (Route 5) and the Cloud-Nebula Proposed Route as the Project routes that avoid or reasonably minimize adverse impact to the greatest extent reasonably practicable on the scenic assets, historic and cultural resources, and environment of the area concerned.

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 times at the future Raines Substation and the existing Cloud Switching Station. Assuming the Commission issues a final order by September 30, 2025, as requested in Section I.H, the Company estimates that the proposed Project construction will commence in June 2027 and be completed by November 1, 2028.

In order to connect the new proposed transmission line to existing infrastructure, it will require outages less than 30 days in duration at the future Raines Substation and at the existing Cloud Switching Station in summer 2028. The outages at the Cloud Switching Station will be coordinated with PJM and MEC. Additionally, an outage of less than five days will be required to cross the Line #137 and #38 corridor at the appropriate time.

The Company intends to complete this work during requested outage windows, as described above. However, as with all outage scheduling, these outages may change depending on whether PJM approves the outages and other relevant considerations allow for it. It is customary for PJM to hold requests for outages and approve only shortly before the outages are expected to occur and, therefore, the requested outages are subject to change. Therefore, the Company will not have clarity on whether this work will be done as requested until very close in time to the requested outages. If PJM approves different outage dates, the Company will continue to diligently pursue timely completion of this work.

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: The Company routinely uses Attachment 1 to these Guidelines in routing its transmission line projects.

The Nebula-Raines Proposed Route and the Cloud-Nebula Proposed Route will avoid or minimize impacts to the maximum extent practicable on national historic places listed in the National Register of Historic Places ("NRHP"). Thus, it is consistent with Guideline #2 (where practical, rights of-way should avoid sites listed on the NRHP). A Stage I Pre-Application Analysis prepared by ERM on behalf of the Company is included with the Environmental Routing Study as Attachment Appendix G, and was submitted to the Virginia Department of Historic Resources ("VDHR") on January 22, 2025.

The Company utilized Guideline #3 (rights-of-way should avoid prime or scenic timbered areas, steep slopes and proximity to main highways where practical) by siting the Project's Proposed Routes away from main highways, with the exception of 1.9 miles along the South Hill Byway. Some crossing of highways was unavoidable; however, most crossings are at perpendicular angles to reduce visual impacts.

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

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

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

II. DESCRIPTION OF THE PROPOSED PROJECT

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

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

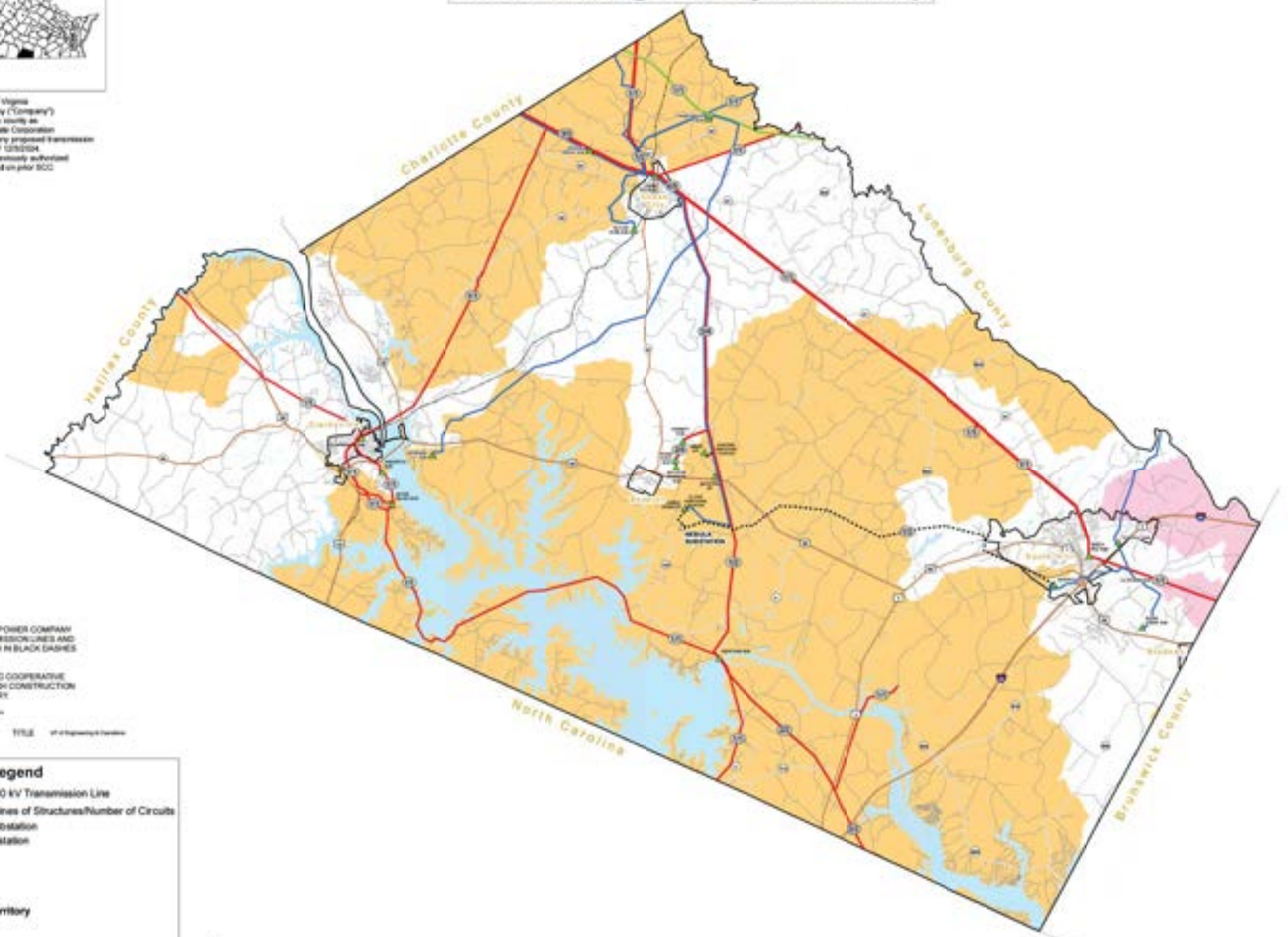
b. Provide three (3) color copies of the Virginia Department of Transportation "General Highway Map" for each county and city through which the line will pass. On the maps show the proposed line and all previously approved and certificated facilities of the Applicant. Also, where the line will be located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

Response: a. The Nebula-Raines Line traverses Mecklenburg County, Virginia, for a total of approximately 14.4 miles and the Cloud-Nebula Line traverses Mecklenburg County, Virginia, for a total of approximately 0.9 mile. Nebula-Raines Line #2399 is located within Dominion Energy Virginia service territory for approximately 4.8 miles and within MEC service territory for approximately 9.6 miles. Cloud-Nebula Line #2402 is located within MEC service territory for approximately 0.9 mile. The Company has confirmed that MEC does not object to the Nebula-Raines Proposed Route or the Cloud-Nebula Proposed Route.

b. An electronic copy of the Virginia Department of Transportation ("VDOT") "General Highway Map" for Mecklenburg 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.

Mecklenburg County Road Map

This digital map depicts the Virginia Electric and Power Company ("Company") transmission facilities in this county as approved by the Virginia State Corporation Commission ("SCC"), and any proposed transmission facilities in this county, as of 12/5/2024. Other Company facilities previously authorized by the SCC may be depicted on prior SCC approved county maps.



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

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

SIGNATURE

DATE 12/17/2024 TITLE

Legend

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

Provider Service Territory

- MEC
- SSEC
- VEPCO

2 1 0 2 4 6 Miles

Mecklenburg

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: The proposed Nebula-Raines Line #2399 will be designed and operated at 230 kV with no anticipated voltage upgrade and have a transfer capability of 1,573 MVA.

The proposed Cloud-Nebula Line #2402 will be designed and operated at 230 kV with no anticipated voltage upgrade and have a transfer capability of 1,573 MVA.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

Response: The 230 kV single circuit transmission lines will include three-phase twin-bundled 768.2 ACSS/TW/HS conductors arranged as shown in Attachments II.B.3.i-iii. 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

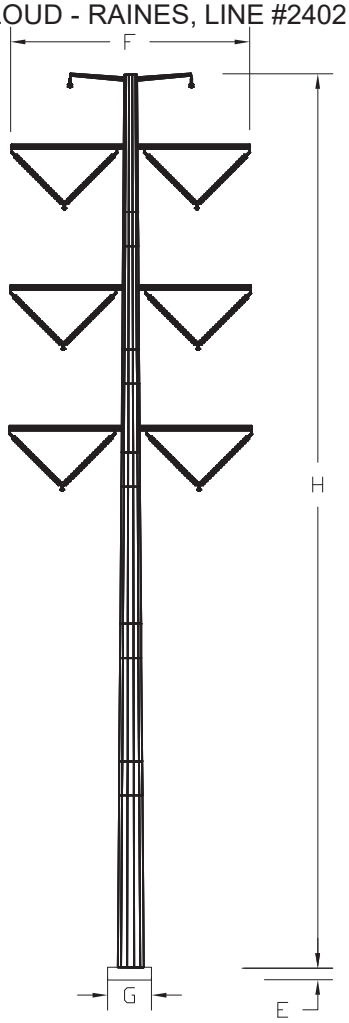
j. the minimum conductor-to-ground clearances under maximum operating conditions.

Response: See Attachment II.B.3.i-iii for subparts (b) through (j).[38]

For subpart (a), see Attachment II.B.3.iv for approximate mapping of the proposed structures along the Proposed Routes of the Nebula-Raines Line and the Cloud-Nebula Line, which are subject to change during final engineering.

[38] Note that the information provided in these diagrams represents the structures along both the Nebula-Raines Proposed Route (looking toward Nebula Switching Station) and the Cloud-Nebula Proposed Route (looking toward Cloud Switching Station) combined.

NEBULA - RAINES, LINE #2399
CLOUD - RAINES, LINE #2402



230kV DC ENGINEERED MONOPOLE SUSPENSION STRUCTURE

A. MAPPING OF THE ROUTE: SEE ATTACHMENT II.B.3.iv

B. RATIONALE FOR STRUCTURE TYPE: TO MINIMIZE RIGHT OF WAY

C. LENGTH OF R/W (STRUCTURE QTY): 15.2 MILES (81 STRUCTURES)

D. STRUCTURE MATERIAL: WEATHERING STEEL

RATIONALE FOR MATERIAL: WEATHERING STEEL WAS SELECTED TO MATCH OTHER LINES IN THE AREA

E. FOUNDATION MATERIAL: CONCRETE

AVERAGE FOUNDATION REVEAL: SEE NOTE 2

F. AVERAGE WIDTH AT CROSS ARM: 33'

G. AVERAGE WIDTH AT BASE: SEE NOTE 2

H. MINIMUM STRUCTURE HEIGHT: 110'

MAXIMUM STRUCTURE HEIGHT: 150'

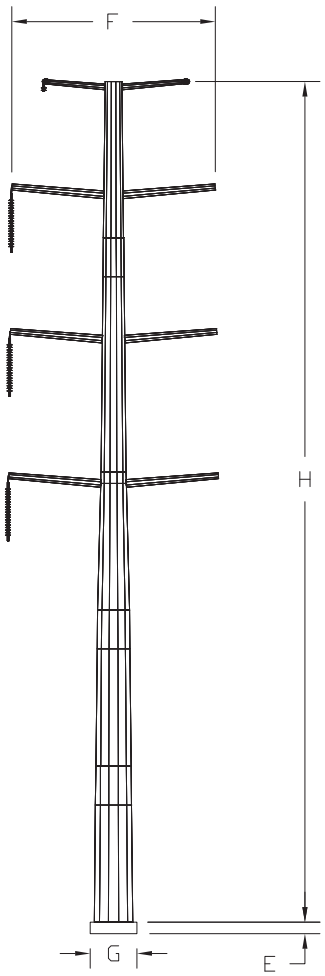
AVERAGE STRUCTURE HEIGHT: 124'

I. AVERAGE SPAN LENGTH (RANGE): 740' (739'-1255') (SEE NOTE 4)

J. MINIMUM CONDUCTOR-TO-GROUND: 22.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:
1. INFORMATION CONTAINED ON DRAWING IS PRELIMINARY IN NATURE AND SUBJECT TO CHANGE DURING FINAL DESIGN.
2. A MINIMUM FOUNDATION REVEAL SHALL BE 1.5 FEET. FOUNDATION DIAMETER SHALL BE BASED ON FINAL ENGINEERING.
3. STRUCTURE HEIGHTS ARE MEASURED FROM STRUCTURE CENTERLINE AND DO NOT INCLUDE FOUNDATION REVEAL.
4. THE SPAN ASSOCIATED WITH EACH STRUCTURE IS THE AHEAD SPAN.

NEBULA - RAINES, LINE #2399
CLOUD - RAINES, LINE #2402



230kV DC ENGINEERED MONOPOLE SUSPENSION STRUCTURE

A. MAPPING OF THE ROUTE: SEE ATTACHMENT II.B.3.iv

B. RATIONALE FOR STRUCTURE TYPE: TO MINIMIZE RIGHT OF WAY

C. LENGTH OF R/W (STRUCTURE QTY): 15.2 MILES (27 STRUCTURES)

D. STRUCTURE MATERIAL: WEATHERING STEEL

RATIONALE FOR MATERIAL: WEATHERING STEEL WAS SELECTED TO MATCH OTHER LINES IN THE AREA

E. FOUNDATION MATERIAL: CONCRETE

AVERAGE FOUNDATION REVEAL: SEE NOTE 2

F. AVERAGE WIDTH AT CROSS ARM: 25'

G. AVERAGE WIDTH AT BASE: SEE NOTE 2

H. MINIMUM STRUCTURE HEIGHT: 105'

MAXIMUM STRUCTURE HEIGHT: 135'

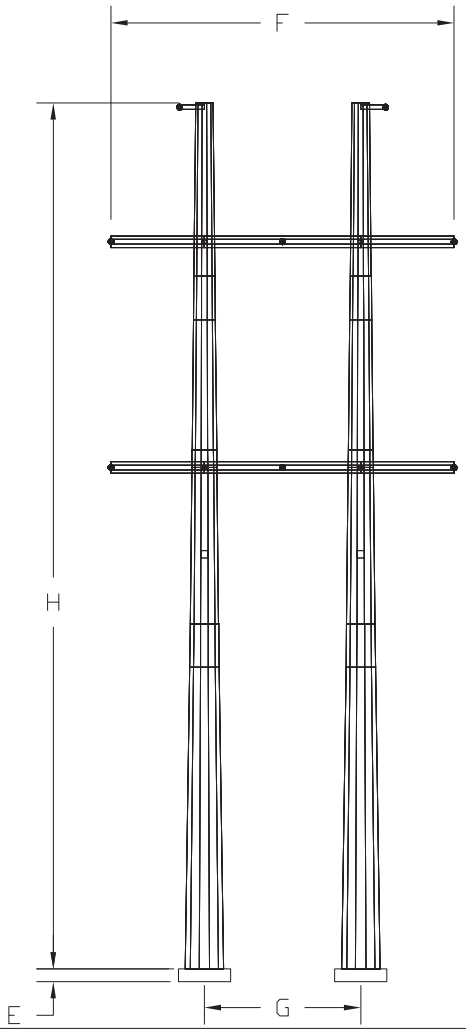
AVERAGE STRUCTURE HEIGHT: 119'

I. AVERAGE SPAN LENGTH (RANGE): 712' (342'-1030') (SEE NOTE 4)

J. MINIMUM CONDUCTOR-TO-GROUND: 22.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:
1. INFORMATION CONTAINED ON DRAWING IS PRELIMINARY IN NATURE AND SUBJECT TO CHANGE DURING FINAL DESIGN.
2. A MINIMUM FOUNDATION REVEAL SHALL BE 1.5 FEET. FOUNDATION DIAMETER SHALL BE BASED ON FINAL ENGINEERING.
3. STRUCTURE HEIGHTS ARE MEASURED FROM STRUCTURE CENTERLINE AND DO NOT INCLUDE FOUNDATION REVEAL.
4. THE SPAN ASSOCIATED WITH EACH STRUCTURE IS THE AHEAD SPAN.

NEBULA - RAINES, LINE #2399



230kV DC ENGINEERED H-FRAME DDE STRUCTURE

A. MAPPING OF THE ROUTE: SEE ATTACHMENT II.B.3.iv

B. RATIONALE FOR STRUCTURE TYPE: TO FACILITATE TRANSMISSION CROSSING

C. LENGTH OF R/W (STRUCTURE QTY): 14.2 MILES (2 STRUCTURE)

D. STRUCTURE MATERIAL: WEATHERING STEEL

RATIONALE FOR MATERIAL: WEATHERING STEEL WAS SELECTED TO MATCH OTHER LINES IN THE AREA

E. FOUNDATION MATERIAL: CONCRETE

AVERAGE FOUNDATION REVEAL: SEE NOTE 2

F. AVERAGE WIDTH AT CROSS ARM: 50'

G. AVERAGE WIDTH AT BASE: SEE NOTE 2

H. MINIMUM STRUCTURE HEIGHT: 165'

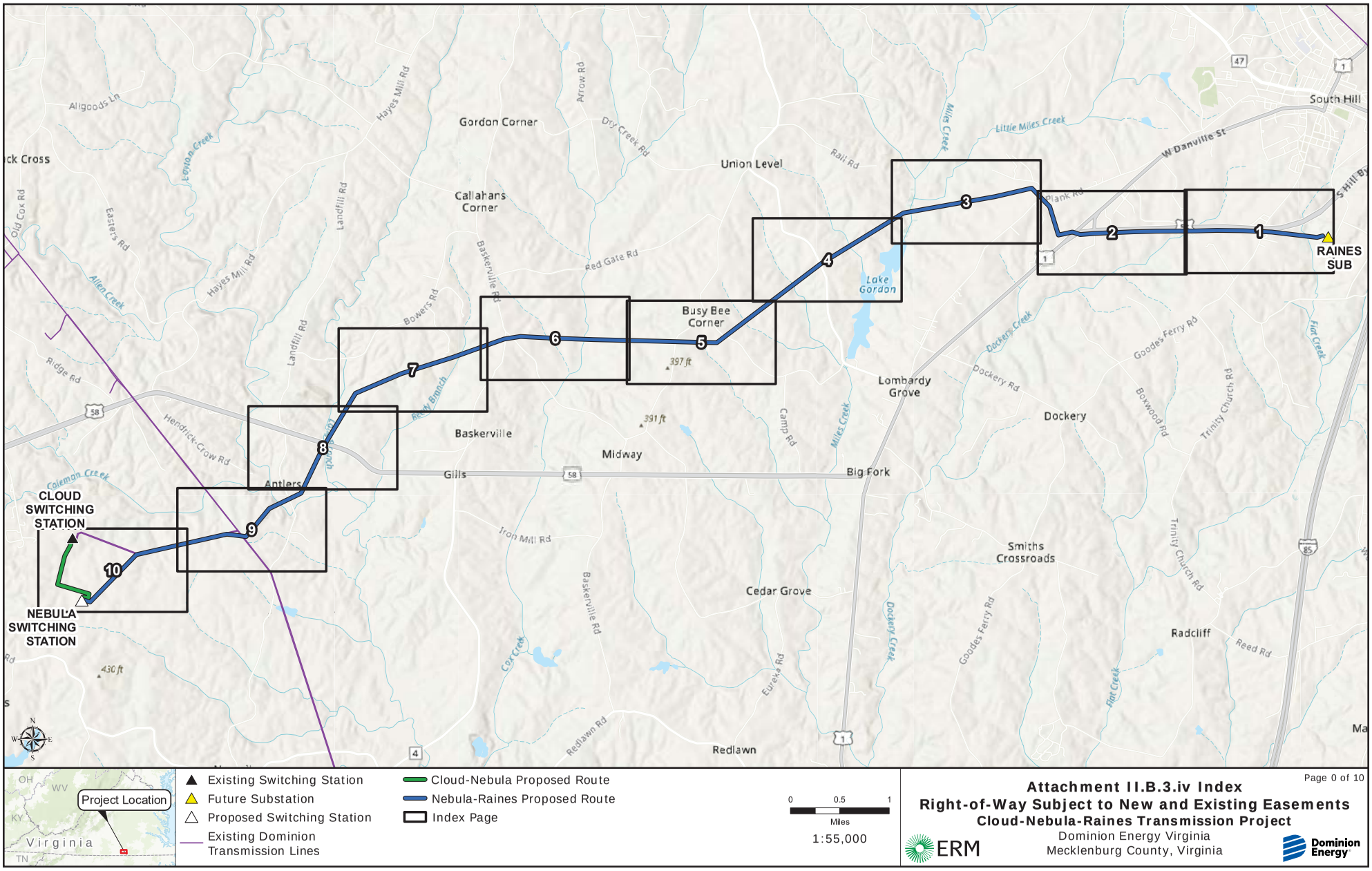
MAXIMUM STRUCTURE HEIGHT: 175'

AVERAGE STRUCTURE HEIGHT: 170'

I. AVERAGE SPAN LENGTH (RANGE): 522' (503'-540') (SEE NOTE 4)

J. MINIMUM CONDUCTOR-TO-GROUND: 22.5' (AT MAXIMUM OPERATING TEMPERATURE)

NOTES:
1. INFORMATION CONTAINED ON DRAWING IS PRELIMINARY IN NATURE AND SUBJECT TO CHANGE DURING FINAL DESIGN.
2. A MINIMUM FOUNDATION REVEAL SHALL BE 1.5 FEET. FOUNDATION DIAMETER SHALL BE BASED ON FINAL ENGINEERING.
3. STRUCTURE HEIGHTS ARE MEASURED FROM STRUCTURE CENTERLINE AND DO NOT INCLUDE FOUNDATION REVEAL.
4. THE SPAN ASSOCIATED WITH EACH STRUCTURE IS THE AHEAD SPAN.



Page 0 of 10

Attachment II.B.3.iv Index

Right-of-Way Subject to New and Existing Easements

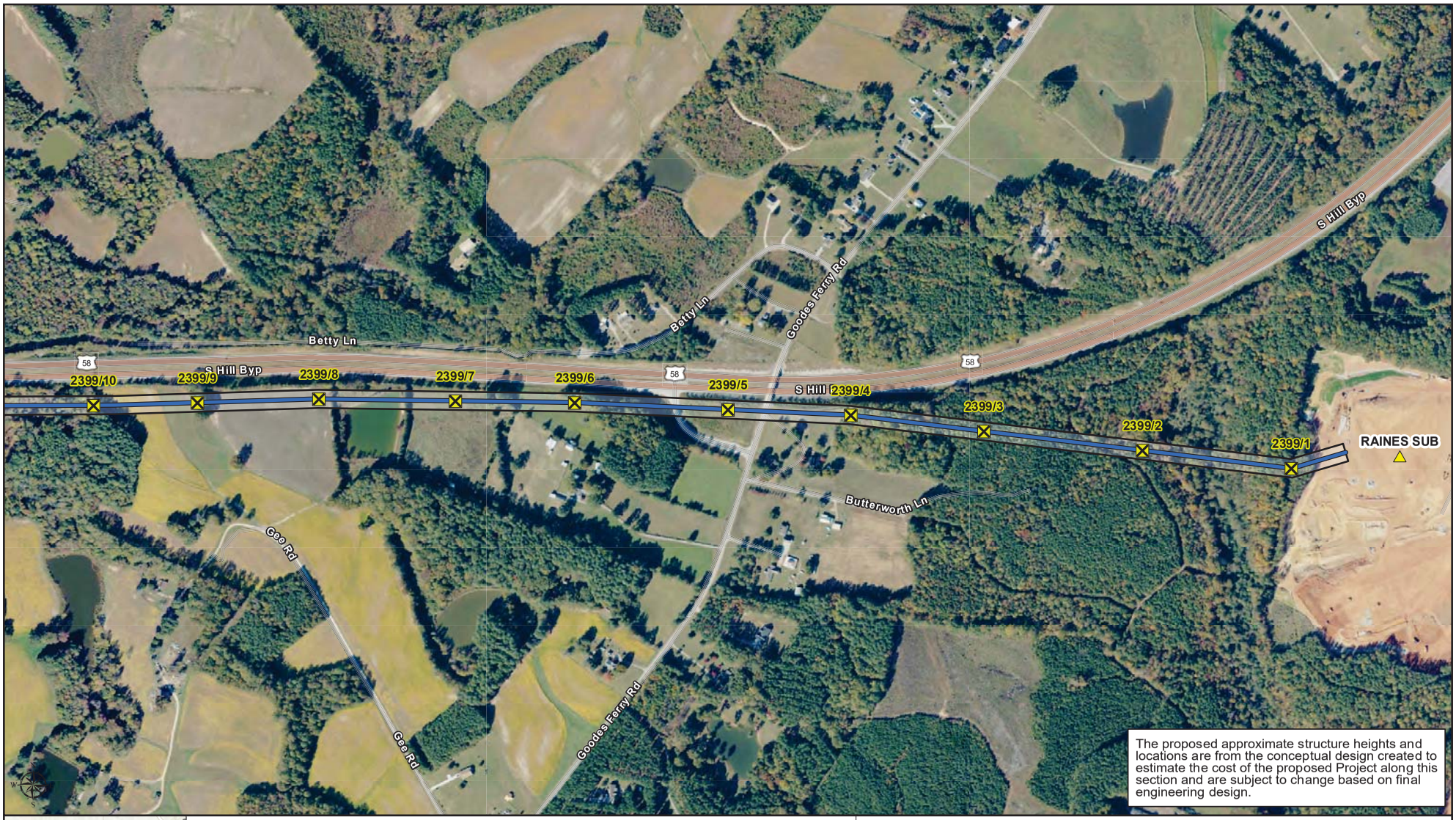
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

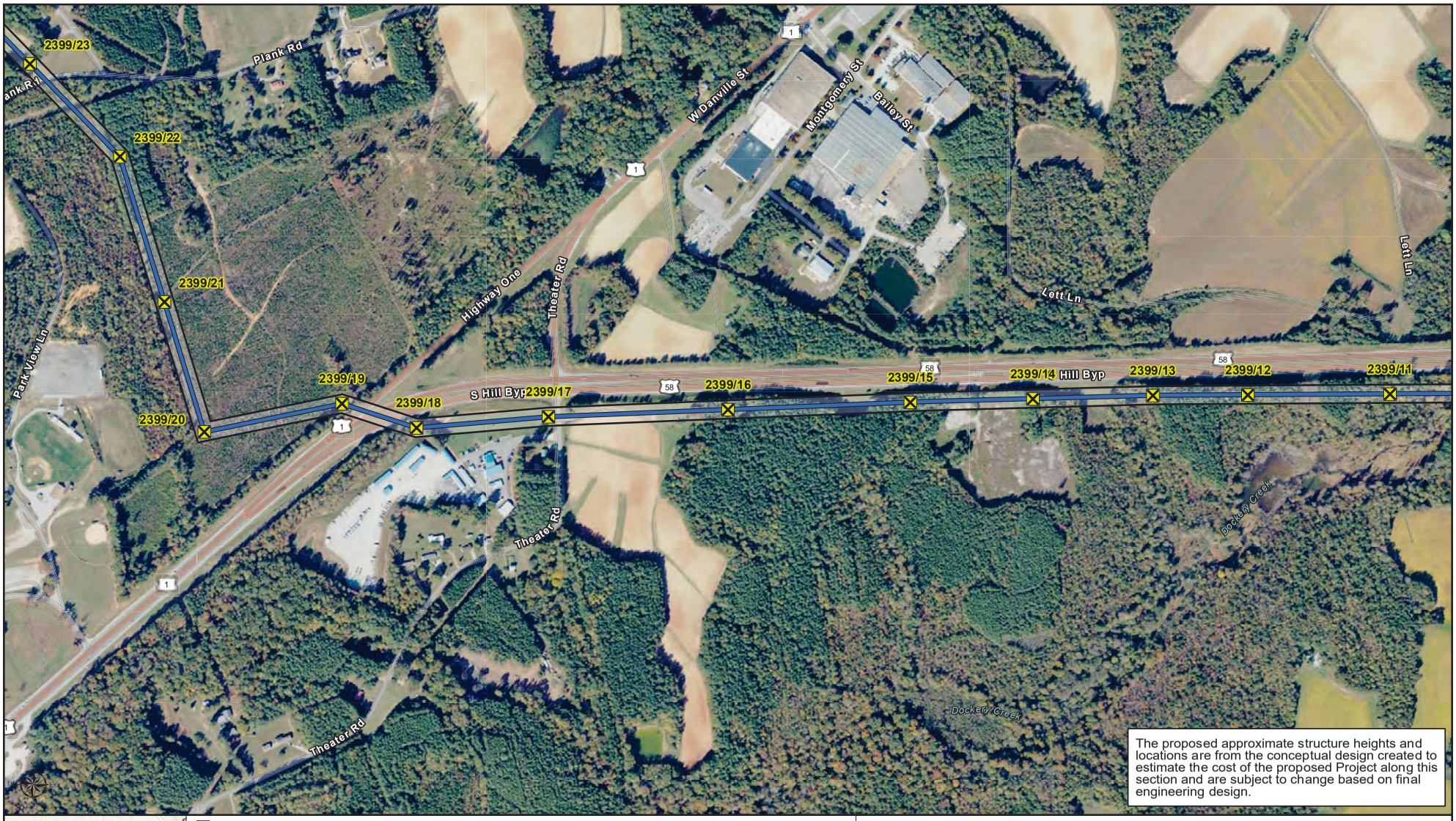
Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

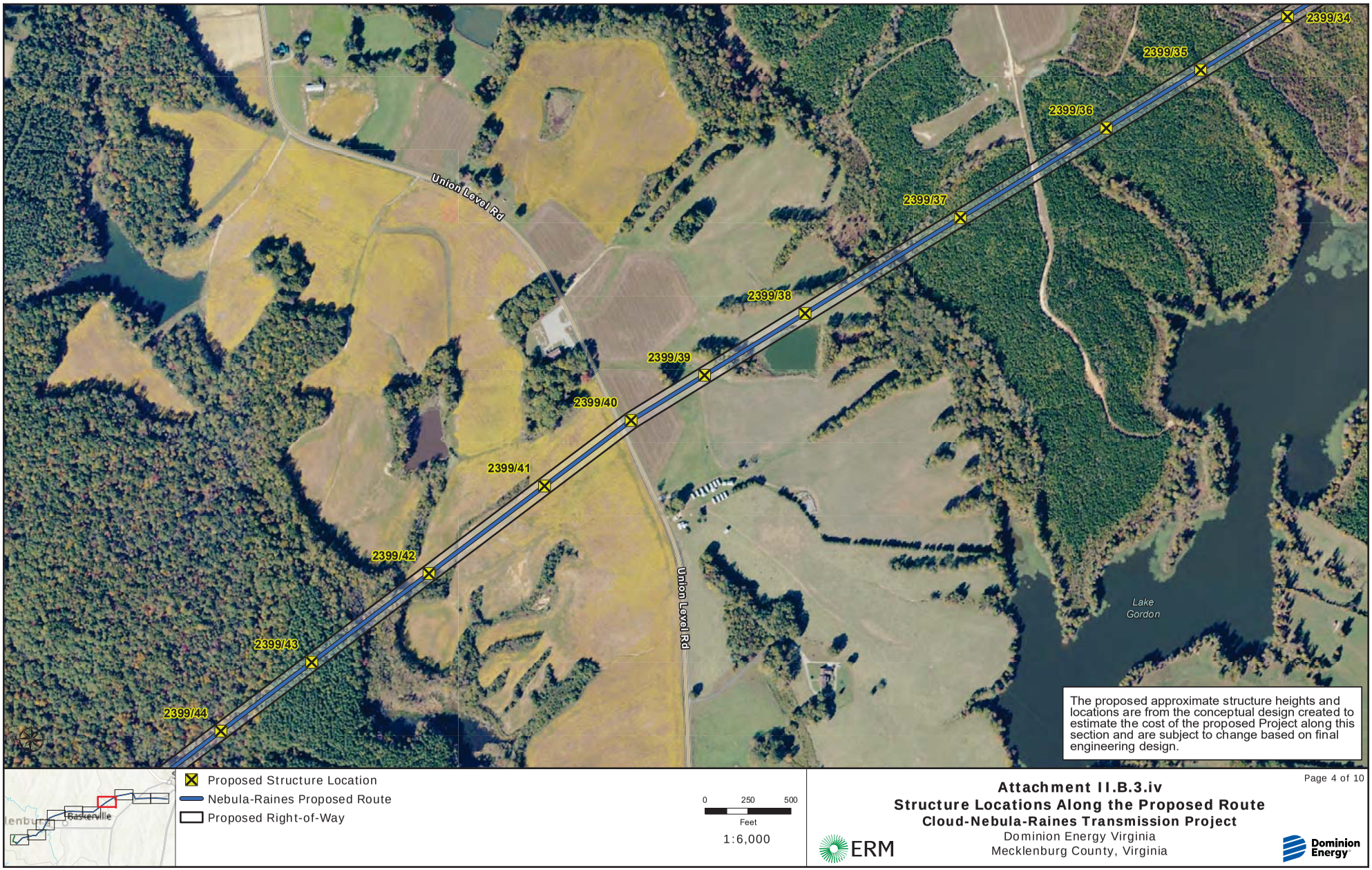
ERM

Dominion Energy

Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

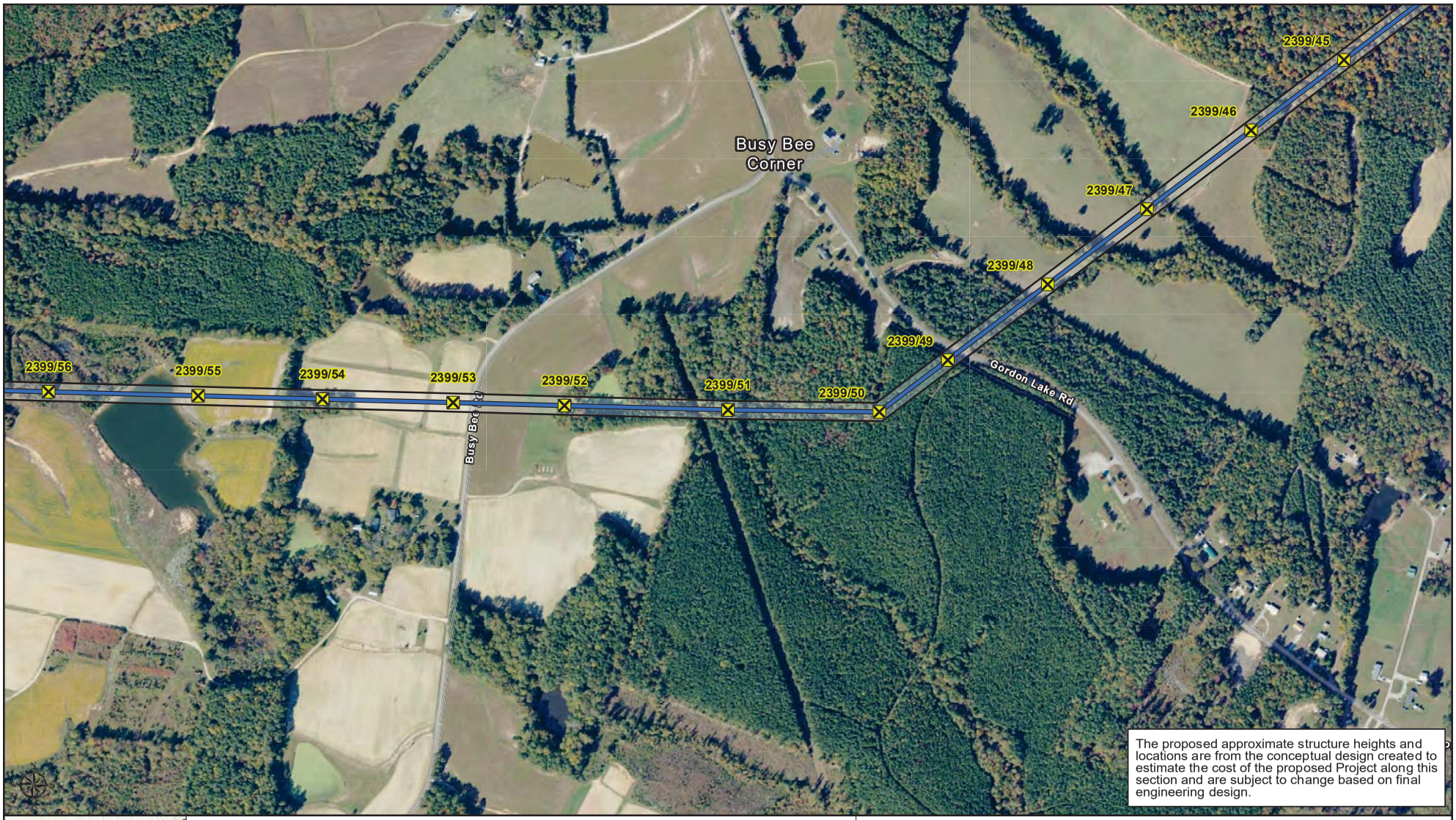
Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

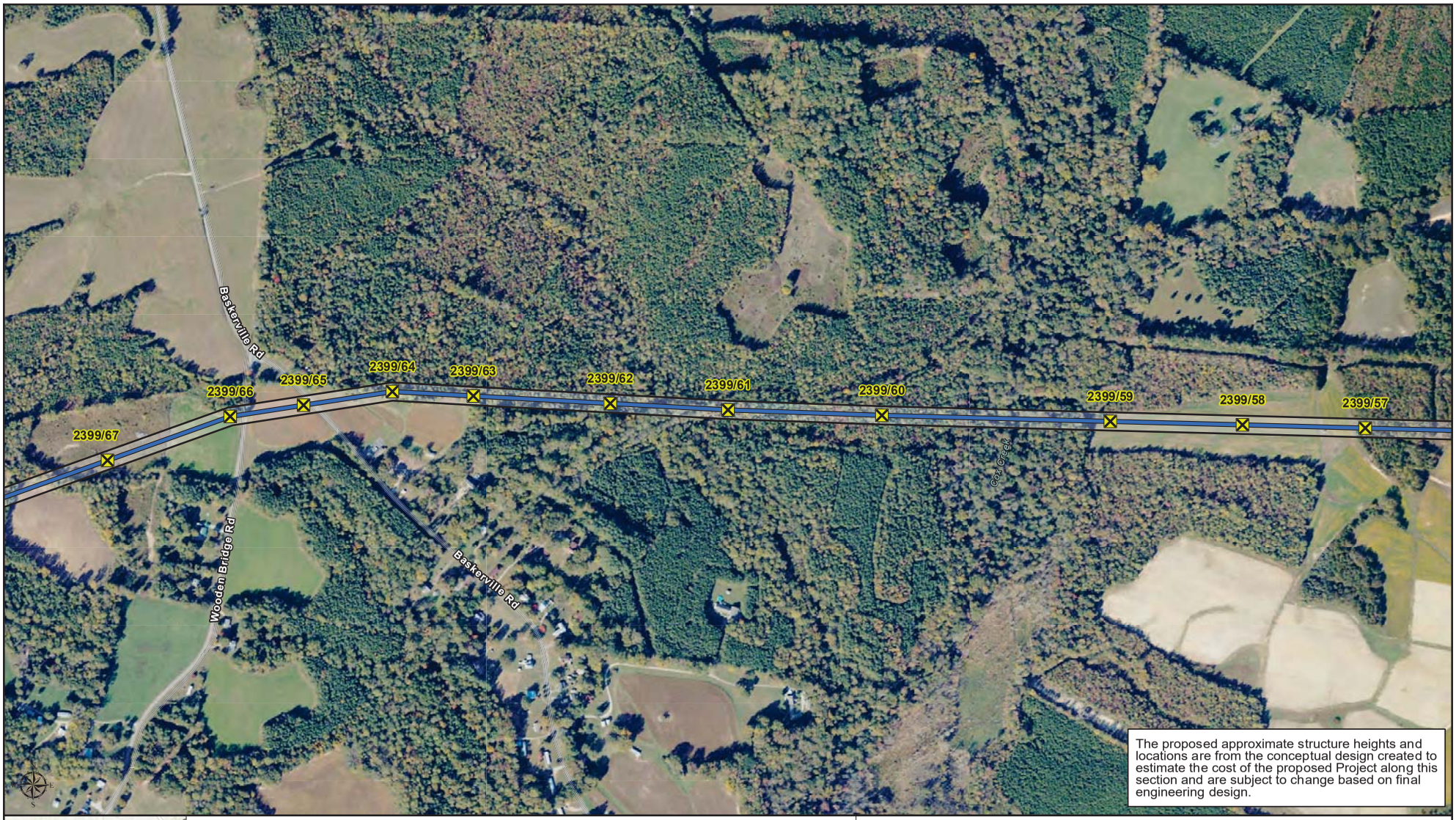
Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

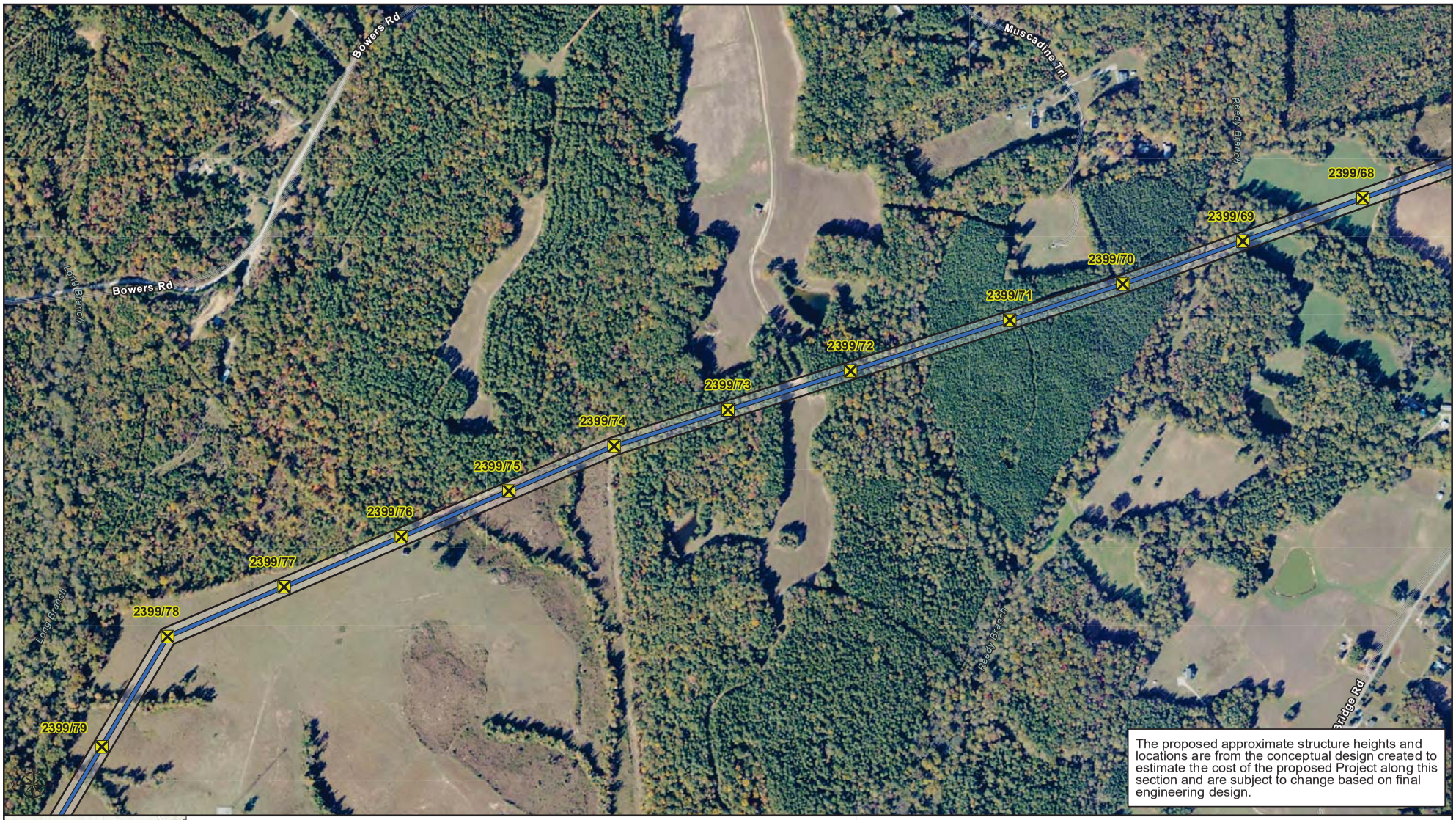
Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

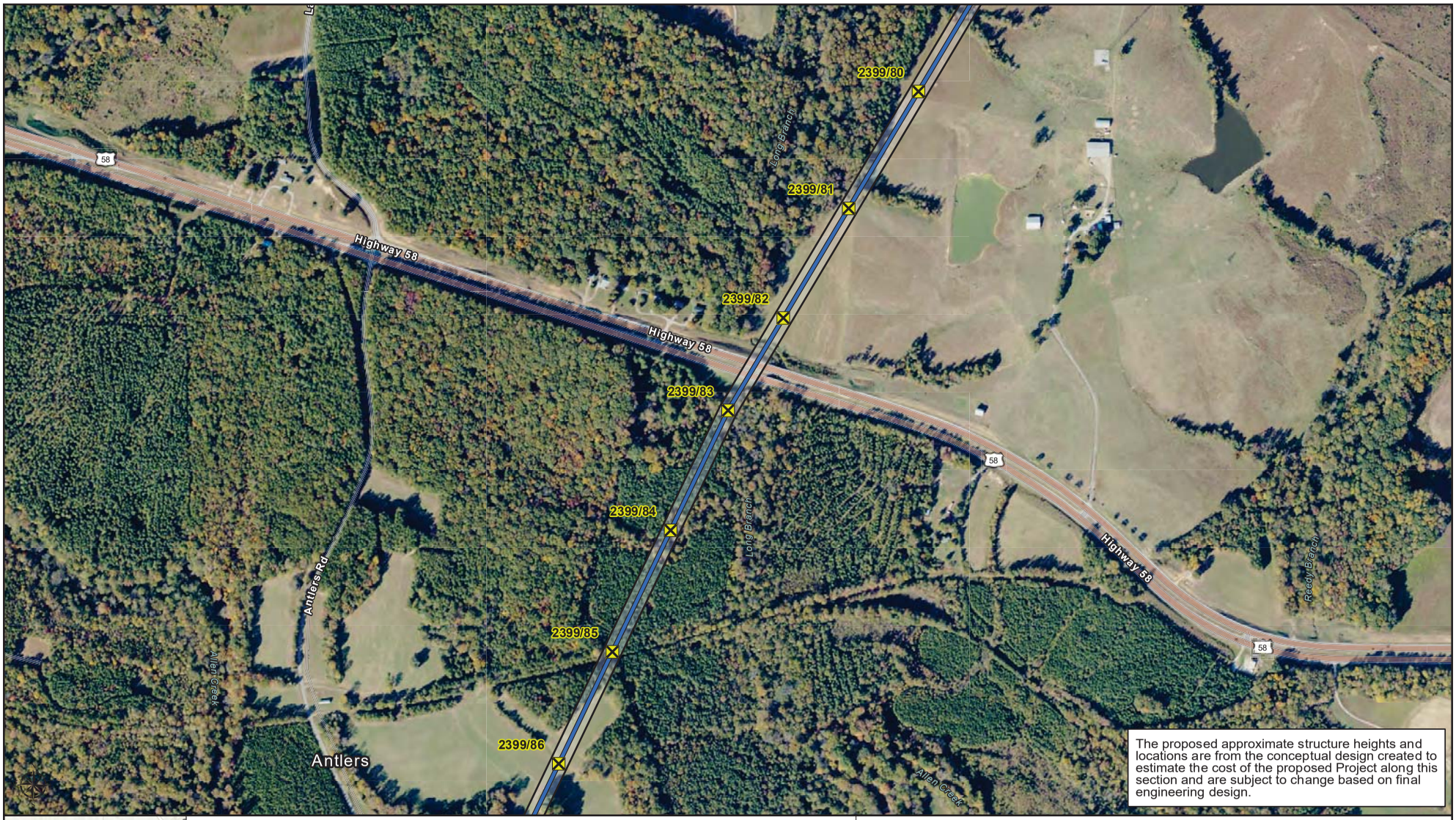
Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

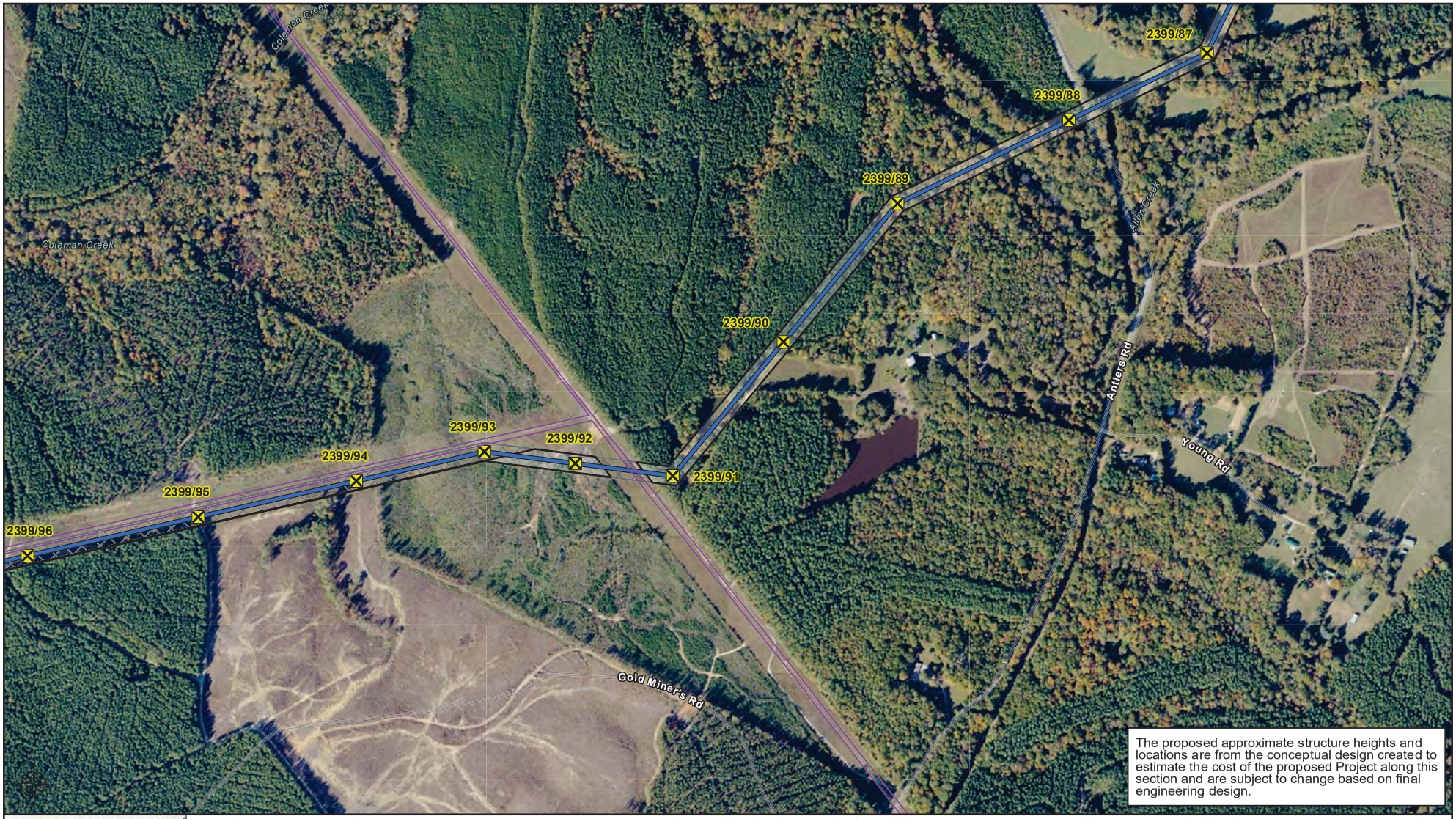
Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

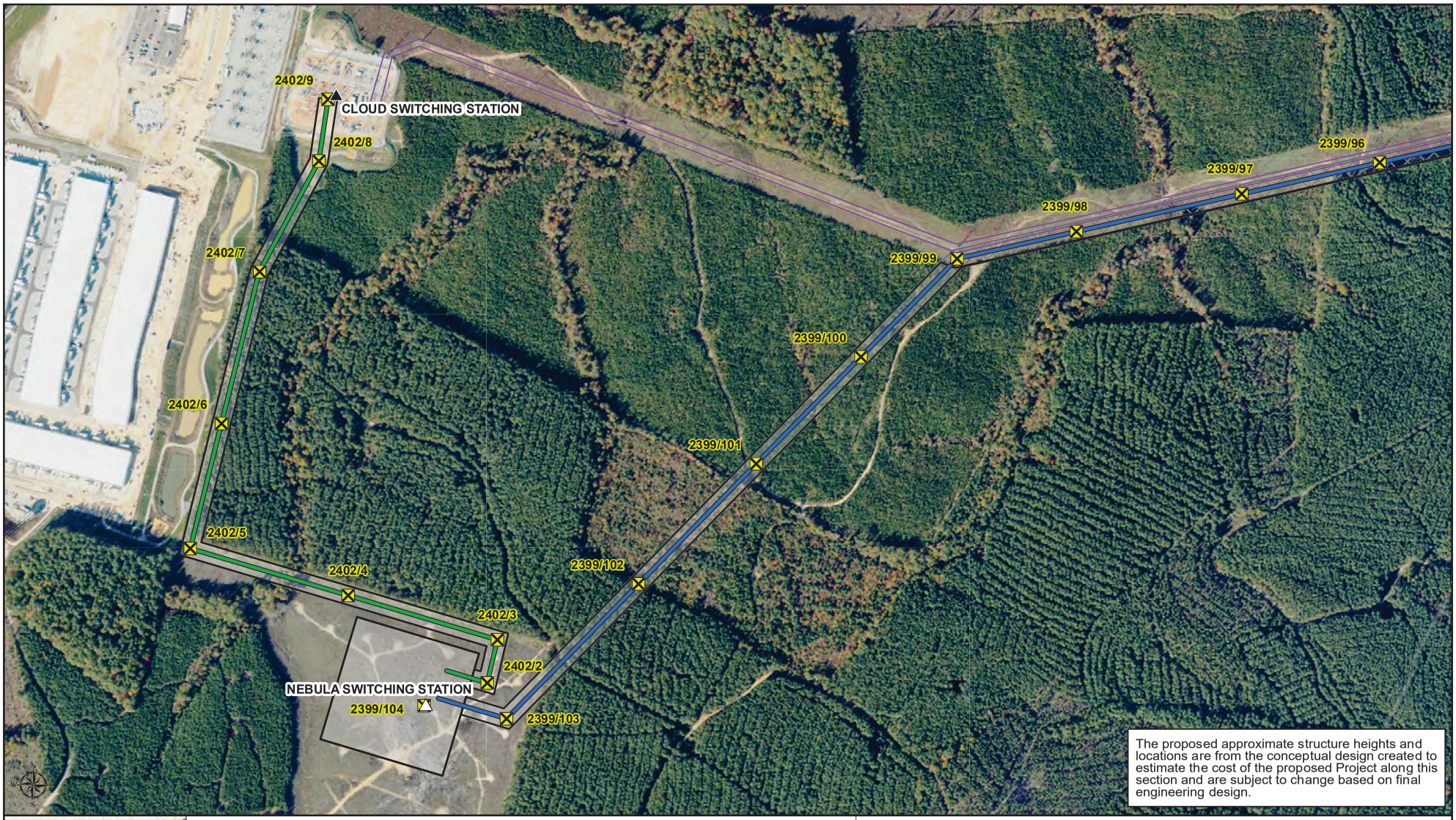
Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment II.B.3.iv
Structure Locations Along the Proposed Route
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

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

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

Route	Minimum (ft.)	Maximum (ft.)	Average (ft.)
Nebula-Raines Line			
Proposed Route (Route 5)	110	175	124
Alternative Route 1	110	175	124
Alternative Route 3	110	175	124
Alternative Route 4	110	175	124
Cloud-Nebula Line			
Proposed Route	105	130	122

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] Not applicable.

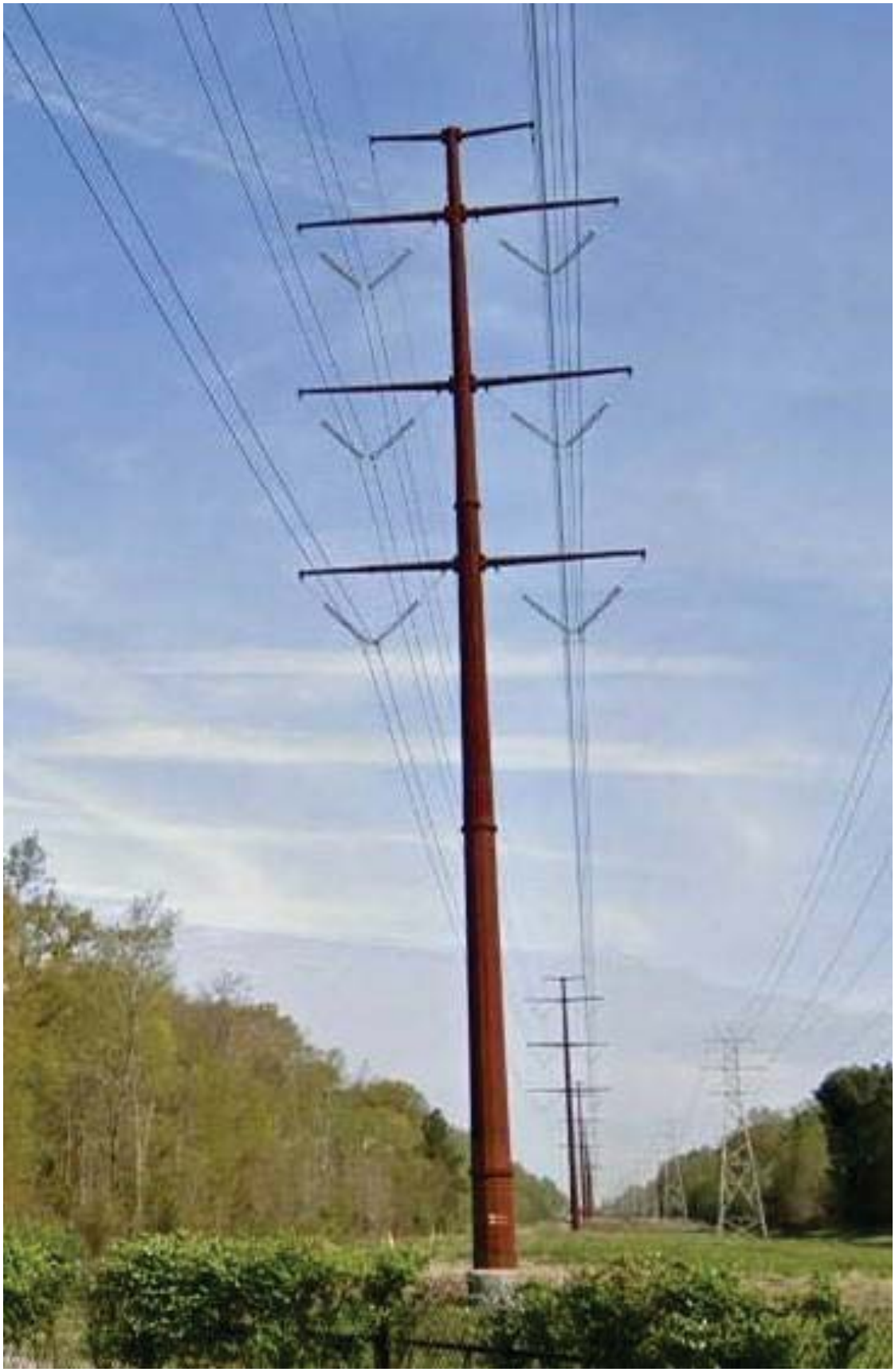
[b] See Attachments II.B.6.b.i-iii for representative photographs of the proposed structure types.

[c] Visual simulations showing the appearance of the proposed transmission structures at identified historic locations within 1.0 mile of the Proposed and Alternative Routes of the Nebula-Raines Line and Cloud-Nebula Line centerlines 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 Geographic Information Systems modeling to depict whether the proposed structures will be visible from the identified historic property. The historic properties evaluated are described below. See also the Stage I Pre-Application Analysis Report contained in Appendix G of the Environmental Routing Study.

Historic Property	Viewpoint	Comments
Sycamore Lodge (VDHR ID# 058-0057)	KOP 101	Nebula-Raines Route Alternatives 3 and 4 would have no impact on 058-0057.
Deloney's Ordinary/Lombardy Grove Tavern (VDHR ID# 058-0073)	KOP 103	Nebula-Raines Route Alternatives 3 and 4 would have no more than a minimal impact on 058-0073.
M.H. Upton House (VDHR ID# 058-0140)	KOP 104 & KOP 105	Nebula-Raines Proposed Route, Route Alternatives 1, 3, and 4 would have no more than a minimal impact on 058-0140.
Sanders Farm (VDHR ID# 058-0141)	KOP 107	Nebula-Raines Proposed Route would have a severe impact on 058-0141 while Route Alternative 4 would have no impact on 058-0141.
Tobacco Barn (VDHR ID# 058-0175)	KOP 108	Nebula-Raines Route Alternative 4 would have no more than a minimal impact on 058-0175.
Tobacco Barn (VDHR ID# 058-0309)	KOP 110	Nebula-Raines Proposed Route and Route Alternative 4 would have no impact on 058-0309.

Historic Property	Viewpoint	Comments
Mecklenburg County Poorhouse Cemetery (VDHR ID# 058-5092)	KOP 112	Cloud-Nebula Proposed Route, Nebula-Raines Proposed Route, Route Alternatives 1, 3, and 4 would have no impact on 058-5092.
Carey Farmhouse (VDHR ID# 058-5412)	KOP 113	Nebula-Raines Route Alternative 1 would have no more than a minimal impact on 058-5412.
East End High School (no VDHR ID #)	KOP 114	Nebula-Raine Route Alternatives 3 and 4 would have no more than a minimal impact on East End High School.

See Attachment III.B.2 and Attachment III.B.3 for visual simulations of key locations evaluated.



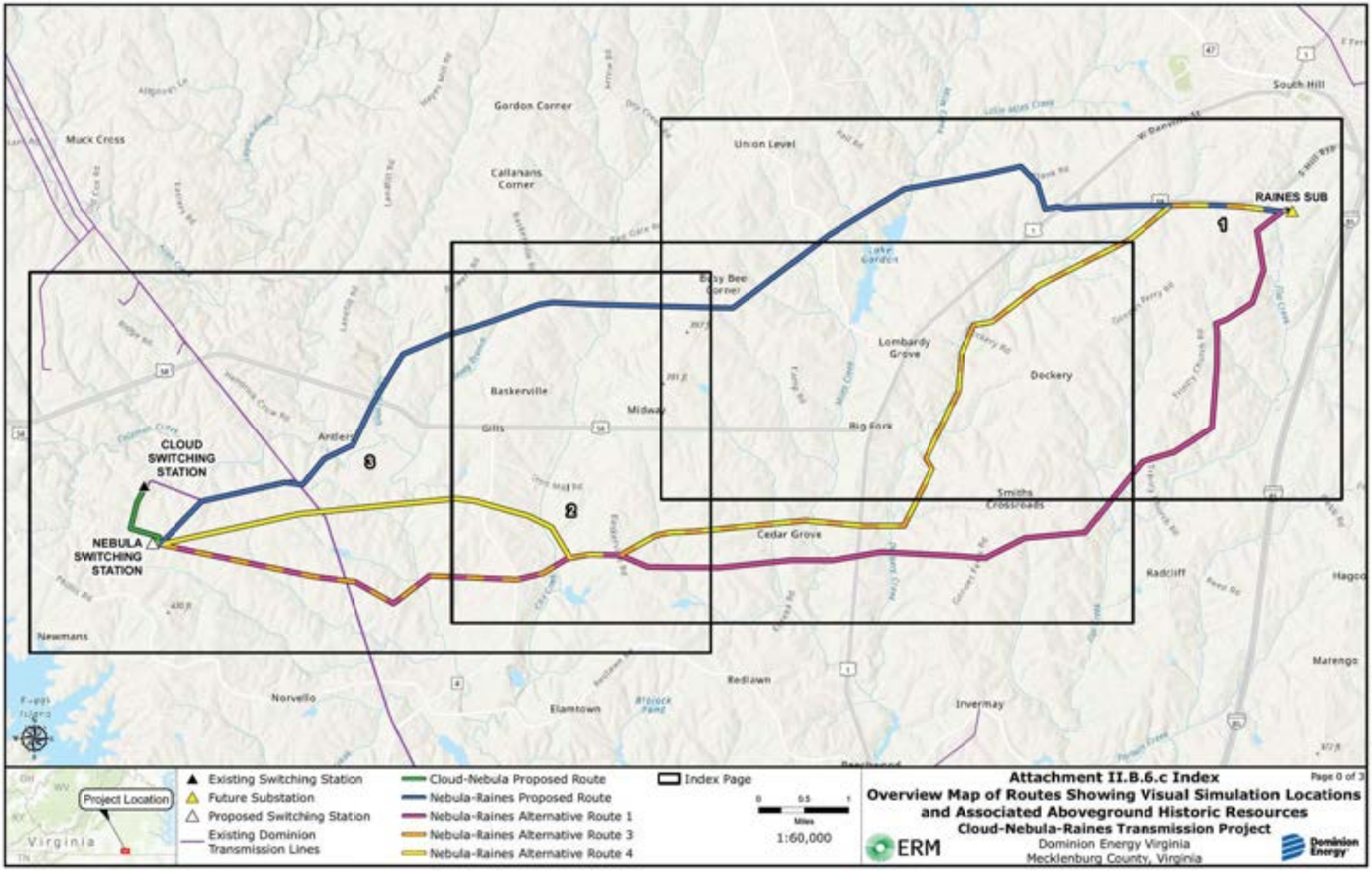
Proposed Structure Type:
230 kV Single Circuit Steel Monopole (Tangent)

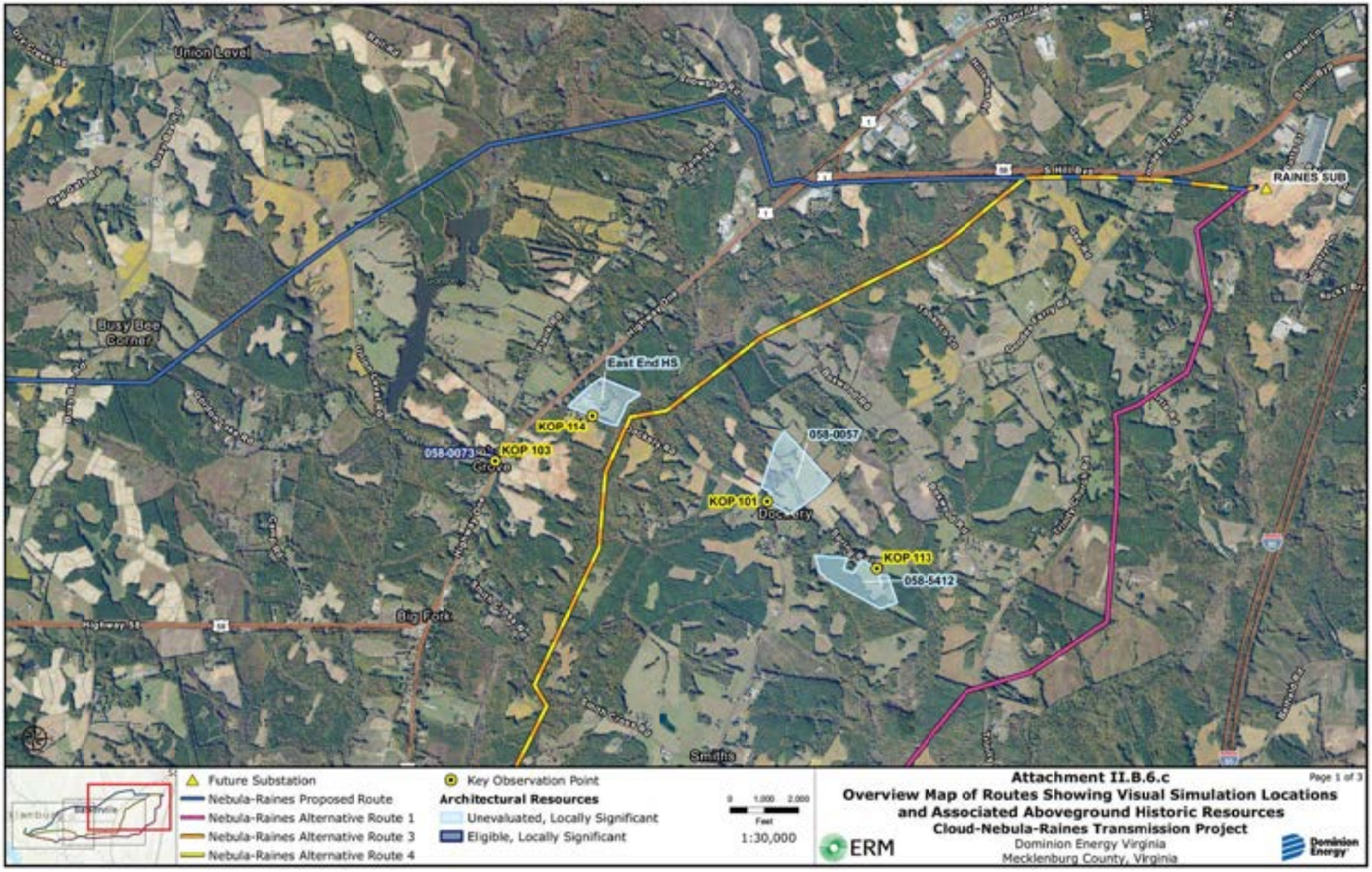
Proposed Structure Type:
230 kV Deadend Monopole

Dominion Energy

Proposed Structure Type:

230 kV Double Circuit Steel H-Frame (Double Deadend)


CLOUD SWITCHING STATION
NEBULA SWITCHING STATION
RAINES SUB
1
2
3
Gordon Corner
Muck Cress
Callaways Corner
Union Level
South Hill
Lake Gordon
Bay Bee Corner
Lombardy Grove
Dockery
Baskerville
Midway
Gills
Big Fork
Smiths Crossroads
Cedar Grove
Radcliff
Hagood
Newmans
Norvello
Elamtown
Redlawn
Invermay
Marengo
Project Location
Virginia
Existing Switching Station
Future Substation
Proposed Switching Station
Existing Dominion Transmission Lines
Cloud-Nebula Proposed Route
Nebula-Raines Proposed Route
Nebula-Raines Alternative Route 1
Nebula-Raines Alternative Route 3
Nebula-Raines Alternative Route 4
Index Page
0 0.5 1
Miles
1:60,000
Attachment II.B.6.c Index
Page 0 of 3
Overview Map of Routes Showing Visual Simulation Locations and Associated Aboveground Historic Resources
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia
ERM
Dominion Energy



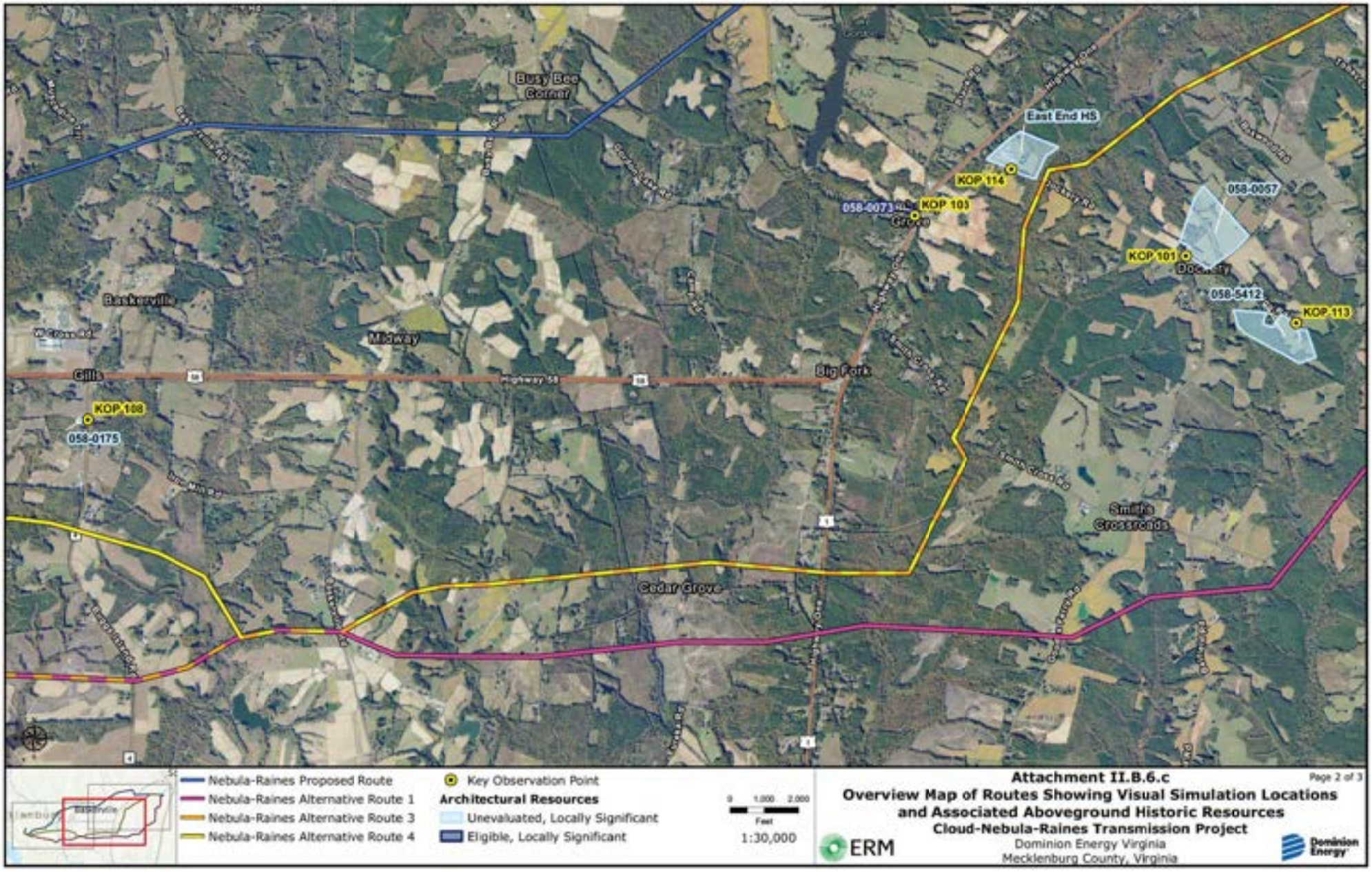
Attachment II.B.6.c Page 1 of 3

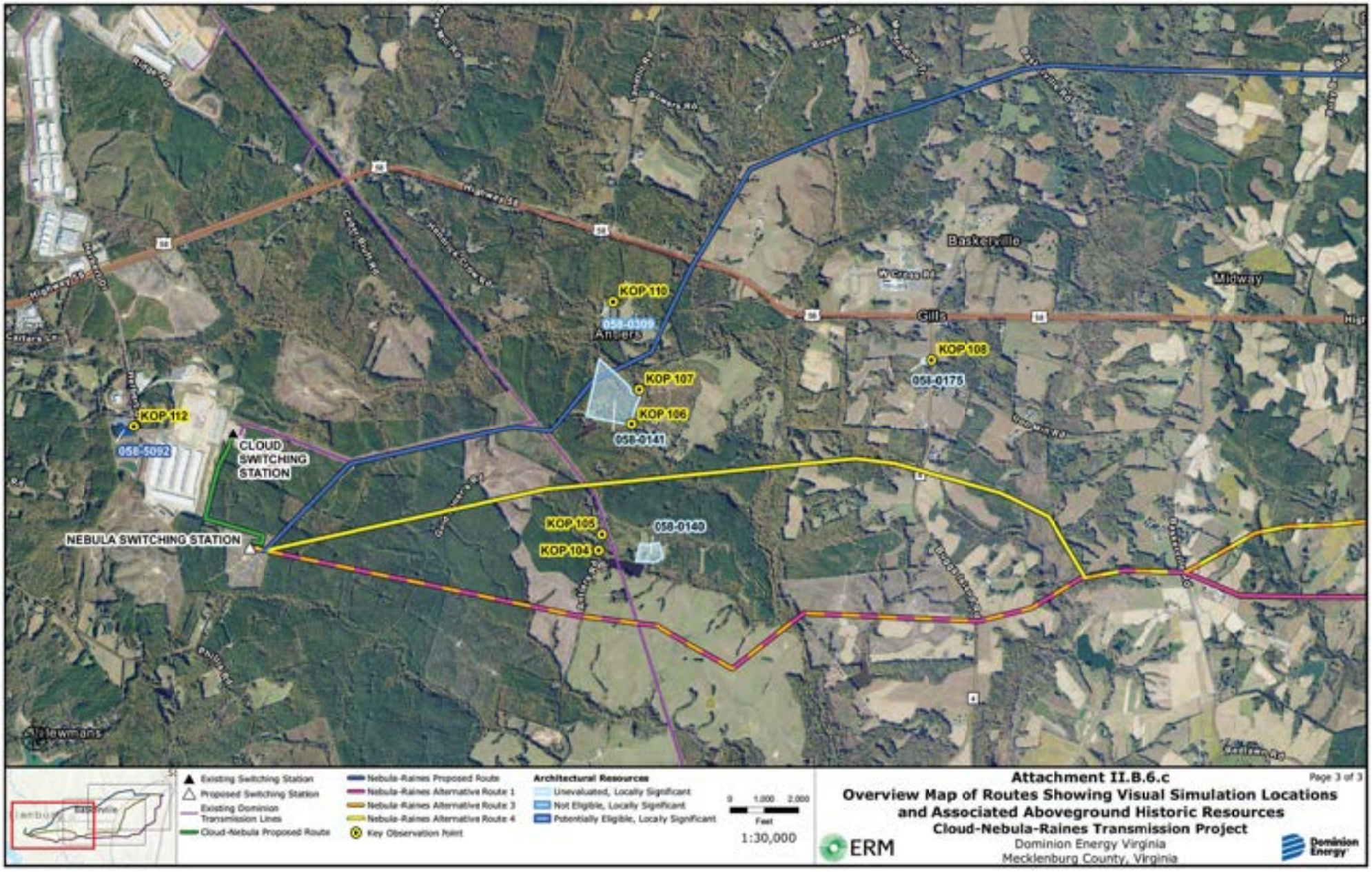
Overview Map of Routes Showing Visual Simulation Locations and Associated Aboveground Historic Resources

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia


Busy Bee Corner
East End HS
KOP 114
KOP 103
058-0073
058-0057
KOP 101
058-5412
KOP 113
Baskerville
Midway
Gills
Highway 58
Big Fork
KOP 108
058-0175
Smiths Crossroads
Cedar Grove
Nebula-Raines Proposed Route
Nebula-Raines Alternative Route 1
Nebula-Raines Alternative Route 3
Nebula-Raines Alternative Route 4
Key Observation Point
Architectural Resources
Unevaluated, Locally Significant
Eligible, Locally Significant
0 1,000 2,000
Feet
1:30,000
ERM
Attachment II.B.6.c
Page 2 of 3
Overview Map of Routes Showing Visual Simulation Locations and Associated Aboveground Historic Resources
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia
Dominion Energy



Attachment II.B.6.c Page 3 of 3

Overview Map of Routes Showing Visual Simulation Locations and Associated Aboveground Historic Resources

Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

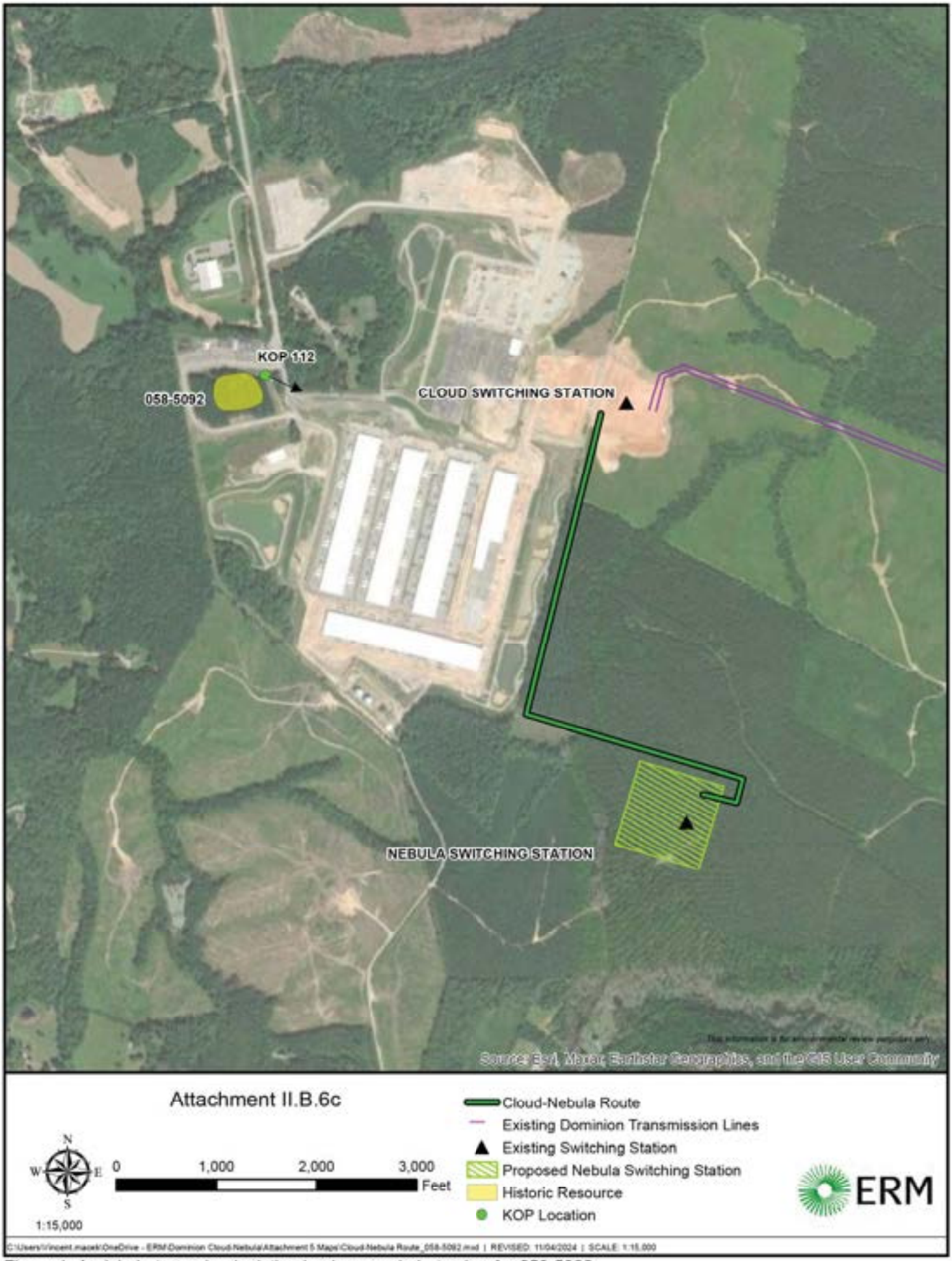


Figure 1. Aerial photography depicting land use and photo view for 058-5092.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES

230 kV Electric Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

Dominion Energy

KOP 112

Herbert Dr

Route: 1

Date:08/13/2024

Time: 10:47 am

Viewing Direction: Southeast

Distance to closest feature: 0.5 miles

Legend

- ▲ Existing Switching Station
- △ Proposed Switching Station
- Existing Dominion Transmission Lines
- KOP View Direction
- Cloud-Nebula Route

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

Figure 3. Aerial photography depicting land use and photo view for 058-0140.

EXISTING CONDITIONS

PROPOSED CONDITIONS

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 104

Antlers Rd

Route: 1
Date:08/13/2024
Time: 11:15 am
Viewing Direction: South
Distance to closest feature: 0.4 miles

Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 1

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

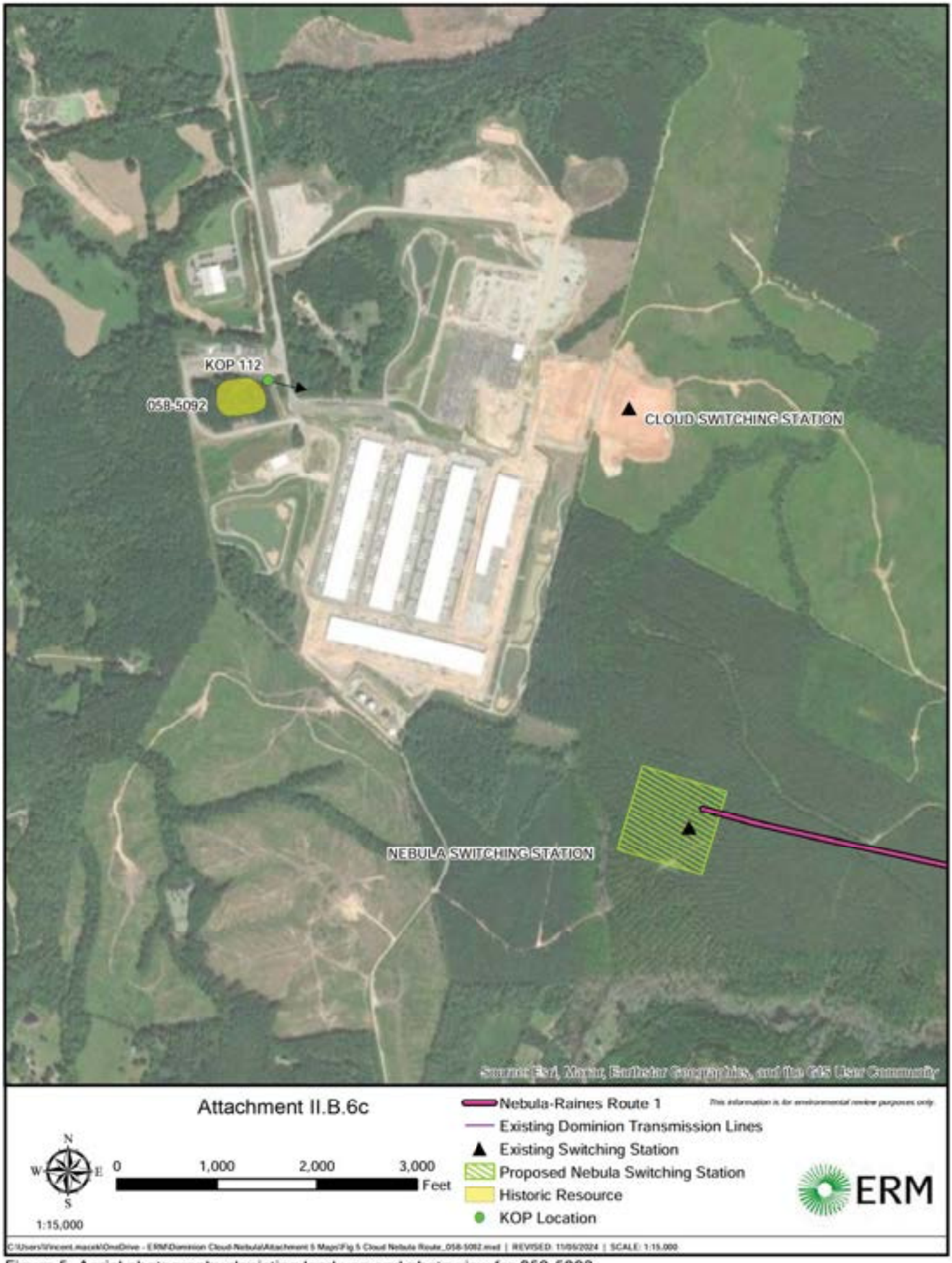


Figure 5. Aerial photography depicting land use and photo view for 058-5092.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 112

Herbert Dr

Route: 1
Date:08/13/2024
Time: 10:47 am
Viewing Direction: Southeast
Distance to closest feature: 1.0 miles

Legend

- ▲ Existing Switching Station
- △ Proposed Switching Station
- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 1

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

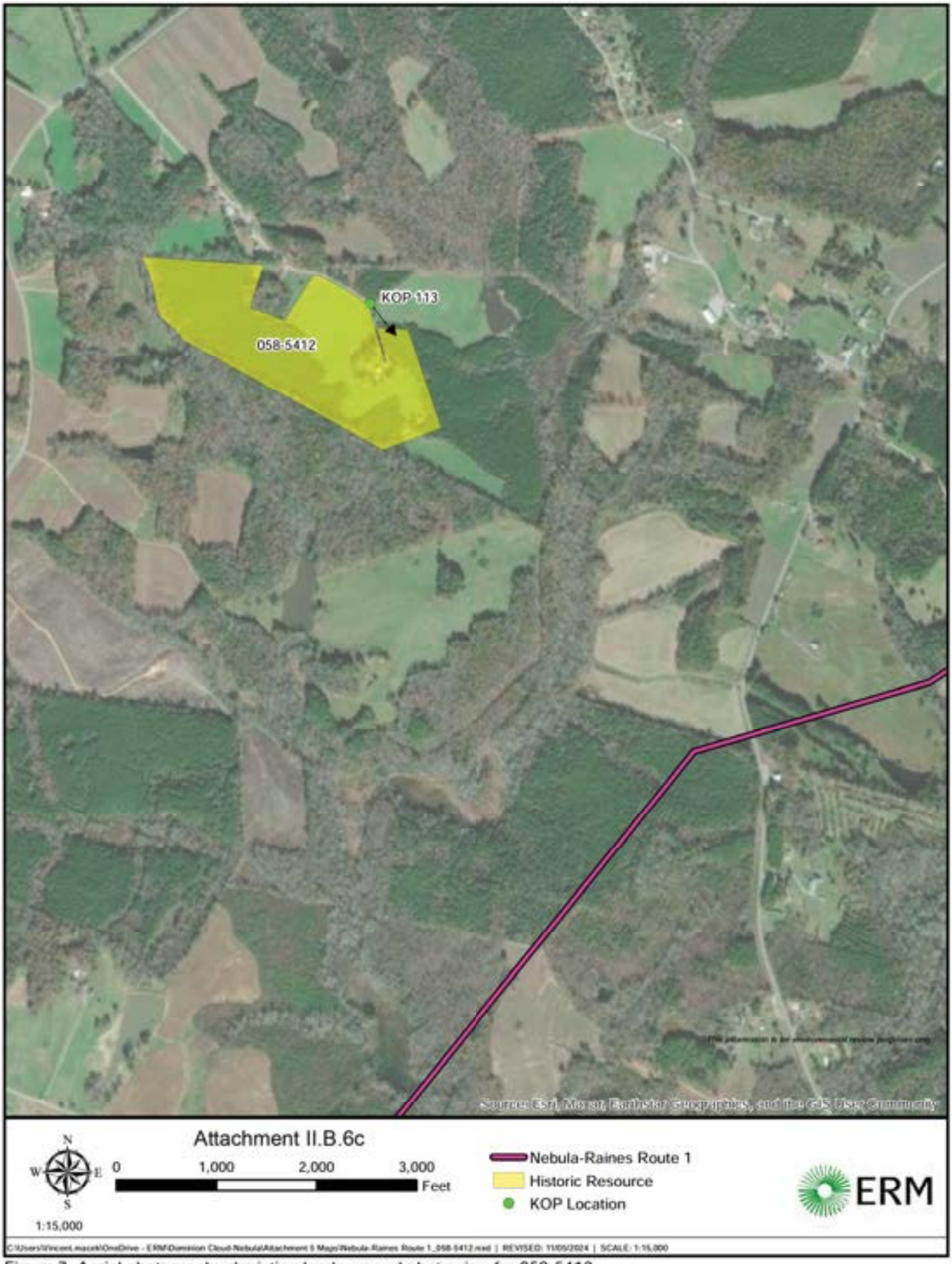


Figure 7. Aerial photography depicting land use and photo view for 058-5412.

EXISTING CONDITIONS

PROPOSED CONDITIONS

171

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 113

Spring Rd

Route: 1
Date:08/13/2024
Time: 2:18 pm
Viewing Direction: East
Distance to closest feature: 0.8 miles

Legend

KOP View Direction

Nebula-Raines Route 1

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

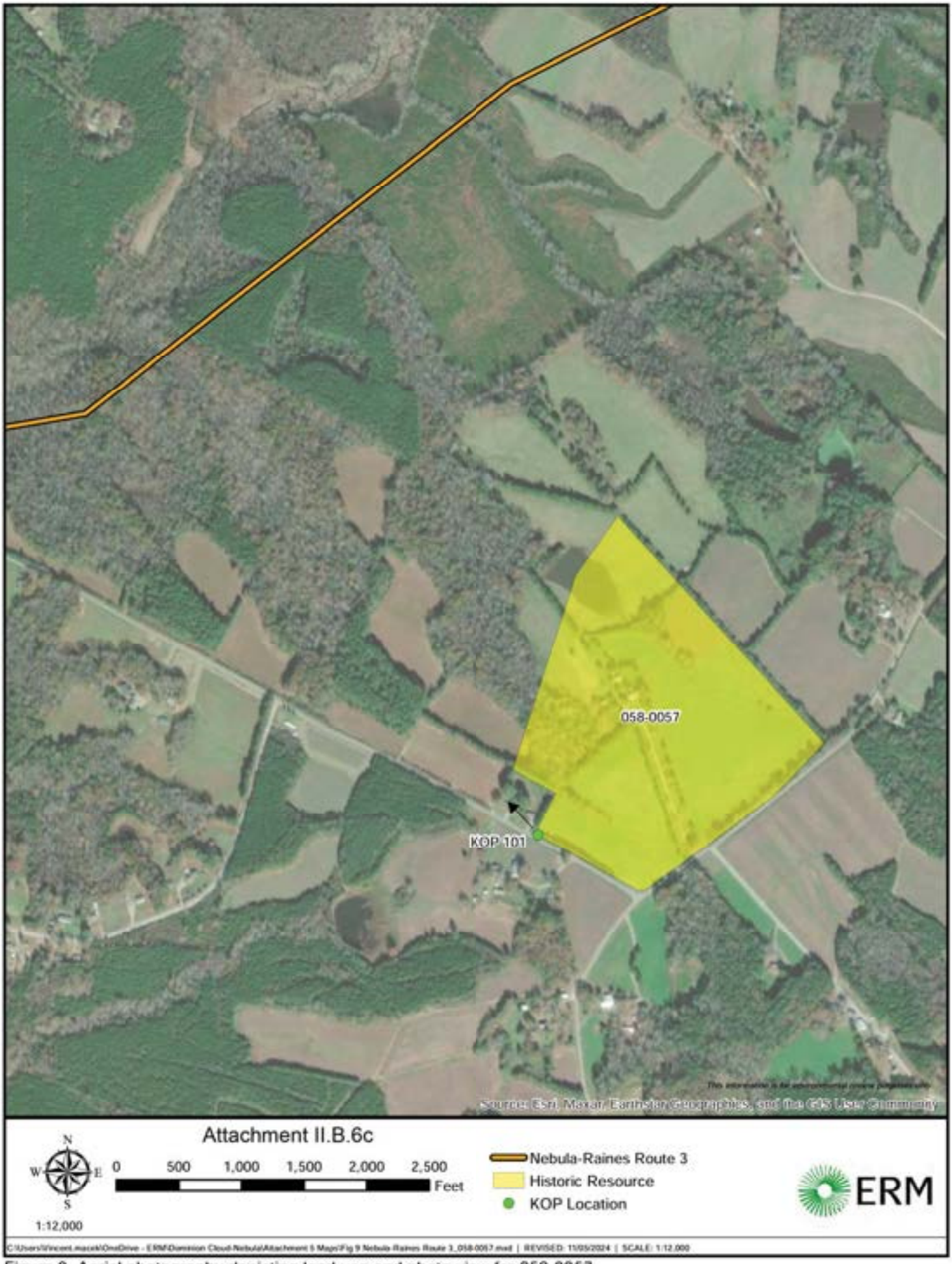


Figure 9. Aerial photography depicting land use and photo view for 058-0057.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 101

Dockery Rd

Route: 3
Date:08/13/2024
Time: 2:45 pm
Viewing Direction: West
Distance to closest feature: 0.7 miles

Legend

KOP View Direction

Nebula-Raines Route 3

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

Figure 11. Aerial photography depicting land use and photo view for 058-0073.

EXISTING CONDITIONS

PROPOSED CONDITIONS

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 103

Union Level Rd

Route: 3
Date:08/13/2024
Time: 2:58 pm
Viewing Direction: East
Distance to closest feature: 0.6 miles

Legend

KOP View Direction

Nebula-Raines Route 3

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

Figure 13. Aerial photography depicting land use and photo view for 058-0140.

177

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 104

Antlers Rd

Route: 3
Date:08/13/2024
Time: 11:15 am
Viewing Direction: South
Distance to closest feature: 0.4 miles

Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 3

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

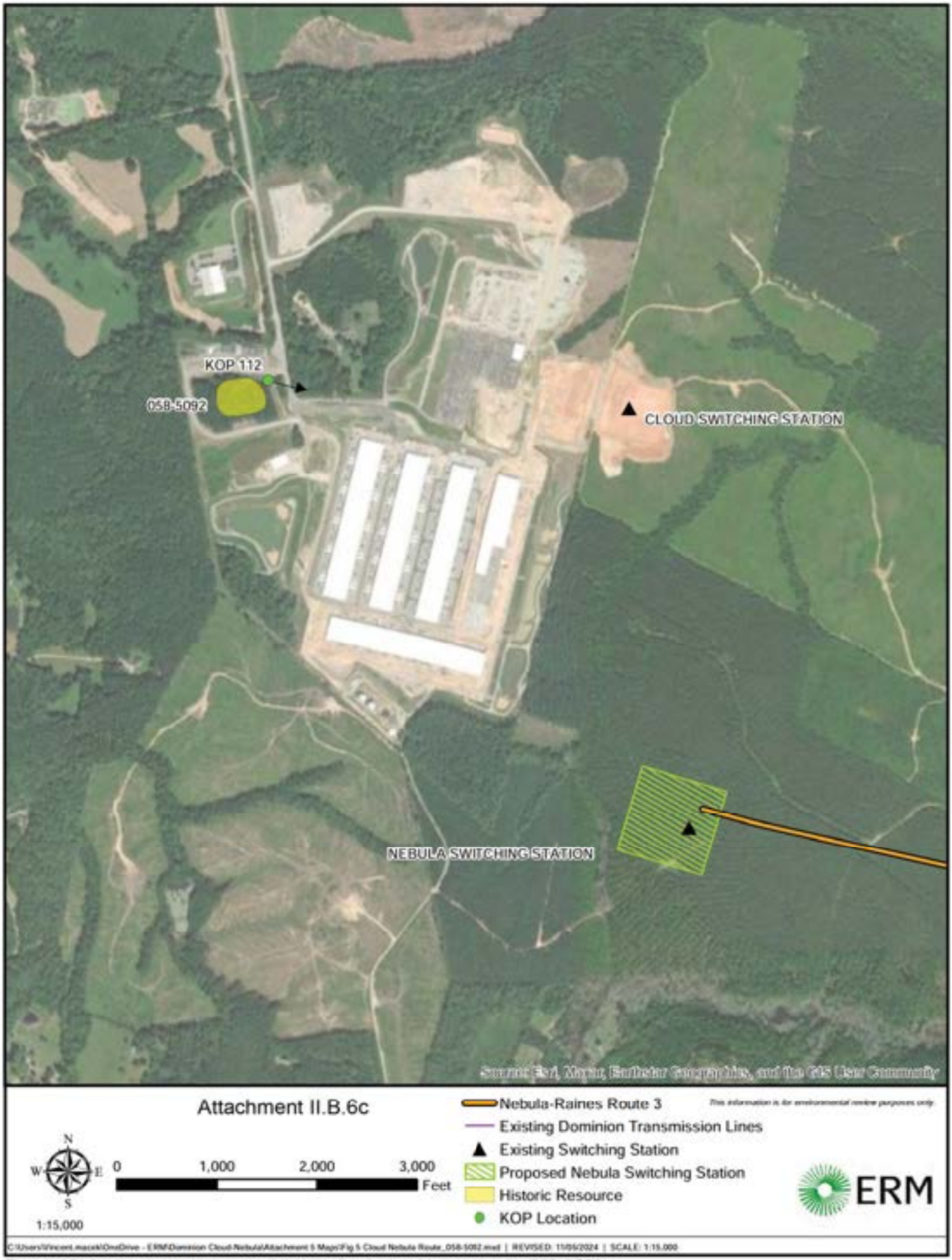


Figure 15. Aerial photography depicting land use and photo view for 058-5092.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 112

Herbert Dr

Route: 3
Date:08/13/2024
Time: 10:47 am
Viewing Direction: Southeast
Distance to closest feature: 1.0 miles

Legend

- ▲ Existing Switching Station
- △ Proposed Switching Station
- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 3

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

Figure 17. Aerial photography depicting land use and photo view for East End High School.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 114

Dockery Rd

Route: 3
Date:08/13/2024
Time: 1:54 pm
Viewing Direction: East
Distance to closest feature: 0.2 miles

Legend

KOP View Direction

Nebula-Raines Route 3

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

EXISTING CONDITIONS

PROPOSED CONDITIONS

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 114

Dockery Rd

Route: 3
Date:08/13/2024
Time: 1:54 pm
Viewing Direction: East
Distance to closest feature: 0.2 miles

Legend

KOP View Direction

Nebula-Raines Route 3

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

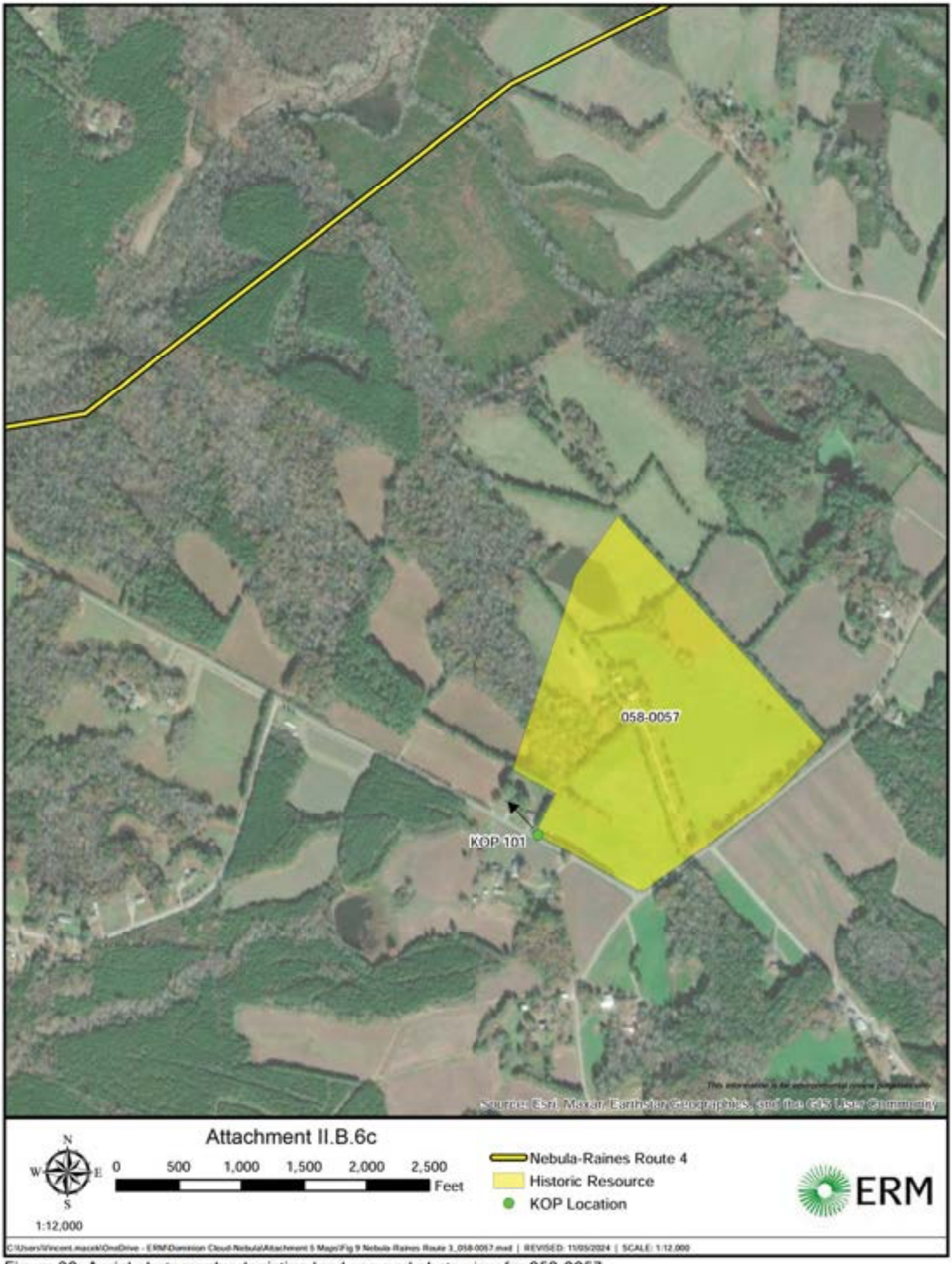


Figure 20. Aerial photography depicting land use and photo view for 058-0057.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 101

Dockery Rd

Route: 4
Date:08/13/2024
Time: 2:45 pm
Viewing Direction: West
Distance to closest feature: 0.7 miles

Legend

KOP View Direction

Nebula-Raines Route 4

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

Figure 22. Aerial photography depicting land use and photo view for 058-0073.

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 103

Union Level Rd

Route: 4
Date:08/13/2024
Time: 2:58 pm
Viewing Direction: East
Distance to closest feature: 0.6 miles

EXISTING CONDITIONS

PROPOSED CONDITIONS

Legend

KOP View Direction
Nebula-Raines Route 4

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

Figure 24. Aerial photography depicting land use and photo view for 058-0140.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 105

Antlers Rd

Route: 4
Date:08/13/2024
Time: 11:32 am
Viewing Direction: North
Distance to closest feature: 0.3 miles

Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 4

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

Figure 26. Aerial photography depicting land use and photo view for 058-0141.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

190

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 106

Antlers Rd

Route: 4
Date:08/13/2024
Time: 11:48 am
Viewing Direction: Southeast
Distance to closest feature: 0.3 miles

Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 4

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

Figure 28. Aerial photography depicting land use and photo view for 058-0175.

EXISTING CONDITIONS

PROPOSED CONDITIONS

192

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 108

Buggs Island Rd

Route: 4
Date:08/14/2024
Time: 2:31 pm
Viewing Direction: South
Distance to closest feature: 0.6 miles

Legend

KOP View Direction

Nebula-Raines Route 4

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

Figure 30. Aerial photography depicting land use and photo view for 058-0309.

EXISTING CONDITIONS

PROPOSED CONDITIONS

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 110

Antlers Rd

Route: 4
Date:08/13/2024
Time: 12:17 pm
Viewing Direction: South
Distance to closest feature: 1.0 miles

Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 4

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

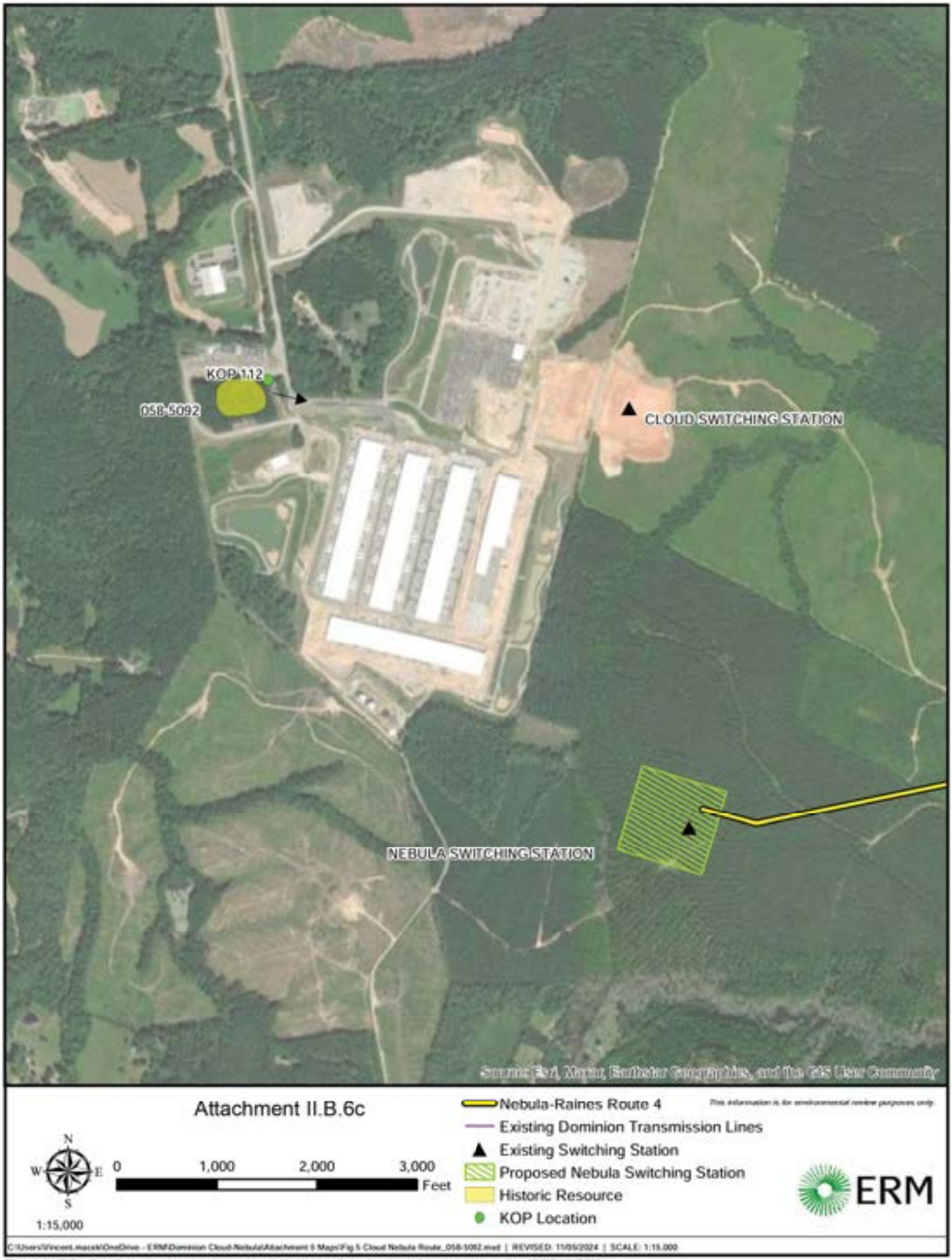


Figure 32. Aerial photography depicting land use and photo view for 058-5092.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 112

Herbert Dr

Route: 4
Date:08/13/2024
Time: 10:47 am
Viewing Direction: Southeast
Distance to closest feature: 1.0 miles

Legend

- ▲ Existing Switching Station
- △ Proposed Switching Station
- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 4

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

Figure 34. Aerial photography depicting land use and photo view for East End High School.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 114

Dockery Rd

Route: 4
Date:08/13/2024
Time: 1:54 pm
Viewing Direction: East
Distance to closest feature: 0.2 miles

Legend

KOP View Direction

Nebula-Raines Route 4

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

EXISTING CONDITIONS

PROPOSED CONDITIONS

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 114

Dockery Rd

Route: 4
Date:08/13/2024
Time: 1:54 pm
Viewing Direction: East
Distance to closest feature: 0.2 miles

Legend

KOP View Direction

Nebula-Raines Route 4

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

Figure 24. Aerial photography depicting land use and photo view for 058-0140.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

201

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 105

Antlers Rd

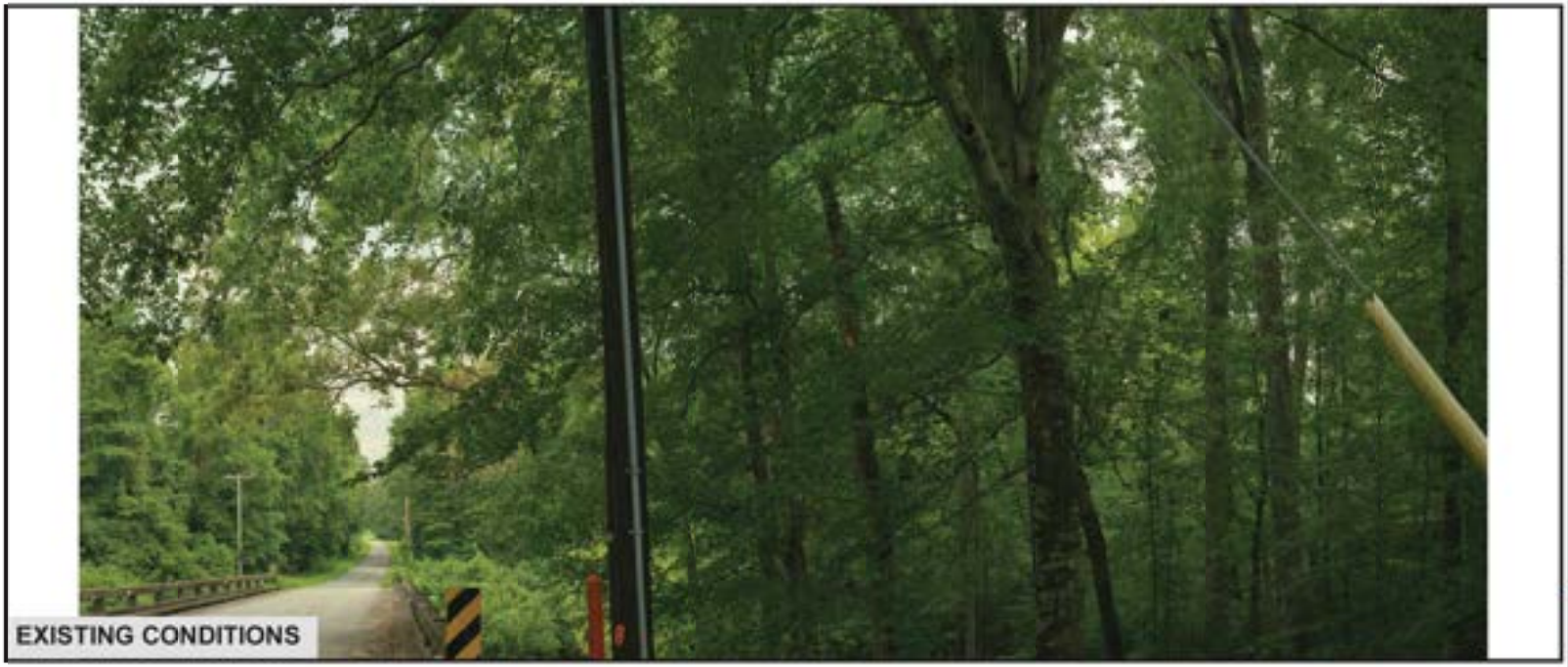
Route: 5
Date:08/13/2024
Time: 11:32 am
Viewing Direction: North
Distance to closest feature: 0.6 miles

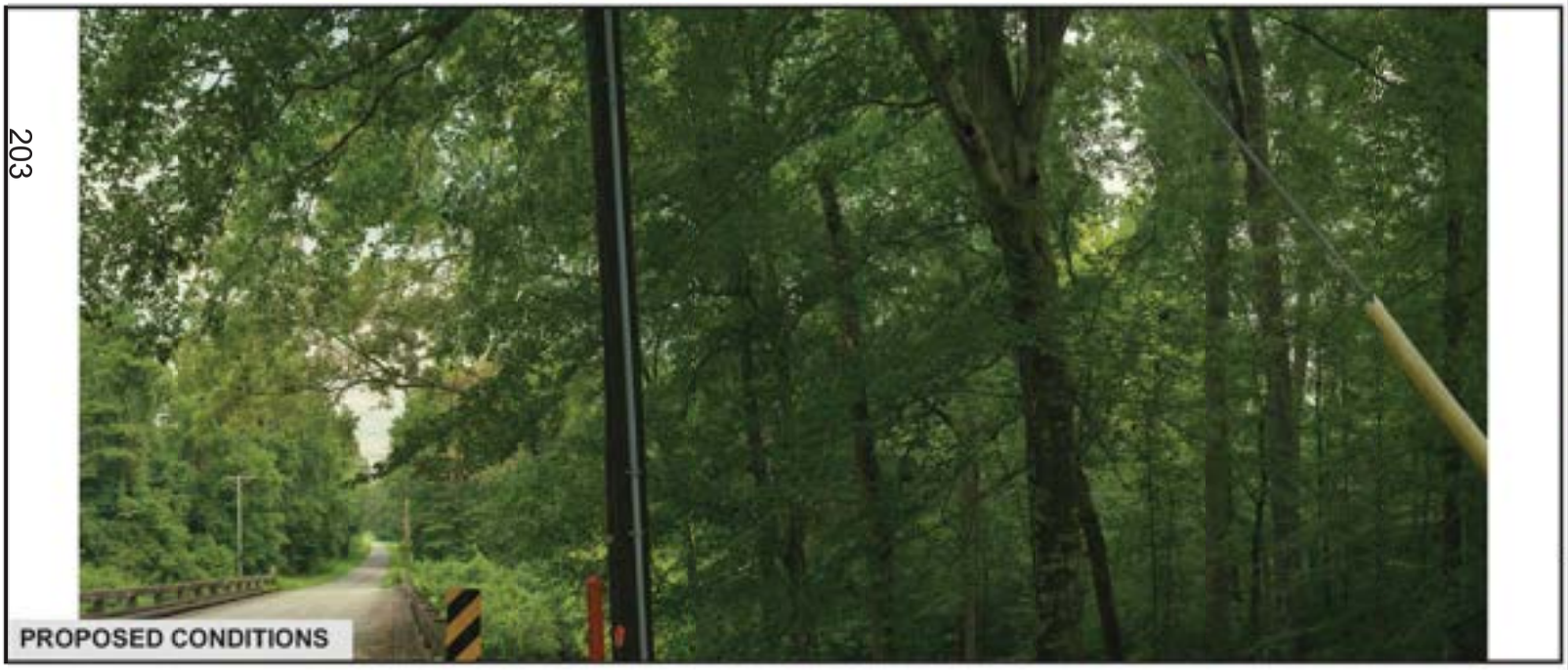
Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 5

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

Figure 39. Aerial photography depicting land use and photo view for 058-0141.





CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 107

Antlers Rd

Route: 5
Date:08/13/2024
Time: 12:03 pm
Viewing Direction: North
Distance to closest feature: 0.2 miles

Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 5

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

Figure 41. Aerial photography depicting land use and photo view for 058-0309.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

205

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 110

Antlers Rd

Route: 5
Date:08/13/2024
Time: 12:17 pm
Viewing Direction: South
Distance to closest feature: 0.3 miles

Legend

- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 5

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

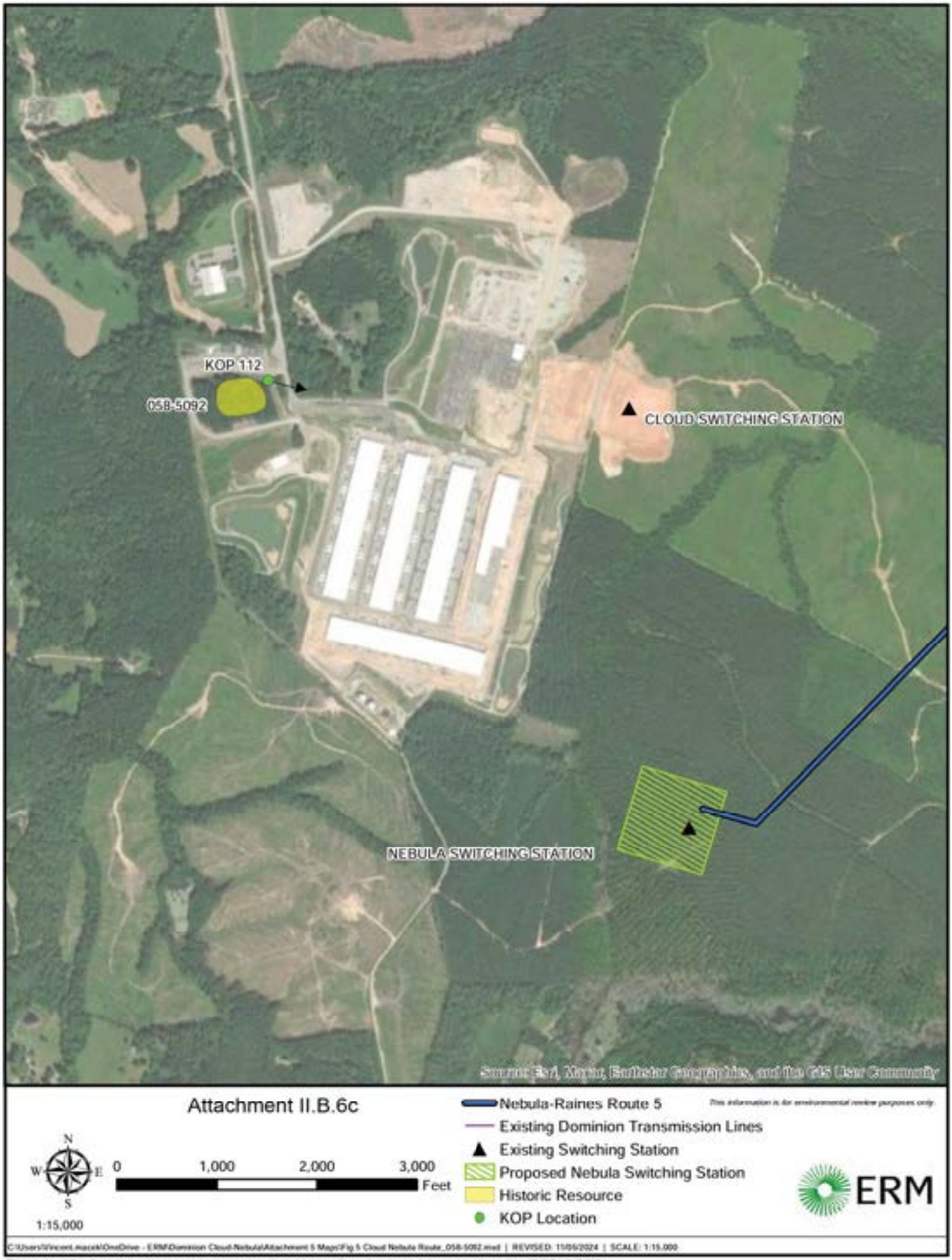


Figure 43. Aerial photography depicting land use and photo view for 058-5092.

EXISTING CONDITIONS

YELLOW: PARTIALLY OR FULLY HIDDEN PROJECT INFRASTRUCTURE

207

CLOUD-NEBULA-RAINES
230 kV Electric Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

Dominion Energy

KOP 112

Herbert Dr

Route: 5
Date:08/13/2024
Time: 10:47 am
Viewing Direction: Southeast
Distance to closest feature: 1.0 miles

Legend

- ▲ Existing Switching Station
- △ Proposed Switching Station
- Existing Dominion Transmission Lines
- KOP View Direction
- Nebula-Raines Route 5

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

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 the proposed Nebula Station, as well as minor substation-related work at the Company's future Raines Substation and existing Cloud Switching Station, in Mecklenburg County, Virginia, as follows.

Nebula Switching Station

The proposed 230 kV Nebula Switching Station will be constructed with fourteen 230 kV 4000A breakers with an ultimate design of six rows of breakers arranged in a breaker-and-a-half configuration. The Nebula Switching Station will be designed to provide six 230 kV feeds to serve MEC's DP. The total area of the Nebula Station is approximately 11.3 acres.

The one-line and general arrangement for the proposed Nebula Station are provided as Attachment II.C.1 and Attachment II.C.2, respectively.

Raines Substation

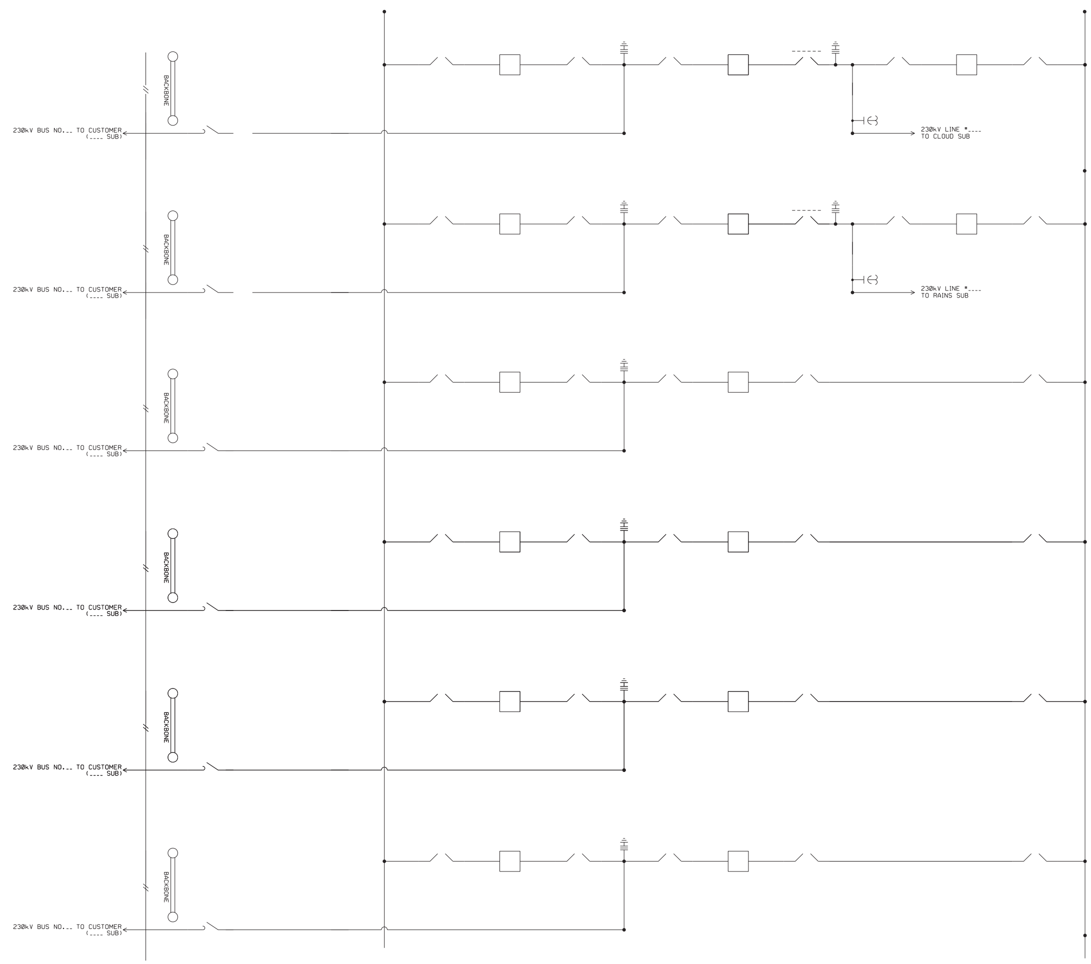
The proposed Nebula-Raines Line will require the installation of one 230 kV 4000A breaker, one 230 kV 4000A switch, and three 230 kV arresters at the future Raines Substation.

A one-line of the new substation equipment at the Raines Substation required by the proposed Project is provided as Attachment II.C.3.

Cloud Switching Station

The proposed Cloud-Nebula Line will require the installation of one 230 kV 4000A breaker, two 230 kV 4000A switches, and three 230 kV arresters at the existing Cloud Switching Station.

The one-line of the new substation equipment at the Cloud Switching Station required by the proposed Project is provided as Attachment II.C.4.



PRELIMINARY
NOT FOR CONSTRUCTION

By	Approval	Date	Project No.	Network No.	BM No.	Description

Revisions

USER: mohamm6

(00) (S) DEMARCATION INDICATOR - SEE SUB. OL. (99) (T) DEMARCATION INDICATOR - SEE TLIN. OL. (98) (D) DEMARCATION INDICATOR - SEE DIST. OL. (97) (C) DEMARCATION INDICATOR - SEE CUST. DOC.

Drawn By: MMO	Date	Substation	NEBULA SUB
Approval	Date	Drawing No.	II.C.1

Dominion Energy

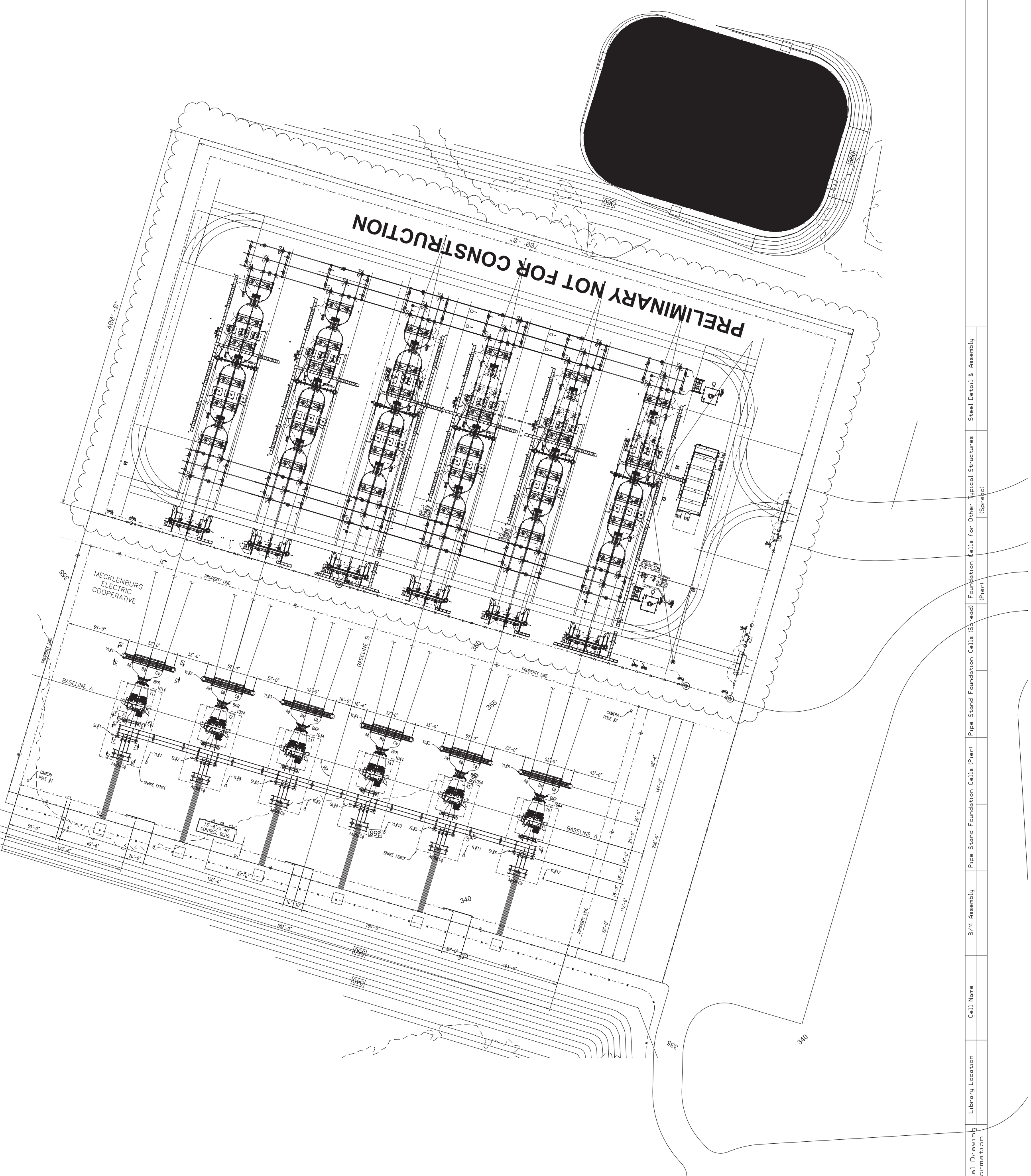
CONSTRUCTION ONE LINE DIAGRAM

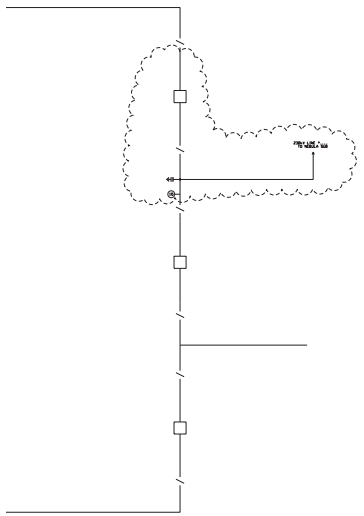
9/3/2024

Attachment II.C.2

NEBULA SWITCHING STATION

Dominion Energy





PRELIMINARY
NOT FOR CONSTRUCTION

Dominion Energy

RAINES SUB

	Name	Date	Project No.	Sheet No.
Designed by:				
Approvals			Scale	OF
Approvals				
			B/M No.	Revisions

Cad File Name

PLOTTED: 9/3/2024

Drawing No. II.C.3

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

Revisions

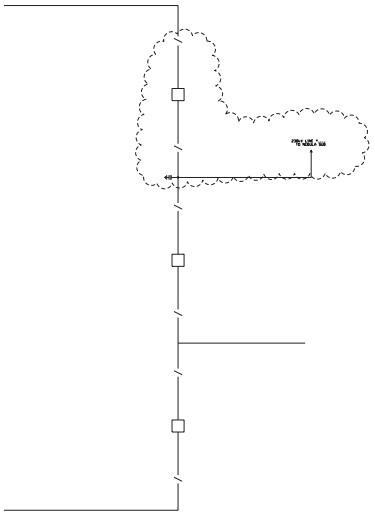
Typical Drawing Information

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

USER: mohamm6

#FILENAME#
PLOTTED: 9/3/2024
USER: mohamm6

Attachment II.C.3



PRELIMINARY
NOT FOR CONSTRUCTION

Dominion Energy

CLOUD SWITCHING STATION

	Name	Date	Project No.	Sheet No.
Designed by:				
Approvals			Scale	OF
Approvals				
			B/M No.	Revisions

Cad File Name

PLOTTED: 9/3/2024

Drawing No.
II.C.4

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

Revisions

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

USER: mohamm6

#FILENAME#
PLOTTED: 9/3/2024
USER: mohamm6

Attachment II.C.4

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: For additional description of the character of the area traversed by each potential route and related impacts, see the DEQ Supplement, specifically as to land use, forest, and agricultural lands (Section 2.L), wetlands and waterbodies (Sections 2.B and 2.D), historic resources (Section 2.I), and wildlife (Sections 2.G and 2.K). See Attachment III.A.1 for a map of farmland within the rights-of-way. Descriptions of the lands crossed by the routes and number of structures within proximity of the routes are described below.

Nebula-Raines Line Routes

Nebula-Raines Proposed Route (Route 5)

The Nebula-Raines Proposed Route is approximately 14.4 miles in length and encompasses approximately 185.2 acres (inclusive of the 11.3-acre proposed Nebula Station). Starting at the Raines Substation, Route 5 heads west crossing forested land before and collocating with the south side of US 58 across a mix of agricultural, open, and forested land. From this point, the route turns to the northwest, crossing US 58 and US 1 across open land. The route then turns north-northwest crossing a mix of open and forested land. The route then heads west/southwest crossing predominantly forested land, with open and agricultural land. At this point the route turns west again crossing primarily forested land with mixtures of open and agricultural land around Busy Bee Road up to Cox Creek and around Baskerville and Wooden Bridge Roads up to Reedy Branch. The route turns southwest and south after Wooden Bridge Road, crossing forest and about a mile of agricultural and open space northwest of US 58. The route continues south/southwest, passing through primarily forested land between US 58 and the Company's existing Lines #137 and #38. At this point, the route crosses the existing lines and shares the maintained right-of-way with the Company's existing Lines #1041 and #38 before turning southwest across managed timberland and terminating at the proposed Nebula Station.

According to County parcel data, zoning data, and aerial photo analysis, there are no residential buildings within the right-of-way or within 100 or 250 feet of the centerline of the Nebula-Raines Proposed Route. There are 11 residential dwellings within 500 feet of the centerline. There are 19 non-residential (commercial and outbuildings) structures within 500 feet of the centerline of the Nebula-Raines Proposed Route.

Nebula Raines Alternative Route 1

The Nebula-Raines Alternative Route 1 is approximately 15.4 miles in length and encompasses approximately 197.6 acres (inclusive of the 11.3-acre proposed Nebula Station). Starting at the future Raines Substation, Alternative Route 1 heads generally southwest crossing through a mixture of forested, open, and agricultural land, with agricultural and open land associated with residences and outbuildings concentrated around Rocky Branch Road, Turtle Road, Trinity Church Road, Belfield Road, and Goodes Ferry Road. The route then turns west crossing about a mile of forested land, US 1, and Miles Creek. After crossing Miles Creek the route crosses predominantly open and agricultural land with some forest. The route then turns south/southwest crossing through forested land around Cox Creek and agricultural land east of Buggs Island Road before turning west. The route passes through largely open and agricultural land Between Buggs Island Road and just west of Antlers Road. The route then crosses through dense managed timberland before terminating at the proposed Nebula Station.

According to County parcel data, zoning data, and aerial photo analysis, there are no residential buildings within the right-of-way or within 100 feet of the centerline of Nebula-Raines Alternative Route 1. There are 3 residential dwellings within 250 feet and 15 residential dwellings within 500 feet of the centerline. There are 28 non-residential (commercial and outbuilding) structures within 500 feet of the centerline of the Nebula-Raines Alternative Route 1.

Nebula Raines Alternative Route 3

The Nebula-Raines Alternative Route 3 is approximately 14.9 miles in length and encompasses approximately 192.0 acres (inclusive of the 11.3-acre proposed Nebula Station). Starting at the future Raines Substation, Alternative Route 3 heads west through forested land before continuing west and collocating with the south side of US 58 across primarily agricultural lands with some open space and open water. The route then turns to the southwest and crosses through mostly forested land. At this point, the route heads south/southwest crossing primarily forested land between Dockery Road and Dockery Creek. The route then turns west, crossing a span of forested land between Dockery Creek and US 1. West of US 1, the route heads west/southwest crossing a mixture of agricultural, forested, and open land, with some rural residences concentrated around US 1 and Cedar Grove Road. West of Baskerville Road, the route shares an alignment with Nebula-Raines Route 1 for the remaining 5.4 miles, crossing through open, agricultural, and managed timber lands before terminating at the proposed Nebula Station.

According to County parcel data, zoning data, and aerial photo analysis, there are no residential buildings within the right-of-way or within 100 or 250 feet of the centerline of Nebula-Raines Alternative Route 3. There are 16 residential dwellings within 500 feet of the centerline. There are 29 non-residential (outbuilding) structures within 500 feet of the centerline of the Nebula-Raines Alternative Route 3.

Nebula Raines Alternative Route 4

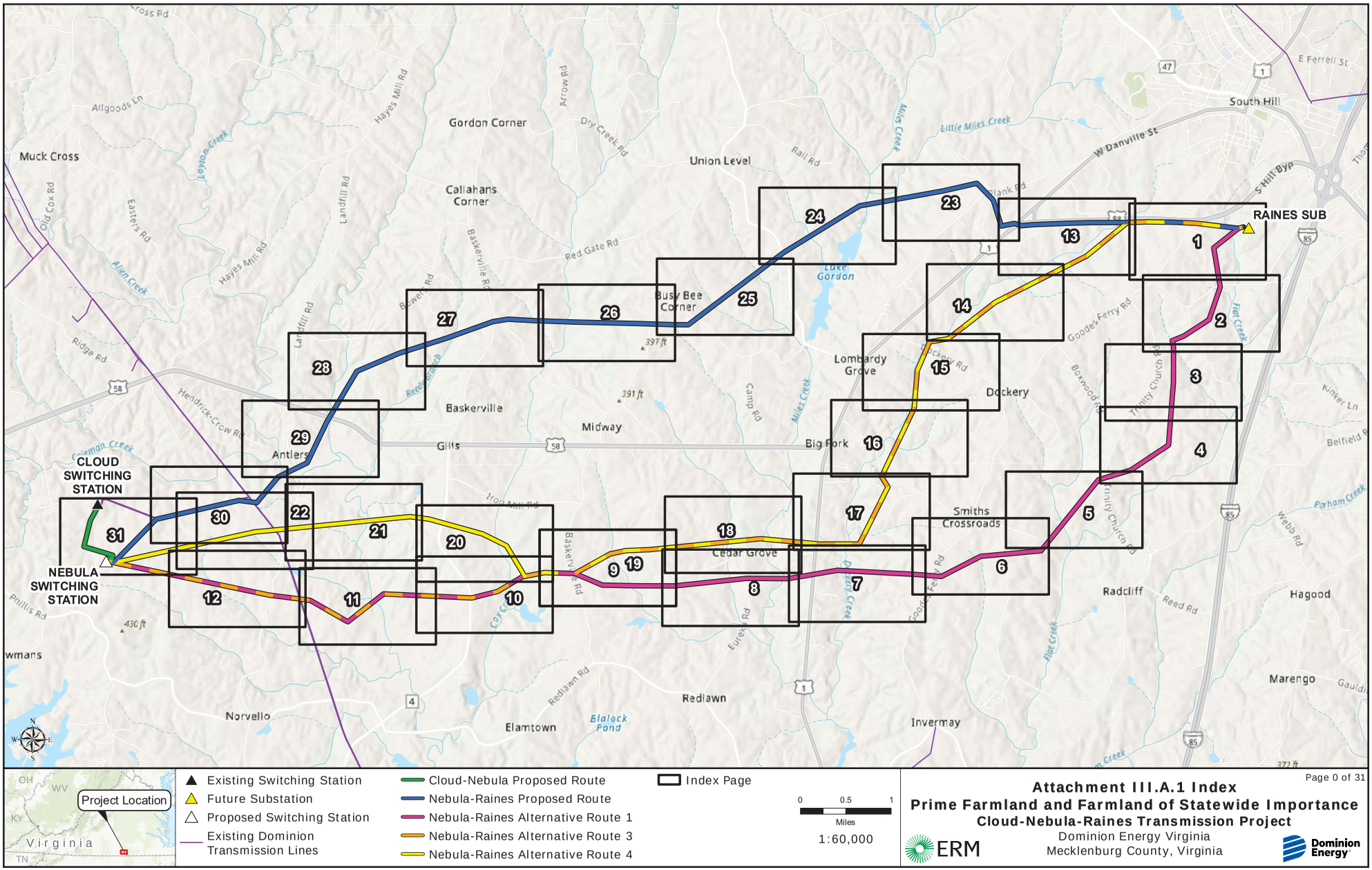
The Nebula-Raines Alternative Route 4 is approximately 15.0 miles in length and encompasses approximately 192.3 acres (inclusive of the 11.3-acre proposed Nebula Station). Alternative Route 4 follows the same alignment as Alternative Route 3 for the first 10.1 miles from the future Raines Substation to a point west of Baskerville Road, crossing through primarily forested lands. At this point, the route turns to the northwest/west, crossing through mostly forested lands surrounding Cox Creek, and agricultural and open lands around Buggs Island Road. The route then heads west through primarily forested land before crossing the Company's existing Lines #137 and #38. From here, the route crosses mainly dense managed timber with some cleared (open) land before terminating at the proposed Nebula Station.

According to County parcel data, zoning data, and aerial photo analysis, there are no residential buildings within the right-of-way or within 100 feet of the centerline of Nebula-Raines Alternative Route 4. There is one residential dwelling within 250 feet and 17 residential dwellings within 500 feet of the centerline. There are 34 non-residential (outbuilding) structures within 500 feet of the centerline of the Nebula-Raines Alternative Route 4.

Cloud-Nebula Proposed Route

The Cloud-Nebula Proposed Route is approximately 0.9 mile in length with a right-of-way encompassing approximately 10.8 acres. Starting at the existing Cloud Switching Station, the Cloud-Nebula Proposed Route heads south crossing through managed timber land. The route then turns to the east across mostly cleared managed timber land crossing a stream before turning south and terminating at the proposed Nebula Station.

According to County parcel data, zoning data, and aerial photo analysis, outside of the existing switching station, there are no residential or non-residential structures within 100, 250, or 500 feet of the proposed centerline and zero buildings within the right-of-way of the Cloud-Nebula Proposed Route.



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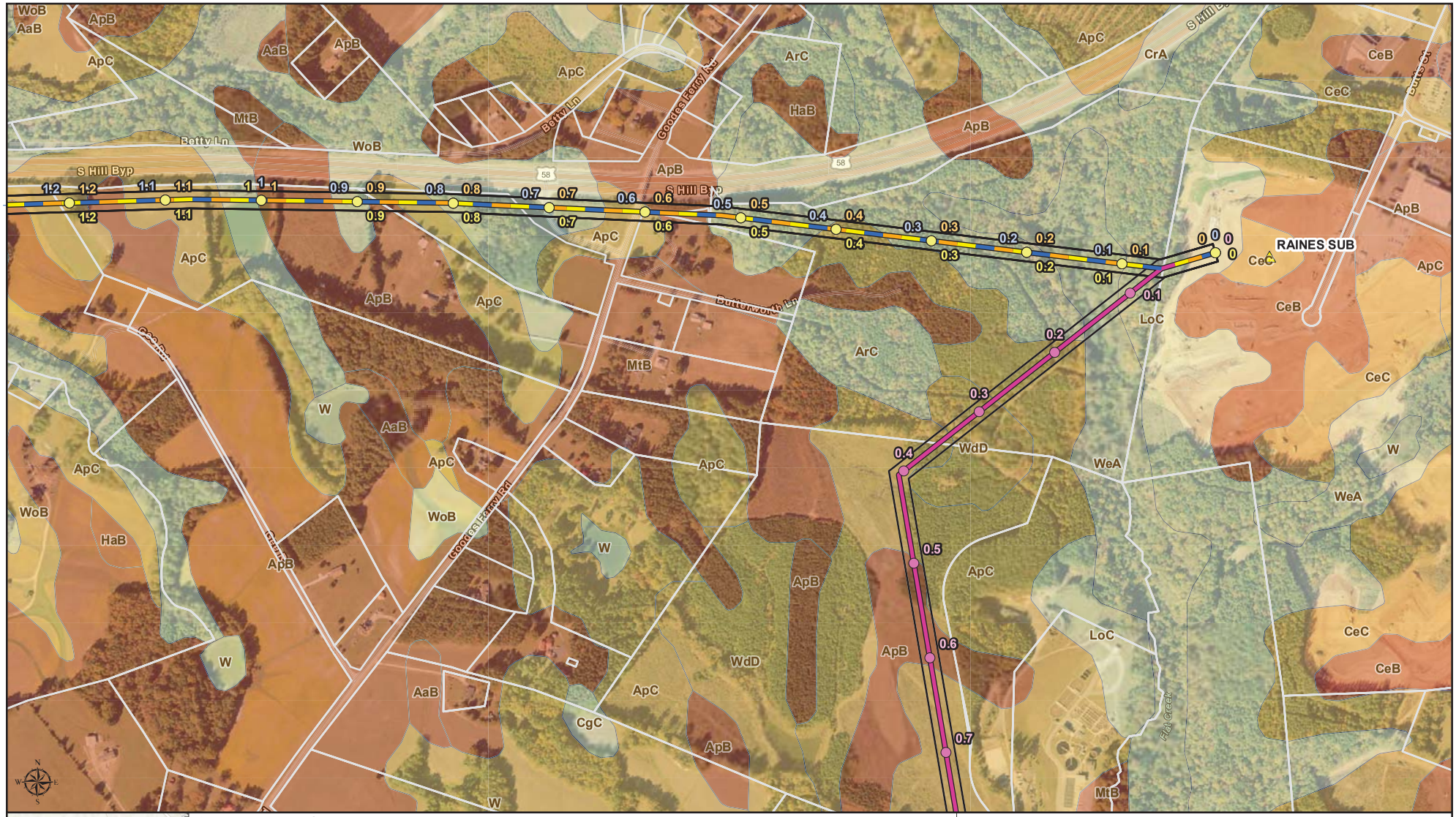
Attachment III.A.1 Index
Prime Farmland and Farmland of Statewide Importance
Cloud-Nebula-Raines Transmission Project
Dominion Energy Virginia
Mecklenburg County, Virginia

ERM

Dominion Energy



Attachment III.A.1

Prime Farmland and Farmland of Statewide Importance

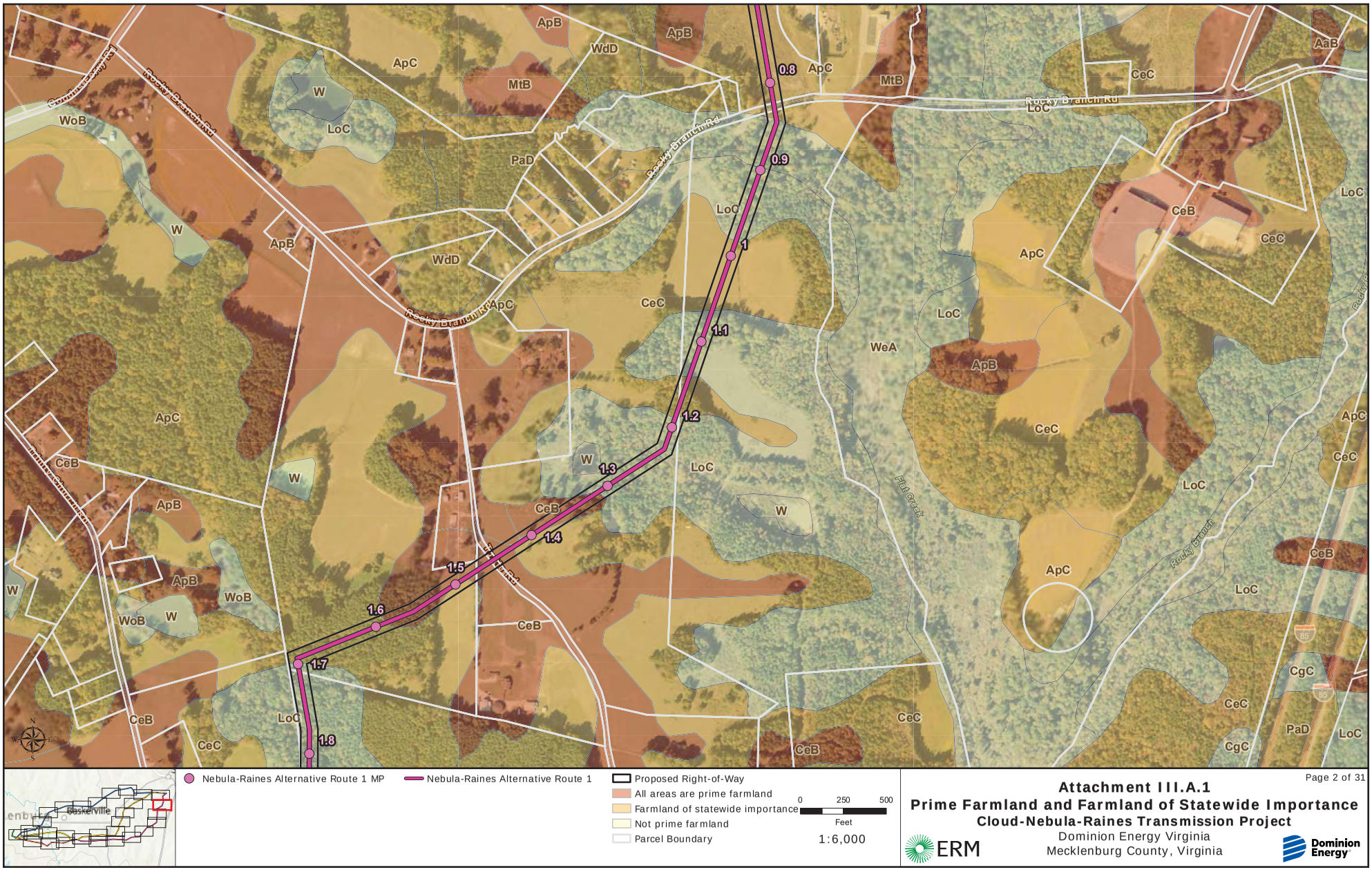
Cloud-Nebula-Raines Transmission Project

Dominion Energy Virginia

Mecklenburg County, Virginia

ERM

Dominion Energy



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Prime Farmland and Farmland of Statewide Importance

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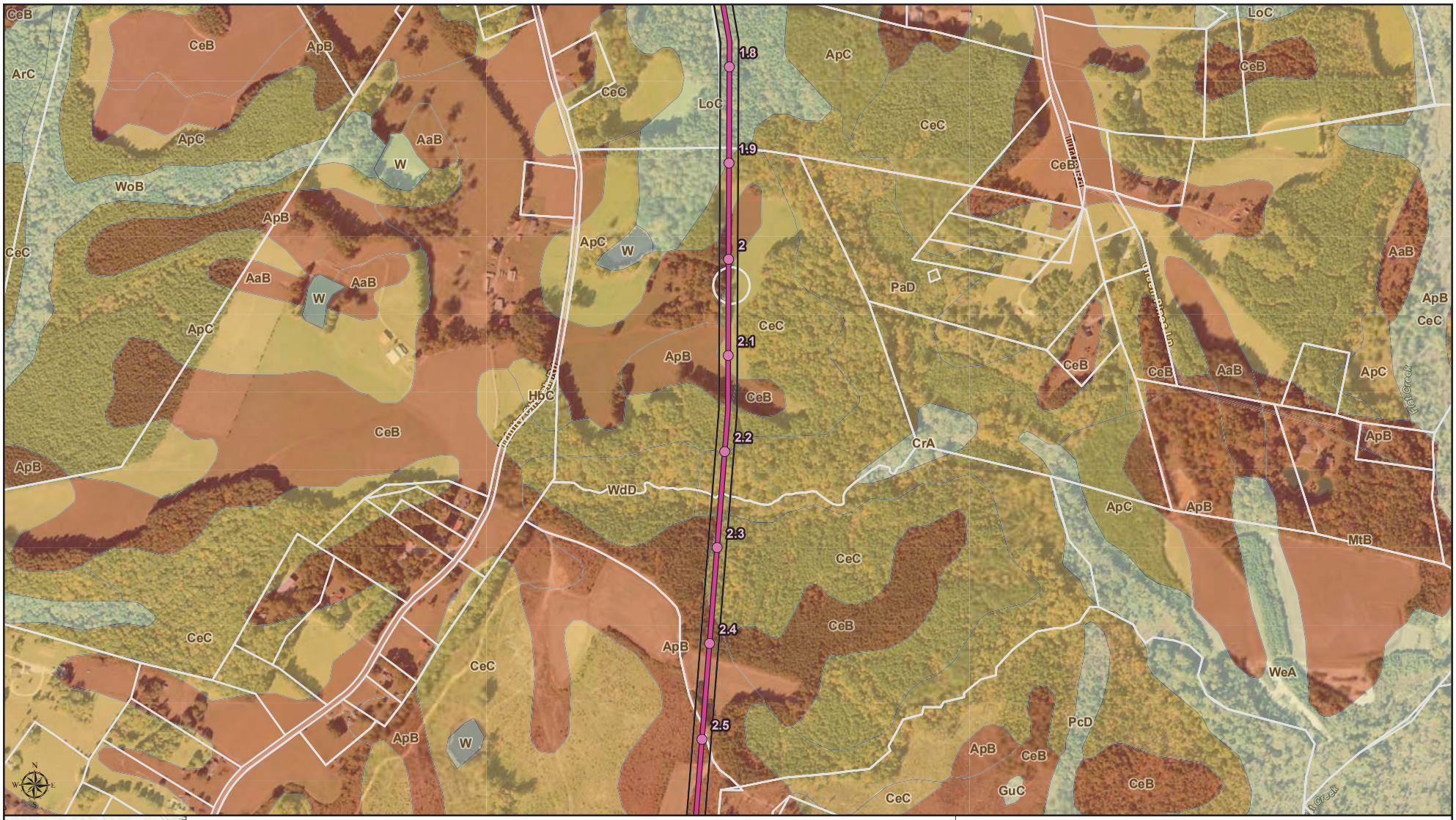

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