Dominion Energy®

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

Before the State Corporation Commission of Virginia

Idylwood-Tysons 230 kV Single Circuit Underground Transmission Line, Tysons Substation Rebuild and Related Transmission Facilities

Application No. 284

Case No. PUR-2017-00143

Filed: November 8, 2017

Volume 1 of 3

Application

COMMONWEALTH OF VIRGINIA
BEFORE THE
STATE CORPORATION COMMISSION

APPLICATION OF

VIRGINIA ELECTRIC AND POWER COMPANY

FOR APPROVAL AND CERTIFICATION
OF ELECTRIC FACILITIES

Idylwood-Tysons 230 kV Single Circuit Underground Transmission Line,
Tysons Substation Rebuild
and Related Transmission Facilities

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COMMONWEALTH OF VIRGINIA
STATE CORPORATION COMMISSION

Application of	)	
	)	
Virginia Electric and Power Company	)	
	)	Case No. PUR-2017-00143
	)	
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.*	)	

APPLICATION OF VIRGINIA ELECTRIC AND POWER COMPANY FOR APPROVAL AND CERTIFICATION OF ELECTRIC FACILITIES FOR IDYLWOOD-TYSONS 230 KV SINGLE CIRCUIT UNDERGROUND TRANSMISSION LINE, TYSONS SUBSTATION REBUILD AND RELATED TRANSMISSION FACILITIES

Virginia Electric and Power Company ("Dominion Virginia Energy" or the "Company") respectfully shows as follows:

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

2. In order to perform its legal duty to furnish adequate and reliable electric service, Dominion Energy Virginia must, from time to time, replace and 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 order to resolve a potential criteria violation of the mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County (the "Tysons Loop") and to maintain reliable service to the overall growth in the area, the Company proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS") equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

4. In addition to the Project, the Company proposes to replace lattice tower 2097/177 located just south of Idylwood Substation property. As part of Fairfax County's approval of Special Exception Amendment application SEA 2014-PR-032 to permit the redevelopment of Idylwood Substation, which was approved by the Commission in Case No. PUR-2017-00002, Fairfax County Staff recommended as a condition of approval that the Company replace lattice tower 2097/177 in order to minimize visual impacts on neighboring properties. As such, the Company has designed and proposed a replacement structure for tower 2097/177 for visual mitigation reasons and is requesting approval of that replacement

structure in the current proceeding ("Replacement Tower Proposal"). While offered for the Commission's consideration and approval, the Replacement Tower Proposal is not a component of the proposed Project; therefore, the estimated approximately $433,000 for replacement of this lattice tower has not been included in the total estimated costs for the proposed Project, provided below.

5. The Project is necessary to assure that Dominion Energy Virginia can maintain and improve reliable electric service to customers within the Tysons Loop Load Area, where development in Tysons specifically is forecasted to increase from approximately 47.1 million square feet ("M ft^2") to between 87.7 M ft^2 and 124 M ft^2 (an increase of 86% to 163%) over a 40-year period (2010-2050)[1]. The Tysons growth primarily is being focused around four Metrorail stations with higher intensity development being allocated to the areas closest to the stations. Phase 1 of the Dulles Metrorail project extended the Silver Line from Falls Church to Wiehle Avenue and went into operation on July 26, 2014. According to the "TYSONS 2016-2017 Progress Report on the Implementation of the Comprehensive Plan" to the Board of Supervisors,[2] the seventh such Annual Report, covering the time period from October 2016 through September 2017, there are now 31 major rezoning applications (defined as having rail-related intensities or densities) approved in Tysons. These 31 approved major rezoning applications represent over 46 M ft^2 of new residential and non-residential development, with four of the applications being approved since the last Annual Report was published. Additionally, one major building was delivered and three are currently under construction.

[1] These figures were provided in a 2008 "blue print" growth plan of the Tysons Corner area, prepared for Fairfax County by the George Mason University Center for Regional Analysis. *See* https://www.fairfaxcounty.gov/tysons/stats/download/george_mason_forecast_tysons.pdf.
[2] *See id.*

Further, as of August 2017, there are nine major rezoning applications pending review that cover approximately 103 acres and propose approximately 13 M ft^2 of new development.[3]

6. In summer 2016, load on the Tysons Loop exceeded 300 MW; however, existing automated switching schemes ("Loop Schemes" or "LS") at the distribution level were available to transfer approximately 40.5 MW to adjacent substations outside of the Tysons Loop with single-increment manual switching available to further reduce the Tysons Loop load by approximately 9.5 MW. As shown in Appendix Attachment I.B.2, by 2023, the projected loading on the Tysons Loop will be approximately 343.4 MW. It is anticipated that the approximately 40 MW of available Loop Scheme load, discussed above, will be inadequate to contain the loading on the Tysons Loop below 300 MW for the loss of the Reston and Idylwood ends of the loop. In the event of an N-1-1 loss of Line #2010 out of Reston Substation and Line #2035 out of Idylwood Substation, more than 300 MW would be dropped, which constitutes a NERC criteria violation.

7. As a transmission owner in PJM Interconnection, L.L.C.'s ("PJM") planning region, the Company fully participates in PJM's transmission planning process under PJM's Regional Transmission Expansion Plan process ("RTEPP"). The Company is obligated under the PJM Operating Agreement to construct, operate, and own transmission facilities as designated by PJM in its annual Regional Transmission Expansion Plan ("RTEP"). PJM's RTEPP, including the Company's own planning criteria and analysis, produced PJM's RTEP for 2013, which identified the need for the construction of the proposed Project to relieve a violation of mandatory NERC Reliability Standards in the Summer of 2017. Dominion Energy Virginia, along with other Transmission Owners in PJM, is actively involved in the

[3] *See id.*

development and the reliability assessment of these power flow models used in the RTEP analysis. The active participation of the Transmission Owners in the development and assessment phases of this process is critical to ensure a comprehensive and accurate RTEP. This reliability violation, if not relieved, could impact reliability to approximately 26,900 customers in the Commonwealth of Virginia.

8. The PJM Board of Directors approved the need for the proposed Project (PJM RTEP project #b2361) at its October 2013 meeting. It should be noted that subsequent discussions with Fairfax County officials have resulted in a change in one of the terminal locations for the line that was presented to PJM (from a proposed new Scotts Run Substation to the existing Tysons Substation). Additionally, revised projections for the Tysons Loop, based on the 2017 PJM Load Forecast, show the violation being delayed until approximately 2023. As a result of these changes, the Company presented a revised proposal to PJM at the October 12, 2017 Transmission Expansion Advisory Committee ("TEAC") meeting describing the proposed underground transmission route. The Company anticipates that the proposed Project will be recommended for approval at the December 2017 PJM Board meeting, and will be approved as part of the 2017 RTEP.

9. The Company anticipates that the Project could be in-service by no later than June 2022, presuming an approximately 36-month schedule to complete engineering, material procurement, permitting and construction, and the ability to obtain outages. The estimated total cost of the proposed Project, which assumes completion by June 2022, is approximately $121.8 million (2017 dollars),[4] of which approximately $89.4 million is for underground

[4] While offered for the Commission's consideration and approval, the Replacement Tower Proposal is not a component of the proposed Project; therefore, the estimated approximately $433,000 for replacement of this lattice tower has not been included in the total estimated costs for the proposed Project.

transmission line construction along the Proposed Route (Underground Alternative 05); approximately $31.5 million is for conversion of Tysons Substation to GIS, including approximately $3.1 million for temporary and permanent overhead transmission line work at the station associated with the conversion; approximately $790,000 is for station work at Idylwood Substation; and approximately $118,000 is for relay work at Reston Substation. The necessity for the proposed Project is described in more detail in Section I of the Appendix attached to this Application.

10. The proposed Project will afford the best means of meeting the continuing need for reliable service while reasonably minimizing adverse impacts on the scenic, environmental, and historic assets of the area. The proposed route for the Project will utilize an existing 230 kV transmission line easement along the Washington & Old Dominion Park trail for approximately 0.6 mile of the Project. The new line will predominately be within road right-of-way belonging to the Virginia Department of Transportation ("VDOT") or the County of Fairfax. These entities generally allow electric facilities through a permitting process rather than granting permanent rights-of-way easement. Temporary construction easements may also be necessary to establish routine equipment access during the construction phase. The Project location and route are described in Section II of the Appendix.

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

12. Dominion Energy Virginia's experience, the advice of consultants, and a review of published studies by experts in the field have disclosed no causal link to harmful health or safety effects from electric and magnetic fields generated by the Company's existing or proposed facilities. For further discussion of this topic, see Section IV of the Appendix.

13. A list of federal, state and local agencies and officials that reasonably may be expected to have an interest in the proposed Rebuild Project, and to which a copy of the Application will be sent, is set forth in Section V of the Appendix.

14. In addition to the information provided in the Appendix and the DEQ Supplement, this Application is supported by the prepared direct testimony of Company Witnesses Mark R. Gill, Matthew E. Rudd, Peter L. Tirinzoni, Elizabeth K. Gatlin, William C. Bland, Amanda M. Mayhew, and Jon M. Berkin filed with this Application.

15. The Company respectfully requests that the Commission schedule a local public hearing in Fairfax County to receive comments from the public pertaining to this Application. Additionally, the Company requests an opportunity to file a subsequent written response, through rebuttal testimony or otherwise, to the comments received at any public hearing.

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 proposed Project as described herein and the Replacement Tower Proposal;

(c) grant a certificate of public convenience and necessity for the facilities under the Utility Facilities Act; and

(d) schedule a local hearing in Fairfax County to receive comments on this Application from public witnesses, and provide the Company an opportunity to file a written response through rebuttal testimony or otherwise.

VIRGINIA ELECTRIC AND POWER COMPANY

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November 8, 2017

Appendix

COMMONWEALTH OF VIRGINIA
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APPLICATION OF

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Appendix

Containing Information in Response to
"Guidelines of Minimum Requirements for Transmission Line Application"

Case No. PUR-2017-00143

Filed: November 8, 2017

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I. NECESSITY FOR THE PROPOSED PROJECT

A. Detail the engineering justifications for the proposed project (for example, provide narrative to support why the project is necessary to upgrade or replace an existing facility, to significantly increase system reliability, to connect a new generating station to the Company's system, etc.). Detail the later plans for the proposed project, if appropriate.

Response: In order to resolve a potential criteria violation of the mandatory North American Electric Reliability Corporation ("NERC") Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County (the "Tysons Loop") and to maintain reliable service to the overall growth in the area, Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS") equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

See Attachment II.A.2 for a map depicting the proposed Project, and Attachments I.E.1 and I.E.2 for depictions of the existing transmission system in the area and the addition of the Project. The Company's proposed route for underground Line #2175 ("Proposed Route," also referred to as "Underground Alternative 05"), as well as five alternative underground routes for possible consideration by the Commission, are described in Section II.A of this Appendix.

Proposed Project

The proposed 230 kV underground transmission line will be constructed along the Proposed Route through means of open trenching and horizontal directional drilling ("HDD") on new 30-foot wide right-of-way permanent easements, transportation rights-of-way of varying width through permit, and on the Company's existing rights-of-way. In addition, temporary easements and work areas may be required during construction of the Project along the Proposed Route. The proposed 230 kV underground transmission line will have a

targeted continuous rating of 950[1] MVA.[2] This underground line rating falls short of the 1047 MVA rating of the Company's standard 230 kV overhead line conductors primarily due to the great depths the cables must be installed in the HDD segments and the inherent problem of dissipating heat generated by underground cables.

The majority of the underground line (approximately 3.7 miles) along the Proposed Route will be comprised of six 3500 kcmil copper, cross-linked polyethylene ("XLPE") solid dielectric cables (two cables per phase) installed using the open trench construction method, with all pipes and conduits encased in an approximately 4.5-foot-wide concrete duct bank designed for physical protection. Each cable will be installed in a polyvinyl chloride ("PVC") conduit, with eight 8-inch conduits total, including two spare conduits. In addition, two 2-inch PVC conduits will be installed for sheath bonding cables and two 2-inch PVC conduits will be installed for protective relaying. See Attachment II.A.3.a for the typical configuration of the proposed 230 kV XLPE cable system using open trenching, and Section II.A.3.a of the Appendix for a general discussion of the open trenching method.

The remainder of the underground line (approximately 0.6 mile) along the Proposed Route will be comprised of six 5000 kcmil copper, XLPE solid dielectric cables (two cables per phase) installed using the HDD construction method, with each HDD segment requiring two parallel drill paths. For these segments of the line, each of the two parallel drill paths will contain three cables in 10-inch high-density polyethylene ("HDPE") conduits, with four 10-inch HDPE conduits total, including one spare conduit, in each of the two parallel drill paths. In addition, each of the two parallel drill paths will install one 4-inch HDPE conduit for sheath bonding cables, and one 4-inch HDPE conduit will be installed for protective relaying. See Attachment II.A.3.b for typical configuration of the proposed 230 kV XLPE cable system using HDD, and Section II.A.3.a of the Appendix for a general discussion of the HDD method.

While installation depths will vary, open trenching will install the line approximately 3.5 feet from the top of the duct bank to the surface of the ground, and HDD will install the line between five and 50 feet from the top of the borehole to the surface of the ground. For purposes of transitioning the line between open trenching and HDD, the Company will utilize a transition fitting, coupling reducer or manhole, as appropriate.

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

[2] This targeted continuous rating closely matches the Company's standard overhead conductor based on a twin bundled 636 kcmil ACSR.

At the existing Idylwood Substation, new 230 kV GIL terminal equipment will be installed to create a terminal point for the new Line #2175 installation. Specifically, underground Line #2175 will originate from new 230 kV GIL terminal equipment at Idylwood Substation at the northwest corner of the substation. Beginning at Idylwood Substation, this Line #2175 will exit the northwest corner of the substation, route under the existing Shreve Road, and continue in the existing right-of-way outside of Idylwood Substation toward Tysons Substation.

The existing Tysons Substation is located on Tyco Road, approximately 0.1 mile south of the Dulles Toll Road (VA 267) ("DTR") and approximately 1.3 miles west of I-495. The current Tysons Substation layout consists of two 230 kV transmission lines terminating into a straight bus that feeds four distribution transformers. For purposes of the proposed Project, this layout will require a modification to the current design to accept a third 230 kV line into the station, which will necessitate a 230 kV ring bus configuration. Tysons Substation will be rebuilt within the existing property line with six 230 kV GIS breakers in a ring bus arrangement to accommodate the terminals for existing Reston-Tysons Line #2010, existing Tysons-Swinks Mill Line #2108, and the proposed Idylwood-Tysons Line #2175, in addition to the four existing 84 and 75 MVA, 230-34.5 kV transformers and one new 230 kV shunt reactor. Other associated equipment will be installed as required. As approved by the Commission on September 8, 2017 in Case No. PUR-2017-00002, and with approval of the Special Exception Amendment by Fairfax County on September 12, 2017,[3] Idylwood Substation currently is being converted from a straight-bus arrangement to a breaker-and-a-half configuration (#B1696) with fifteen 230 kV GIS breakers. Additional discussion of the station work, including temporary work, required for the Project is provided in Section II.C.

Replacement Tower Proposal

As part of Fairfax County's approval of Special Exception Amendment application SEA 2014-PR-032 to permit the redevelopment of Idylwood Substation, which was approved by the Commission in Case No. PUR-2017-00002, Fairfax County Staff recommended as a condition of approval that the Company replace lattice tower 2097/177 (located just south of the Idylwood Substation property) in order to minimize visual impacts on neighboring properties. See Attachment I.A.1 for a copy of the Development Conditions approved by the Fairfax County Board of Supervisors on September 12, 2017, in SEA 2014-PR-032. Pursuant to the terms of Paragraph 42(c) of Attachment I.A.1, the Company has designed and proposed a replacement structure for tower 2097/177 for visual mitigation reasons and is requesting approval of that replacement structure in the current proceeding ("Replacement Tower Proposal"). See Attachment I.A.2 for the existing and proposed structure design and location, subject to final engineering. While offered for

[3] See http://ldsnet.fairfaxcounty.gov/ldsnet/ZAPSMain.aspx?cde=SEA&seq=4227521.

the Commission's consideration and approval, the Replacement Tower Proposal is not a component of the proposed Project; therefore, the estimated approximately $433,000 for replacement of this lattice tower has not been included in the total estimated costs for the proposed Project.

Need for the Proposed Project

The Tysons Substation is part of the Tysons Loop, as shown on Attachment I.E.1. The Tysons Loop is approximately 20.8 miles in length, consisting of four 230 kV single circuit transmission lines – Line #2010 from Reston Substation to Tysons Substation, Line #2108 from Tysons Substation to Swinks Mill Substation, Line #2029 from Swinks Mill Substation to CIA Substation, and Line #2035 from CIA Substation to Idylwood Substation – and serves approximately 26,900 customers via the CIA, Reddfield, Swinks Mill, and Tysons Substations that are served from it. Roughly, the load area served by the substations on the Tysons Loop extends south from the Potomac River to I-66 and Route 7, east from Tysons along Chain Bridge Road to Arlington County and west from Tysons to just past Wolf Trap ("Tysons Loop Load Area"). Within the Tysons Loop Load Area, development in Tysons specifically is forecasted to increase from approximately 47.1 million square feet ("M ft^2") to between 87.7 M ft^2 and 124 M ft^2 (an increase of 86% to 163%) over a 40-year period (2010-2050).[4] The Tysons growth primarily is being focused around four Metrorail stations with higher intensity development being situated in the areas closest to the stations. Phase 1 of the Dulles Metrorail project extended the Silver Line from Falls Church to Wiehle Avenue and went into operation on July 26, 2014. According to the "TYSONS 2016-2017 Progress Report on the Implementation of the Comprehensive Plan" to the Board of Supervisors,[5] the seventh such Annual Report, covering the time period from October 2016 through September 2017, there are now 31 major rezoning applications (defined as having rail-related intensities or densities) approved in Tysons. These 31 approved major rezoning applications represent over 46 M ft^2 of new residential and non-residential development, with four of the applications being approved since the last Annual Report was published. Additionally, one major building was delivered and three are currently under construction. Further, as of August 2017, there are nine major rezoning applications pending review that cover approximately 103 acres and propose approximately 13 M ft^2 of new development.[6]

In summer 2016, load on the Tysons Loop exceeded 300 MW; however, existing automated switching schemes ("Loop Schemes" or "LS") at the distribution level were available to transfer approximately 40.5 MW to adjacent

[4] These figures were provided in a 2008 "blueprint" growth plan of the Tysons area, prepared for Fairfax County by the George Mason University Center for Regional Analysis. *See* https://www.fairfaxcounty.gov/tysons/stats/download/george_mason_forecast_tysons.pdf.

[5] See https://www.fairfaxcounty.gov/tysons/implementation/download/tysons_annual_report_2017_final.pdf.

[6] *See, supra,* n. 5, and related text.

substations outside of the Tysons Loop with single-increment manual switching available to further reduce the Tysons Loop load by approximately 9.5 MW. As shown in Attachment I.B.2, by 2023, the projected loading on the Tysons Loop will be approximately 343.4 MW. It is anticipated that the approximately 40 MW of available Loop Scheme load, discussed above, will be inadequate to contain the loading on the Tysons Loop below 300 MW for the loss of the Reston and Idylwood ends of the loop. In the event of an N-1-1 loss of Line #2010 out of Reston Substation and Line #2035 out of Idylwood Substation, more than 300 MW would be dropped, which constitutes a NERC criteria violation.

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 utilities could be fined up to and in excess of $1 million a day per violation if found to be in noncompliance. NERC has been designated by the Federal Energy Regulatory Commission ("FERC") as the Electric Reliability Organization for the United States.

Dominion Energy Virginia is part of the Eastern Interconnection transmission grid, meaning it 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 Quebec and most of Texas. All of the transmission systems in the Eastern Interconnection are dependent on each other for support in 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.

Dominion Energy Virginia also is part of the PJM Interconnection, L.L.C. ("PJM") regional transmission organization ("RTO") providing 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 about 60 million and on July 21, 2011, set a record high of 158,450 MW for summer peak demand, of which Dominion Energy Virginia's load portion was approximately 19,636 MW serving 2.4 million customers. On July 22, 2011, the Company set a record high of 20,061 MW for summer peak demand. On February 20, 2015, the Company set a winter and all-time record demand of 21,651 MW. Moreover, based on the 2017 PJM Load Forecast, the Dominion Zone (or "DOM Zone") is expected to be one of the fastest growing zones in PJM with an average growth rate of 0.4% over the next ten years compared to the PJM average of 0.2% over the same period.

Dominion Energy Virginia's transmission system is responsible for providing

transmission service to the Company's retail customers and also to Appalachian Power Company (APCo), Old Dominion Electric Cooperative (ODEC), Northern Virginia Electric Cooperative (NOVEC), Central Virginia Electric Cooperative (CVEC), and Virginia Municipal Electric Association (VMEA) for redelivery to their retail customers in Virginia, as well as to North Carolina Electric Membership Corporation (NCEMC) and North Carolina Eastern Municipal Power Agency (NCEMPA) for redelivery to their customers in North Carolina. The Company needs to be able to maintain the overall, long-term reliability of its transmission system, as its customers require more power in the future.

PJM's regional transmission expansion planning process ("RTEPP"), including the Company's own planning criteria and analysis, produced PJM's Regional Transmission Expansion Plan ("RTEP") for 2013, which identified the need for the construction of the proposed Project to relieve a violation of mandatory NERC Reliability Standards in the Summer of 2017. See Attachment I.A.3. Dominion Energy Virginia, along with other Transmission Owners in PJM, is actively involved in the development and the reliability assessment of these power flow models used in the RTEP analysis. The active participation of the Transmission Owners in the development and assessment phases of this process is critical to ensure a comprehensive and accurate RTEP. This reliability violation, if not relieved, could impact reliability to approximately 26,900 customers in the Commonwealth of Virginia. The PJM Board of Directors approved the need for the proposed Project (PJM RTEP project #b2361) at its October 2013 meeting. See Attachment I.A.4 for slides presented by PJM Staff to the Board Reliability Committee at that meeting. It should be noted that subsequent discussions with Fairfax County officials have resulted in a change in one of the terminal locations for the line that was presented to PJM (from a proposed new Scott's Run Substation to the existing Tysons Substation). Additionally, revised projections for the Tysons Loop, based on the 2017 PJM Load Forecast, show the violation being delayed until approximately 2023. As a result of these changes, the Company presented a revised proposal to PJM at the October 12, 2017 Transmission Expansion Advisory Committee ("TEAC") meeting describing the proposed underground transmission route. See Attachment I.A.5 for copies of the slides presented at that TEAC meeting. The Company anticipates that the proposed Project will be recommended for approval at the December 2017 PJM Board meeting, and will be approved as part of the 2017 RTEP.

The Supreme Court of Virginia has affirmed the Commission's determination of need for new transmission facilities based on violations of NERC Reliability Standards identified through the PJM RTEPP. *The Piedmont Environmental Council v. Virginia Elec. And Power Co.*, Record Nos. 090249, et al., opinion issued November 5, 2009.

The Company anticipates that the Project could be in-service by no later than June 2022, presuming an approximately 36-month schedule to complete

engineering, material procurement, permitting and construction, and the ability to obtain outages. The estimated total cost of the proposed Project, which assumes completion by no later than June 2022, is approximately $121.8 million (2017 dollars),[7] of which approximately $89.4 million is for underground transmission line construction along the Proposed Route (Underground Alternative 05); approximately $31.5 million is for conversion of Tysons Substation to GIS, which includes approximately $3.1 million for temporary and permanent overhead transmission line work at the station associated with the conversion; approximately $790,000 is for station work at Idylwood Substation; and approximately $118,000 is for relay work at Reston Substation.

[7] As noted earlier in Section I.A of the Appendix, while offered for the Commission's consideration and approval, the Replacement Tower Proposal is not a component of the proposed Project; therefore, the estimated approximately $433,000 for replacement of this lattice tower has not been included in the total estimated costs for the proposed Project.

County of Fairfax, Virginia

To protect and enrich the quality of life for the people, neighborhoods and diverse communities of Fairfax County

September 13, 2017

Sheri L. Akin
McGuireWoods LLP
1750 Tysons Boulevard, Suite 1800
Tysons, VA 22102

Re: Special Exception Amendment Application SEA 2014-PR-032

Dear Ms. Akin:

At a regular meeting of the Board of Supervisors held on September 12, 2017, the Board approved Special Exception Amendment Application SEA 2014-PR-032 in the name of Va. Electric and Power Company, D/B/A Dominion Energy Virginia. The subject property is located at 7701 and 7707 Shreve Road, on approximately 7.15 of acres of land, zoned in the R-3 District, Providence District [Tax Map 49-2 ((12)) 1A and 49-2 ((1)) 151]. The Board's action amends Special Exception Application SE 2014-PR-032, previously approved for an electric substation and telecommunications facility to modify site and development conditions to permit the addition of temporary equipment at its existing facility and associated modifications to site design and development conditions. Previously approved conditions or those with minor modifications are marked with an asterisk (*).

1. This Special Exception Amendment is granted for and runs with the land indicated in this application and is not transferable to other land.*

2. This Special Exception Amendment is granted only for the purpose(s), structure(s) and/or use(s) indicated on the special exception plat approved with the application, as qualified by these development conditions.*

3. This Special Exception Amendment is subject to the provisions of Article 17, Site Plans. Any plan submitted pursuant to the Special Exception Amendment shall be in substantial conformance with the approved Special Exception Amendment (SEA) Plat entitled "Idylwood Substation, Special Exception Plat Amendment & 2232 Plan," prepared by Dewberry Engineers Inc., dated April 2015, as revised through May 2017, with Sheet 17-SEA revised through September 2017, and these conditions. Minor modifications to the approved Special Exception Amendment may be permitted pursuant to Par. 4 of Sect. 9-004 of the Zoning Ordinance.

Office of the Clerk to the Board of Supervisors
12000 Government Center Parkway, Suite 533
Fairfax, Virginia 22035
Phone: 703-324-3151 ♦ Fax: 703-324-3926 ♦ TTY: 711
Email: clerktothebos@fairfaxcounty.gov
http://www.fairfaxcounty.gov/bosclerk

4. Right-of-way along Shreve Road shall be dedicated as generally depicted on the plat, as approved by Fairfax County and the Virginia Department of Transportation (VDOT). The right-of-way shall be dedicated without encumbrances and in fee simple to the Board of Supervisors upon request by either Fairfax County or the Virginia Department of Transportation, whichever occurs first.*

5. The entrances to the substation and the telecommunications facility shall meet the commercial entrance standards of the Virginia Department of Transportation (VDOT) and the driveways outside the perimeter wall shall be asphalt. The existing curb cut/entrance on Holly Manor Lane shall be removed and the curb and gutter and sidewalk shall be restored in the right of way prior to issuance of a Non Residential Use Permit (Non-RUP).*

6. A 5-foot wide sidewalk shall be constructed across the Shreve Road frontage prior to issuance of a Non-RUP.*

7. Stormwater management shall be provided as generally depicted on the SEA Plat or as approved by the Department of Public Works and Environmental Services (DPWES). The applicant shall promptly provide mitigation measures if there are impacts from increased stormwater downstream of the property.*

8. A) The planting schedule provided on the SEA Plat provides suggested vegetation and can be modified upon approval of the Urban Forest Management Division should other vegetation options be preferred, as an example, replacing the Yellow Wood and Greenspire with Red Sunset and/or Black gum varieties.*

   B) Further, prior to approval of the landscape plan, the Applicant and/or the County shall consult with a Certified Arborist Utility Specialist, who has experience in electric utility vegetation management, to find possible locations for taller vegetation within the restricted height areas shown on the SEA Plat. Should the Certified Arborist Utility Specialist find areas where taller plantings may installed, the Applicant shall modify the final site plan/landscape plan upon approval of the Urban Forest Management Division.

9. Landscaping shall be provided onsite in order to meet the intent of the Type 2 and Type 3 Transitional Screening requirements subject to the review and approval of the Urban Forest Management Division. On-site landscaping shall be as generally depicted on the SEA Plat. The Applicant shall provide the off-site landscaping to reduce the visual impact of the substation on the adjacent residential properties, property owners who have views of the new substation equipment, and community association common areas. The Applicant shall provide evergreen and/or deciduous vegetation on the lot of each landowner along Holly Manor Drive and Marthas Lane who are adjacent to the substation property or who will have views of the new substation equipment, and who elect to have off-site landscaping installed on their property. The Applicant shall contact the Holly Crest Community Association

and/or individual property owners adjacent to the substation along Holly Manor Drive to develop a plan for supplemental landscaping to be installed by the Applicant. The height limitations for vegetation shown on the substation property shall not apply to offsite vegetation nor shall the Applicant conduct trimming or maintenance on said offsite vegetation without the property owners consent. The Applicant shall also contact the representatives of the Dominion Heights Herrell Addition subdivision to determine if off-site landscaping should be provided on those properties as well. The Applicant shall negotiate the quantity, location, species, and type of landscaping with each individual landowner and submit the final design to the Urban Forest Management Division (UFMD) for review and comment. The design shall also be submitted to the Providence District Supervisor's office for review and comment. Landscaping shall be a minimum size of 7 feet tall and between 2 and 2 ½ inches in caliper at the time of planting. The landscaping shall be installed by the Applicant at the sole cost of the Applicant. The viability of such plantings shall be assured by the Applicant for a one (1) year period after installation, but regular care and maintenance shall be provided by the landowner. For satisfaction of this development condition, prior to site plan approval, the Applicant shall demonstrate that the landowners adjacent to the substation along Holly Manor Drive and Marthas Lane and in the Dominion Heights Herrell Addition subdivision were notified via certified mail of their eligibility to receive off-site landscaping. The Applicant shall begin working with the adjacent homeowners anytime thereafter. Landscaping may be installed prior to or following construction of the substation, as determined by the individual landowner, including the Holly Crest Community Association. Prior to release of the project's performance bond, the Applicant shall demonstrate final compliance of this development condition with either approved landscape layouts including property owner signatures verifying installation of respective off-site landscaping, a property owner's election to not receive off-site landscaping, or evidence of the Applicant's good faith effort to obtain such approval. The Applicant shall work with UFMD and the Providence District Supervisor's office to resolve any differences that arise during this process.*

10. Prior to the installation of plants to meet requirements of the approved landscape plan, the Applicant, with the Contractor/Developer serving as the agent, shall coordinate a pre-installation meeting on site with the contractor/developer of the site and a representative of the County Urban Forest Management Division (UFMD). Any proposed changes to the location of planting, size of trees/shrubs, and any proposed plant substitutions for species specified on the approved plan shall be reviewed at this time and must be approved prior to planting. The installation of plants not specified on the approved plan, and not previously approved by UFMD, may require submission of a revision to the landscape plan or removal and replacement with approved material, prior to bond release. UFMD shall be contacted (703-324-1770) a minimum of three (3) days prior to the meeting on site.*

11. The wall shall be constructed as generally depicted on the SEA Plat and shall be precast masonry panels and pilasters with brick façade along the north, east and west boundaries. Pre-cast concrete masonry panels and pilasters may be installed for the southern wall with matching brick color. The wall shall be built in general conformance with the SEA Plat and meet the Applicant's latest security requirements. A 7 foot high chain link fence with barbed wire shall be provided along Lots 18, 19 and 20 of Holly Crest in a similar location to the existing chain link fence. (Tax Map Parcels 49-2 ((41)), 0018, 0019 and 0020) This area between the fence and the wall shall be gated to prohibit unauthorized access. The gate along the front shall be 16 feet tall to match the rest of the wall height along Shreve Road, and shall open in towards the substation, slide or roll upwards.*

12. A) The vegetation and wall proposed on-site are required to remain as generally depicted on the SEA Plat. Minor modifications as allowed by the Zoning Ordinance may be permitted; however, replacement and appropriate maintenance of the vegetation and wall shall be provided as necessary to ensure the survival of the vegetation and aesthetic quality of the wall. Should the vegetation not survive, the Applicant shall replace such vegetation and maintain it thereafter.*

    B) To increase the survivability of the new plantings, the Applicant shall enter into a one (1) year maintenance contract for the on-site landscaping. Further, in order to minimize the likelihood of vegetation replacement, for a period of two (2) years, Dominion's arborist shall inspect the overall health of the plantings each spring, summer, and fall season to determine if appropriate actions, such as additional watering or insect management, are necessary. Records of inspections and necessary actions shall be maintained during this 2-year period and be made available upon request from Fairfax County or the Providence District Supervisor's office.

13. If a gate is necessary in the chain link fence along the southern boundary adjacent to the Dominion Power easement, a gap in the vegetation may be permitted up to 14 feet wide upon review by the Urban Forestry Management Division.*

14. As a condition of the 10-year tree canopy modification, a contribution of $19,538.00 shall be made to the Tree Preservation and Planting Fund at the time of site plan approval.*

15. Tree Preservation: The Applicant shall submit a tree preservation plan and Narrative as part of the first and all subsequent site plan submissions. The preservation plan and narrative shall be prepared by a Certified Arborist or a Registered Consulting Arborist, and shall be subject to the review and approval of the Urban Forest Management Division, DPWES.*

16. The tree preservation plan shall include a tree inventory that identifies the location, species, critical root zone, size, crown spread and condition analysis percentage

rating for all individual trees to be preserved, as well as all on- and off-site trees, living or dead with trunks 12 inches in diameter and greater (measured at 4 ½ -feet from the base of the trunk or as otherwise allowed in the latest edition of the Guide for Plant Appraisal published by the International Society of Arboriculture) located within 25 feet of the limits of clearing and grading within the undisturbed area. The tree preservation plan shall provide for the preservation of those areas shown for tree preservation, those areas outside of the limits of clearing and grading shown on the SEA and those additional areas in which trees can be preserved as a result of final engineering. The tree preservation plan and narrative shall include all items specified in PFM 12-0507 and 12-0509. Specific tree preservation activities that will maximize the survivability of any tree identified to be preserved, such as: crown pruning, root pruning, mulching, fertilization, and others as necessary, shall be included in the plan.*

17. Tree Preservation Walk-Through. The limits of clearing and grading are proposed to cover the entire site and it is unlikely that these will be significantly altered. The Applicant shall retain the services of a certified arborist or Registered Consulting Arborist, and shall have the limits of clearing and grading marked with a continuous line of flagging prior to the walk-through meeting. The Providence District Supervisor's office and adjacent neighbors shall be notified in writing in advance of this walk-through for their opportunity to participate in the walk-through. During the tree preservation walk-through meeting, the Applicant's certified arborist or Registered Consulting Arborist shall walk the limits of clearing and grading with an UFMD, DPWES, representative to determine where adjustments to the clearing limits can be made to increase the area of tree preservation and/or to increase the survivability of trees at the edge of the limits of clearing and grading, and such adjustment shall be implemented. Trees that are identified as dead or dying may be removed as part of the clearing operation. Any tree that is so designated shall be removed using a chain saw and such removal shall be accomplished in a manner that avoids damage to surrounding trees and associated understory vegetation. If a stump must be removed, this shall be done using a stump-grinding machine in a manner causing as little disturbance as possible to adjacent trees and associated understory vegetation and soil conditions. Any trimming of trees on adjacent properties for purposes of construction shall be done under the supervision of a certified arborist and after notification of the property owner.*

18. Limits of Clearing and Grading. The Applicant shall conform strictly to the limits of clearing and grading as shown on the SEA Plat, subject to allowances specified in these proffered conditions and for the installation of utilities and/or trails as determined necessary by the Director of DPWES, as described herein. If it is determined necessary to install utilities and/or trails in areas protected by the limits of clearing and grading as shown on the SEA Plat, they shall be located in the least disruptive manner necessary as determined by the UFMD, DPWES. A replanting plan shall be developed and implemented, subject to approval by the UFMD, DPWES, for any areas protected by the limits of clearing and grading that must be

disturbed for such trails or utilities.*

19. Tree Preservation Fencing: All trees shown to be preserved on the tree preservation plan shall be protected by tree protection fence. Tree protection fencing in the form of four (4) foot high, fourteen (14) gauge welded wire attached to six (6) foot steel posts driven eighteen (18) inches into the ground and placed no further than ten (10) feet apart or, super silt fence to the extent that required trenching for super silt fence does not sever or wound compression roots which can lead to structural failure and/or uprooting of trees shall be erected at the limits of clearing and grading as shown on the demolition, and phase I & II erosion and sediment control sheets, as may be modified by the "Root Pruning" proffer below.*

20. All tree protection fencing shall be installed after the tree preservation walk-through meeting but prior to any clearing and grading activities, including the demolition of any existing structures. The installation of all tree protection fencing shall be performed under the supervision of a certified arborist, and accomplished in a manner that does not harm existing vegetation that is to be preserved. Three (3) days prior to the commencement of any clearing, grading or demolition activities, but subsequent to the installation of the tree protection devices, the UFMD, DPWES, shall be notified and given the opportunity to inspect the site to ensure that all tree protection devices have been correctly installed. If it is determined that the fencing has not been installed correctly, no grading or construction activities shall occur until the fencing is installed correctly, as determined by the UFMD, DPWES.*

21. Root Pruning. The Applicant shall root prune, as needed to comply with the tree preservation requirements of these development conditions. All treatments shall be clearly identified, labeled, and detailed on the erosion and sediment control sheets of the subdivision plan submission. The details for these treatments shall be reviewed and approved by the UFMD, DPWES, accomplished in a manner that protects affected and adjacent vegetation to be preserved, and may include, but not be limited to the following:

    - Root pruning shall be done with a trencher or vibratory plow to a depth of 18 inches.
    - Root pruning shall take place prior to any clearing and grading, or demolition of structures.
    - Root pruning shall be conducted with the supervision of a certified arborist.
    - An UFMD, DPWES, representative shall be informed when all root pruning and tree protection fence installation is complete."*

22. A plan for the care and maintenance of the trees to be managed and maintained onsite along Shreve Road and for protection of offsite trees shall be developed during site plan review based on consultation and coordination with a certified arborist. The care and maintenance of the onsite trees could include pruning and

supplemental planting to meet the intent of Transitional Screening 2. The offsite trees shall include but not be limited to trees numbered 104, 105, 131, 132, 133, 134,114, 116, 117, 113, 107, 109 and 111. During site plan review, the total square footage of the canopy area associated with those trees to be protected, managed and maintained shall be provided. Based on the square footage of canopy, a replacement cost will be prepared by the Urban Forest Management Division (UFMD) based on the latest County of Fairfax, Department of Public Works and Environmental Services Comprehensive Unit Price Schedule. Once the cost estimate is approved, a bond or letter of credit shall be provided for the replacement value for the onsite trees. For the offsite trees, the trees shall either be replaced or replacement value shall be provided to the property owner (based on the preference of the property owner).*

23. The wall may be built in stages. Upon installation of the distribution 38kV GIS vault and the installation of the distribution circuits, the Applicant shall use expeditious efforts to complete the wall frontage along Shreve Road. Thereafter, all reasonable efforts shall be made to complete as much of the wall as possible at the earliest stage possible.*

24. Construction and demolition debris waste shall be recycled to the maximum extent practicable during the various stages of the existing substation demolition.*

25. During site plan review, a plan for the mitigation of construction impacts shall be developed by the Applicant. Measures to alleviate construction impacts on Shreve Road and the surrounding communities will include a flag person as necessary during construction, setting up a schedule for deliveries of large construction equipment or materials (subject to VDOT regulations), locating dumpsters and other similar devices behind covered fencing, the future wall, or in a location on the Dominion property to reasonably limit public visablitiy and providing timely removal of the same when full, establishment and continuation of a website for the project which will provide alerts (which could include mass emails or use of social media) on high impact (for instance noise or traffic impacts) activities or other measures, designed to provide timely notification to the area residents and those traveling on Shreve Road. This plan shall be provided to the Providence District Supervisors office. Pedestrian access across the property shall be maintained at all times throughout construction.*

26. This use shall be subject to the Noise Ordinance of Fairfax County. The following noise and glare mitigation measures shall be implemented during construction:

    - All motorized vehicles and equipment used on this project shall be equipped with proper mufflers.
    - Delivery routes shall be arranged to minimize the use of backup alarms on commercial vehicles and equipment.
    - The banging of tail gates shall be prohibited. All drivers associated with this

project shall be informed each day about this prohibition.

- All lights used to illuminate the project site, including any staging areas, shall be full cut-off or directionally shielded so that the directed light shall be substantially confined to the construction site.

27. All applicable permits from the US Army Corps of Engineers, Virginia Department of Environmental Quality, and Virginia Department of Conservation and Recreation shall be obtained prior to obtaining site plan approval.*

28. Construction hours shall be limited as follows:

Initial Site Work Period (Grading/Excavation/SWM/E&S): Monday through Friday 7:00 am to 7:00 pm; Saturdays from 9:00 am – 5:00 pm. No construction work during this period shall be performed on Sundays or major federal holidays. The proposed 15' tall mobile sound mitigations panels shall be completely installed prior to the initial site work period and remain for the duration of construction. The schedule for the extended construction hours associated with the Initial Site Work Period shall be seven (7) weeks, and no more than a maximum of ten (10) weeks to allow for uncertainties such as weather, as measured from the date of the required pre construction meeting.

Post-Site Work Period (Re-build Period) - Monday through Friday 7:30am to 6:00 pm. Should work on Saturdays be necessary, hours shall be limited from 9:00 am to 5:00 pm. No construction work shall be performed on Sundays or major federal holidays.

The Applicant shall notify the Holly Crest HOA and the Providence District Supervisor's office when the Initial Site Work Period commences and when it is complete. For either Work Period, signage shall be posted on-site in English and Spanish, or any other language which may become necessary based on construction personnel, notifying construction personnel of residential properties in close proximity to the substation and to limit truck idling. Construction vehicles shall not idle or park along Holly Manor Drive and signs for the construction and prohibition on idling shall be placed on the nearby streets subject to VDOT approval. In addition to the proposed 15' tall mobile sound mitigation panels, noise reducing efforts such as using flags or a single buzzer instead of beepers, use of temporary construction noise abatement techniques or such other measures shall be diligently pursued. The Applicant shall provide the Providence District Supervisor's office with a point of contact for construction related issues. The Applicant shall provide a response to construction related issues/questions/complaints within 24 hours of receiving notice. The construction hours noted above shall not prohibit the Applicant from performing emergency construction or maintenance on the substation or adjacent power lines as necessary.*

29. All signs onsite shall be subject to Article 12.*

30. Storage of materials, equipment or trucks not needed for operation of the substation or adjacent power lines is not permitted onsite once construction activities have been completed.*

31. All graffiti shall be removed as expeditiously as possible, and shall be removed no later than a week after the Applicant is notified of the issue. A point of contact for ongoing maintenance issues shall be established with the Providence District Supervisors office and updated as the contact may change.*

32. Construction traffic shall be limited to the Shreve Road entrances.*

33. All reasonable efforts shall be made to reduce construction noise on the east side of the property due to the close proximity of residences. Multi-lingual signage shall be posted on-site notifying construction personnel of these efforts.*

34. Electromagnetic field (EMF) readings at the perimeter of the site shall be provided to the Holly Crest Community Association and other interested property owners within 6 months after the substation equipment becomes operational, or prior to bond release, whichever occurs first.*

35. Following construction of the substation wall and installation of the landscaping at the property's northeastern corner (including the Holly Crest off-site landscaping that is located in this general area and depicted at the northeast corner on the plat), the Applicant shall work with the Holly Crest HOA to determine if there is a need to relocate or replace the Holly Crest entrance sign. The Applicant will fund the relocation or replacement of the entrance sign up to $35,000.00 if it is determined that the sign is not adequately screened from the substation or if the sign appears disconnected from the residential community. The intent is to ensure the sign is associated with the Holly Crest neighborhood and not the substation. If the new landscaping satisfactory separates the sign from the substation use, the $35,000.00 contribution shall be not required. Prior to the issuance of the non-RUP, the applicant shall obtain a letter from the Holly Crest HOA indicating that this condition has been satisfied.*

36. A soil remediation plan will be submitted on the first and all subsequent site plans for review and approval by UFMD. The soil remediation plan shall comply with ANSI A300-Part 2 Standards and its accompanying Best Management Practices. The remediation plan shall include, but not be limited to, Section 14 Soil Management a. Soil Modification, of ANSI A300-Part 2, latest edition. The remediation plan shall also be generally consistent with the drawing entitled "Areas of Anticipated Soil Remediation", prepared by Dewberry Engineering, Inc. and dated May 15, 2017, and included as Attachment 1 to these development conditions. The remediation plan shall demonstrate where soil remediation will take

place within all of the required Transitional Screening buffer areas around the full perimeter of the site. These areas shall include where construction activities have or have not already occurred.

37. The backbone structure generally shown on the special exception plat in the northwestern corner of the approved substation and the associated two (2) spans of conductors/shield wire shall not be constructed unless such backbone and associated conductors/shield wire are required to reflect approvals by the State Corporation Commission. Should the backbone not be constructed, alternative line connection/transitions from the substation to the applicable transmission line may also be provided from that shown on the SEA plat.

38. A 7' chain-link construction fence with an additional foot of barbed wire shall be placed around the perimeter of the construction area, except on the Shreve Road frontage and the approximately 115 linear foot area generally behind the existing Hollycrest Subdivision sign, which shall be 10' in height with no barbed wire. In addition, the 10' construction fence on the Shreve Road frontage will have a fabric screen design that is chosen by the Applicant after obtaining input from the Holly Crest HOA and Dominion Heights Herrell Addition subdivision.

39. The Applicant shall remove vines and invasive species, do soil testing, amending of soils based on the results from the soil testing, prune broken and dead limbs, and add 3 inches of shredded hardwood mulch by hand within the proposed tree save area along Shreve Road. Understory plantings may be installed within the tree save area as generally depicted on the drawing and narrative entitled "Mitigation Landscape Plan – Enhance Existing Tree Area," prepared by Dewberry Engineering, Inc., dated April 6, 2017, and included as Attachment 2 to these development conditions.

40. The high bus may be constructed in advance of its energization. The Applicant shall provide notice to the Holly Crest HOA of when the high bus is to be energized. Similar notice shall be provided when the high bus is to be de-energized, along with an anticipated date of structure removal. Removal of the high bus shall be completed as soon as practical following de-energization.

41. The Applicant may pursue processing of the site plan and/or rough grading permit with DPWES; however, no plans shall be approved and no permits shall be issued until the State Corporation Commission has issued a Final Order and a Certificate of Public Convenience and Necessity in or related to Case No. PUR-2017-00002.

42. The 120-foot lattice tower (identified as #2097/177) is creating an adverse visual impact on neighboring properties and is nearing the end of its useful life. Therefore, the Applicant shall take the following steps:

    (a) The Applicant will inspect the 120-foot lattice tower (identified as

#2097/177) for possible replacement within commercially reasonable timeframes, but not less than every year. The Applicant will submit the findings of such inspections to Fairfax County and the office of the Providence District Supervisor.

(b) To the extent lattice tower 2097/177 is deemed to meet the Applicant's criteria for replacement before its next transmission project on the subject property, the Applicant will remove the existing lattice tower and install a replacement tower or pole structure of a design and materials intended to minimize adverse visual impacts on neighboring properties, as determined by the Zoning Administrator.

(c) If such tower replacement has not already occurred or is not already underway at the time Dominion initiates its next transmission project that includes the subject property, the Applicant will design and propose to the Virginia State Corporation Commission (SCC) replacement of the tower based on visual mitigation reasons, and advocate in good faith for such replacement, at the time it initiates the next transmission project that includes the subject property. While this condition does not mandate a specific type or form of tower replacement, the Applicant will exercise its best efforts to replace the tower in a manner that minimizes the adverse visual impact on neighboring properties. Upon approval by the SCC, the Applicant will replace the 120-foot tower as expeditiously as possible.

This approval, contingent on the above noted conditions, shall not relieve the applicant from compliance with the provisions of any applicable ordinances, regulations, or adopted standards. The applicant shall be himself responsible for obtaining the required Non-Residential Use Permit through established procedures, and this Special Exception shall not be valid until this has been accomplished.

Pursuant to Section 9-015 of the Zoning Ordinance, this Special Exception shall automatically expire, without notice, 30 months after the date of approval unless the use has been established or construction has commenced and been diligently prosecuted. The Board of Supervisors may grant additional time to establish the use or to commence construction if a written request for additional time is filed with the Zoning Administrator prior to the date of expiration of the Special Exception. The request must explain why additional time is required, specify the amount of additional time requested, and explain the basis for the amount of time requested.

The Board also:

- Waived the major paved trail shown on the Countywide Trails Plan in favor of the five foot wide sidewalk that is proposed along the entire Shreve Road frontage

- Waived the actual striping for the proposed bike lane along Shreve Road shown on the Countywide Bicycle Master Plan

- Reaffirmed all previously approved waivers and modifications, as listed below:

  - Modification of transitional screening requirements along all boundaries of the site in favor of that shown on the special exception (SE) plat

  - Directed the Director of the Department of Public Works and Environmental Services (DPWES) to approve a modification of 10-year tree canopy requirements in favor of that shown on the SE plat

  - Directed the Director of DPWES to approve a waiver of the tree preservation target requirements in favor of that shown on the SE plat

Sincerely,

Catherine A. Chianese

Catherine A. Chianese

cc: Chairman Sharon Bulova
Supervisor Linda Smyth, Providence District
Howard Goodie, Director, Real Estate Division, Dept. of Tax Administration
Tracy D. Strunk, Director, Zoning Evaluation Division, DPZ
Diane Johnson-Quinn, Deputy Zoning Administrator, Dept. of Planning and Zoning
Thomas Conry, Dept. Manager, GIS, Mapping/Overlay
Michael Davis, Section Chief, Transportation Planning Division
Ken Williams, Plans & Document Control, ESRD, DPWES
Andrea Dorlester, Park Planning Branch Manager, FCPA
Abdi Hamud, Development Officer, DHCD/Design Development Division
Jill Cooper, Executive Director, Planning Commission
Karyn Moreland, Chief Capital Projects Sections, Dept. of Transportation

COUNTY OF FAIRFAX
Department of Planning and Zoning
Zoning Evaluation Division
12055 Government Center Parkway, Suite 801
Fairfax, VA 22035 (703) 324-1290, TTY 711
www.fairfaxcounty.gov/dpz/zoning/applications

APPLICATION No: SEA 2014-PR-032
(Staff will assign)

RECEIVED
Department of Planning & Zoning
JAN 17 2017
Zoning Evaluation Division

APPLICATION FOR A SPECIAL EXCEPTION

(PLEASE TYPE or PRINT IN BLACK INK)

APPLICANT	**NAME** VA. Electric & Power Co., d/b/a Dominion ~~Virginia Power~~ Energy Virginia dd 6/26/17
	MAILING ADDRESS 701 E. Cary Street, Richmond, VA 23219
	PHONE HOME ( ) **WORK** (804) 771-6408
	PHONE MOBILE (804) 380-9335
PROPERTY INFORMATION	**PROPERTY ADDRESS** 7701 & 7707 Shreve Road, Falls Church, VA 22043
	TAX MAP NO. 49-2-((1))-151 and 49-2-((12))-001A **SIZE (ACRES/SQ FT)** 7.15 ac / 311,367 sf
	ZONING DISTRICT R-3 **MAGISTERIAL DISTRICT** Providence
	PROPOSED ZONING IF CONCURRENT WITH REZONING APPLICATION:
SPECIAL EXCEPTION REQUEST INFORMATION	**ZONING ORDINANCE SECTION** 9-014; 9-101
	PROPOSED USE Amend SE 2014-PR-032 previously approved for an Electric Substation and Telecommunication Facility to modify site and development conditions
AGENT/CONTACT INFORMATION	**NAME** Gregory A. Riegle, Esquire / Sheri L. Akin, Senior Land Use Planner
	MAILING ADDRESS McGuireWoods LLP 1750 Tysons Boulevard, Suite 1800, Tysons Corner, VA 22102
	PHONE HOME ( ) **WORK** (703) 712-5483 (SLA)
	PHONE MOBILE ( )
MAILING	**Send all correspondence to (check one):** ☐ **Applicant** –or– ☑ **Agent/Contact**

The name(s) and addresses of owner(s) of record shall be provided on the affidavit form attached and made part of this application. The undersigned has the power to authorize and does hereby authorize Fairfax County staff representatives on official business to enter the subject property as necessary to process the application.

Sheri L. Akin, Senior Land Use Planner — Sheri L. Akin

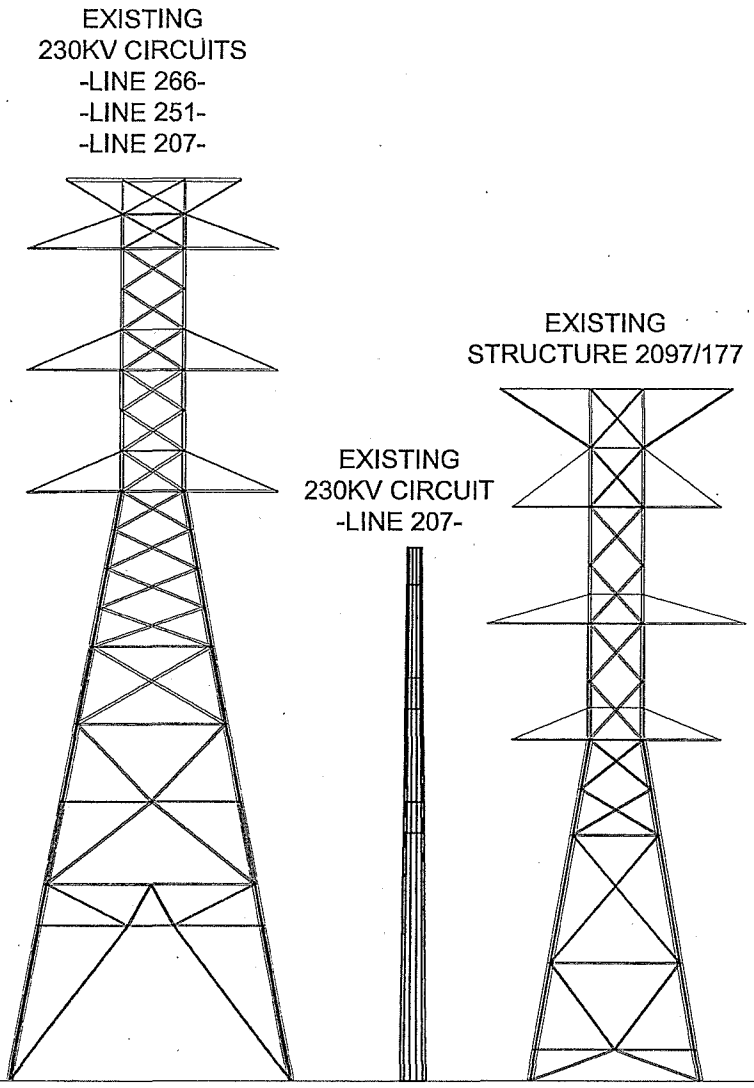
TYPE/PRINT NAME OF APPLICANT/AGENT — **SIGNATURE OF APPLICANT/AGENT**

DO NOT WRITE IN THIS SPACE — SEA 2016-0376 mm 1/24/17

Date Application accepted: January 24, 2017 Application Fee Paid: $ 16,375.00

Name change only June 26, 2017

EXISTING



APPROXIMATE EDGE OF ROW

SEE EXISTING PLAN VIEW
FOR STRUCTURE 2097/177PLACEMENT IN ROW

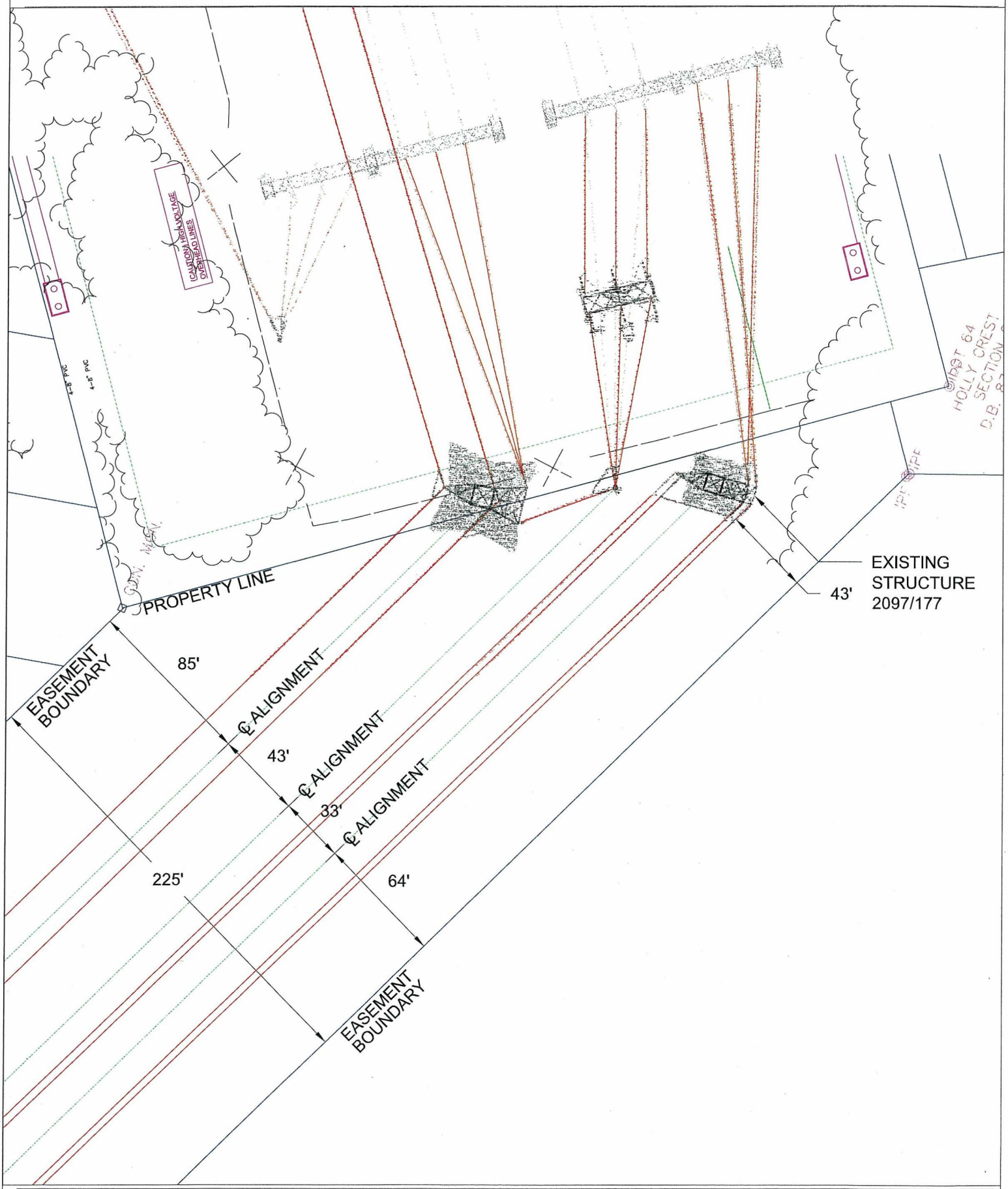
APPROXIMATE EDGE OF ROW

EXISTING STRUCTURE 2097/177
RIGHT OF WAY LOOKING TOWARD IDYLWOOD SUB

STRUCTURE TYPE:	LATTICE STEEL TOWER
FOUNDATION MATERIAL:	CONCRETE
APPROXIMATE STRUCTURE HEIGHT:	112'
APPROXIMATE STRUCTURE CROSS ARM WIDTH:	41'
APPROXIMATE STRUCTURE BASE WIDTH:	27'
ROW WIDTH:	225'

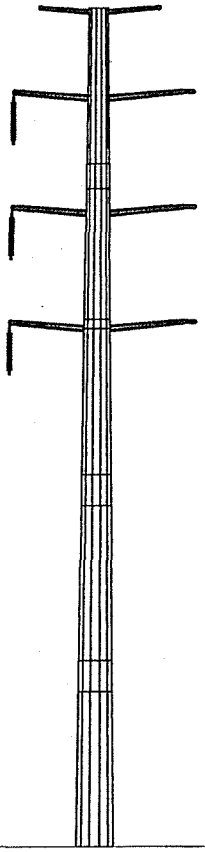
NOTES: 1. APPROXIMATE HEIGHT DOES NOT INCLUDE FOUNDATION REVEAL.

EXISTING PLAN VIEW

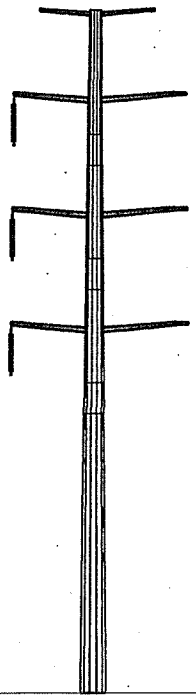


PRELIMINARY
PROPOSED

APPROVED FOR
REPLACEMENT UNDER
Case No. PUR-2017-00002
230KV CIRCUITS
-LINE 2064-
-LINE 207-



PROPOSED
STRUCTURE 2097/177



APPROXIMATE EDGE OF ROW

SEE PRELIMINARY PROPOSED PLAN VIEW
FOR STRUCTURE 2097/177 PLACEMENT IN ROW

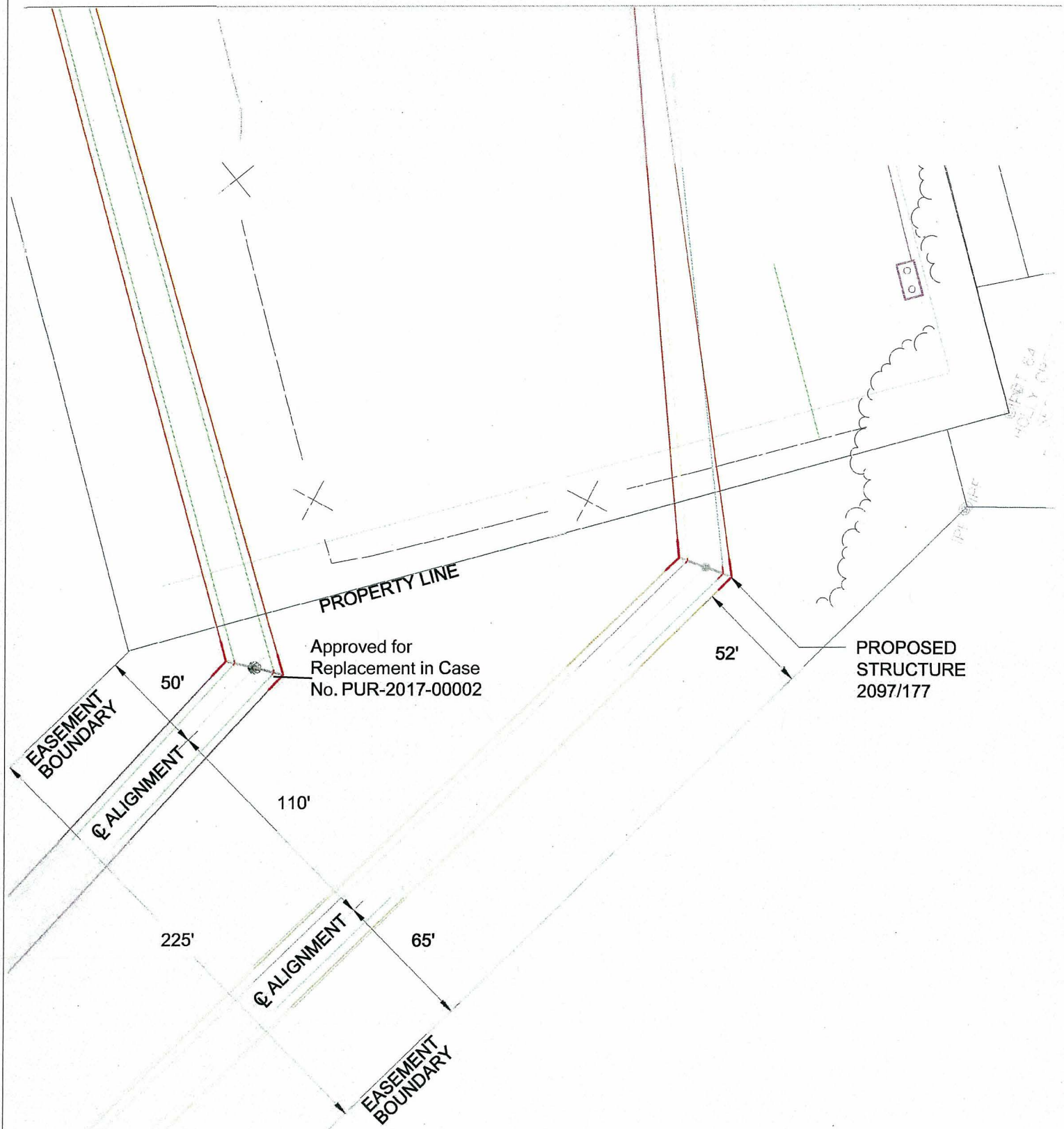
APPROXIMATE EDGE OF ROW

PROPOSED STRUCTURE 2097/177
RIGHT OF WAY LOOKING TOWARD IDYLWOOD SUB

STRUCTURE TYPE:	STEEL POLE
FOUNDATION MATERIAL:	CONCRETE
APPROXIMATE STRUCTURE HEIGHT:	110'
APPROXIMATE STRUCTURE CROSS ARM WIDTH:	26'
APPROXIMATE STRUCTURE BASE WIDTH:	8'
ROW WIDTH:	225'

NOTES: 1. APPROXIMATE HEIGHT DOES NOT INCLUDE FOUNDATION REVEAL.
2. INFORMATION IS PRELIMINARY AND SUBJECT TO FINAL ENGINEERING

PRELIMINARY PROPOSED PLAN VIEW



NOTES: 1. STRUCTURE LOCATION SUBJECT TO FINAL ENGINEERING.


Transmission Expansion Advisory Committee
September 12, 2013

Recommendations to PJM Board in October

Recommendations to PJM Board in October 2013

- This is the first request for PJM Board approval of the RTEP in 2013
  - Includes SRRTEP reliability projects reviewed at March and August 2013 SRRTEP meetings
  - Includes TEAC reliability projects reviewed during 12/2012 through 9/2013 (today)
- The PJM Board will be requested to approve projects in this section of the presentation for inclusion in the RTEP

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Summer 2017 Reliability

Idylwood to Scott's Run 230 kV Line and Substation

- **NERC Category C3 N-1-1 Violation – New Upgrade Required**

Problem:

N-1-1 loss of Line #2010 (Reston-Tysons 230 kV) and Line #2035 (Idylwood-CIA 230 kV) results in the loss of more than 300 MW .

Potential Solutions:

A) Construct a 230 kV OH line along existing Line #2035 corridor, approx. 2.4 miles from Idylwood to Dulles Toll Road (DTR) and 2.1 miles on new right-of-way (ROW) along DTR to new Scott's Run Substation.

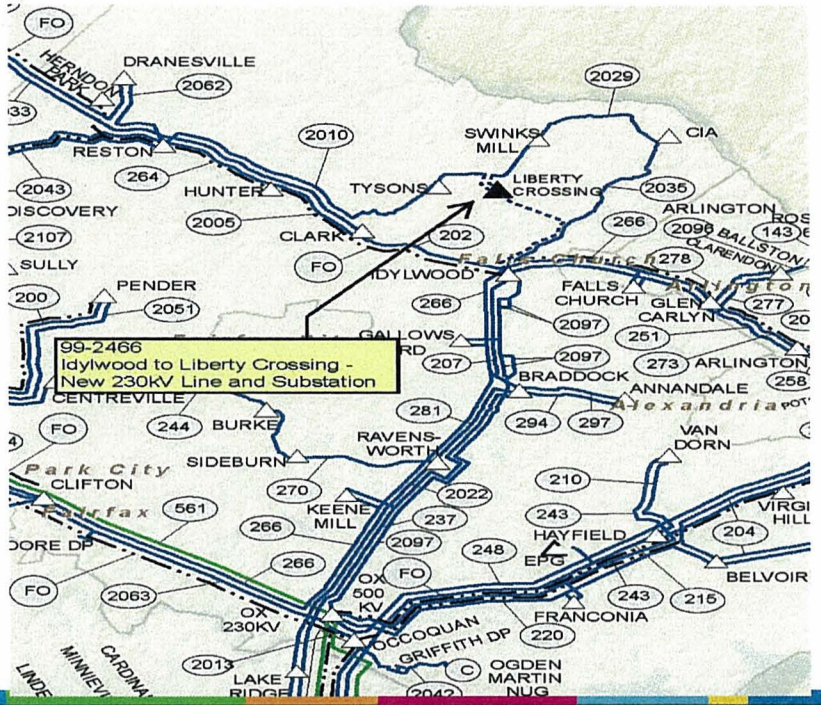
B) Same as A, except 2.1 miles along DTR would be UG due to possible ROW constraints.

C) Construct new 230 kV UG line approx. 4.0 miles along new ROW from Idylwood to new Springhill Substation (approx. 0.7 miles south of Tysons Substation).

D) Construct a 9 mile hybrid (OH & UG) 230 kV line approx. 6 miles UG along new ROW from PEPCO's Bells Mill Substation to south of the Potomac River and approx 3 miles OH along existing ROW to Scott's Run Substation.

E) Double-circuit the existing 230 kV loop from Idylwood to CIA to Swinks Mill to Tysons to new Springhill Sub, approx. 13.4 miles

• (Continued Next Page)



Summer 2017 Reliability

Idylwood to Scott's Run 230 kV Line and Substation

Solution Alternative	Estimated Project Cost
A) 4.5 mile OH line – Idylwood to Scott's Run	$32M
B) 4.5 mile hybrid (OH/UG) line – Idylwood to Scott's Run	$59M
C) 4 mile UG line – Idylwood to Spring Hill	$98-118M
D) 9 mile hybrid (OH/UG) line – Bells Mill (PEPCO) to Scott's Run	$144M
E) 13 mile OH line – Double circuit Idylwood to Spring Hill	$76-96M

Proposed Solution:

A) Construct a 230 kV OH line along existing Line #2035 corridor, approx. 2.4 miles from Idylwood to Dulles Toll Road (DTR) and 2.1 miles on new right-of-way (ROW) along DTR to new Scott's Run Substation.

Expected IS Date: Summer 2017

Notes:

1) Preliminary field visit along proposed route indicates potential ROW constraints that may limit the use of 230 kV OH along DTR. Further analysis by engineering and routing team will be required.
2) Each of the solutions will require new ROW to be acquired.

Transmission Expansion Advisory Committee (TEAC) Recommendations to the PJM Board

PJM Staff Whitepaper
October 2013

Appendix – RTEP Baseline Upgrade Cost Allocation

Single Zone Allocations

Upgrade ID	Description	Cost Estimate	Transmission Owner	Required IS date
b2055	Upgrade relay at Brues Station	$ 0.10	AEP	6/1/2015
b2117	Reconductor 0.33 miles of the Parkersburg - Belpre line and upgrade Parkersburg terminal equipment	$ 0.25	APS	6/1/2015
b2118	Add 44 MVAR Cap at New Martinsville	$ 1.10	APS	6/1/2015
b2120	Six-wire Lake Lynn - Lardin 138 kV circuits	$ 0.10	APS	6/1/2015
b2122.1	Reconductor the ATSI portion of the Howard - Brookside 138 kV line	$ 7.75	ATSI	6/1/2015
b2122.2	Upgrade terminal equipment at Brookside on the Howard - Brookside 138 kV to achieve ratings of 251/291 (SN/SE)	$ 0.06	ATSI	6/1/2015
b2122.3	Upgrade terminal equipment at Howard on the Howard - Brookside 138 kV line to achieve ratings of 252/291 (SN/SE)	$ 0.60	AEP	6/1/2015
b2122.4	Perform a sag study on the Howard - Brookside 138 kV line	$ 0.03	AEP	6/1/2015
b2123	Upgrade the 69 kV bus at Laurel	$ 0.18	AEC	6/1/2015
b2130	Replace Waneeta 138 kV breaker '15' with 63 kV rated breaker	$ 0.25	PECO	6/1/2017
b2131	Replace Waneeta 138 kV breaker '35' with 63 kA rated breaker	$ 0.28	PECO	6/1/2017
b2132	Replace Waneeta 138 kV breaker '875' with 63 kA rated breaker	$ 0.28	PECO	6/1/2017
b2133	Replace Waneeta 138 kV breaker '895' with 63 kA rated breaker	$ 0.28	PECO	6/1/2017
b2134	Plymouth Meeting 230 kV breaker '115' with 63 kA rated breaker	$ 0.29	PECO	6/1/2017
b2141.1	Remove Byron SPS upon completion of Byron - Wayne 345 kV	$ -	ComEd	6/1/2017
b2142	Replace Weirton 138 kV breaker "Wylie Ridge 210" with 63 kA rated breaker	$ 0.50	APS	6/1/2017
b2143	Replace Weirton 138 kV breaker "Wylie Ridge 216" with 63 kA rated breaker	$ 0.50	APS	6/1/2017
b2174.10	Peform relay seting changes at Bethel Park substation	$ 0.01	APS	6/1/2015
b2174.8	Replace relays at Mitchell substation	$ 0.15	APS	6/1/2015
b2174.9	Replace primary relay at Piney Fork substation	$ 0.04	APS	6/1/2015
b2175.1	200 MVAR shunt reactor at Brunot Island 345 kV	$ 8.65	DL	6/1/2016
b2175.2	200 MVAR shunt reactor on future Brunot Island - Carson 345 kV circuit	$ 8.65	DL	6/1/2016
b2188	Revise the reclosing for the Bluebell 138 kV breaker '301-B-94'	$ 0.25	ATSI	6/1/2017

Appendix – RTEP Baseline Upgrade Cost Allocation continued

Upgrade ID	Description	Cost Estimate	Transmission Owner	Required IS date
b2347	Replace the North Delphos 600A switch. Rebuild approximately 18.7 miles of 138 kV line North Delphos -	$ 22.44	AEP	6/1/2017
b2348	Construct a new 138 kV line from Richlands Station to intersect with the Hales Branch - Grassy Creek 138 kV circuit	$ 28.00	AEP	6/1/2017
b2350	Reconductor 211 feet of 545.5 ACAR conductor on 59 line Elmont - Greenwood DP 115 kV to achieve a summer	$ 0.05	Dominion	5/31/2014
b2351	Reconductor section A of Corson - Sea Isle - Swainton 69 kV line	$ 0.95	AEC	6/1/2014
b2353	Upgrade the overcurrent protective relaying at Middle T3 and T4 138/69 kV transformers	$ 0.32	AEC	6/1/2014
b2354	Install second 230/69 kV transformer and 230 kV circuit breaker at Churchtown substation	$ 3.50	AEC	6/1/2015
b2358	Install a 230 kV 54 MVAR capacitor bank on the 2016 line at Harmony Village Substation	$ 1.20	Dominion	5/1/2015
b2359	Wreck and rebuild approximately 1.3 miles of existing 230 kV line between Cochran Mill - X4-039 Switching Station	$ 4.00	Dominion	11/1/2015
b2360	Build a new 39 mile 230 kV transmission line from Dooms - Lexington on existing right-of-way	$ 35.00	Dominion	6/1/2016
b2361	Construct 230 kV OH line along existing Line #2035 corridor, approximately 2.4 miles from Idylwood - Dulles Toll Road	$ 32.00	Dominion	6/1/2017
b2362	Install a 250 MVAR SVC at Squab Hollow 230 kV	$ 33.50	APS	6/1/2015
b2363	Convert the Shingletown 230 kV bus into a 6 breaker ring bus	$ 5.50	APS	6/1/2018
b2364	Install a new 230/138 kV transformer at Squab Hollow 230 kV substation. Loop the Forest - Elko 230 kV line into Squab	$ 16.80	APS	6/1/2015

Reliability Analysis Update

Transmission Expansion Advisory Committee

October 12, 2017

2017 RTEP
Reliability Analysis Update

Dominion Transmission Zone Baseline Project

Existing b2361 Cost Increase and Scope Modification
Original: Baseline Project: Idylwood to Scott's Run 230kV Line and Substation
Revised: Idylwood to Tysons 230kV Line and Rebuild Tysons with GIS

Problem Statement:

- N-1-1 loss of Line #2010 (Reston-Tysons) and Line #2035 (Idylwood-CIA) results in the loss of more than 300 MW (NERC Category P6 - Multiple Contingency – Two overlapping singles).

Date Original Project Presented: 08/21/2013 (SRRTEP); 09/12/2013 (TEAC)

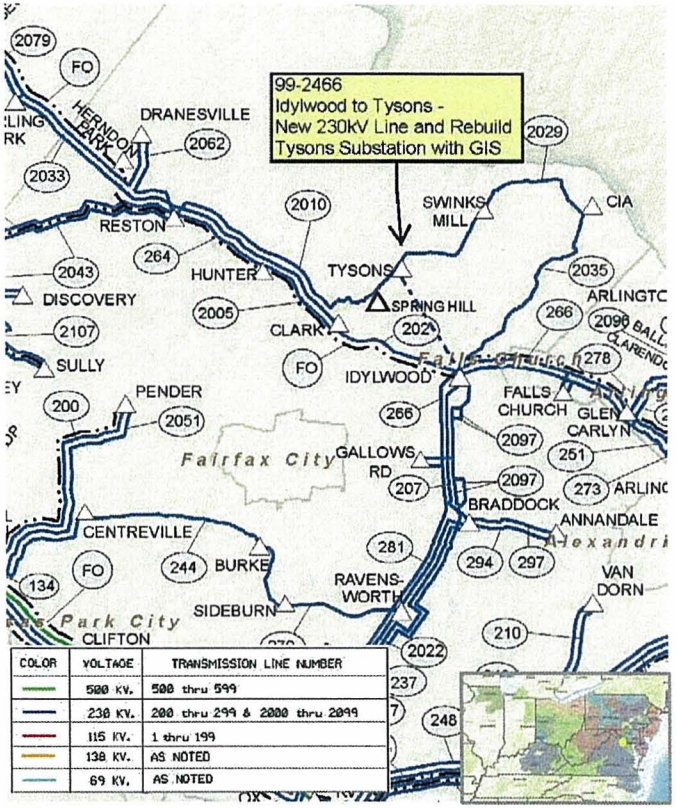
Original Proposed Solution

- Construct a 230kV OH line along existing Line #2035 corridor, approx. 2.4 miles from Idylwood to Dulles Toll Road (DTR) and 2.1 miles on new right-of-way (ROW) along DTR to new Scott's Run Substation. (**Est. cost $32M**)

Reason for Scope Modification and Cost Increase:

- Project scope had to be modified due to issues with siting of the new Scott's Run substation in Fairfax County.
- Area is very densely populated and is in close proximity to interstate highways and the DC Metro rail system limiting the options of bringing an additional source into the area. Multiple substation options were also considered. (Refer to the next slide.)
- Very narrow existing right-of-way also limits the ability to expand.
- Conversion of Tysons to GIS was determined to be the best option given the obstacles presented.
- High real estate and land costs along with conversion to GIS drove costs considerably higher.

Continued on next slide…



Dominion Transmission Zone
Baseline Project b2361 - Sites Examined

Illustration of space constraints in the area and all the substation options considered

Primary Site

- Tysons Substation

Alternate Sites

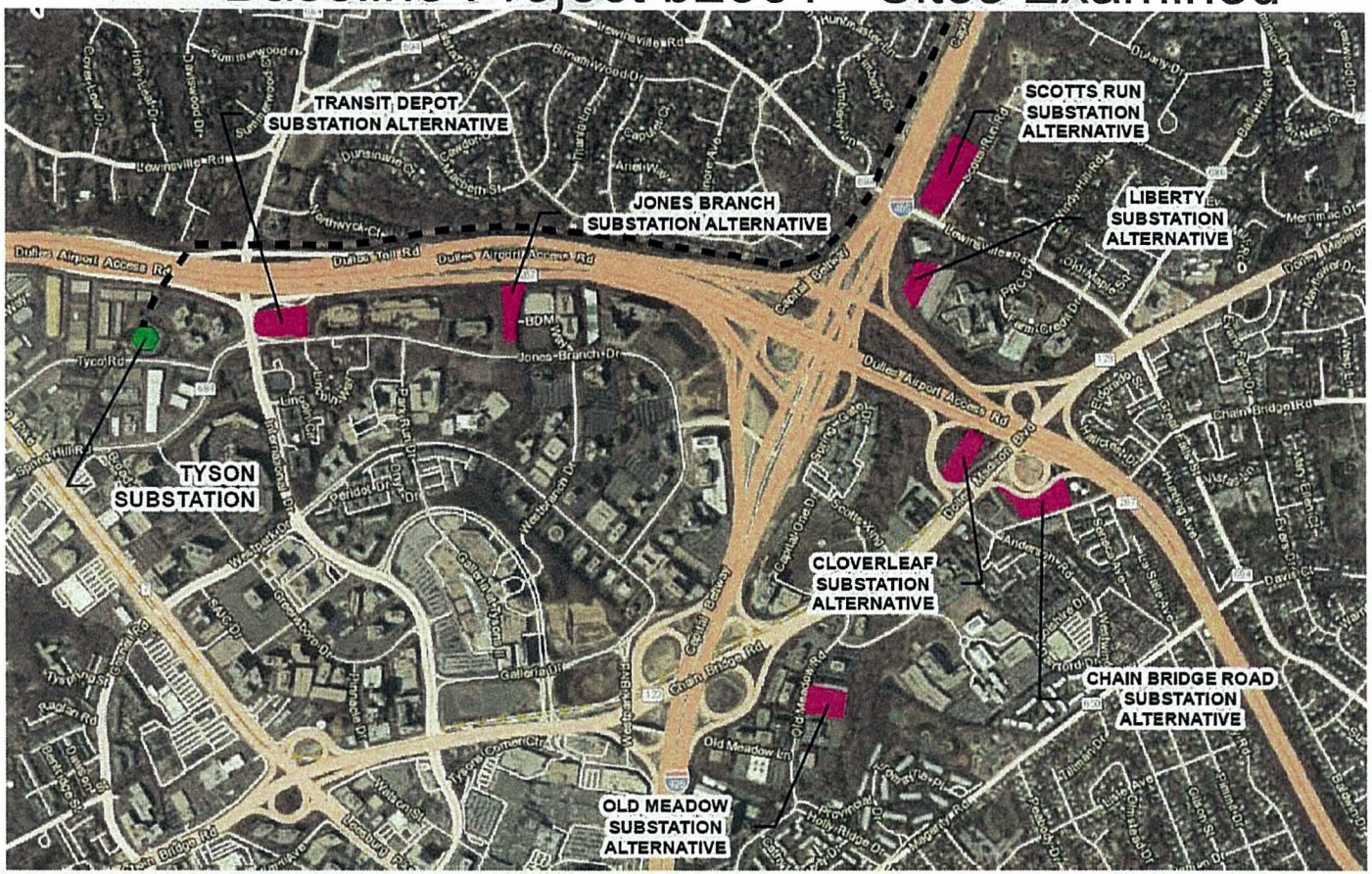
- Jones Branch Road
- Chain Bridge Road*
- Scotts Run Road
- Cloverleaf

Eliminated Sites

- Liberty Crossing
- Transit Depot*
- Old Meadow Road

**Sites identified by Fairfax DOT*

Continued on next slide…



Dominion Transmission Zone Baseline Project

Existing b2361 Cost Increase and Scope Modification

Original: Baseline Project: Idylwood to Scott's Run 230kV Line and Substation

Revised: Idylwood to Tysons 230kV Line and Rebuild Tysons with GIS

Revised Proposed Solution

- Construct a 230kV UG line approx. 4.5 miles from Idylwood to Tysons. Tysons Substation will be rebuilt, within its existing footprint, with a 6-breaker ring bus using GIS equipment. (**Est. cost $111.7M**)
- Cost increase due to change in terminal location (Scott's Run to Tysons), detailed evaluation of routes, and $29.2M to rebuild Tysons Sub using GIS equipment

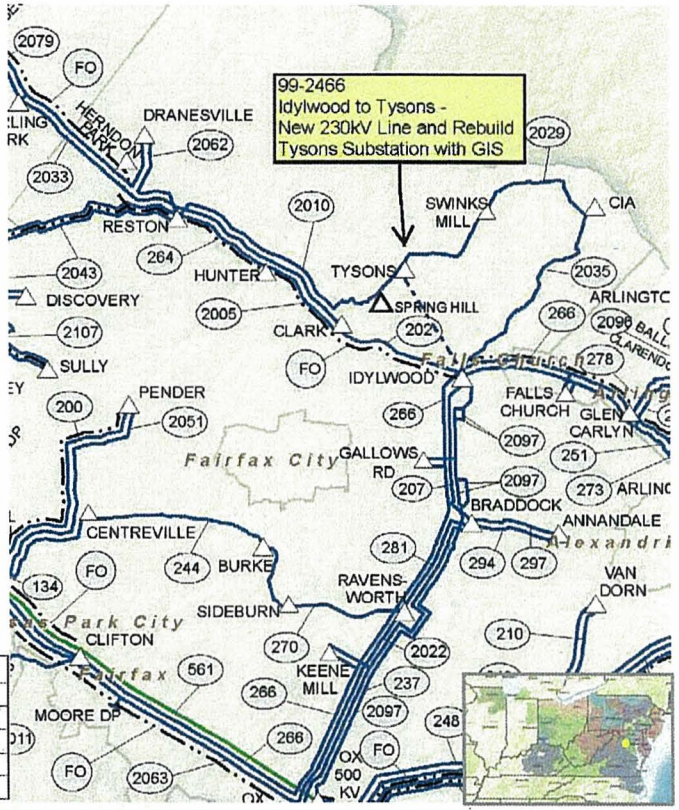
Alternatives

- Construct a 230kV OH line approx. 5.2 miles from Idylwood to Tysons. Rebuild Tysons Substation, within its existing footprint, with a 6-breaker ring bus using GIS equipment. (**Est. cost $122.6M**)

Original Projected IS Date: 6/1/2017

Revised Projected IS Date: 6/11/2022

Project Status: Conceptual



COLOR	VOLTAGE	TRANSMISSION LINE NUMBER
	500 KV.	500 thru 599
	230 KV.	200 thru 299 & 2000 thru 2099
	115 KV.	1 thru 199
	138 KV.	AS NOTED
	69 KV.	AS NOTED

Revision History

- V1 – 10/6/2017 – Original Slides Posted

38

I. NECESSITY FOR THE PROPOSED PROJECT

B. Describe the present system and detail how the proposed project will effectively satisfy present and future demand requirements. Provide pertinent load growth data (at least five years of historical and ten years of projected loads where applicable). Provide all assumptions inherent within the projected data and why existing right-of-way cannot adequately serve the needs of the Company if that is the case. Indicate when the existing system is projected to be inadequate. If the existing system is, or will at some future time be inadequate in a contingency situation, describe this critical contingency. Detail what might cause such situation. Where appropriate, provide historical incidence of similar situations which would be avoided by the proposed construction.

Response: As presented in Attachment I.E.1, Dominion Energy Virginia's existing utility system in the vicinity of the proposed Project includes nine existing substations (CIA, Clark, Hunter, Idylwood, Reddfield, Reston, Sunset Hills, Swinks Mill, and Tysons) that are networked by lines from three overhead 230 kV transmission corridors. A future substation (Spring Hill) is planned to be added to the Tysons Loop between approximately 2020 and 2022 to relieve Tysons Substation.

Five of the nine existing substations are located in the transmission corridor that runs east/west, parallel and adjacent to the Washington & Old Dominion ("W&OD") Regional Park (W&OD Park") trail. Starting from west to east, these substations include Reston, Sunset Hills, Hunter, Clark, and Idylwood, with Idylwood Substation also being at the intersection of a north/south transmission corridor. The four remaining substations (Tysons, Swinks Mill, CIA, and Reddfield) are in a corridor that leaves the W&OD Park trail approximately 1.0 mile west of the Town of Vienna, passing through a residential area until it reaches Tysons, crossing Route 7 and feeding Tysons Substation just before crossing the DTR. On the north side of the DTR, it turns east and continues approximately 1.4 miles to I-495 where it turns north again, following along the west side of I-495. Approximately 0.3 mile north of the DTR, the transmission corridor crosses Lewinsville Road and continues north for approximately another mile to Swinks Mill Substation. Approximately 0.8 mile north of Swinks Mill Substation, the corridor crosses I-495 to the east and follows along the south side of the George Washington Memorial Parkway to the CIA Headquarters, where it turns south and feeds CIA Substation. From CIA Substation, the corridor travels southwest through residential areas approximately 4.5 miles until it crosses the DTR again and feeds Reddfield Substation near the intersection of the DTR and I-66. Leaving Reddfield Substation, the corridor follows the north side of I-66 for approximately 1.4 miles before crossing to the south side and continuing another approximately 0.5 mile into Idylwood Substation.

As mentioned above, the Company's existing Idylwood Substation sits at the intersection of two transmission corridors and is presently the terminus for five 230 kV transmission lines (Line #207 to Braddock Substation, Line #202 to Clark Substation, Line #251 to Glen Carlyn Substation, Line #2097 to Ox Substation, and Line #2035 to CIA Substation). Idylwood Substation also currently contains one 168 MVA 230-34.5 kV transformer, two 84 MVA 230-34.5 kV transformers, and 14 34.5 kV distribution circuits. It presently is being converted from a straight-bus arrangement to a breaker-and-a-half configuration to resolve an identified bus overload and operational performance issues (PJM RTEP project #b1696). The new breaker-and-a-half configuration will add three 230 kV line terminals: two to accommodate existing 230 kV Clifton-Glen Carlyn Line #266, which will be cut and terminated at Idylwood Substation, creating 230 kV Clifton-Idylwood Line #266 and 230 kV Idylwood-Glen Carlyn Line #2164, and the third for the proposed 230 kV Idylwood-Tysons Line #2175. The conversion of the Idylwood Substation was approved by the Commission in Case No. PUR-2017-00002, with an in-service date of May 31, 2020.

Clark Substation is located approximately 4.0 miles west of Idylwood Substation, adjacent to the W&OD Park trail, and is the terminus for three 230 kV transmission lines (Line #202 to Idylwood Substation, Line #2005 to Hunter Substation, and Line #2033 to Sterling Park Substation) that are networked in a three-breaker 230 kV ring arrangement. Clark Substation also contains one 84 MVA 230-34.5 kV transformer, two 75 MVA 230-34.5 kV transformers, and eleven 34.5 kV distribution circuits.

Approximately 2.6 miles west of Clark Substation is Hunter Substation, which is the terminus for two 230 kV transmission lines (Line #2005 to Clark Substation and Line #264 to Reston Substation) that are networked through a single tie-breaker. Hunter Substation also contains two 75 MVA 230-34.5 kV transformers and six 34.5 kV distribution circuits.

Continuing west along the W&OD Park trail, approximately 1.8 miles from Hunter Substation, is Sunset Hills Substation, which is tapped off the 230 kV Clark-Sterling Park Line #2033. Sunset Hills Substation contains a single 84 MVA 230-34.5 kV transformer and four 34.5 kV distribution circuits.

Reston Substation is approximately 1.0 mile west of Sunset Hills Substation and is the terminus for five 230 kV transmission lines (Line #264 to Hunter Substation, Line #2010 to Tysons Substation, Line #2015 to Dulles Substation, Line #2043 to Discovery Substation, and Line #2062 to Dranesville Substation) that are networked in a five-breaker 230 kV ring arrangement. Reston Substation also contains one 84 MVA 230-34.5 kV transformer, two 75 MVA 230-34.5 kV transformers, and nine 34.5 kV distribution circuits.

As discussed in Section I.A of this Appendix, the four remaining existing substations, Tysons, Swinks Mill, CIA, and Reddfield, are sourced from the

single circuit transmission lines that make up the Tysons Loop and serve the Tysons Loop Load Area. Tysons Substation, in addition to being the terminus for Line #2010 from Reston Substation and Line #2108 to Swinks Mill Substation, contains one 84 MVA 230-34.5 kV transformer, three 75 MVA 230-34.5 kV transformers, and fourteen 34.5 kV distribution circuits that feed approximately 7,900 customers. Lines #2010 and #2108 are separated by two 230 kV breakers, with a bus section in between that feeds two of the distribution transformers.

Swinks Mill Substation is the terminus for Line #2108 from Tysons Substation and Line #2029 to CIA Substation, which are networked through a single tie-breaker. This substation also contains one 75 MVA 230-34.5 kV transformer, one 45 MVA 230-34.5 kV transformer, and five 34.5 kV distribution circuits that feed approximately 6,200 customers.

CIA Substation is the terminus for Line #2029 from Swinks Mill Substation and Line #2035 to Idylwood Substation, which are networked through a single tie-breaker. This substation also contains one 84 MVA 230-34.5 kV transformer, one 45 MVA 230-34.5 kV transformer, two 45 MVA 230-13.2 kV transformers, and five 34.5 kV distribution circuits. The two 230-13.2 kV transformers directly feed the CIA Substation switchgear, while the two 230-34.5 kV transformers feed the five 34.5 kV distribution circuits. Two of the 34.5 kV distribution circuits also serve as the source for 34.5-12.5 kV Chesterbrook and McLean Substations. Over 8,900 customers are served from the CIA Substation, which includes Chesterbrook and McLean Substation customers.

Reddfield Substation is tapped from 230 kV CIA-Idylwood Line #2035 and contains one 84 MVA 230-34.5 kV transformer and three 34.5 kV distribution circuits that feed approximately 3,900 customers.

The future Spring Hill Substation will be located on the Tysons Loop approximately 0.6 mile south of Tysons Substation, south of Route 7, and is planned to be configured with a 230 kV six-breaker ring bus that will allow Line #2010 to be cut and terminated at the substation, creating a 230 kV Reston-Spring Hill line and a 230 kV Spring Hill-Tysons line. There will also be space for two additional 230 kV line terminations, four 84 MVA 230-34.5 kV transformers, and twelve 34.5 kV distribution circuits.

Attachment I.B.1 provides five years of historical summer loads for the Tysons Loop Load Area. Summer loads are shown because the higher ambient temperatures cause customer loads in this area to be at their annual maximum, and the heat also reduces the thermal capacity of the transmission system components such as wires and transformers. The historic loads shown are coincident with the peak load on the Dominion Energy Virginia transmission system. Over the five-year period from 2012 to 2016, the summer peak load on the Tysons Loop increased approximately 13.9% (3.3% compound annual

growth rate).

Attachment I.B.2 provides the projected summer peak loads for the Tysons Loop Load Area without the proposed Project. The projected summer loads are based on PJM's 2017 Load Forecast for the DOM Zone. It should be noted that block load additions from the anticipated higher intensity development focused around the four Metrorail stations in Tysons (described in Section I.A), typically provided by the Company's Distribution Planning group, have not been included in the projected summer peak loads. Similarly, project load transfers associated with the relief of Tysons Substation to the future Spring Hill Substation (also fed from the Tysons Loop, as discussed previously) have not yet been determined and are therefore not included in the table. It is expected, however, that load growth on the Tysons Loop will be somewhat higher than the approximately 1.5% compound annual growth rate shown for the 10-year period from 2017 to 2026.

Once the Project has been constructed, the Tysons Loop will be split such that Swinks Mill, CIA, and Reddfield Substations will be sourced from the loop that starts at Tysons Substation and ends at Idylwood Substation (the "Swinks Mill Loop") while the future Spring Hill Substation would be sourced from the loop that begins at Reston Substation and ends at Tysons Substation (the "Spring Hill Loop"). Attachment I.B.3 provides a breakdown of projected summer loading on the Swinks Mill Loop and the remaining load at Tysons Substation with implementation of the proposed Project. It should be noted that, as discussed above, loading on the future Spring Hill Substation (i.e., the Spring Hill Loop) has not been determined. Also, because the remaining load at Tysons Substation will be sourced by three transmission paths (one from Reston Substation and two from Idylwood Substation) it will not be impacted for an N-1-1 contingency. Since it is expected that the majority of the new load growth in the Tysons area will be served from the existing Tysons and future Spring Hill Substations, splitting the Tysons Loop by terminating the new line from Idylwood Substation into Tysons Substation would eliminate the need for a future line between Tysons and Spring Hill Substations, as discussed in more detail in Section I.C.1.

Tysons Loop Substation Transformers Historical Summer Peak Loads (in MW) – Coincident with Dominion System Peak

Substation TX	06/29/12 17:00	07/18/13 17:00	07/02/14 16:00	06/23/15 17:00	07/25/16 17:00
CIA TX #1	12.4	12.5	13.0	10.2	11.2
CIA TX #2	11.2	11.7	10.3	7.6	10.9
CIA TX #3	44.4	43.2	41.5	23.9	45.2
CIA TX #4	16.7	15.7	15.3	9.4	15.7
Reddfield TX #1	0.0	0.0	24.5	26.1	26.4
Swinks Mill TX #1	27.7	27.1	25.7	22.5	26.1
Swinks Mill TX #2	29.3	28.4	26.8	23.3	29.7
Tysons TX #1	49.7	49.4	49.3	48.9	48.7
Tysons TX #2	18.8	18.4	20.0	22.2	23.9
Tysons TX #3	31.8	46.6	43.6	45.8	44.4
Tysons TX #5	28.2	28.2	28.0	24.7	25.4
Tysons Loop Total	**270.2**	**281.2**	**298.0**	**264.8**	**307.7**

Tysons Loop Substation Transformers Projected Summer Peak Loads (in MW)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
CIA TX #1	11.5	11.7	11.9	12.0	12.1	12.3	12.5	12.7	12.9	13.1
CIA TX #2	11.2	11.4	11.6	11.7	11.8	12.0	12.2	12.4	12.6	12.8
CIA TX #3	46.4	47.4	48.2	48.5	49.0	49.7	50.5	51.4	52.2	53.1
CIA TX #4	16.1	16.5	16.7	16.9	17.0	17.3	17.6	17.9	18.2	18.5
Reddfield TX #1	27.2	27.7	28.2	28.3	28.6	29.0	29.5	30.0	30.5	31.0
Swinks Mill TX #1	26.8	27.3	27.8	27.9	28.2	28.6	29.1	29.6	30.1	30.6
Swinks Mill TX #2	30.5	31.1	31.6	31.8	32.2	32.6	33.2	33.7	34.3	34.9
Tysons TX #1	50.0	51.0	51.9	52.2	52.8	53.5	54.4	55.3	56.2	57.2
Tysons TX #2	24.6	25.1	25.5	25.7	25.9	26.3	26.7	27.2	27.6	28.1
Tysons TX #3	45.6	46.5	47.3	47.6	48.1	48.8	49.6	50.4	51.3	52.1
Tysons TX #5	26.1	26.6	27.0	27.2	27.5	27.9	28.3	28.8	29.3	29.8
Tysons Loop Total	**316.0**	**322.3**	**327.6**	**329.7**	**333.2**	**338.1**	**343.4**	**349.5**	**355.1**	**361.3**

Swinks Mill Loop and "New" Tysons Loop Substation Transformers Projected Summer Peak Loads (in MW)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
CIA TX #1	11.5	11.7	11.9	12.0	12.1	12.3	12.5	12.7	12.9	13.1
CIA TX #2	11.2	11.4	11.6	11.7	11.8	12.0	12.2	12.4	12.6	12.8
CIA TX #3	46.4	47.4	48.2	48.5	49.0	49.7	50.5	51.4	52.2	53.1
CIA TX #4	16.1	16.5	16.7	16.9	17.0	17.3	17.6	17.9	18.2	18.5
Reddfield TX #1	27.2	27.7	28.2	28.3	28.6	29.0	29.5	30.0	30.5	31.0
Swinks Mill TX #1	26.8	27.3	27.8	27.9	28.2	28.6	29.1	29.6	30.1	30.6
Swinks Mill TX #2	30.5	31.1	31.6	31.8	32.2	32.6	33.2	33.7	34.3	34.9
Swinks Mill Loop Total	**169.7**	**173.1**	**176.0**	**177.1**	**179.0**	**181.6**	**184.4**	**187.7**	**190.7**	**194.0**
Tysons TX #1	50.0	51.0	51.9	52.2	52.8	53.5	54.4	55.3	56.2	57.2
Tysons TX #2	24.6	25.1	25.5	25.7	25.9	26.3	26.7	27.2	27.6	28.1
Tysons TX #3	45.6	46.5	47.3	47.6	48.1	48.8	49.6	50.4	51.3	52.1
Tysons TX #5	26.1	26.6	27.0	27.2	27.5	27.9	28.3	28.8	29.3	29.8
"New" Tysons Loop Total	**146.3**	**149.2**	**151.7**	**152.6**	**154.3**	**156.5**	**159.0**	**161.8**	**164.4**	**167.2**

I. NECESSITY FOR THE PROPOSED PROJECT

C. Describe the feasible alternatives, if any, for meeting the identified need without constructing the proposed project. Explain why these alternatives were rejected.

Response: In addition to the proposed Project, the following transmission alternatives were considered but rejected for the reasons described below. There are no feasible distribution alternatives to resolve the identified criteria violations.

The Company also reviewed the demand-side resources incorporated in Dominion Energy Virginia's planning studies used in support of this application in accordance with the Commission's November 26, 2013 Order entered in Case No. PUE-2012-00029. As shown in Attachment I.C.1, there are 1,337 customers participating in the Company's Air Conditioner ("AC") Cycling program within the zip codes that cover the Tysons and McLean areas of the Tysons Loop (22043, 22101, 22102, 22182). Because a customer may have multiple AC or heat pump units, the total number of switches available to cycle in these zip codes is 18,005. For the 2016 cycling season, the Company's Evaluation, Measurement & Verification vendor determined that there were approximately 0.97 kW per switch. This amount has fluctuated over time, based on numerous factors, such as heat, humidity, and duration of events. On average, the Company has called the AC Cycling program around 20 times per season. This past season, the Company operated the program 29 times. As approved, the Company is allowed to call on the program 30 times, or up to 120 hours. Typically, cycling events are called for three- to four-hour periods, typically between the hours of 2:00 p.m. and 6:00 p.m. The AC Cycling program can be operated June 1 through September 30 each year. Participants can opt out of two events each season without losing the $40 annual incentive.

Multiplying the number of switches by the 0.97 kW load reduction per switch results in an approximately 1.75 MW load reduction in the Tysons Loop. As such, the need to construct the 230 kV transmission line as proposed by the Company for this Project would not be diminished or eliminated, and is in fact wholly unaffected, by the application of demand-side resources.

1) Construct a 230 kV single circuit line from Idylwood Substation to a proposed Scott's Run Substation, located between Tysons Substation and Swinks Mill Substation, and cut into Tysons-Swinks Mill Line #2108 (Idylwood-Scott's Run Alternative)

For this alternative, the Company would construct a new 230 kV Scott's Run Substation between Tysons Substation and Swinks Mill Substation. Depending on the location of the new Scott's Run Substation, a 230 kV ring bus with between four and six breakers would be installed. Tysons-Swinks Mill Line #2108 would be cut and each end extended overhead to the new Scott's Run Substation, creating a new Tysons-Scott's Run line and a new Scott's Run-

Swinks Mill line. A new single-circuit 230 kV line would be constructed from Idylwood Substation to the new Scott's Run Substation.

Contingent upon the location of the new Scott's Run Substation, the ring bus at Scott's Run would have between four and six breakers in the ring, depending on whether the substation site could also accommodate distribution transformers. In addition to the three 230 kV breakers in the ring that are required to terminate both ends of the extended Line #2108 and the new line from Idylwood Substation, two additional breakers would be needed to create bus sections to feed distribution transformers. A sixth breaker would be required to terminate a future 230 kV line between the proposed Scott's Run Substation and the future Spring Hill Substation, if the combined loading on Spring Hill and Tysons Substations were to exceed 300 MW.

From an electrical perspective, introducing another 230 kV line into the Tysons Loop at any of the potential Scott's Run Substation locations would eliminate the concern of a possible NERC criteria violation in the near term (dropping 300 MW for an N-1-1 loss of Line #2010 out of Reston Substation and Line #2035 out of Idylwood Substation). However, it is expected that the combined load on the existing Tysons Substation and future Spring Hill Substation will grow to above 300 MW, at which time the N-1-1 loss of the line between Reston and Spring Hill Substations and the line between Scott's Run and Tysons Substations would drop the Tysons and Spring Hill Substation load. At that time, a new line from Scott's Run to Tysons/Spring Hill Substations would be required.

The Company purchased the Scott's Run Substation site in the summer of 2015. The property is large enough to potentially accommodate the substation; however, there were other constraints on the site that made the location for a substation problematic. The substation would be located adjacent to a flood plain and would be constrained by wetlands located on the property. Additionally, the site is zoned residential and a special exemption from Fairfax County would be required. Obtaining the special exemption at this location would require County Board of Supervisor approval, which is unlikely to be approved by Fairfax County.

For the foregoing reasons, the Idylwood-Scott's Run Alternative was rejected.

2) Construct an overhead 230 kV line from Reston Substation to Tysons Substation (Reston-Tysons Alternative).[8]

This alternative would construct a new overhead 230 kV line approximately 7.0 miles from existing Reston Substation to Tysons Substation. At Reston Substation, the existing footprint of the station does not provide space for an air insulated line terminal for a new overhead line. For this reason, this alternative

[8] This alternative was also referred to by the Company prior to filing this application as Overhead Route 06.

would require conversion of Reston Substation from an air insulated station to a 230 kV GIS six circuit breaker ring bus arrangement. The new line would exit Reston Substation along the W&OD Park trail for approximately 1.3 miles until reaching the DTR.[9] It would follow the DTR for approximately 5.4 miles on new right-of-way until reaching the Tysons-Swinks Mill Line #2108 crossing, at which point the new line would turn south for approximately 0.3 mile, terminating at the rebuilt Tysons Substation. The new Reston-Tysons line would require a new, primarily single circuit line[10] built using single-shaft steel poles with three twin-bundled 636 ACSR 24/7 phase conductors with a summer transfer capability of 1047 MVA.

The total estimated cost of the Reston-Tysons Alternative is approximately $172.0 million.

In addition to a higher cost than the proposed Project, this alternative would require seven crossings of a Metropolitan Washington Airport Authority ("MWAA") managed limited access roadway, of which, four would be non-perpendicular crossings. This Reston-Tysons Alternative requires extensive tree removal (more than 21 acres) parallel to a limited access highway. The trees removed would be primarily located along the DTR, removing a visual screen and sound buffer between adjacent residential neighborhoods and the toll road and/or sound wall. This tree removal would also result in a visual impact on users of the toll road. Three residences would be located within 60 feet of the right-of-way. A portion of the route would be located immediately adjacent to Wolf Trap National Park. The clearing of trees adjacent to the park would remove a significant amount of visual screening between the park and the DTR. Removal of the trees and installation of the transmission line facilities would result in permanent visual impacts on the park and its users. In addition, this route would require construction along 1.2 miles of the W&OD Park trail causing potential disruption to users of the trail during construction. See Attachments 2.N.1 and 2.N.2 to the DEQ Supplement for correspondence with the Virginia Department of Transportation ("VDOT") and MWAA, respectively, in regards to this alternative. For the foregoing reasons, the Reston-Tysons Alternative was rejected.

3) Construct an underground single circuit 230 kV line from Idylwood Substation to Tysons Substation primarily along I-495 ("I-495 Underground Alternative")[11]

This alternative would involve construction of a new underground single circuit 230 kV line approximately 5.4 miles from the existing Idylwood Substation to

[9] Only this 1.3-mile segment of the overhead 230 kV line would be double circuit; the remainder of the 6.7-mile line traveling along the DTR would be single circuit.

[10] *Id.*

[11] This alternative was also referred to by the Company prior to filing this application as Underground Alternative 07.

Tysons Substation. This alternative route is the longest of all of the underground alternatives considered for the Project. Significantly, it is 0.9 miles longer than the Proposed Route.

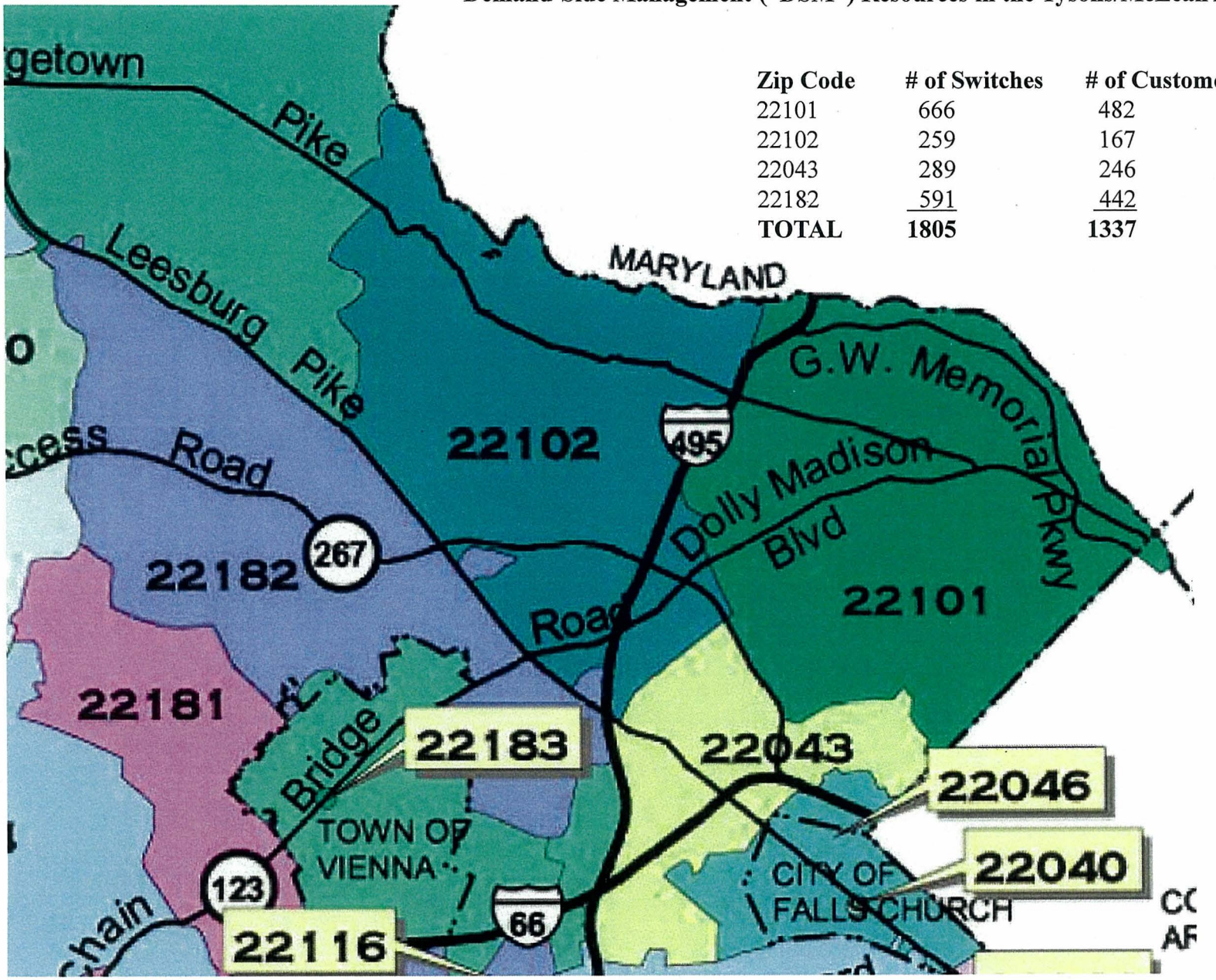
This alternative would follow the Company's existing Line #2035 out of the Idylwood Substation continuing north across Shreve Road. The route would then turn west at the W&OD Park and follow Line #202 along the park, crossing under I-66 and I-495. The route would then turn north and be installed within new right-of-way along I-495. The route would first follow the west side of I-495 for about 0.6 mile and then cross over to the east side of I-495 and continue north for about 2.5 miles. The alternative would next cross the DTR at the DTR/I-495 interchange, and turn west crossing I-495 to parallel Line #2108 along the north side of DTR for about 1.5 miles. After crossing Spring Hill Road, the route turns south crossing the DTR and terminating at the rebuilt Tysons Substation.

The total estimated cost of the I-495 Underground Alternative is approximately $179.5 million.

In addition to a higher cost than the proposed Project, this alternative would require two crossings of a MWAA managed roadway (the DTR/VA 267) and six crossings of a VDOT-managed roadway (I-495), of which two would be non-perpendicular crossings. The I-495 Underground Alternative would require 12 HDD segments. HDDs and additional workspace at the drill locations would be necessary to conduct the drilling operations for staging the drilling equipment and stringing the conduit. The route would require the removal of 4.3 acres of trees primarily within limited access right-of-ways associated with I-495 and the DTR, which is restricted by VDOT regulations. In addition, the removal of the trees would result in a loss of a visual screen and sound buffer between adjacent residential neighborhoods and the road and/or sound wall. This tree removal would also result in a visual impact on users of the road. Finally, there also would be three residences located within 60 feet of the edge of the right-of-way. For the foregoing reasons, the I-495 Underground Alternative was rejected.

Demand-Side Management ("DSM") Resources in the Tysons/McLean Area

Zip Code	# of Switches	# of Customers
22101	666	482
22102	259	167
22043	289	246
22182	591	442
TOTAL	**1805**	**1337**



I. NECESSITY FOR THE PROPOSED PROJECT

D. Describe any lines or facilities which will be removed, replaced, or taken out of service upon completion of the proposed project.

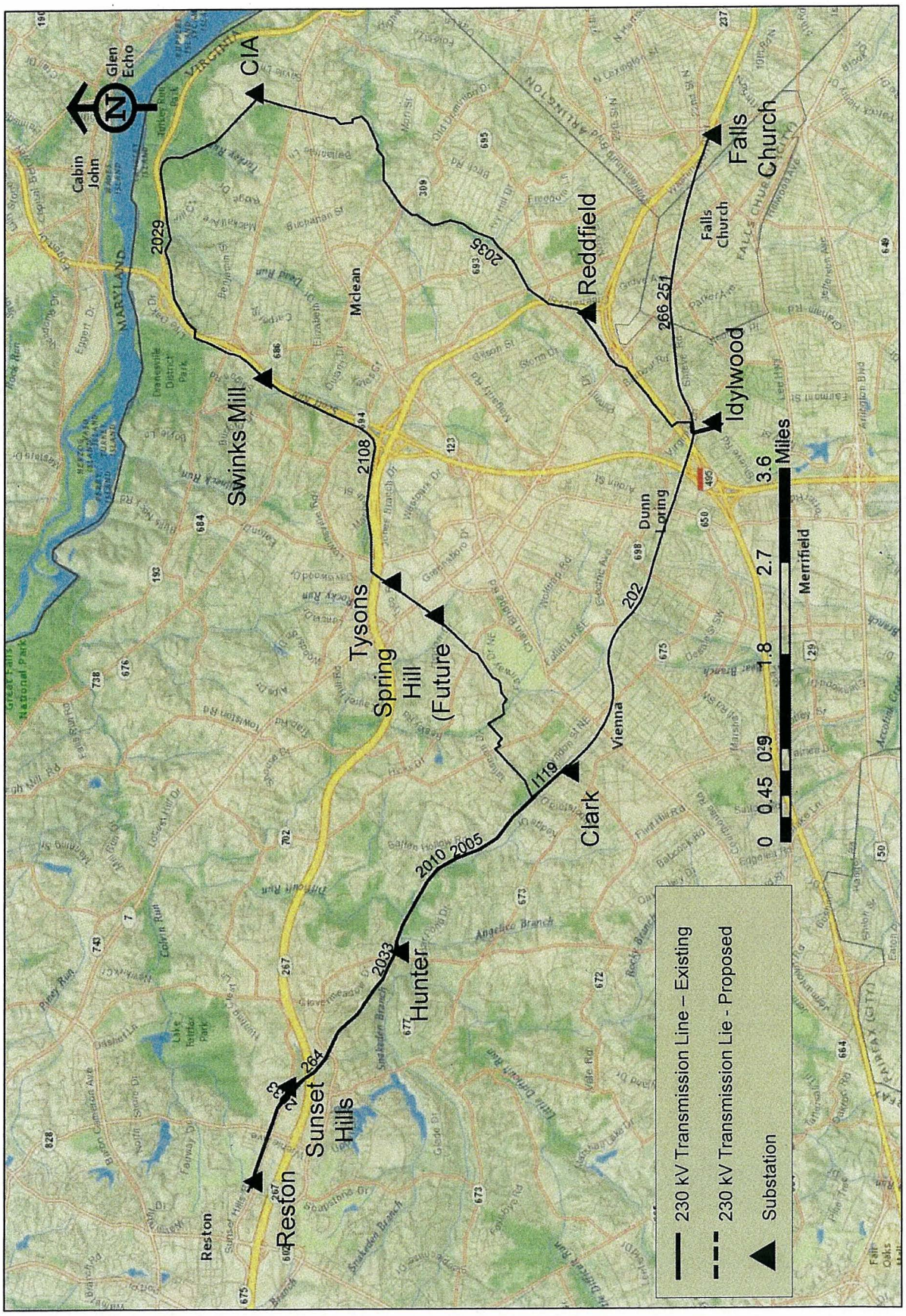
Response: With the exception of the facilities discussed in Section II.C, no lines or facilities will be removed, replaced, or taken out of service upon completion of the proposed Project.[12]

[12] While offered for the Commission's consideration and approval, the Replacement Tower Proposal is not a component of the proposed Project, as discussed further in Section I.A of the Appendix.

I. NECESSITY FOR THE PROPOSED PROJECT

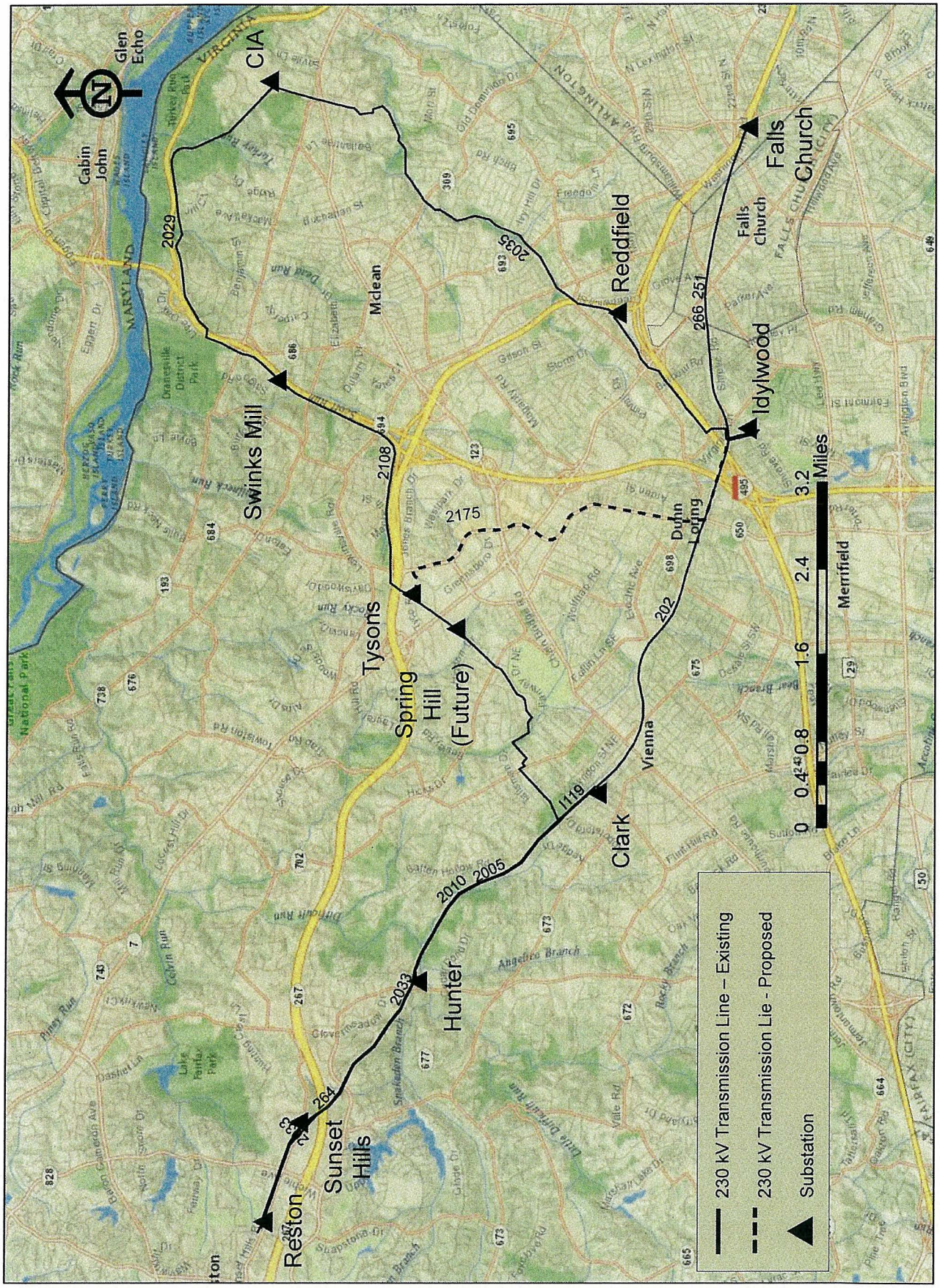
E. Provide a system map of suitable scale showing the location and voltage of the Company's transmission lines, substations, generating facilities, etc., which would affect or be affected by the new transmission line and are relevant to the necessity for the proposed line. Clearly, label on this map all points referenced in the necessity statement.

Response: See Attachment I.E.1 for a system map of the existing transmission system facilities and Attachment I.E.2 for a system map with the addition of the Project facilities. These maps show the general locations and are not intended to show the actual location of facilities.


Glen Echo
Cabin John
CIA
Falls Church
Reddfield
Idylwood
Swinks Mill
Mclean
Tysons
Spring
Hill
(Future
Dunn Loring
Merrifield
Vienna
Clark
Hunter
Sunset Hills
Reston
2029
2035
266 251
2108
202
1119
2010 2005
2033
264
230 kV Transmission Line – Existing
230 kV Transmission Lie - Proposed
Substation
0 0.45 0.9 1.8 2.7 3.6 Miles

SYSTEM WITH PROPOSED PROJECT

Attachment I.E.2



I. NECESSITY FOR THE PROPOSED PROJECT

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

Response: The in-service date for the proposed Project is anticipated to be no later than June 2022.

A period of approximately 36 months will be needed for engineering, material procurement, permitting, and construction, based on the ability to obtain outages.

I. NECESSITY FOR THE PROPOSED PROJECT

G. Provide the estimated cost of the project.

Response: The total estimated construction cost of the proposed Project utilizing the Proposed Route is approximately $121.8 million (2017 dollars),[13] which includes the following:

- Approximately $89.4 million for the new 230 kV XLPE underground transmission line from Idylwood to Tysons Substation.
- Approximately $31.5 million for conversion of the existing Tysons Substation to GIS, which includes approximately $3.1 million for temporary and permanent overhead transmission line work at the station associated with the conversion.
- Approximately $790,000 for station work at the existing Idylwood Substation.
- Approximately $118,000 for relay work at the existing Reston Substation.

[13] *See, supra,* n. 7.

I. NECESSITY FOR THE PROPOSED PROJECT

H. In addition to all 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 the 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 the FERC;

4. In addition to the information required in 3a or 3b, provide the project number and project name used by the 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

I. Describe the new 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: No new or existing generating facilities are associated with the proposed Project. For a description of distribution circuits and load centers to be served by the Project, see Sections I.A and I.B of this Appendix.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

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

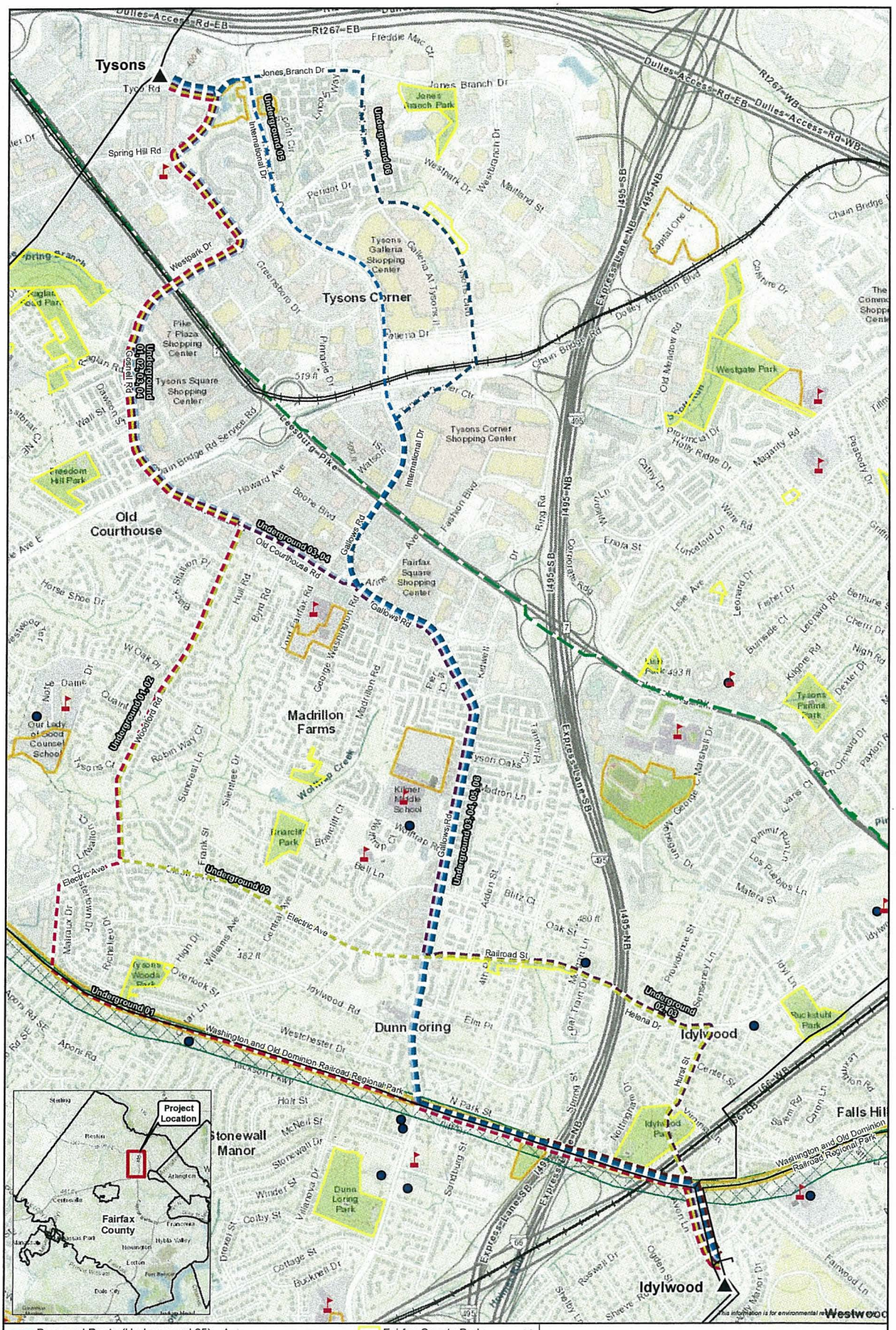
Response: The length of the Proposed Route (Underground Alternative 05) is approximately 4.3 miles long. The length of the five Underground Alternatives to the Proposed Route varies from 4.5 miles to 5.0 miles. See Section II.A.7 of this Appendix for further discussion of the Proposed Route and Underground Alternatives.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

2. Provide a map of suitable scale showing the route of the proposed line and its relation to: the facilities of other public utilities which could influence the route selection, highways, streets, parks and recreational areas, scenic and historic areas, schools, convalescent centers, hospitals, airports and other notable structures close to the proposed project. Indicate the existing facilities which the line is proposed to follow, such as existing ROW, railroad tracks, etc.;

Response: See Attachment II.A.2.


Tysons
Tysons Corner
Old Courthouse
Madrillon Farms
Dunn Loring
Idylwood
Stonewall Manor
Falls Hill
Westwood
Underground 05
Underground 06
Underground 03, 04
Underground 01, 02
Underground 02
Underground 01
Underground 03, 04, 05, 06
Underground 03, 06
Project Location
Fairfax County
Proposed Route (Underground 05)
Underground Alternative 01
Underground Alternative 02
Underground Alternative 03
Underground Alternative 04
Underground Alternative 06
Existing Substation
Existing Dominion Transmission Line
Natural Gas Pipeline
Architectural Resource
Fairfax County Park
Recreation Area
Railroad
School
Church
1:15,000
0 625 1,250 Feet
Attachment II.A.2
Idylwood to Tysons Project
Fairfax County, Virginia
ERM
Dominion Energy
FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\10\SCC_Apdx_DOM_IDYL_Appendix_II_A_2.mxd | REVISED: 10/17/2017 | SCALE: 1:15,000 when printed at 11x17
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II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

3. Provide a drawing(s) of the ROW cross section showing typical transmission line structure placements referenced to the edge of the right-of-way. This drawing should include:

a. ROW width for each cross section drawing;

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

c. Existing utility facilities on the ROW.

Response: a. See Attachments II.A.3.a and b for cross sections showing the horizontal configuration of the XLPE cable system utilizing the open trench and HDD construction methods, respectively.[14]

Typical construction methods utilized for duct bank work involve open trenching with large excavators. The trench is temporarily shored with trench boxes to provide a safe working area for personnel to install the conduits and spacers. Once the conduits that are placed into the trench are properly aligned, ready-mix concrete is poured into the trench to provide physical protection and appropriate heat transfer properties around the cables. The trench boxes are then removed and fluidized thermal backfill ("FTB") is placed into the trench as needed to provide the proper thermal environment for the cables to operate within design parameters. The National Electrical Safety Code requires that cables of this type and voltage be buried a minimum of 42 inches below the ground surface.

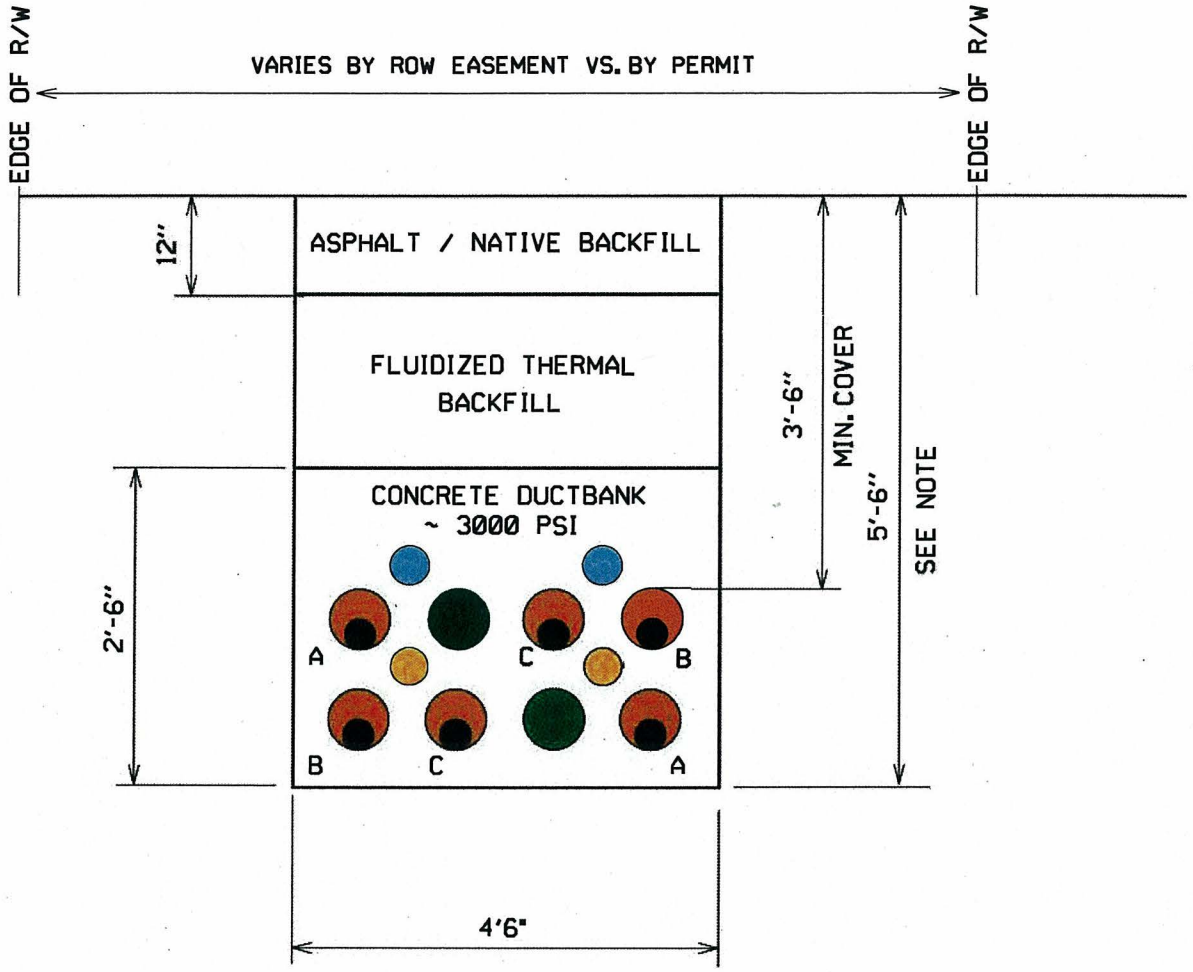
To transition between construction methods, manholes would be placed between open trenching and HDD segments, or a transition fitting or coupling reducer could be utilized, as appropriate. The depth of the conduits would be determined based on design requirements of the drill path. A bundle of four 10-inch HDPE conduits and two 4-inch conduits would be pulled back through each drill path. Two parallel drill paths would be used for the proposed Project, for a total of eight 10-inch and four 4-inch HDPE conduits.

b. See Attachments II.A.3.a and b.

[14] While offered for the Commission's consideration and approval, the Replacement Tower Proposal is not a component of the proposed Project, as discussed further in Section I.A of the Appendix. See Attachment I.A.2 for the proposed structure design.

c. Due to the urban nature of the area in which this line is to be installed, several varieties of numerous existing utilities would be crossed by the proposed lines including water, gas, sewer, communications and electric power. The mapping/surveying of these existing utilities is ongoing for the Proposed Route and the Underground Alternatives (01-06) and is expected to be completed around the first quarter of 2018, depending upon the availability of utility data. This information will be utilized in conjunction with a Traffic Review to determine if any variation to the Proposed Route (Underground Alternative 05) or other Underground Alternatives is needed due to utility conflicts.

Idylwood - Tysons
Proposed 230 kV XLPE Cable System
Open Trench (Horizontal Configuration)



2 INCH PVC CONDUIT FOR SHEATH BONDING CABLE

2 INCH PVC CONDUIT FOR PROTECTIVE RELAYING

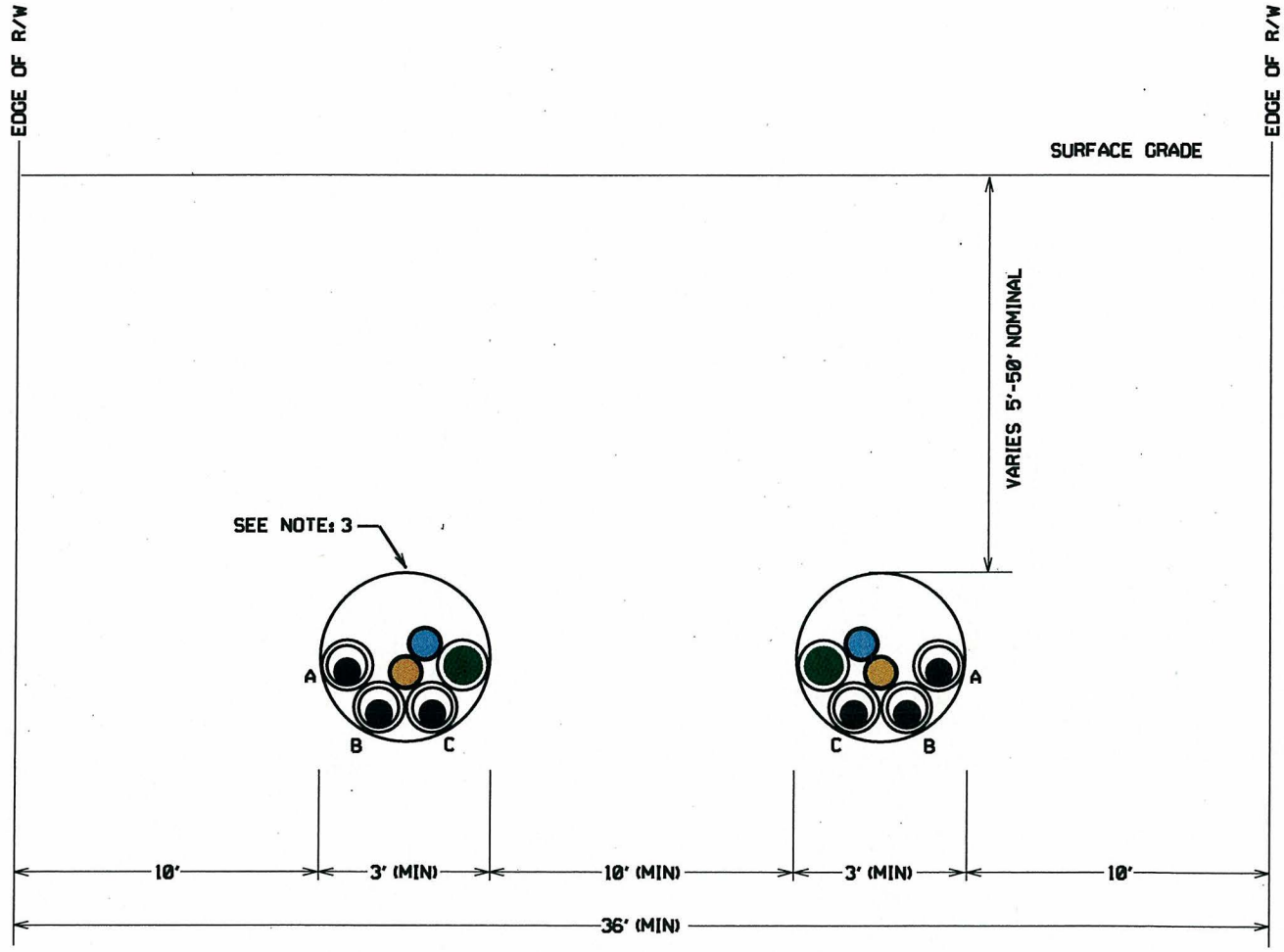
8 INCH PVC CONDUIT FOR ENERGIZED 230KV CABLE WITH PHASE POSITION

8 INCH PVC CONDUIT FOR SPARE

NOTES:

1. THIS DIMENSION WILL VARY DEPENDING ON CLEARANCES NEEDED WHEN CROSSING OTHER FACILITIES.
2. PROPOSED CONSTRUCTION METHOD FOR APPROXIMATELY 3.7 MILES.
3. LETTERS A,B, & C ADJACENT TO CONDUITS DENOTE CABLE PHASING
4. INFORMATION IS PRELIMINARY AND SUBJECT TO FINAL ENGINEERING

Idylwood - Tysons
Proposed 230kV XLPE Cable System
Horizontal Directional Drill



4 INCH HDPE CONDUIT FOR SHEATH BONDING CABLE

4 INCH HDPE CONDUIT FOR PROTECTIVE RELAYING

10 INCH HDPE CONDUIT FOR ENERGIZED 230KV CABLE WITH PHASE POSITION

10 INCH HDPE CONDUIT FOR SPARE

NOTES:

1. LETTERS A,B, & C ADJACENT TO CONDUIT DENOTE CABLE PHASING
2. PROPOSED CONSTRUCTION METHOD FOR APPROXIMATELY .6 MILE
3. BOREHOLE (SIZE TO BE DETERMINED BY CONTRACTOR)
4. INFORMATION IS PRELIMINARY AND SUBJECT TO FINAL ENGINEERING

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

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

Response: For purposes of the Proposed Route, the Company will utilize an existing 230 kV transmission line easement along the W&OD Park trail for approximately 0.6 mile of the Project. Because of the urban nature of the area, numerous existing underground utilities, including electric distribution, natural gas, water, sewage, transit, and communications, intersect the entire area.

The Proposed Route will predominately be within road right-of-way belonging to VDOT. These entities generally allow electric facilities through a permitting process rather than granting permanent rights-of-way easement. Temporary construction easements may also be necessary to establish routine equipment access during the construction phase.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

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

Response: Any clearing required along the W&OD Park trail will be minimal. The Company will work with Northern Virginia Regional Park Authority Parks ("NOVA Parks") to restore the W&OD Park trail.

Beginning west of the W&OD Park trail, proceeding north along Gallows Road, no significant clearing will be required as the underground line will be constructed within existing road right-of-way. Pavement will be restored in accordance with VDOT permits as the construction phase progresses.

Site rehabilitation during the Project is a continuous operation. Erosion control devices 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 General Erosion and Sedimentation Control Specifications for Transmission Lines that is approved yearly by the Department of Environmental Quality. Time-of-year restrictions and weather conditions may affect the timing of permanent stabilization.

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

6. Indicate the permitted uses of the ROW.

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;
- shall not restrict future line design flexibility; and
- shall not permanently interfere with future construction.

Typical permitted uses, with conditions, of the rights-of-way include:

1) Agriculture
2) Limited recreational uses
3) Parking lots
4) Perpendicular road crossings
5) Fences with gates

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

7. Describe the Company's route selection procedures. Detail alternative routes considered. Describe the Company's efforts in considering these alternatives. Detail why the proposed route was selected and other alternatives were rejected.

Response: The Company's route selection for a new transmission line typically begins with identification of the project "origin" and "termination" points provided by the Company's Transmission Planning Department and then the creation of a study area for the project.

For the Project, the Company requested the services of Environmental Resources Management ("ERM") to help collect information within the study area, perform a routing analysis comparing the alternative routes, and document the routing efforts in the Environmental Routing Study. A single electrical solution was considered; namely, a 230 kV route (overhead or underground) between the Idylwood Substation and Tysons Substation. A study area was developed that included the area surrounding Tysons and Idylwood Substations and expanded to incorporate the McLean/CIA area when a potential route was identified along the Company's existing right-of-way. The route selection process for the Project is described in detail in the Environmental Routing Study.

A total of four Overhead Routes and six Underground Alternatives were identified. As to the four Overhead Routes, Overhead Route 01 (approximately 12.9 miles) was estimated to cost approximately $301.0 million; Overhead 02 (approximately 6.1 miles) was estimated to cost approximately $100.2 million; Overhead Route 03 (approximately 5.2 miles) was estimated to cost approximately $98.5 million; and Overhead Route 04 (approximately 7.2 miles) was estimated to cost approximately $164.9 million. Following a detailed routing analysis, the four Overhead Routes were rejected by the Company due to concerns over significant environmental impacts, the Company's ability to construct these routes, and cost. The results of the analysis of the Overhead Routes are presented in Appendix A of the Environmental Routing Study.

The underground Proposed Route and five Underground Alternatives are described below.

Proposed Route (Underground Alternative 05)

Construct an underground single circuit 230 kV line from Idylwood Substation to Tysons Substation along the W&OD Park trail and Gallows Road West of the Tysons Corner Center (Proposed Route or Underground Alternative 05)

The Proposed Route (Underground Alternative 05) would construct an underground single circuit 230 kV line between Idylwood Substation and Tysons Substation.

The length of the corridor for the Proposed Route is approximately 4.3 miles long. The route would extend north from Idylwood Substation, through means of open trenching, for approximately 0.3 mile, crossing Shreve Road. See Attachment II.A.3.a for reference. The route would then turn west at the W&OD Park and follow Line #202 along the park, crossing under I-66, the Washington Metropolitan Area Transit Authority ("WMATA") Orange Line and I-495 until reaching Gallows Road through means of HDD (two parallel drill paths) for approximately 0.6 mile. See Attachment II.A.3.b for reference. The route would then turn north at Gallows Road, where the remainder of the route would be constructed within public road rights-of-way for approximately 3.4 miles by means of open trenching. The route would follow Gallows Road and cross Leesburg Pike, just before Gallows Road intersects with Old Courthouse Road. After crossing over Leesburg Pike, where Gallows Road transitions into International Drive, the route would then turn northwest, crossing over Chain Bridge Road, crossing WMATA Silver Line, and continue along International Drive. The route then turns east onto Spring Hill Road, west along Tyco Road, and end at Tysons Substation.

This option would require a total of one HDD segment, which would extend approximately 0.6 mile under areas of I-66, I-495, and the W&OD Park trail. The remainder of the route would be constructed with open trenching. The cost of the Proposed Route is estimated to be approximately $89.4 million.

In addition to being the lowest cost alternative, the Proposed Route would result in minimal disturbance to the W&OD Park trail east of Gallows Road, since it would be installed under the trail via HDD. Therefore, the Company proposes this route as the Proposed Route for notice and consideration by the Commission.

Underground Alternatives

The following are the Underground Alternatives ranked from (1)-(5), in current order of preference. The Company recommends these five Underground Alternatives be proposed for notice and consideration by the Commission in the course of this proceeding. Note that this ranking may change based on the results of the utilities mapping/survey being completed as discussed in Section II.A.3.c of this Appendix.

1) Construct an underground single circuit 230 kV line from Idylwood Substation to Tysons Substation along the W&OD Park trail and Gallows Road East of the Tysons Corner Center (Underground Alternative 06)

This alternative would construct an underground single circuit 230 kV line between Idylwood Substation and Tysons Substation.

The length of the corridor for Underground Alternative 06 is approximately 4.7 miles long. The route would leave Idylwood Substation northward, through means of open trenching for approximately 0.3 mile, crossing Shreve Road into the northern portion of existing overhead right-of-way. See Attachment II.A.3.a for reference. At this point, the route crosses under I-66 and I-495, following the W&OD Park trail westward to Gallows Road through means of HDD (two parallel drill paths) for approximately for 0.6 mile. See Attachment II.A.3.b for reference. Beginning at this location, the remainder of the route would be constructed within road right-of-way for approximately 3.8 miles through means of open trenching. The route proceeds up Gallows Road and crosses Leesburg Pike, just before Gallows Road meets Old Courthouse Road. After crossing over Leesburg Pike, where Gallows Road transitions into International Drive, the route then turns northeast, following Tysons One Place. At this point, the route then crosses Chain Bridge Road and continues northward along Tysons Boulevard. Here the route makes a northward turn onto Park Run Drive and then a westward turn onto Jones Branch Drive. The route proceeds along Jones Branch Drive by crossing over International Drive onto Spring Hill Road and Tyco Road, before ending at Tysons Substation.

This route would require a total of one HDD segment, which would travel approximately 0.6 mile under areas of I-66, I-495, and the W&OD Park trail. The remainder of the installation process would be achieved through open trenching. The cost of this alternative is estimated to be approximately $99.6 million.

While Underground Alternative 06 is the second highest cost option (approximately $10.2 million more than the Proposed Route), due to the extended route length through the Tysons Corner Center and Tysons Galleria areas and the crossing of a private road, it is only 0.4 mile longer than the Proposed Route and is largely located on public roads via permit as is the Proposed Route. Further, it crosses through fewer residential areas than

Underground Alternative 04. Therefore, the Company proposes Underground Alternative 06 for notice and consideration by the Commission.

2) Construct an underground single circuit 230 kV line from Idylwood Substation to Tysons Substation, along the W&OD Park trail and Gallows Road (Underground Alternative 04).

This alternative would construct an underground single circuit 230 kV line between Idylwood Substation and Tysons Substation.

The length of the corridor for Underground Alternative 04 is approximately 4.5 miles long. The route would leave Idylwood Substation northward, through means of open trenching, for approximately 0.3 mile crossing Shreve Road into the northern portion of existing overhead right-of-way. See Attachment II.A.3.a for reference.. At this point, the route crosses under I-66 and I-495, following the W&OD Park trail westward to Gallows Road through means of HDD (two parallel drill paths) for approximately for 0.6 mile. See Attachment II.A.3.b for reference. Beginning at this location, the remainder of the route would be constructed within road right-of-way for approximately 3.6 miles through means of open trenching. The route proceeds up Gallows Road, to a point where Gallows Road meets Old Courthouse Road. The route then proceeds northwest along Old Courthouse Road, crossing over Chain Bridge Road, where Old Courthouse Road transitions into Gosnell Road. The route continues northeast along Gosnell Road to a point at the intersection of Gosnell Road and Leesburg Pike. After crossing over Leesburg Pike, where Gosnell Road transitions into Westpark Drive, the route then turns northwest along Greensboro Drive. The route ends along this path following both Spring Hill Road and Tyco Road, before ending at Tysons Substation.

This option would require a total of one HDD segment, which would travel approximately 0.6 mile under areas of I-66, I-495, and the W&OD Park trail. The remainder of the installation process would be achieved through open trenching. The cost of this alternative is estimated to be approximately $89.7 million.

In addition to being the second lowest cost when compared to the Proposed Route and Underground Alternatives, Underground Alternative 04 would cause minimal disturbance to the W&OD Park trail east of Gallows Road. Therefore, the Company proposes Underground Alternative 04 for notice and consideration by the Commission.

3) Construct an underground single circuit 230 kV line from Idylwood Substation to Tysons Substation along the W&OD Park trail (Underground Alternative 01).

This alternative would construct an underground single circuit 230 kV line between Idylwood Substation and Tysons Substation.

The length of the corridor for Underground Alternative 01 is approximately 5.0 miles long. The route would leave Idylwood Substation northward through means of open trenching, crossing Shreve Road into the northern portion of existing overhead right-of-way for approximately 0.3 mile. See Attachment II.A.3.a for reference. At this point, the route crosses under I-66 and I-495, following the W&OD Park trail westward to Gallows Road through means of HDD (two parallel drill paths) for approximately for 0.6 mile. See Attachment II.A.3.b for reference. At Gallows Road, the section westward along the W&OD Park trail would be installed through means of open trenching for approximately 1.1 miles. Once exiting the W&OD Park trail, the remainder of the route would be installed through means of open trenching for approximately 3.0 miles. The route would track behind the Navy Federal Credit Union Campus before turning northward on Electric Avenue, just beyond Northside Park. Beginning at this location, the remainder of the route installation would be constructed within road right-of-way. The route then runs northeast along Woodford Road to a point at the intersection of Woodford Road and Old Courthouse Road. The route continues northwest along Old Courthouse Road, crossing over Chain Bridge Road, where Old Courthouse Road transitions into Gosnell Road. The route continues northeast along Gosnell Road to a point at the intersection of Gosnell Road and Leesburg Pike. After crossing over Leesburg Pike, where Gosnell Road transitions into Westpark Drive, the route turns northwest along Greensboro Drive. The route continues along this path following both Spring Hill Road and Tyco Road, before ending at Tysons Substation.

This route would require a total of one HDD segment, which would travel approximately 0.6 mile under areas of I-66, I-495, and the W&OD Park trail. The remainder of the installation process would be achieved through open trenching. The cost of this underground route is estimated to be approximately $102.2 million.

While the Company proposes Underground Alternative 01 for notice and consideration by the Commission, it is the highest cost alternative when compared to the Proposed Route and other Underground Alternatives. Further, Underground Alternative 01 would cause a significant disturbance to the W&OD Park trail west of Gallows Road proceeding towards the Navy Federal Property located at Electric Avenue. This particular segment would require installation through means of open trenching, severely impacting daily operations to the trail.

4) Construct an underground single circuit 230 kV line from Idylwood Substation to Tysons Substation along Gallows Road and not along the W&OD Park trail (Underground Alternative 03).

This alternative would construct an underground single circuit 230 kV line between Idylwood Substation and Tysons Substation.

The length of the corridor for Underground Alternative 03 is approximately 4.6 miles long. The route would leave Idylwood Substation northward through means of open trenching for approximately 0.2 mile, crossing Shreve Road into the northern portion of existing overhead right-of-way. See Attachment II.A.3.a for reference. The route would cross under I-66, before resurfacing in Idylwood Park through means of HDD (two parallel drill paths) for approximately 0.1 mile. See Attachment II.A.3.b for reference. The route continues through means of open trenching for about 0.6 mile crossing. This section of the route crosses through the gravel parking lot at Idylwood Park then runs northeast along Hurst Street to a point at the intersection of Hurst Street and Idylwood Road. The route continues a short distance westward along Idylwood Road before making a shift northeast along Helena Drive. Here the route stays on Helena Drive before crossing under I-495 through means of a liner plate tunnel installation for approximately 0.1 mile. On the west side of I-495, the route transitions into Railroad Street, where the route would proceed westward via HDD for approximately 0.3 mile, and resurface just north of South Railroad Street Park. At this location, the remainder of the route would be constructed within road right-of-way through means of open trenching for approximately 3.3 miles. The route would continue along Railroad Street, making a northward turn up Gallows Road, to a point where Gallows Road meets Old Courthouse Road. The route then would proceed northwest along Old Courthouse Road, crossing over Chain Bridge Road, where Old Courthouse Road transitions into Gosnell Road. The route then would continue northeast along Gosnell Road to a point at the intersection of Gosnell Road and Leesburg Pike. After crossing over Leesburg Pike, where Gosnell Road transitions into Westpark Drive, the route then would turn northwest along Greensboro Drive. The route ends along this path following both Spring Hill Road and Tyco Road, before ending at Tysons Substation.

This route would require approximately 0.2 mile of open trenching leaving Idylwood Substation before reaching its first two common HDD segments. This option would require a total of two HDD segments, and one liner plate tunnel segment.[15] The first HDD segment would travel approximately 0.1 mile under I-66 before resurfacing in Idylwood Park. The next open trenching segment would be approximately 0.6 mile leaving Idylwood Park, traveling along Hurst Street, to Idylwood Road, before ending at the end of Helena Drive. The one liner plate tunnel segment would be approximately 0.1 mile between

[15] As with the HDD segments, the liner plate tunnel segments would be comprised of six (two per phase) 5000 kcmil copper, XLPE solid dielectric cables.

Helena Drive and Railroad Street, under I-495. The second HDD segment would travel approximately 0.3 mile beginning at Railroad Street, westward to S. Railroad Street Park. The remainder of the installation process would be achieved through open trenching for approximately 3.3 miles. The cost of this alternative is estimated to be approximately $90.9 million.

While the Company proposes Underground Alternative 03 for notice and consideration by the Commission, it is the third highest cost option when compared to the Proposed Route and Underground Alternatives. Further, Underground Alternative 03 would likely result in property disturbance impacts to the homes located at the end of Helena Drive and along Railroad Street to Gallows Road, including possible tree removal. These particular drill segments would require extended work for approximately four to five months. Finally, this alternative would cross Idylwood Park, which is owned by Fairfax County Park Authority and cannot be crossed without permission from Fairfax County. See Attachment II.A.7.a for correspondence with the Fairfax County Park Authority regarding this route alternative.

5) Construct an underground single circuit 230 kV line from Idylwood Substation to Tysons Substation to the West, but not along the W&OD Park trail (Underground Alternative 02).

This alternative would construct an underground single circuit 230 kV line between Idylwood Substation and Tysons Substation.

The length of the corridor for Underground Alternative 02 is approximately 5.0 miles long. The route would leave Idylwood Substation northward through means of open trenching for approximately 0.2 mile, crossing Shreve Road into the northern portion of existing overhead right-of-way. See Attachment II.A.3.a for reference. The route would cross under I-66, before resurfacing in Idylwood Park through means of HDD (two parallel drill paths) for approximately 0.1 mile. See Attachment II.A.3.b for reference. The route would continue through means of open trenching for about 0.6 mile crossing through the gravel parking lot at Idylwood Park, then would run northeast along Hurst Street to a point at the intersection of Hurst Street and Idylwood Road. The route would continue a short distance westward along Idylwood Road before making a shift northeast along Helena Drive. Here the route would stay on Helena Drive before crossing under I-495 through means of a liner plate tunnel installation, for approximately 0.1 mile. On the west side of I-495, the route would transition into Railroad Street, where the route would proceed via HDD westward for approximately 0.3 mile, and resurface just north of South Railroad Street Park. At this location the remainder of the route would be constructed within road right-of-way through means of open trenching for approximately 3.7 miles. The route would continue along Railroad Street, crossing Gallows Road to a point where Railroad Street transitions into Electric Avenue. The route would maintain a northwest path before shifting north along Woodford Road to a point at the intersection of Woodford Road and Old

Courthouse Road. The route then would continue northwest along Old Courthouse Road, crossing over Chain Bridge Road, where Old Courthouse Road transitions into Gosnell Road. The route would continue northeast along Gosnell Road to a point at the intersection of Gosnell Road and Leesburg Pike. After crossing over Leesburg Pike, where Gosnell Road transitions into Westpark Drive, the route then would turn northwest along Greensboro Drive. The route would continue along this path following both Spring Hill Road and Tyco Road before ending at Tysons Substation.

This route would require approximately 0.2 mile of open trenching leaving Idylwood Substation before reaching its first HDD segment. The route would require a total of two HDD segments, and one liner plate tunnel segment. The first HDD segment would travel approximately 0.1 mile under I-66, before resurfacing in Idylwood Park. The next open trenching segment would be approximately 0.6 mile leaving Idylwood Park, traveling along Hurst Street, to Idylwood Road, before ending at the end of Helena Drive. The one liner plate segment would be approximately 0.1 mile between Helena Drive and Railroad Street, under I-495. The second HDD segment would travel approximately 0.3 mile beginning at Railroad Street, westward to S. Railroad Street Park. The remainder of the installation process would be achieved through open trenching, for approximately 3.7 miles. The cost of this alternative is estimated to be approximately $96.5 million.

While the Company proposes Underground Alternative 02 for notice and consideration by the Commission, it is the fourth highest cost option when compared to the Proposed Route and Underground Alternatives. Further, Underground Alternative 02 would likely result in property disturbance impacts to the homes located at the end of Helena Drive and along Railroad Street to Gallows Road, including possible tree removal. These particular segments would require extended work for approximately four to five months. Finally, like Underground Alternative 03, this alternative would cross Idylwood Park, which is owned by Fairfax County Park Authority and cannot be crossed without permission from Fairfax County. See Attachment II.A.7.a for correspondence with the Fairfax County Park Authority regarding this route alternative.

Dominion Energy®

September 8, 2017

Ms. Suzie Battista, AICP
Development Review Supervisor
Fairfax County Park Authority
12055 Government Center Parkway
Herrity Building, 4th Floor
Fairfax, Virginia 22035

RE: Dominion Energy Virginia - Idylwood to Tysons Substation 230kV Electric Transmission Line

Dear Ms. Battista,

This letter is to follow up on our discussions and to thank you for your time on our August 23, 2017, meeting held at your office regarding Dominion Energy Virginia's proposed Idylwood to Tysons 230kV Electric Transmission Line Project located in Fairfax County. The project will connect the Company's Idylwood Substation off Shreve Road and Tysons Substation off Tyco Road.

Dominion Energy and its consultant ERM have been researching overhead and underground route alternatives to connect the two substations. Currently, there are four overhead routes and seven underground routes under consideration. The attached table identifies which route bisects each park, the existing easements in each park, as well as the expanded easement areas that would be necessary to accommodate the routes being considered, if any. Maps showing how each park is affected also are included.

Dominion Energy requests that the Fairfax County Park Authority review each park bisected by the various routes and provide to us your written thoughts and comments about the impacts related thereto. Dominion Energy will use this information in determining the routes that will be presented to the State Corporation Commission in an application to be filed in the fall of this year. Along with your review of each route, we have a few questions for you to consider and answer in your response:

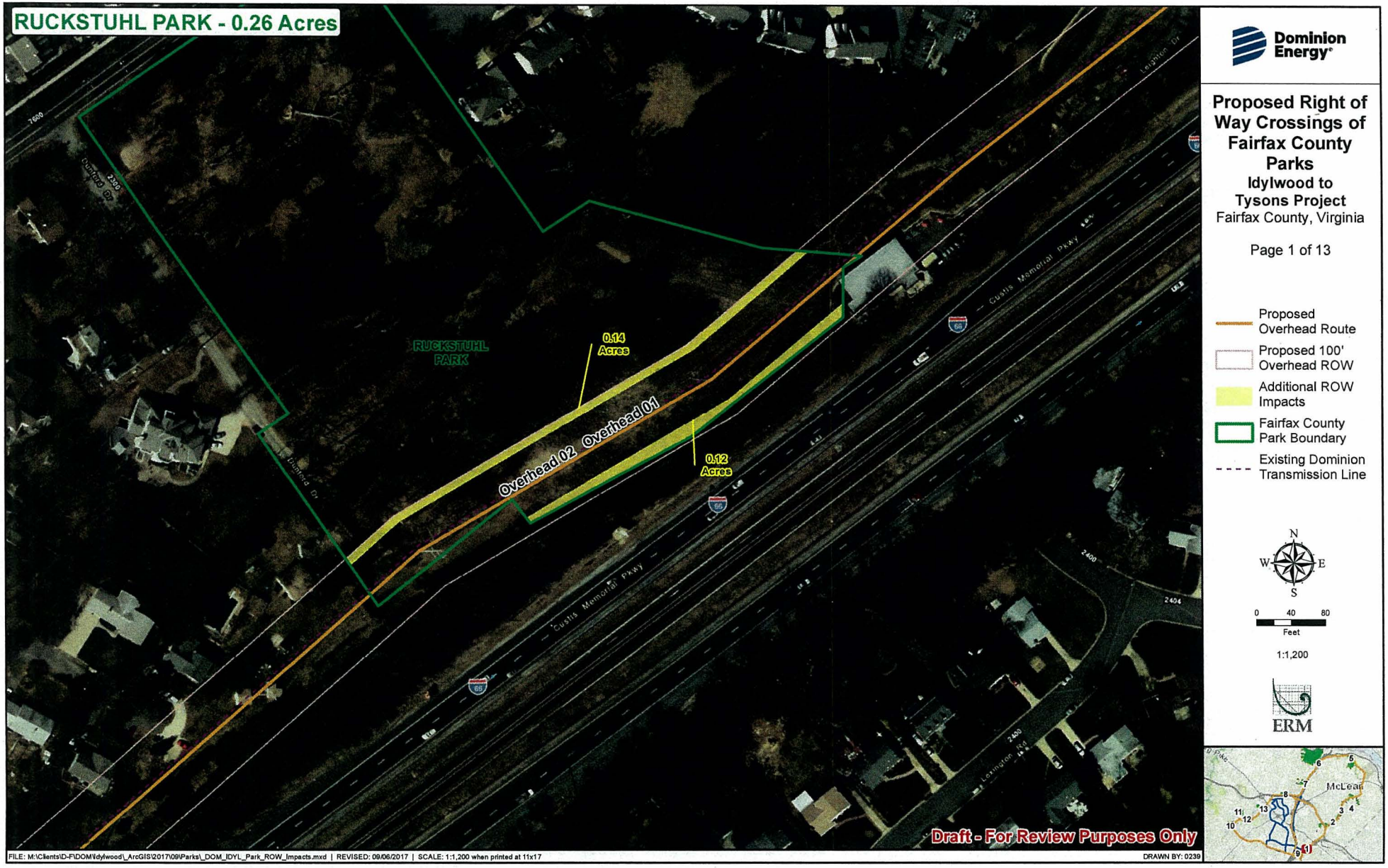
- For Overhead Routes where we would require additional easement, would the Park Authority have sole approval of easement expansion or would the Board of Supervisors require approval as well?
- For Overhead Routes where we would require additional easement, would the Park Authority allow tree removal outside of any new easement to protect the line from Danger Trees (trees outside the easement that still have the potential of interfering with line operation)?
- For Underground Routes that would impact Idylwood Park, what restrictions would we have for tree removal, parking, and working in the soccer field?

- Are any of the routes more preferable than another?
- Finally, are there any route options that could not be built based on Park Authority restrictions, or based on the Park Authority's reservations to provide approval for a required easement?

Thank you for your attention to this matter. Your input will aid in the routing process and help Dominion identify the route that best fits the area. Please contact me with any questions at 804.771.6145 or amanda.m.mayhew@dom.com.

Sincerely,

Amanda Mayhew
Senior Siting and Permitting Specialist



Dominion Energy

Proposed Right of Way Crossings of Fairfax County Parks
Idylwood to Tysons Project
Fairfax County, Virginia

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- Proposed Overhead Route
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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Dominion Energy

Proposed Right of Way Crossings of Fairfax County Parks

Idylwood to Tysons Project

Fairfax County, Virginia

- Proposed Overhead Route
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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Dominion Energy

Proposed Right of Way Crossings of Fairfax County Parks
Idylwood to Tysons Project
Fairfax County, Virginia

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- Proposed Overhead Route
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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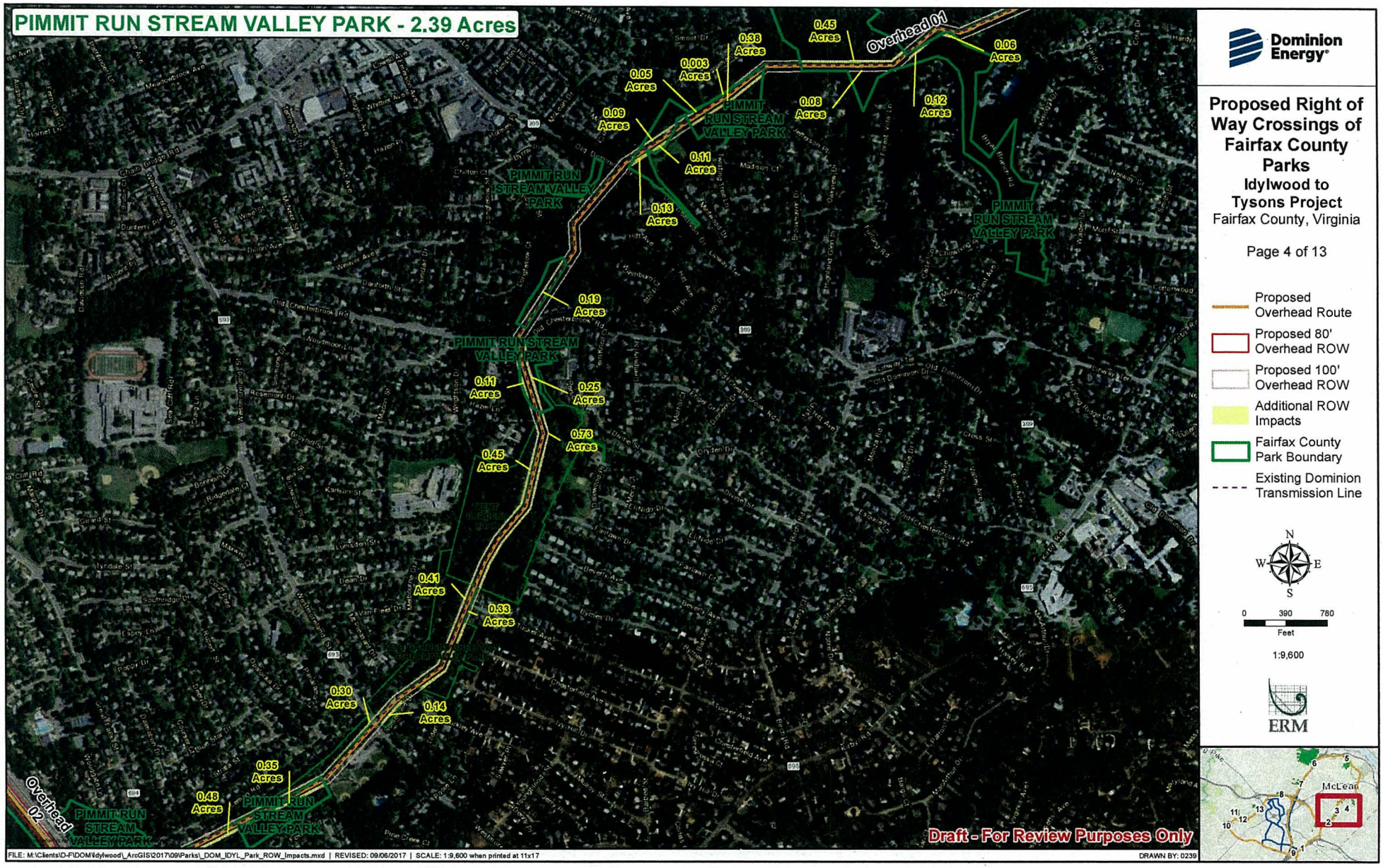

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Proposed Right of Way Crossings of Fairfax County Parks

Idylwood to Tysons Project

Fairfax County, Virginia

- Proposed Overhead Route
- Proposed 80' Overhead ROW
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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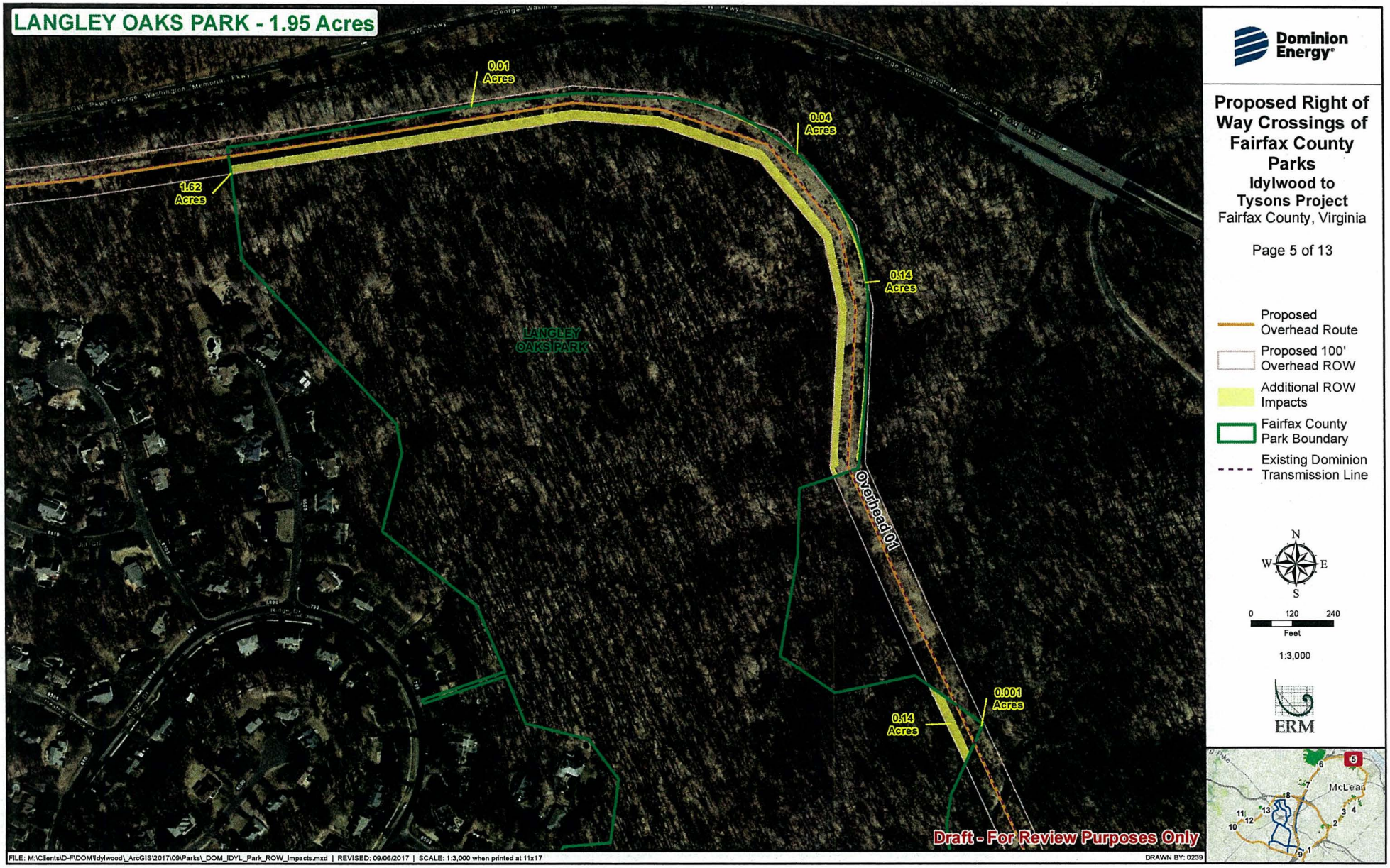
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LANGLEY OAKS PARK
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Dominion Energy
Proposed Right of Way Crossings of Fairfax County Parks
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Proposed Overhead Route
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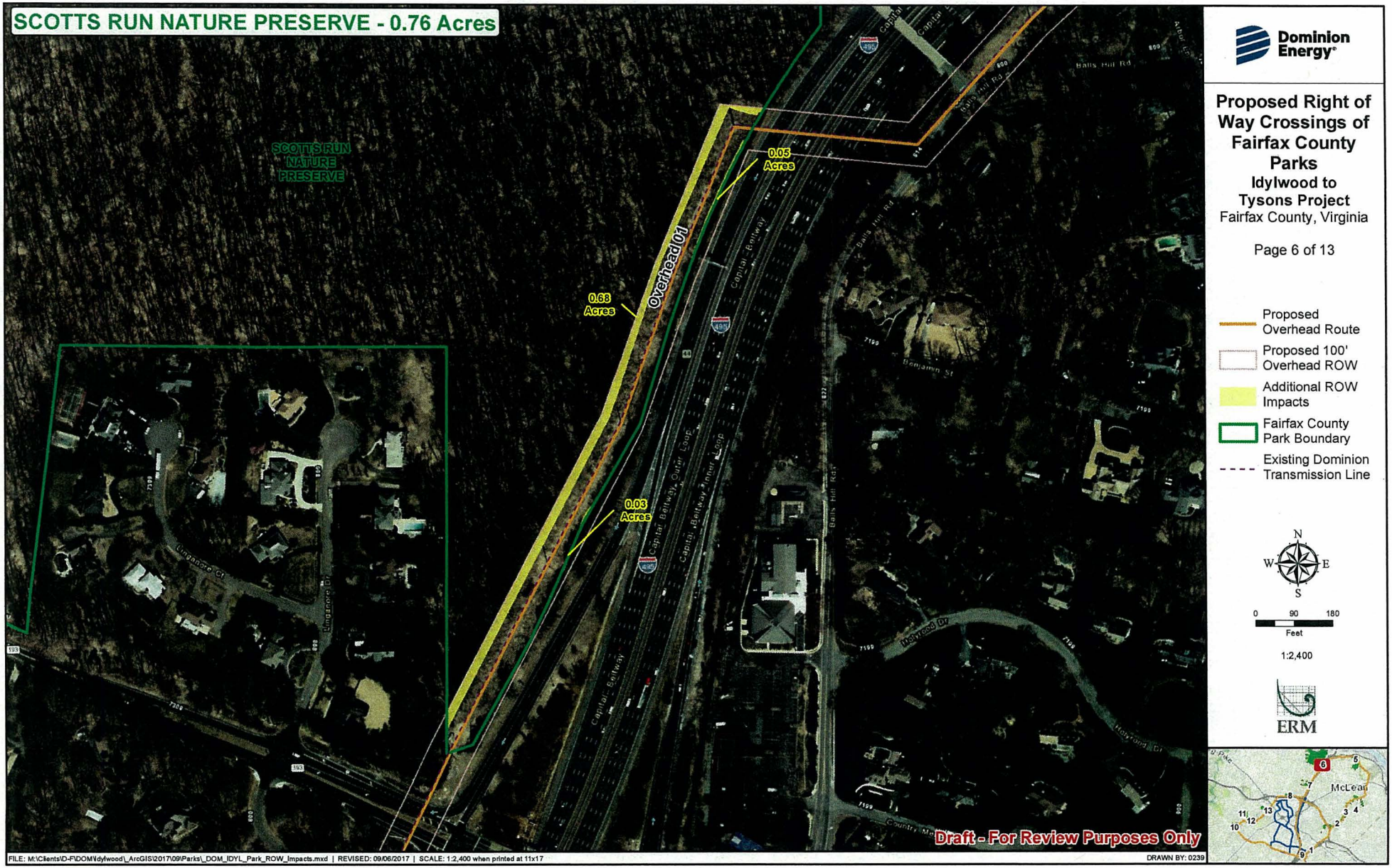

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Proposed Right of Way Crossings of Fairfax County Parks
Idylwood to Tysons Project
Fairfax County, Virginia

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- Proposed Overhead Route
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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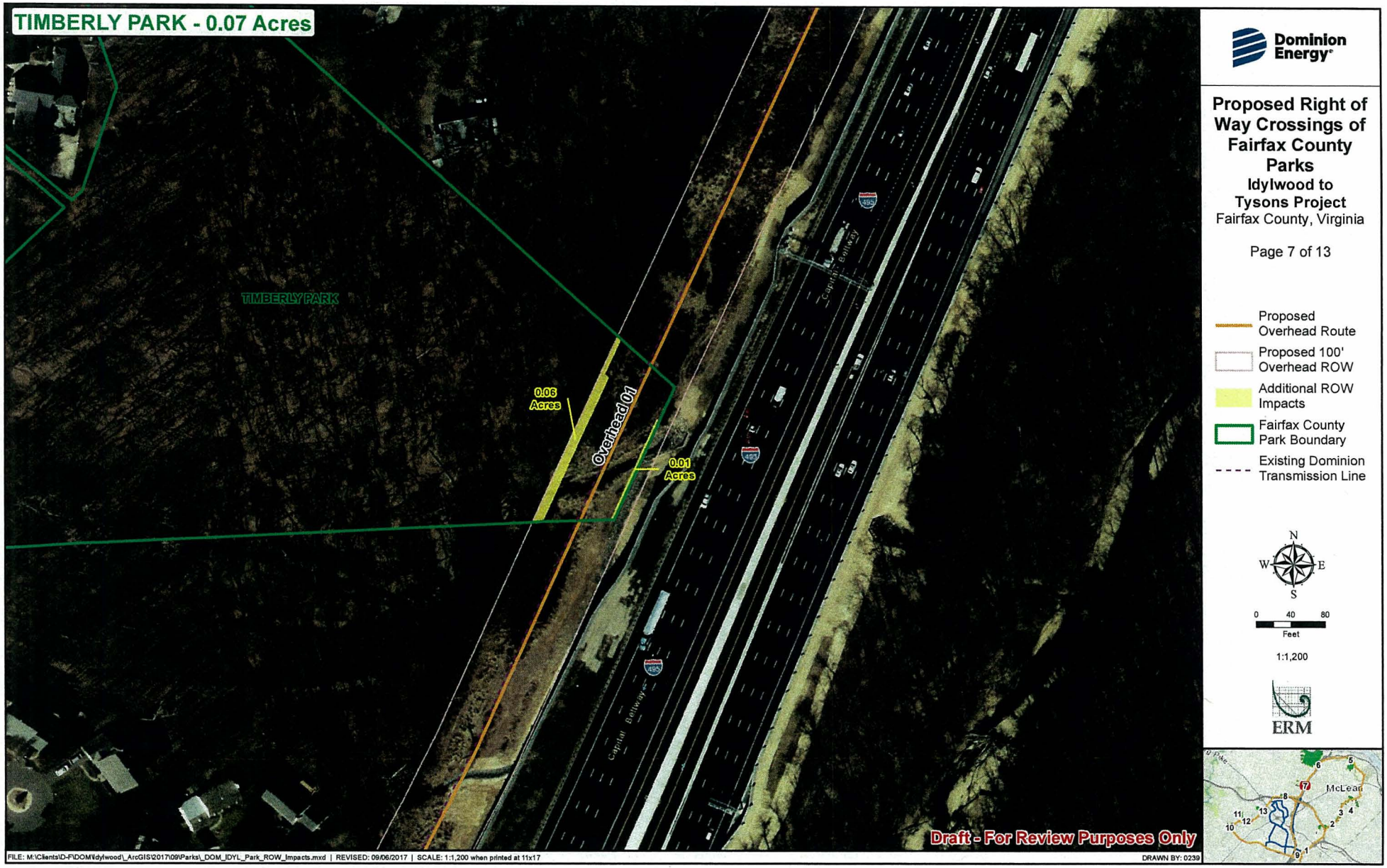

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Proposed Right of Way Crossings of Fairfax County Parks
Idylwood to Tysons Project
Fairfax County, Virginia

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- Proposed Overhead Route
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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Overhead 02
Overhead 03
Overhead 01
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Underground 07
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Dulles Airport Access Rd
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Proposed Right of Way Crossings of Fairfax County Parks
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Proposed 100' Overhead ROW
Additional ROW Impacts
Fairfax County Park Boundary
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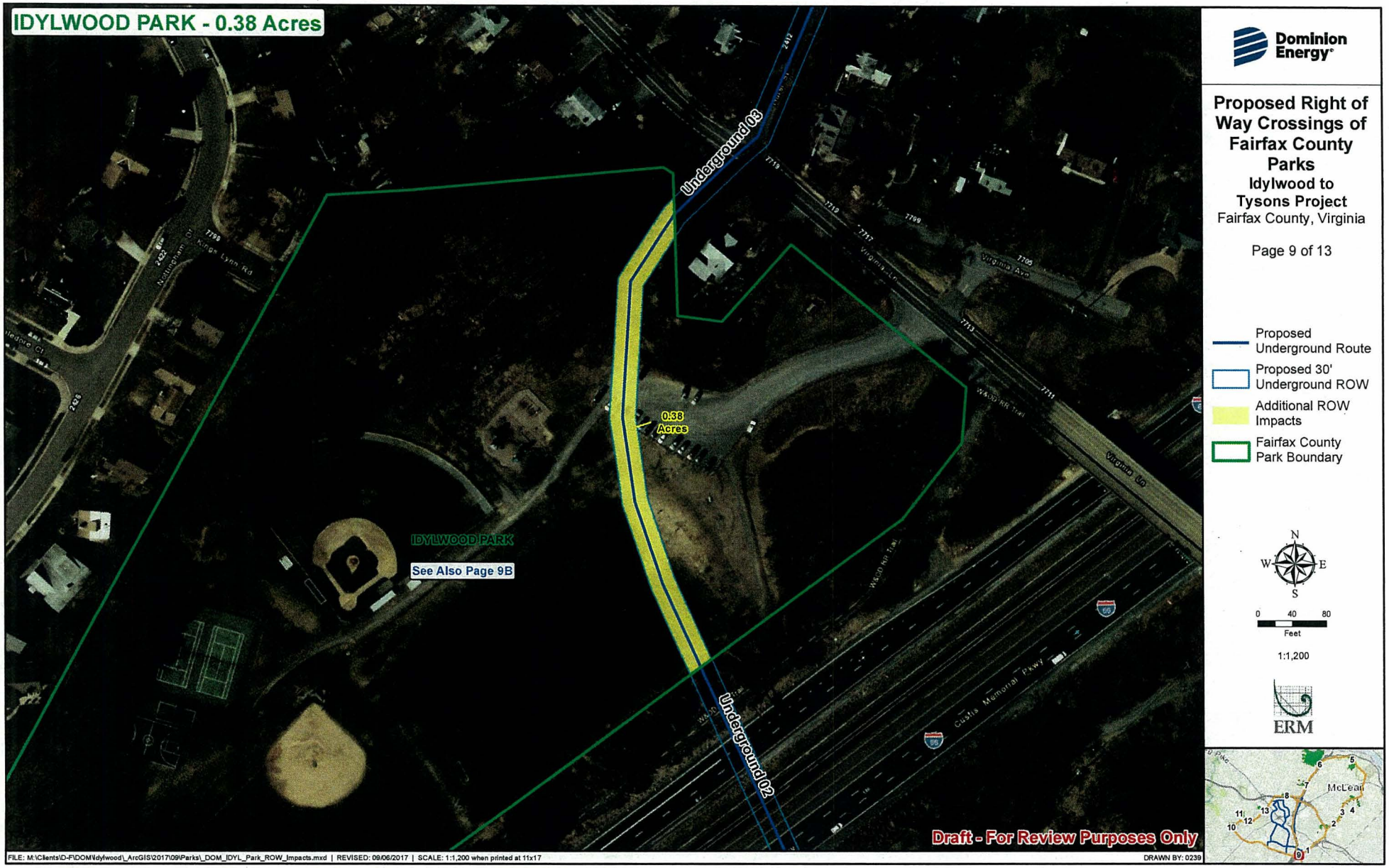

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Proposed Right of Way Crossings of Fairfax County Parks
Idylwood to Tysons Project
Fairfax County, Virginia

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- Proposed Underground Route
- Proposed 30' Underground ROW
- Additional ROW Impacts
- Fairfax County Park Boundary

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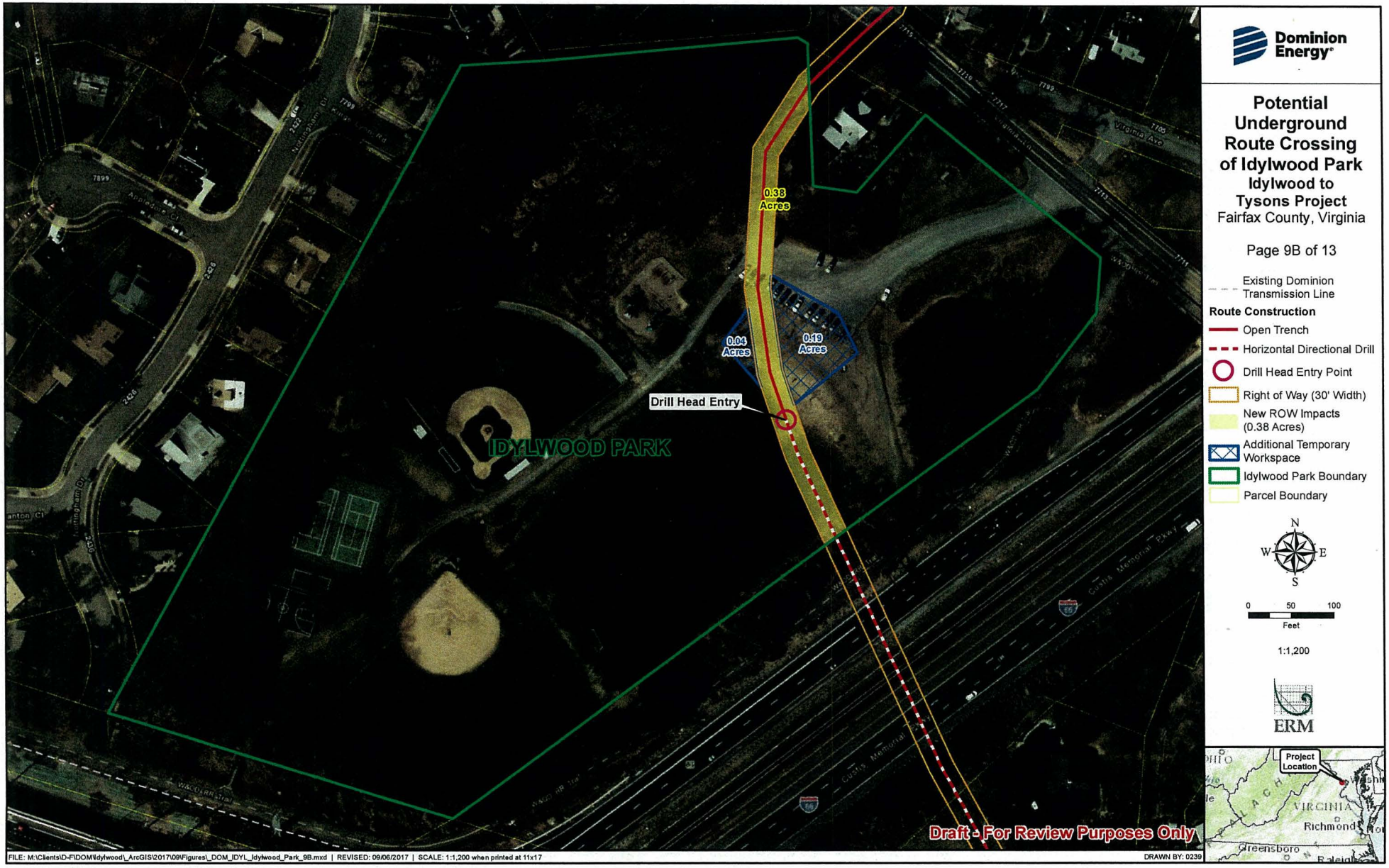

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Potential Underground Route Crossing of Idylwood Park

Idylwood to Tysons Project

Fairfax County, Virginia

Page 9B of 13

- Existing Dominion Transmission Line

Route Construction

- Open Trench
- Horizontal Directional Drill
- Drill Head Entry Point
- Right of Way (30' Width)
- New ROW Impacts (0.38 Acres)
- Additional Temporary Workspace
- Idylwood Park Boundary
- Parcel Boundary

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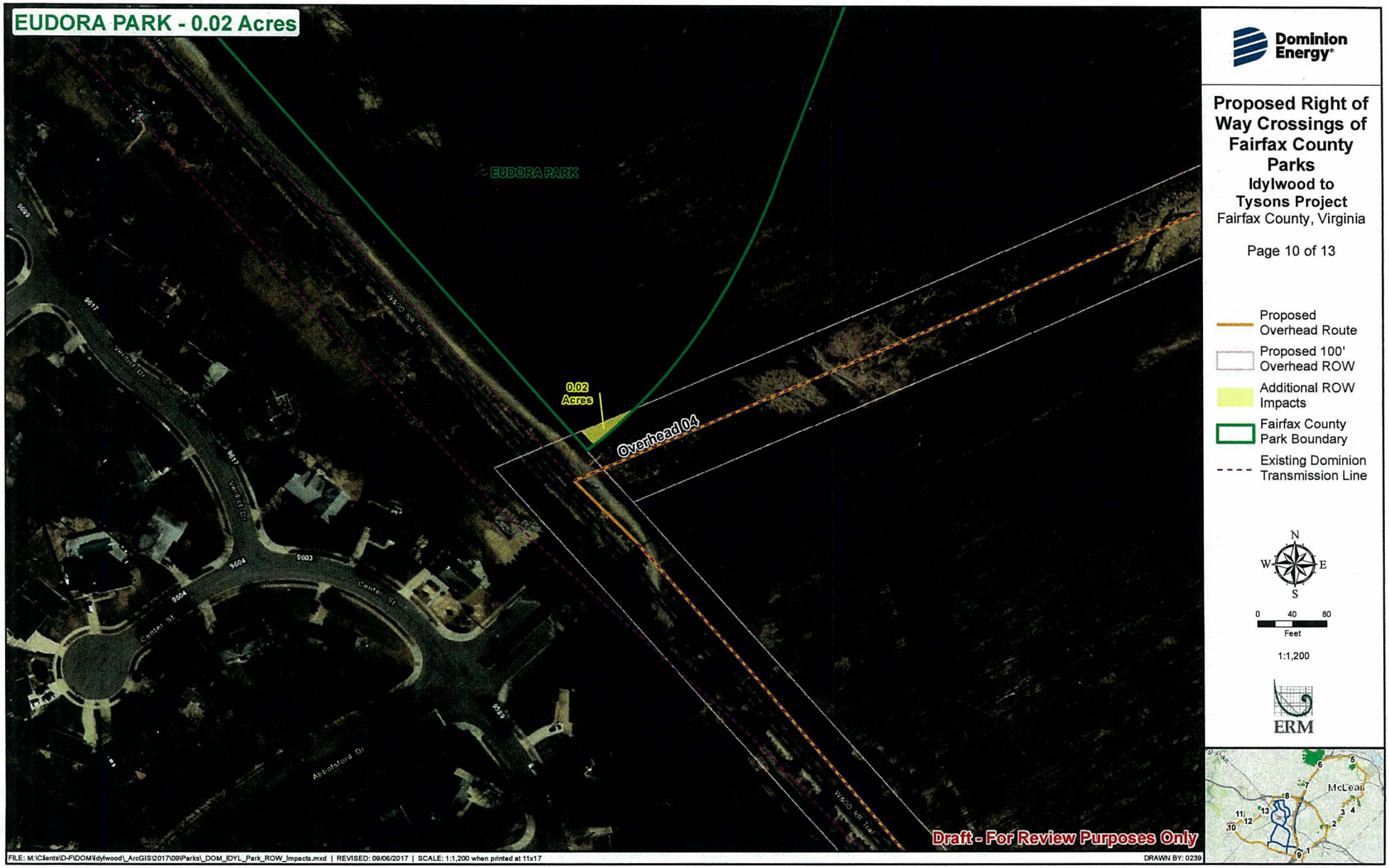
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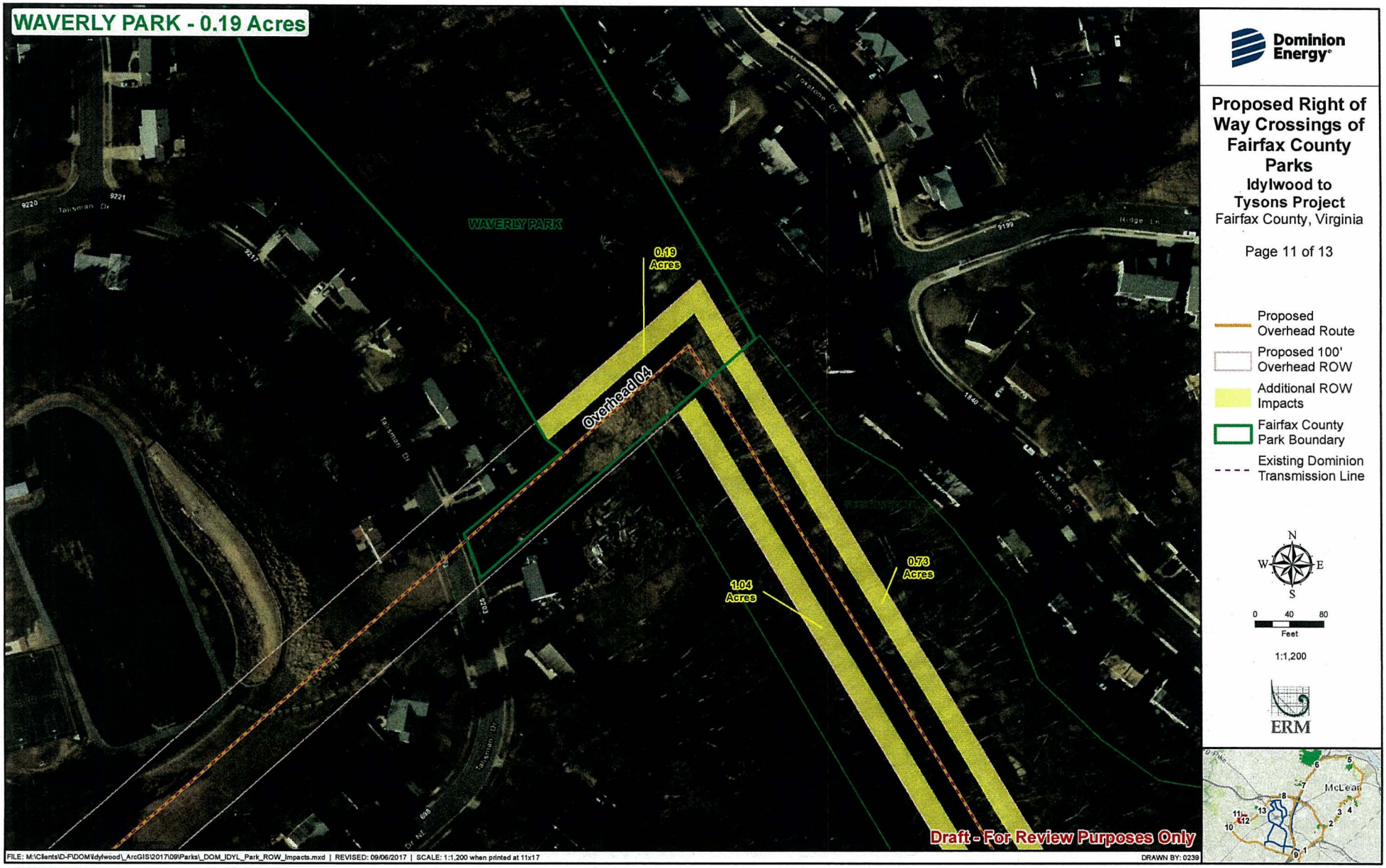

Dominion Energy

Proposed Right of Way Crossings of Fairfax County Parks
Idylwood to Tysons Project
Fairfax County, Virginia

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- Proposed Overhead Route
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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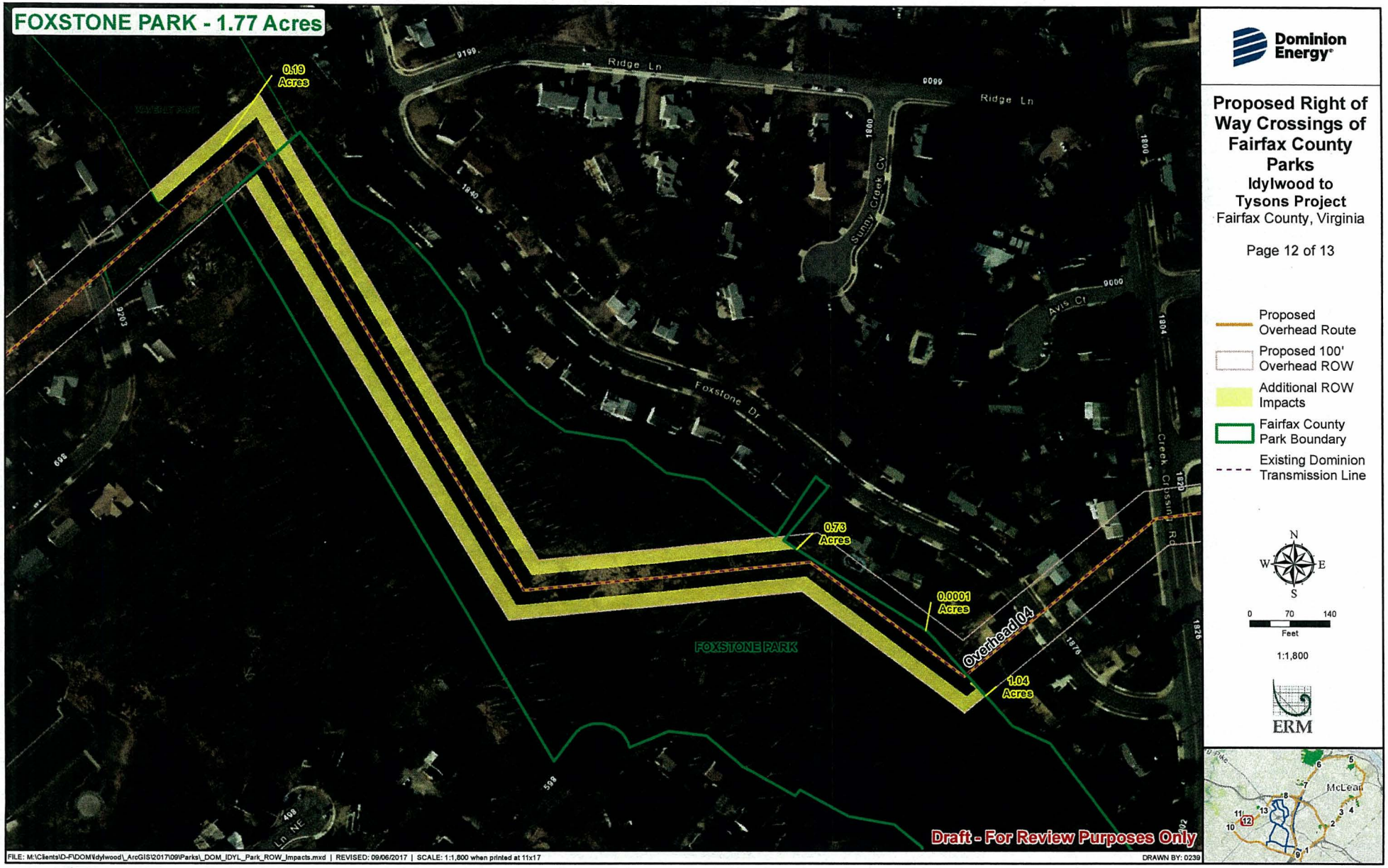

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Proposed Right of Way Crossings of Fairfax County Parks

Idylwood to Tysons Project

Fairfax County, Virginia

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- Proposed Overhead Route
- Proposed 100' Overhead ROW
- Additional ROW Impacts
- Fairfax County Park Boundary
- Existing Dominion Transmission Line

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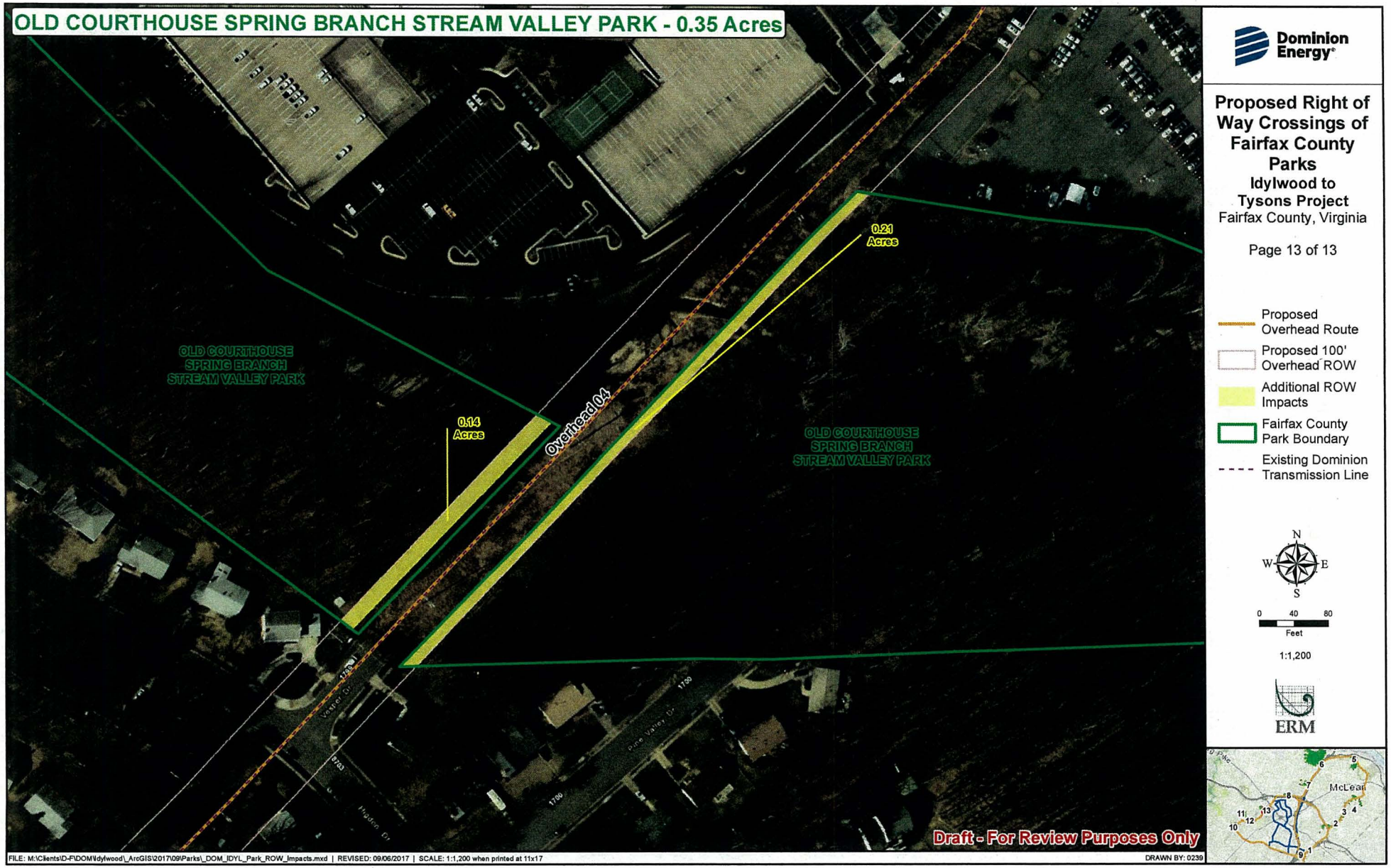
OLD COURTHOUSE SPRING BRANCH STREAM VALLEY PARK - 0.35 Acres
OLD COURTHOUSE SPRING BRANCH STREAM VALLEY PARK
0.14 Acres
Overhead 04
0.21 Acres
OLD COURTHOUSE SPRING BRANCH STREAM VALLEY PARK
Draft - For Review Purposes Only
FILE: M:\Clients\D-F\DOM\Idylwood_ArcGIS\2017\09\Parks_DOM_IDYL_Park_ROW_Impacts.mxd | REVISED: 09/06/2017 | SCALE: 1:1,200 when printed at 11x17
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Dominion Energy
Proposed Right of Way Crossings of Fairfax County Parks
Idylwood to Tysons Project
Fairfax County, Virginia
Page 13 of 13
Proposed Overhead Route
Proposed 100' Overhead ROW
Additional ROW Impacts
Fairfax County Park Boundary
Existing Dominion Transmission Line
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McLean

FAIRFAX COUNTY PARK AUTHORITY

12055 Government Center Parkway, Suite 927 • Fairfax, VA 22035-5500
703-324-8700 • Fax: 703-324-3974 • www.fairfaxcounty.gov/parks

November 2, 2017

Ms. Amanda Mayhew
Senior Siting and Permitting Specialist
Dominion Energy Virginia
701 East Cary Street
Richmond, VA 23219

SUBJECT: Idylwood to Tysons 230kV Electric Transmission Line

Dear Ms. Mayhew:

Thank you for your letter dated September 8, 2017, requesting the Fairfax County Park Authority's review of the Idylwood to Tysons Substation 230kV electric transmission line project and potential route alignments. Park Authority staff has reviewed the project for potential impacts to park facilities, natural resources, cultural resources, and trails. The following comments are offered for your consideration.

Cultural Resources Impacts

The Parcels were subjected to archival review on an individual basis based on the potential route alignments provided. If any portions of the parcels are to be impacted by ground disturbing activities and have not been previously surveyed, the Archaeology and Collections Branch (ACB) would recommend Phase I archaeological survey in order to determine the presence or absence of archaeological sites. If sites are found to be potentially eligible for inclusion onto the National Register of Historic Place or are significant to the history of Fairfax County, Phase II archaeological testing is recommended. If the sites are found eligible or significant, avoidance or additional archaeological work is recommended.

If Federal funding or permitting are required for the project, the ACB recommends that the applicant initiate consultation with the Virginia Department of Historic Resources (VDHR).

At the completion of any cultural resource studies that may be completed, Park Authority staff requests that the applicant provide two copies (one hard copy, one digital copy) of the archaeology report as well as field notes, photographs, and artifacts to the Park Authority's Resource Management Division (Attention: Liz Crowell) within 30 days of completion of the study. Materials can be sent to 2855 Annandale Road, Falls Church, VA 20110 for review and concurrence. For artifact catalogues, please include the database in Access ™ format, as well as digital photography, architectural assessments, including line drawings. If any archaeological, architectural or other sites are found during cultural resources assessments, the applicant should update files at VDHR, using the VCRIS system.

Natural Resources Impacts

All projects on Park Authority land must conform to Park Authority Natural Resource Policy 201 and the Natural Resource Management Plan. Impacts to parks are to be avoided; in cases where they cannot be avoided, unavoidable impacts are to be minimized and mitigation provided at the Department of Public Works and Environmental Services (DPWES) Unit Price Schedule rate for Reforestation. Effective February 1, 2017, this rate is $58,620.75 per acre.

The area designated as new or expanded right-of-way (ROW) should be eliminated or reduced to the minimum area necessary to complete the proposed project. If the new or expanded ROW as shown in table attached in your letter cannot be reduced or eliminated, mitigation fees would be as follows:

- **Overhead 1: $529,931.58 (9.04 acres)** *Ruckstuhl, Kent Gardens Greenway Stream Valley, Kent Gardens, Pimmit Run Stream Valley, Langley Oaks, Scotts Run Nature Preserve, Timberly, and McLean Hamlet Parks*
- **Overhead 2: $59,793.17 (1.02 acres)** *Ruckstuhl and McLean Hamlet Parks*
- **Overhead 3: $44,551.77 (.76 acres)** *Mclean Hamlet Park*
- **Overhead 4: $136,586.35 (2.33 acres)** *Eudora, Waverly, Foxstone, and Old Courthouse Spring Branch Stream Valley Parks*
- **Underground 2: $22,275.89 (.38 acres)** *Idylwood Park*
- **Underground 3: $22,275.89 (.38 acres)** *Idylwood Park*

In addition to evaluating the potential mitigation fees for each proposed route, the Natural Resources Branch (NRB) utilized GIS data to evaluate each park for soils, water resources, Resource Protection Areas, easements, non-native invasive species, wildlife, forest cover, natural resource management conflicts, and plant, animal, and exemplary natural communities tracked by the Virginia Natural Heritage Program due to their rarity. As this information and analysis contained in this letter is based on available GIS data, it should be field verified to confirm current conditions.

In terms of soils and forest cover, all 13 parks that were evaluated did not appear to contain any soils of concern and forest cover was variable throughout. Furthermore, each park provides habitat to various wildlife, including nesting birds, which should be considered as part of any development activity.

Specific Park Analysis

An analysis of the potential impacts to specific parks included in the potential alignments is included below. This information is intended to be used for planning purposes; additional issues or considerations may arise with future, more detailed route alignment review.

Ruckstuhl Park: The potential route alignment across the park will impact two cultural sites. The first site is a Native American site, 44FX0007. Adjacent to the park is 44FX1203, the Mount and Lindsay Cemetery. Care should be taken as to not disturb human remains. Archaeological testing prior to ground disturbing activities is recommended. No water resources, Resource

Protection Area (RPA), or plant, animal, or exemplary natural communities exist. A high level of non-native invasive species are present and no current natural resource management activities are happening in this park. This park and the proposed project area is within a conservation easement and a Northern Virginia Conservation Trust (NVCT) easement, which may have restrictions; proposed work should also be reviewed by the NVCT.

Kent Gardens Greenway Stream Valley Park: The potential route alignment that crosses the park may contain significant Civil War resources. Archaeological testing prior to ground disturbing activities is recommended. Water resources include Pimmit Run and RPA. Wood turtle and American eel have been documented in Virginia Department of Game and Inland Fisheries (VDGIF) surveys. No plant, animal, or exemplary natural communities exist and a moderate to high level of non-native invasive species are present. No current natural resource management activities or easements are located in this park.

Kent Gardens Park: The potential route alignment that crosses the park may contain significant Civil War resources. Archaeological testing prior to ground disturbing activities is recommended. Water resources include Pimmit Run and RPA. No plant, animal, or exemplary natural communities exist. A moderate to high level of non-native invasive species are present. No current natural resource management activities or easements are located in the park. Trails in this park could be impacted by route alignments that require clearing in the floodplain.

Pimmit Run Stream Valley Park: The potential route alignment that crosses the park may contain significant Civil War resources. Archaeological testing prior to ground disturbing activities is recommended. Water resources include Pimmit Run and RPA. No plant, animal, or exemplary natural communities exist and a high level of non-native invasive species are present. No current natural resource management activities or easements are located in the park. This park also contains about six miles of natural surface trail that is fairly fragile and may be further impacted by construction and/or clearing in the floodplain associated with certain alignments.

Langley Oaks Park: The potential route alignment shown across the park will impact one known Native American Site (44FX0328). In addition, other areas in the easement have moderate to high potential to contain additional sites. Archaeological testing prior to ground disturbing activities is recommended. Water resources include perennial streams and RPA. An exemplary natural community is located east of the proposed alignment. Moderate level of non-native invasive species exist and there are no current natural resource management activities or easements.

Scott's Run Nature Preserve: The potential route alignment across the park will impact one known Native American Site (44FX2430). In addition, other areas in the easement have moderate to high potential to contain additional sites. Archaeological testing prior to ground disturbing activities is recommended. No water resources or RPA are present. Exemplary natural community located north of proposed easement. A low level of non-native invasive species are present. No current natural resource management activities or easements.

Timberly Park: The area of the park where the potential route alignment is located is steep and previously disturbed; there are no cultural resources issues noted. Water resources include

Bradley Branch and RPA. No plant, animal, or exemplary natural communities exist and a low level of non-native invasive species are present. No current natural resource management activities are happening in this park.

McClean Hamlet Park: There are no known cultural sites within the park, but the western portion of the proposed alignment route has moderate to high potential to contain significant archaeological sites. Archaeological testing prior to ground disturbing activities is recommended. Water resources include RPA. No plant, animal, or exemplary natural communities exist and a moderate level of non-native invasive species are present. This park is currently part of the Invasive Management Area (IMA) program, which has ongoing natural resource management activities. The proposed route alignment does not interfere with the location of the IMA site at the park; however, outreach to the IMA program coordinator and volunteers will be necessary.

Idylwood Park: The proposed route alignment area in Idylwood Park is disturbed and has low potential to contain significant cultural resources. There are no cultural resources issues and no archaeological work is warranted. Water resources are located onsite. American bluesnake has been documented onsite by VDGIF as well as an historical, exemplary plant community. A moderate level of non-native invasive species are present. The park is currently part of the IMA program, which has ongoing natural resource management activities. The proposed route alignment will cut directly through the IMA site. This will require outreach to the IMA program coordinator and volunteers, as it will significantly alter this site and will permanently alter the management of this area. The Park Authority requests that if Dominion wishes to pursue route alignment options that include this park, a separate meeting to discuss easement needs, construction timing/needs, impacts and mitigation specific to this park be scheduled. In addition to the natural resource concerns, the park contains athletic fields and parking areas that are heavily used; disruption to these areas needs to be minimized and mitigated.

Eudora Park: The portion of the park that could be impacted is small and steep. It is unlikely to contain significant resources. There are no cultural resources issues and no archaeological work is warranted. Water resources and RPA are directly adjacent to the proposed easement location. No current plant, animal, or exemplary natural communities exist. A moderate level of non-native invasive species are present, and there are no current natural resource management activities.

Waverly Park: This area of the park is previously disturbed. There are no cultural resources issues. Water resources and RPA are onsite. No current plant, animal, or exemplary natural communities exist. A moderate level of non-native invasive species are present. There are no current natural resource management activities. Trails in this park could be impacted.

Foxstone Park: This area of the park is previously disturbed. There are no cultural resources issues. Water resources and RPA are onsite. No current plant, animal, or exemplary natural communities exist. A moderate to high level of non-native invasive species are present. There are no current resource natural resource management activities. Trails in this park could be impacted.

Old Courthouse Spring Branch Stream Valley Park: The portion of the park that could be impacted is previously disturbed. There are no cultural resources issues. There are water resources and RPA onsite. No current plant, animal, or exemplary natural communities exist. A moderate level of non-native invasive species are present. This park is currently being managed for non-native invasive species as part of a trail development project. Other activities that are ongoing include a stream restoration and a sewer line project, both administered by DPWES. The Ashgrove Lane Trail could potentially be impacted.

Response to Specific Questions

Your letter included specific questions for our reply; please see below.

For Overhead Routes were we would require additional easement, would the Park Authority have sole approval of easement expansion or would the Board of Supervisors require approval as well?

Some parcels are deed restricted and require easements greater than 30 feet to be approved by the Board of Supervisors in writing. As further described below, once specific parcel numbers and easement areas by parcel are provided, the Park Authority will check each deed for restrictions and existing easement conflicts.

For Overhead Routes where we would require additional easement, would the Park Authority allow tree removal outside of any new easement to protect the line from Danger Trees (trees outside the easement that still have the potential of interfering with line operation)?

Tree removal may be allowed in consultation with the Park Authority and potentially subject to fees and/or replacement requirements. Depending on the size, species, and number of trees that may need to be removed, to operate within Park Authority Natural Resource Policy, the NRB requests that these removals be avoided where possible, kept to the minimum necessary, and where possible, replacement trees be planted in consultation with the NRB.

For Underground routes that would impact Idylwood Park, what restrictions would we have for tree removal, parking, and working in the soccer field?

To conform to Park Authority Natural Resource Policy, tree removal would need to be avoided, and where unavoidable, minimized with mitigation provided for their loss. This work would need to be done in coordination with the NRB. Other natural resource restrictions associated with Idylwood Park would be associated with the IMA site, which this proposed alignment will bisect and permanently disturb. This will require coordination with the IMA program manager as well as volunteers. This park contains three athletic fields and courts and is highly utilized. Parking is already inadequate and any route should avoid impacts to the parking lot, field, or park operations. For natural resource reasons and operational reasons, this route as currently shown is not recommended. The Park Authority requests that if Dominion wishes to pursue route options that will impact Idyldood Park, a separate meeting to discuss impacts and mitigation specific to this park be scheduled.

Are any routes more preferable than another?

As they pertain to natural resource impacts, the most preferable route would be one that avoids natural resource impacts. Where that is not possible, a route that minimizes those impacts would be preferable, and mitigation would be required. The acreage disturbed and associated mitigation fee for each route is provided above with Overhead Route 1 having greatest impacts, and associated fees, and Underground Route 2 and 3 the least.

Furthermore, two parks, Idylwood and Ruckstuhl Park, have an Invasive Management Area and conservation and Northern Virginia Conservation Trust easements, respectively, that would require additional review in consultation with the NRB, including the Invasive Management Area program coordinator and volunteers, and the Northern Virginia Conservation Trust. Route options that include either of these parks are not recommended.

Based on this information, while there will still be impacts and mitigation required, the route option identified as Overhead Route 3 would be the most preferable, and Overhead Routes 1 and 2 as well as Underground Routes 2 and 3 the least preferable.

Finally, are there any route options that could not be built based on Park Authority restrictions, or based on the Park Authority's reservations to provide approval for a required easement?

As described above, routes options that impact Idylwood and Ruckstuhl Park are not recommended (Overhead 1, 2, Underground 2, 3). Furthermore, the route option for Overhead 1 will impact the largest acreage of parkland, including water resources, Resource Protection Areas, exemplary plant, animal, and natural communities, Virginia Department of Game and Inland Fisheries, wildlife habitat, and areas being managed for natural resources. Regardless of the option, mitigation will be required. When the requested information on the parcels is provided as described below, the Park Authority can provide further information on deed and easement restrictions associated with a particular route alignment.

Easement Areas and Clearing & Grading on Parkland

In order to fully evaluate the easement areas and associated needs, the Park Authority requests the following information for route alignments that are being further pursued:

- Identify parcels on plans
- Provide breakdown of proposed easement area by parcel
- Provide deed book and page numbers of existing easements by parcel
- Identify any proposed easement greater than 30 feet wide by parcel. Some parcels are deed restricted and require easements greater than 30 feet to be approved by the Board of Supervisors in writing.
- Provide schedule of necessary approvals/permitting and construction

Once this information is provided, the Park Authority will check each deed for deed restrictions and existing easement conflicts.

In order to do any clearing and grading or drainage improvement on parkland, the applicant must first acquire a Letter of Permission and/or Easement from the Park Authority. Because of restrictive covenants on some of the Park Authority properties, it may not be possible to approve easements on the park property. Conditions and/or fees may be required for Park Authority permits or easements.

If any land disturbing activities are proposed on park property, the applicant must submit a request for a permit and/or easement request. Applications and information are available at http://www.fairfaxcounty.gov/parks/plandev/easements.htm or from the Easement Coordinator, Fairfax County Park Authority, Planning and Development Division, 12055 Government Center Parkway, Suite 421, Fairfax, Virginia 22035; main telephone number (703) 324-8741.

Thank you for the opportunity to comment on this project. Should you need further information, please contact Suzie Battista at 703-324-8643 or sbatti@fairfaxcounty.gov.

Sincerely,

David Bowden, P.E., Director
Planning and Development Division

ECopy: Ken Quincy, Park Authority Board, Providence District
Sara K. Baldwin, Acting Executive Director
Cindy Walsh, Acting Deputy Director/COO
Aimee Vosper, Deputy Director/CBD
Todd Brown, Director, Operations Division and Acting Director, Resource Management
Andrea Dorlester, Manager, Park Planning Branch
Cindy McNeal, Project Coordinator, Real Estate Services Branch
Alex Burdick, Engineer IV, Real Estate Services Branch
Yudhie Brownson, Project Manager, Real Estate Services Branch
Liz Crowell, Manager, Archaeology & Collections Branch
John Stokely, Manager, Natural Resource Protection Branch
Elizabeth Cronauer, Trail Coordinator, Project Management Branch
Russell Arrington, Area Manager, Idylwood Park, Park Operations Division

II. DESCRIPTION OF THE PROPOSED PROJECT

A. Right-of-way (ROW)

8. Indicate how the construction of this transmission line complies with "Guidelines for the Protection of Natural, Historic, Scenic, and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities" adopted by the Federal Power Commission in Order No. 414 issued November 27, 1970, and now applied by the Federal Energy Regulatory Commission. These guidelines may be found in Volume 44 of the Federal Power Commission Reports, page 1,491, or Volume 35 of the Federal Register, page 18,585 (December 8, 1970). Copies of the Guidelines may also be obtained from the Office of Public Information, Federal Energy Regulatory Commission, Washington, D.C. 20426. For reference purposes a copy of the guidelines is included.

Response: The FERC guidelines are a tool routinely used by the Company in routing its transmission line projects. Those that pertain most aptly to this underground Project include:

Guideline #2 – Because the route of the proposed lines cannot avoid being within this area of national historic places, locating the line underground will avoid the public view and preserve the character of the area.

Guideline #4 – Because the route is within streets maintained by VDOT, or on NOVA Parks property, the Company has been in contact with those agencies during the route selection process.

Guidelines #11 - #15 – These are guidelines related to soil disturbance, maintaining the natural terrain and erosion and sedimentation control. These guidelines will be followed.

Many of the remaining guidelines do not apply to an underground line or the situation of this particular Project.

II. DESCRIPTION OF THE PROPOSED PROJECT

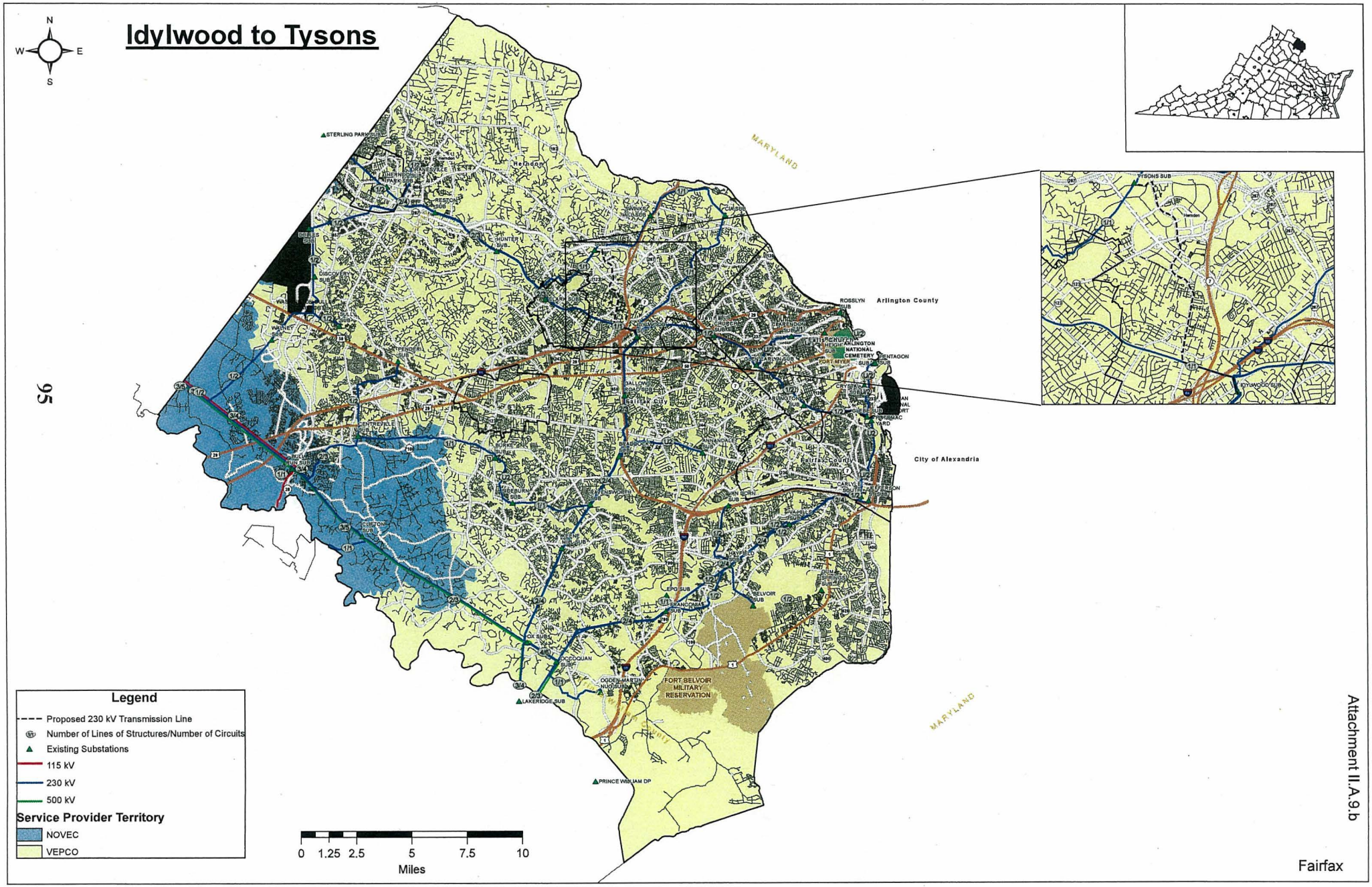
A. Right-of-way (ROW)

9. 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) advise of each electric utility affected; (2) whether any affected electric utility objects to such construction and (3) the length of line proposed to be located in the service area of an electric utility other than the applicant;**

b. **Provide three (3) copies of the Virginia Department of Transportation "General Highway Map" of 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 showing the line outside of the applicant's certificated service area, have the appropriate individual of the affected electric utility sign if his/her company is not opposed to the proposed construction.**

Response: a. The Proposed Route of the Project is located entirely in Fairfax County, in the Company's service territory.

b. Three copies of the VDOT "General Highway Map" of Fairfax County are marked as required and have been submitted to the Commission's Division of Energy Regulation. This map reflects VDOT and other road data obtained from Navteq and County data. A reduced copy of the map is provided as Attachment II.A.9.b.



Attachment II.A.9.b

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

1. Detail number of circuits and their design voltage and transfer capabilities.

Response: The Project along the Proposed Route will be built to the Company's 230 kV design standards. For the single underground circuit to operate at the targeted continuous rating of 950 MVA, a total of six power cables are required (two cables per electrical phase).[16] See Attachments II.A.3.a and b.

[16] *See, supra,* n. 2 and related text.

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

2. Detail number, size(s), type(s), and typical configurations of conductors.

Response: The Project along the Proposed Route involves the installation of a new 4.3-mile single circuit underground 230 kV transmission line.

The new line will be designated Idylwood-Tysons Line #2175. The open trenching segments of the line (approximately 3.7 miles) will be comprised of six 3500 kcmil copper, XLPE solid dielectric cables (two cables per phase). The HDD segments of the line (approximately 0.6 mile) will be comprised of six 5000 kcmil copper, XLPE solid dielectric cables (two cables per phase). Section I.A of the Appendix provides additional discussion regarding the conductors for the proposed Project, including the number, size, and type for both the open trenching and HDD segments of the Proposed Route. See Attachments II.A.3.a and b for the proposed configurations.

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 provide:

a. types of structures;

b. length of ROW with each type of structure;

c. material for typical structure (steel, oxidizing steel, etc.);

d. foundation material;

e. width at cross arms of typical structure;

f. width at base of typical structures;

g. typical span length;

h. approximate average heights of structures;

i. a schematic drawing of each typical structure; and

j. minimum conductor-to-ground clearance under maximum operating conditions

Response:

Proposed Route – Open Trenching (Attachment II.A.3.a)

a. Structure type — Open trenched concrete duct bank

b. Right-of-way length — approximately 3.7 miles

c. Structure material — Concrete-encased duct bank

d. Foundation material/Conduit type — 8-inch PVC conduits for power cables; 2-inch PVC conduits for sheath bonding cables and protective relaying cables

e. Width of structure — Concrete-encased duct bank approximately 4.5 feet wide, 2.5 feet tall

f. Base width of typical structure — not applicable to underground

g. Typical span length — approximately 1,800 feet (0.3 mile) average segment length between manholes

h. Approximate average structure height — 7 feet to bottom of trench from surface of the ground

i. Typical structure — See Attachment II.A.3.a

j. Minimum cable clearance — minimum of approximately 42 inches from top of PVC conduits containing energized cables to surface of the ground

Proposed Route – HDD (Attachment II.A.3.b)

a. Structure type — Two parallel drill paths

b. Right-of-way length — approximately 0.6 mile

c. Structure material — bore surrounded by native fill with no casing

d. Foundation material/Conduit type — 10-inch HDPE conduits for power cables; 4-inch HDPE conduits for sheath bonding cables and protective relaying cables

e. Width of structure — two parallel drill paths, minimum of approximately 3.0 feet in diameter (bore hole size to be determined by contractor at installation) spaced a minimum of approximately 10.0 feet apart

f. Base width of typical structure — not applicable to underground construction

g. Typical span length — one HDD segment (two parallel drill paths) extending approximately 3,400 feet (0.6 mile)

h. Approximate average structure height — minimum of approximately 53.5 feet from surface of the ground to bottom of trench

i. Typical structure — See Attachment II.A.3.b

j. Minimum cable clearance — varies between a minimum of approximately 5.0 feet to approximately 50.0 feet from top of bore hole containing energized cables to surface of the ground

II. DESCRIPTION OF THE PROPOSED PROJECT

B. Line Design and Operational Features

4. Describe why the proposed structure type(s) was selected for this line.

Response: For the open trenching segments (approximately 3.7 miles) of the Proposed Route, a concrete-encased duct bank will be installed containing eight 8-inch PVC conduits. Six conduits will contain power cables, leaving two conduits as spares. The concrete-encased duct bank will provide mechanical protection for installing underground facilities adjacent to the duct bank. The spare conduits will provide a path for a replacement cable to be installed, expediting restoration of the circuit after a cable failure. See Attachment II.A.3.a for the typical configuration of the proposed 230 kV XLPE cable system using open trenching, and Section II.A.3.a of the Appendix for a general discussion of the open trenching method.

In the one area where open trenching cannot be achieved along the Proposed Route, the conduits for the cables will be installed by HDD (approximately 0.6 mile). Each drill segment, which will consist of two parallel drill paths, will contain a total of eight 10-inch HDPE conduits – six for power cables and two for spares. The spare conduit in each of the two parallel drill paths will provide a path for a replacement cable to be installed, expediting restoration of the circuit after a cable failure. See Attachment II.A.3.b for the typical configuration of the proposed 230 kV XLPE cable system using HDD, and Section II.A.3.a of the Appendix for a general discussion of the HDD method.

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.

Response: This Project will require the rebuild of the existing Tysons Substation, station work at Idylwood Substation, and relay work at Reston Substation, as described below.

Idylwood Substation

At the Idylwood Substation, new 230 kV GIL terminal equipment will be installed to create a terminal point for the new Line #2175 installation. Specifically, underground Line #2175 will originate from new 230 kV GIL terminal equipment at Idylwood Substation at the northwest corner of the substation. Beginning at Idylwood Substation, this Line #2175 will exit the northwest corner of the substation, route under the existing Shreve Road, and continue in the existing right-of-way outside of Idylwood Substation toward Tysons Substation.

Minor work will be required to install a protective line relay panel at the existing Idylwood Substation.

The one-line diagram for Idylwood Substation is provided as Attachment II.C.1.

Tysons Substation

The underground Line #2175 will terminate into new 230 kV GIS terminal equipment at Tysons Substation at the northern corner of the substation. As Line #2175 approaches Tysons Substation from Idylwood Substation, it will travel west along Tyco Road, then enter Tysons Substation at the southeast corner and continue north parallel to the existing fence line then turn west until it reaches the northwest corner of the station, where it will terminate as described.

The current Tysons Substation layout consists of two 230 kV transmission lines (Lines #2108 and #2010) terminating into a straight bus which feeds four distribution transformers. This layout will require a modification to the current design to accept a third 230 kV line into the station, which will necessitate a 230 kV ring bus configuration.

Tysons Substation will be constructed with six 230 kV, 3000A GIS circuit breakers in a ring bus configuration, three 230 kV line terminals, one position

within the ring bus to accommodate a 230 kV variable shunt reactor and two terminals to accommodate the four existing distribution transformers. A total of four single circuit backbones will be installed, two to terminate the existing Lines #2010 and #2108 into the new ring bus and two to accommodate the installation of the new 230 kV shunt reactor within the existing property line.

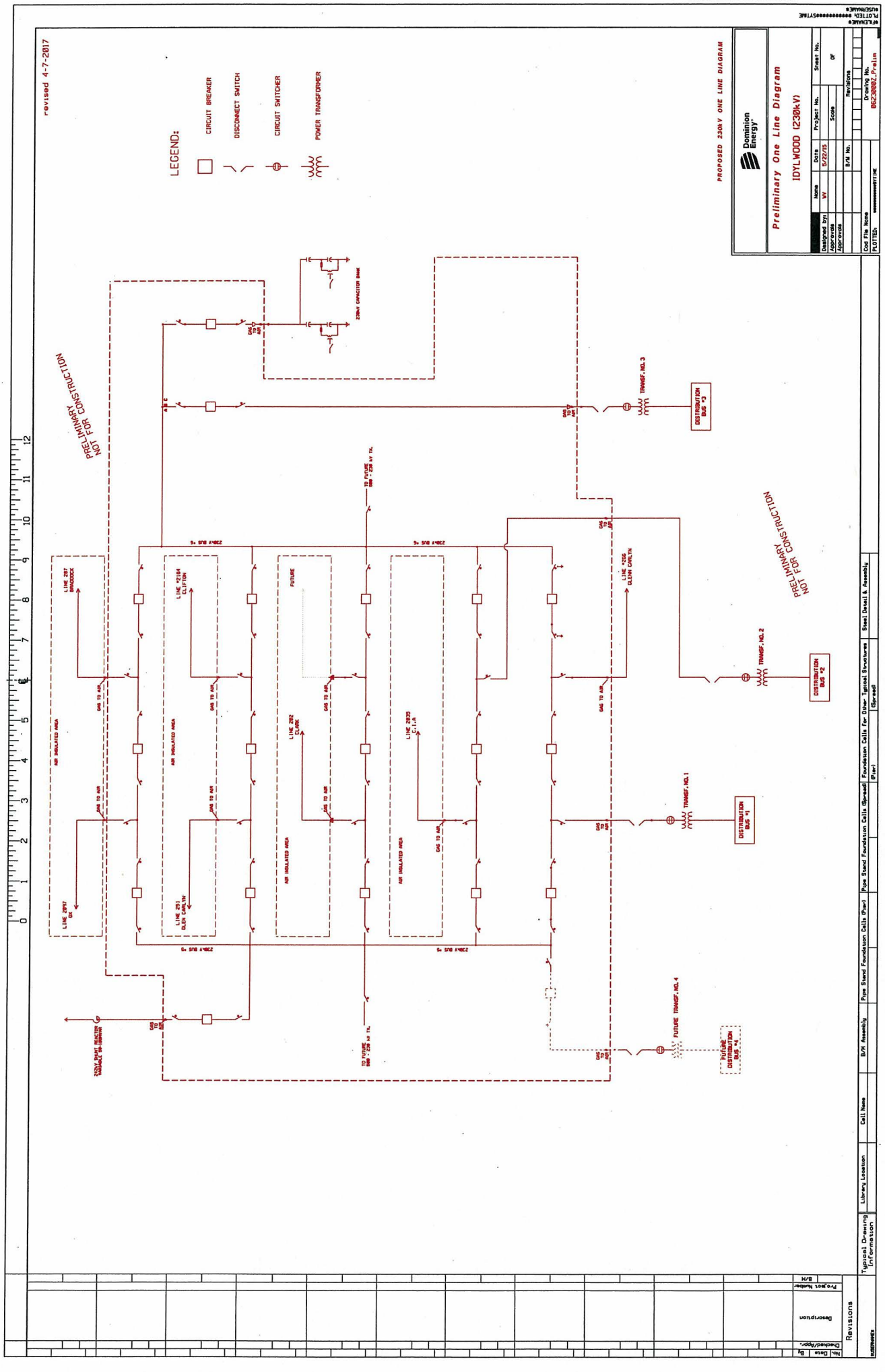
Additionally, a new control enclosure will be installed at Tysons Substation to accommodate the communications and protective relays cabinets for the new equipment. This installation will require a fence expansion within the existing property line to accommodate the installation of the new control enclosure.

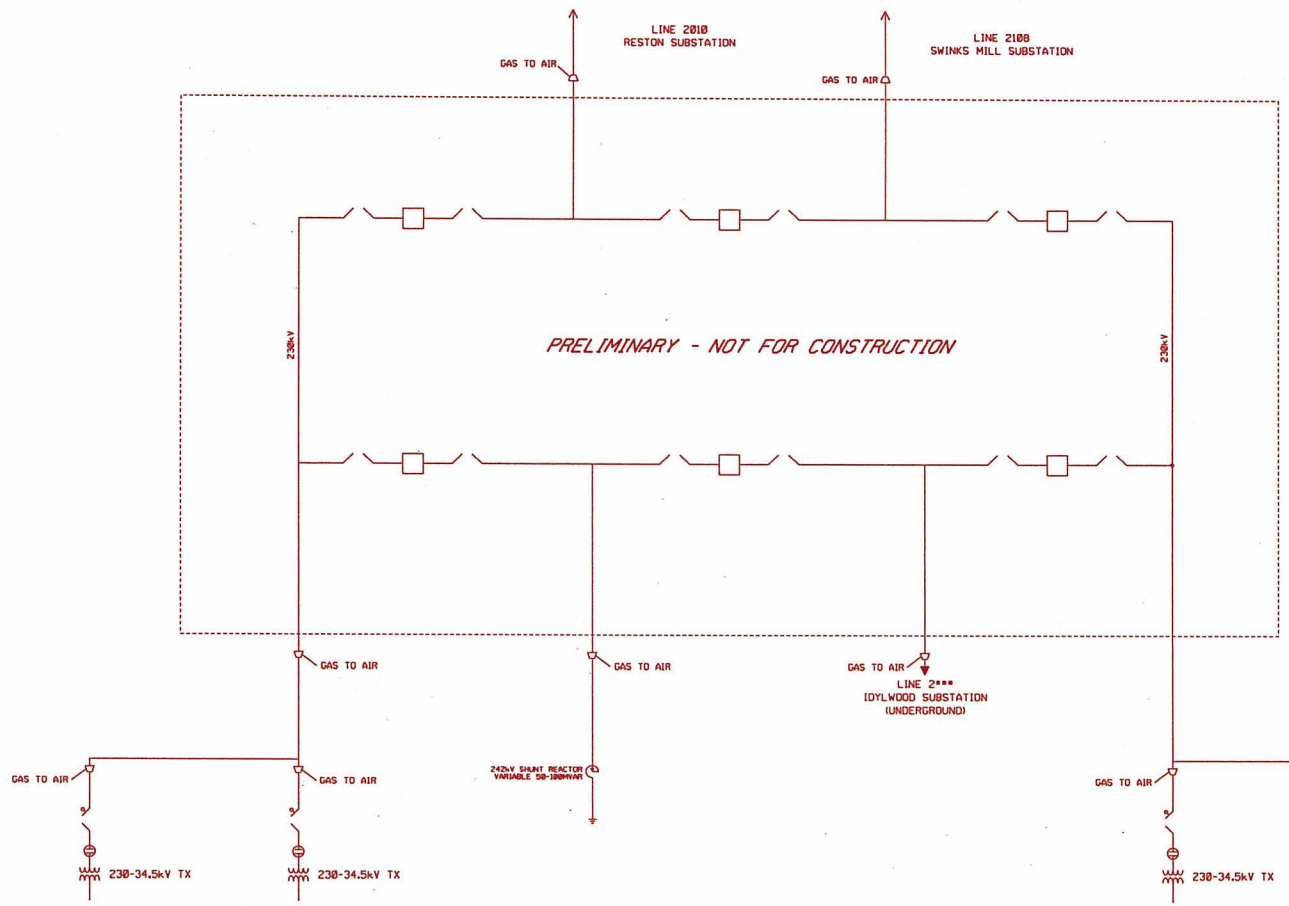
Temporary overhead lines and substation equipment installations will also be required at Tysons Substation. Temporary overhead measures will be used to mitigate reliability concerns associated with long duration outages of the existing transmission line facilities during construction. This work will consist of two permanent transmission line structures outside of the substation, two temporary spans of substation strain bus and protective shield wire, two temporary transmission line structures inside of the substation and one temporary backbone structure inside of the substation. The associated temporary substation equipment will include one 230 kV tie circuit breaker, associated breaker disconnects as well as two wave traps, six coupling capacitor voltage transformers ("CCVTs") and six line terminal arresters. All temporary substation equipment, overhead line structures, conductor and shield wire will be removed at the conclusion of the project.

The one-line diagram for Tysons Substation is provided as Attachment II.C.2.

Reston Substation

Minor work will be required to install a protective line relay panel at the existing Reston Substation. Such work would not require a reconfiguration of the one-line diagram.


PROPOSED 230kV ONE LINE DIAGRAM
Dominion Energy
Preliminary One Line Diagram
IDYLWOOD (230kV)
LEGEND:
CIRCUIT BREAKER
DISCONNECT SWITCH
CIRCUIT SWITCHER
POWER TRANSFORMER
revised 4-7-2017
PRELIMINARY NOT FOR CONSTRUCTION
PRELIMINARY NOT FOR CONSTRUCTION
TRANSF. NO. 3
TRANSF. NO. 2
TRANSF. NO. 1
FUTURE TRANSF. NO. 4
DISTRIBUTION BUS #3
DISTRIBUTION BUS #2
DISTRIBUTION BUS #1
FUTURE DISTRIBUTION BUS #4
LINE 287 BRADDOCK
LINE 2184 CLIFTON
LINE 253 GLEN CARLYN
LINE 2897
FUTURE
LINE 282 CLARK
LINE 2835 C.I.A.
LINE 2126 GLENN CARLYN
AIR INSULATED AREA
GAS TO AIR
230kV BUS #2
TO FUTURE MAR. #126 kV T/L
230kV CAPACITOR BANK
230kV REACTOR
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
(Pier)
(Spread)
Steel Detail & Assembly
Revisions
No.
Date
By
Description
Project Number
B/M



LEGEND:

- CIRCUIT BREAKER
- DISCONNECT SWITCH
- CIRCUIT SWITCHER
- POWER TRANSFORMER

Attachment II.C.2

Dominion Energy

Construction One Line Diagram

Drawn By	AS	Date	9-11-95
Approval	RJC	Date	11-15-95

Substation TYSONS

Drawing No. 8884000Z

Revisions

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

A. Describe the character of the area which will be traversed by this line, including, land use, wetlands, etc. Provide the number of dwellings within 500 feet of the line for each route considered.

Response: Proposed Route (Underground Alternative 05)

The Proposed Route primarily would be constructed either within the Company's existing transmission line right-of-way or within road rights-of-way. The right-of-way follows the W&OD Park from mile point ("MP") 0.2 to MP 1.0, abutting primarily low to medium-density residential land through Dunn Loring and Idylwood. Between MPs 1.1 and 4.3, the Proposed Route heads north through residential areas south of Tysons before crossing into commercial mixed-use development near the route terminus south of the DTR.

Land cover categories crossed by the Proposed Route are predominantly developed (3.5 miles). Other land uses crossed by the Proposed Route, consist of about 0.5 mile (12%) of open land and 0.3 mile (7%) of forested land.

The Proposed Route is expected to have minimal impacts on recreational, agricultural and forest resources, since it is largely located within existing roadways. The Proposed Route right-of-way would impact about 0.2 acre of wetlands. Development of the route would require the clearing of about 0.7 acre of trees. None of this tree clearing would take place within a VDOT right-of-way. Fairfax County has designated an Agricultural and Forestal District ("AFD"), however no AFDs would be crossed by the Proposed Route. The Proposed Route would not cross any Virginia Scenic Byways or Scenic Rivers. Additionally, the Proposed Route does not cross any private recreation areas.

The Proposed Route has a total of 387 dwellings within 500 feet of the centerline.

Underground Alternative 06

Underground Alternative 06 primarily would be constructed either within the Company's existing transmission line right-of-way or within road rights-of-way. Underground Alternative 06 primarily crosses developed land, following local road rights-of-way. The right-of-way follows the W&OD Park from MP 0.2 to MP 1.0, abutting primarily low-to medium-density residential land through Dunn Loring and Idylwood. Between MPs 1.1 and 4.7, Underground Alternative 06 heads north through residential areas south of Tysons before crossing into commercial mixed-use development near the route terminus south of VA 267.

Land cover categories crossed by Underground Alternative 06 are predominantly developed (3.8 miles). Other land uses crossed by the

alternative consist of about 0.6 mile (13%) of open land and 0.3 mile (6%) of forested land.

Underground Alternative 06 is expected to have minimal impacts on recreational, agricultural and forest resources, since it is largely located within existing roadways. The alternative right-of-way would impact about 0.2 acre of wetlands. Development of the route would require the clearing of about 0.7 acre of trees. None of this tree clearing would take place within a VDOT right-of-way. Fairfax County has designated AFDs, however no AFDs would be crossed by the alternative. Underground Alternative 06 would not cross any Virginia Scenic Byways or Scenic Rivers. Additionally, the alternative does not cross any private recreation areas.

Underground Alternative 06 has a total of 395 dwellings within 500 feet of the centerline.

Underground Alternative 04

Underground Alternative 04 primarily would be constructed either within the Company's existing transmission line right-of-way or within road rights-of-way. Underground Alternative 04 primarily crosses developed land, following local road rights-of-way. The right-of-way follows the W&OD Park from MP 0.2 to MP 1.0, abutting primarily low-to medium-density residential land through Dunn Loring and Idylwood. Between MPs 1.1 and 4.7, Underground Alternative 04 heads north through residential areas south of Tysons before crossing into commercial mixed-use development near the route terminus south of VA 267.

Land cover categories crossed by Underground Alternative 04 are predominantly developed (3.7 miles). Other land uses crossed by the alternative consist of about 0.5 mile (11%) of open land and 0.3 mile (7%) of forested land.

Underground Alternative 04 is expected to have minimal impacts on recreational, agricultural and forestal resources, since it is largely located within existing roadways. The alternative right-of-way would impact about 0.2 acre of wetlands. Development of the route would require the clearing of about 0.7 acre of trees. None of this tree clearing would take place within a VDOT right-of-way. Fairfax County has designated AFDs, however no AFDs would be crossed by the alternative. Underground Alternative 04 would not cross any Virginia Scenic Byways or Scenic Rivers. Additionally, the alternative does not cross any private recreation areas.

Underground Alternative 04 has a total of 427 dwellings within 500 feet of the centerline.

Underground Alternative 01

Underground Alternative 01 primarily would be constructed either within the Company's existing transmission line right-of-way or within road rights-of-way. The right-of-way follows the W&OD Park from MP 0.2 to MP 2.0, abutting primarily low to medium-density residential land through Dunn Loring. Between MPs 2.1 and 4.9, the Underground Alternative 01 heads north through residential areas south of Tysons before crossing into commercial mixed-use development near the route terminus south of VA 267.

Land cover categories crossed by Underground Alternative 01 are predominantly developed (3.0 miles). Other land uses crossed by the alternative consist of about 1.2 mile (24%) of forested land and 0.8 mile (16%) of open land.

Underground Alternative 01 is expected to have minimal impacts on recreational, agricultural and forestal resources, since it is largely located within existing roadways. The alternative right-of-way would impact about 0.2 acre of wetlands. Development of the route would require the clearing of about 2.8 acres of trees. None of this tree clearing would take place within a VDOT right-of-way. Fairfax County has designated AFDs, however no AFDs would be crossed by the alternative. Underground Alternative 01 would not cross any Virginia Scenic Byways or Scenic Rivers. Additionally, the alternative does not cross any private recreation areas.

Underground Alternative 01 has a total of 798 dwellings within 500 feet of the centerline.

Underground Alternative 03

Underground Alternative 03 primarily would be constructed either within the Company's existing transmission line right-of-way or within road rights-of-way. Underground Alternative 03 primarily crosses developed land, following local road rights-of-way abutting primarily low-to medium-density residential land through Idylwood and Dunn Loring. At MP 2.4, Underground Alternative 03 enters the commercial mixed-use developments in Tysons.

Land cover categories crossed by Underground Alternative 03 are predominantly developed (3.4 miles). Other land uses crossed by the alternative consist of about 1.0 mile (22%) of open land and 0.2 mile (4%) of forested land.

Underground Alternative 03 is expected to have minimal impacts on recreational, agricultural and forestal resources, since it is largely located within existing roadways. The alternative right-of-way would impact about 0.2 acre of wetlands. Development of the route would require the clearing of about 1.0 acre of trees. None of this tree clearing would take place within a VDOT right-of-way. Fairfax County has designated AFDs, however no AFDs would be

crossed by the alternative. Underground Alternative 03 would not cross any Virginia Scenic Byways or Scenic Rivers. Additionally, the alternative does not cross any private recreation areas.

Underground Alternative 03 has a total of 496 dwellings within 500 feet of the centerline.

Underground Alternative 02

Underground Alternative 02 primarily would be constructed either within the Company's existing transmission line right-of-way or within road rights-of-way. Underground Alternative 02 primarily crosses developed land. The right-of-way follows local road rights-of-way, abutting primarily low-to medium-density residential land through Dunn Loring. Underground Alternative 02 heads north at MP 2.4 where land use transitions from residential to commercial mixed-use developments in Tysons.

Land cover categories crossed by Underground Alternative 02 are predominantly developed (3.5 miles). Other land uses crossed by the alternative consist of about 1.3 mile (26%) of open land and 0.2 mile (4%) of forested land.

Underground Alternative 02 is expected to have minimal impacts on recreational, agricultural and forestal resources, since it is largely located within existing roadways. The alternative right-of-way would impact about 0.2 acre of wetlands. Development of the route would require the clearing of about 1.5 acres of trees. None of this tree clearing would take place within a VDOT right-of-way. Fairfax County has designated AFDs, however no AFDs would be crossed by the alternative. Underground Alternative 02 would not cross any Virginia Scenic Byways or Scenic Rivers. Additionally, the alternative does not cross any private recreation areas.

Underground Alternative 02 has a total of 843 dwellings within 500 feet of the centerline.

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

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

Response: In accordance with Va. Code § 15.2-2202 E, letters dated October 12, 2017, included as Attachment III.B.1, were delivered to Supervisor John Foust representing the Dranesville District of the Fairfax County Board of Supervisors, Supervisor Cathy Hudgins representing the Hunter Mill District, and Supervisor Linda Smyth representing the Providence District, advising of the Company's intention to file this application and inviting the county to consult with the Company about the Project.

The Company also submitted information requests to a variety of state and federal environmental agencies concerning the Project by letters dated October 17, 2017 and October 20, 2017. See Attachment III.B.2.

In the spring of 2014, the project team contacted Fairfax County Department of Transportation ("FCDOT"), VDOT, and MWAA to discuss the need for a new electric transmission line and facility in the area to resolve forecasted load issues in the Tysons and McLean areas of Fairfax County.

Following these initial meetings, representatives from the Company met with Fairfax County Board of Supervisors in the potentially impacted areas, including Supervisor Linda Smyth, Supervisor John Foust, and Supervisor Catherine Hudgins. A general overview of the proposed Project was also given to Chair of the Board, Sharon Bulova, Supervisor at-Large.

Additional meetings have been held with VDOT, FCDOT, and MWAA to provide project updates and obtain feedback on the different route options. The Company also met with the following agencies:

- George Washington National Parkway staff
- Fairfax County Planning Staff
- Fairfax County Park Authority
- NOVA Parks (maintain the W&OD Park)
- Washington Metropolitan Area Transit Authority (or, WMATA)

As the Project continued to develop, the Company launched a three-part Energy Infrastructure Focus Group ("Focus Group") series of facilitated, small group meetings of stakeholders with technical expertise and knowledge of local concerns and plans for development.

The purpose of the Focus Group was to get participants to provide community perspectives and technical input on opportunities, constraints and local issues related to the proposed Idylwood to Tysons 230 kV Reliability Project. These half-day meetings were held July 27, 2017, August 24, 2017, and October 5, 2017 in Fairfax. Per request of the Focus Group participants, the Company provided the opportunity for a tour of the potential routes, which was held on September 13, 2017.

The Company consulted with community leaders, environmental groups, business groups and others to identify participants who represent a cross-section of public and private interests and who would bring unique, diverse and varying perspectives to the process. Area homeowner associations were invited to attend the work sessions as well. The following organizations were represented in the Focus Group:

- Dranesville District Representative
- Dunn Loring Citizens Association
- Fairfax County Department of Transportation
- Fairfax County Park Authority
- Fairfax County Park Authority Board
- Fairfax County Planning & Zoning
- Greater Tysons Green Civic Association
- Home Performance Coalition
- McLean Citizens Association Planning and Zoning Committee
- Northern Virginia Chamber of Commerce
- NOVA Parks
- Tysons Partnership, Inc.
- VDOT Route 6 Planning Task Force Virginia Department of Transportation - NOVA District

The group focused on Project need, the regulatory process, overhead versus underground solutions, and routing and siting, and also participated in an interactive routing constraints and impacts exercise. In addition, Company representatives hosted a half-day bus tour of potential routes being considered as of September 2017.

Company representatives have continued to meet with and periodically update each member of Fairfax County Board of Supervisors in districts potentially affected by the proposed Project.

The Company also hosted two public open house events:

Tuesday, September 26, 2017
Shrevewood Elementary School
7525 Shreve Rd., Falls Church
6 p.m. - 8:30 p.m.

Thursday, September 28, 2017
Kilmer Middle School
8100 Wolftrap Rd., Vienna
6 p.m. - 8:30 p.m.

The Company sent approximately 4,700 Save the Date postcards and separate letters of invitation to owners of surrounding parcels within 300 feet of the center line of all proposed underground routes and within 500 feet of the overhead route still under consideration as of summer/fall 2017. Area homeowner associations, civic groups, and cultural and scenic oriented organizations were also mailed and emailed invitations to the open houses.

Finally, ads for the open houses were placed in the Fairfax Connection (circ. 6,087), McLean Connection (circ. 7,470), Fairfax County Times (circ. 129,980), and Falls Church News Press (circ. 9,900). Approximately 95 community members attended the open houses.

Additional information is provided to the public through a website dedicated to the Project: https://dominionenergy.com/tysons. The project web page includes overview slides, maps, a written explanation of need, notes from each Focus Group meeting, structure renderings and the Commission review process, among other information.

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 12, 2017

Supervisor John Foust
McLean Governmental Center
1437 Balls Hill Road
McLean, VA 22101

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Supervisor Foust,

As you are aware, Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

Dominion Energy has been researching overhead and underground routes as required by the Virginia State Corporation Commission (SCC). Currently, the company is reviewing six underground routes and one overhead route in greater detail. At present, the company is considering an underground option as the proposed solution. The final decision on the route, however, ultimately will be determined by the SCC.

Dominion Energy intends to file an application for a Certificate of Public Convenience and Necessity with the SCC in the fourth quarter of this year. In accordance with Section 15.2-2202 of the Code of Virginia, Dominion Energy respectfully requests that you submit any comments or additional information you feel would have bearing on the proposed project. Enclosed is an overview map of the routes currently under review. Please do not hesitate to contact me with any questions at (804) 771-6145, or Tim Sargeant (571) 203-5003. Dominion Energy appreciates your assistance with this project review and looks forward to any additional information you may have to provide.

Sincerely,

Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 12, 2017

Supervisor Cathy Hudgins
Hunter Mill District
1801 Cameron Glen Drive
Reston, VA 20190

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Supervisor Hudgins,

As you are aware, Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

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Sincerely,

Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 12, 2017

Supervisor Linda Smyth
Providence Community Center
3001 Vaden Drive
Fairfax, VA 22031

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Supervisor Smyth,

As you are aware, Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

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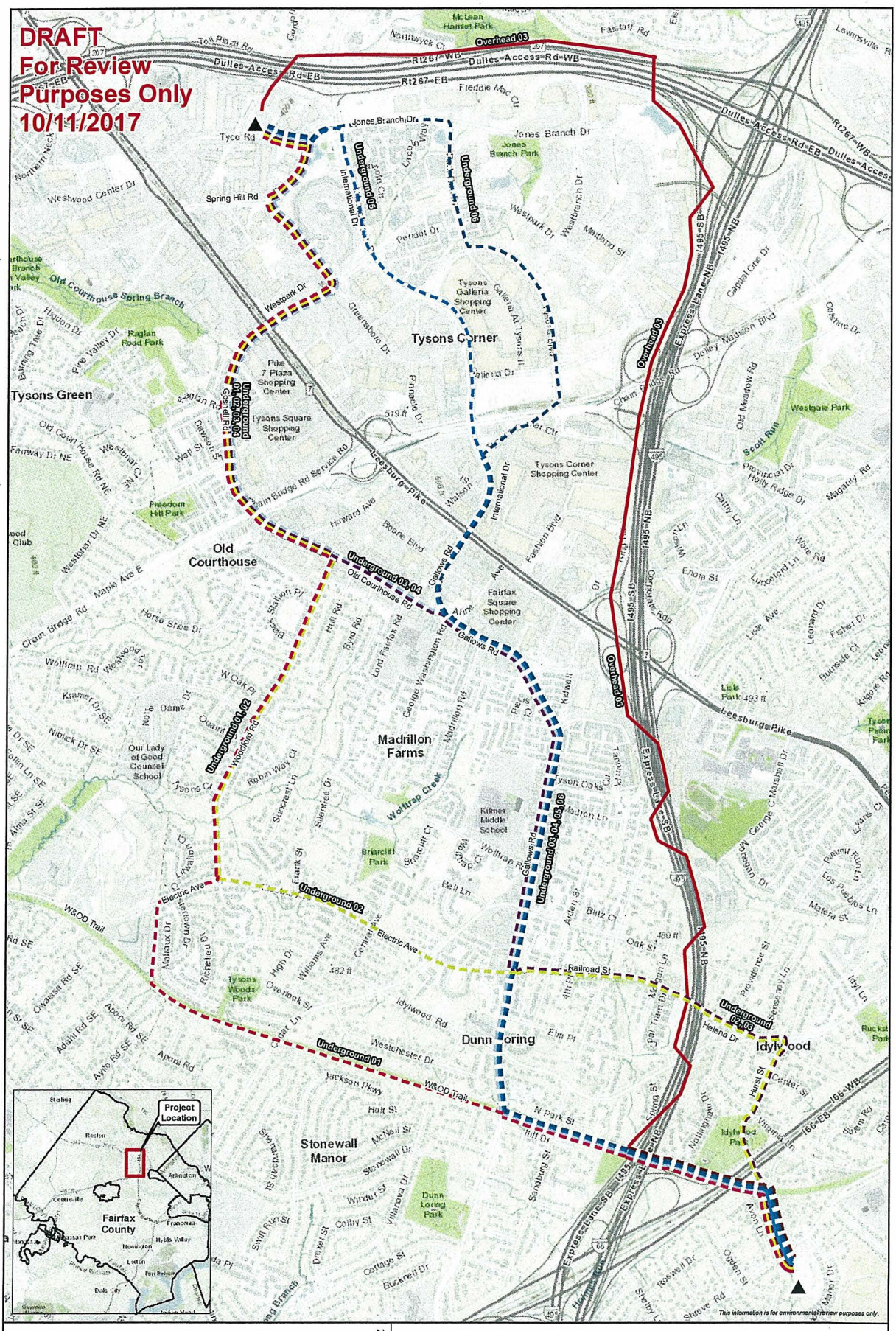
DRAFT
For Review
Purposes Only
10/11/2017
Overhead 03
Underground 01
Underground 02
Underground 03
Underground 04
Underground 05
Underground 06
Underground 03-04
Underground 03-04-05
Underground 03-05
Tyco Rd
Jones Branch Dr
Spring Hill Rd
Westwood Center Dr
Old Courthouse Spring Branch
Tysons Green
Tysons Corner
Tysons Galleria Shopping Center
Pike 7 Plaza Shopping Center
Tysons Square Shopping Center
Tysons Corner Shopping Center
Fairfax Square Shopping Center
Old Courthouse
Madrillon Farms
Stonewall Manor
Dunn Loring
Idylwood
Leesburg Pike
Chain Bridge Rd
Gallows Rd
Electric Ave
Railroad St
Idylwood Rd
Dulles Access Rd EB
Dulles Access Rd WB
I-495 SB
I-495 NB
I-66 EB
I-66 WB
W&OD Trail
Wolftrap Creek
Project Location
Fairfax County
Existing Substation
Overhead 03
Underground 01
Underground 02
Underground 03
Underground 04
Underground 05
Underground 06
1:15,600
0 650 1,300 Feet
ERM
Detailed Route Overview Map
Idylwood to Tysons Project
Fairfax County, Virginia
Dominion Energy
This information is for environmental review purposes only.
FILE: M:\Clients\D-F\DOM\dylwood_ArcGIS\2017\09\Open_House_DOM_IDYL_Overview_11x17_v20171011.mxd | REVISED: 10/11/2017 | SCALE: 1:15,600 when printed at 11x17
DRAWN BY: 0239

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 17, 2017

Ms. Theresita Crockett-Augustine
U.S. Army Corps of Engineers- Norfolk District
Northern Virginia Field Office
18139 Triangle Plaza, Suite 213
Dumfries, VA 22026

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Ms. Crockett-Augustine,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

Dominion Energy has been researching overhead and underground routes as required by the Virginia State Corporation Commission (SCC). Currently, the company is reviewing six underground routes and one overhead route in greater detail. At present, the company is considering an underground option as the proposed solution. The final decision on the route, however, ultimately will be determined by the SCC.

Dominion Energy intends to file an application for a Certificate of Public Convenience and Necessity with the SCC in the fourth quarter of this year. In advance of the SCC filing, Dominion Energy respectfully requests that you submit any comments or additional information you feel would have bearing on the proposed project. Enclosed is an overview map of the routes currently under review. If you would like to receive a GIS shapefile of the proposed routes or if you have any questions please contact me at (804) 771-6145 or amanda.m.mayhew@dominionenergy.com. Dominion Energy appreciates your assistance with this project review and looks forward to any additional information you may have to provide.

Sincerely,

Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 17, 2017

Mr. Troy Anderson
U.S. Fish and Wildlife Services
Ecological Services Virginia Field Offices
6669 Short Lane Gloucester, VA 23061

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Mr. Anderson,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

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Sr. Siting and Permitting Specialist

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Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

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October 17, 2017

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

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Mr. Denny,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

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Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 17, 2017

Mr. Roger W. Kirchen, Director
Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Mr. Kirchen,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

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Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

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October 17, 2017

Ms. Amy Ewing, Biologist
Virginia Department of Game and Inland Fisheries
7870 Villa Park Drive, Suite 400
Henrico, VA 23228

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Ms. Ewing,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

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Sincerely,

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Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 20, 2017

Ms. Robbie Rhur
Virginia Department of Conservation and Recreation
Planning Bureau
600 East Main Street, 24th Floor
Richmond, Virginia 23219

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Ms. Rhur,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

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Amanda Mayhew
Sr. Siting and Permitting Specialist

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Dominion Energy®

October 20, 2017

Ms. S. Rene Hypes
Virginia Department of Conservation and Recreation
Division of Natural Heritage- Project Review Coordinator
600 East Main St, 24th Floor
Richmond, VA 23219

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Ms. Hypes,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

Dominion Energy has been researching overhead and underground routes as required by the Virginia State Corporation Commission (SCC). Currently, the company is reviewing six underground routes and one overhead route in greater detail. At present, the company is considering an underground option as the proposed solution. The final decision on the route, however, ultimately will be determined by the SCC.

Dominion Energy intends to file an application for a Certificate of Public Convenience and Necessity with the SCC in the fourth quarter of this year. In advance of the SCC filing, Dominion Energy respectfully requests that you submit any comments or additional information you feel would have bearing on the proposed project. Enclosed is an overview map of the routes currently under review. If you would like to receive a GIS shapefile of the proposed routes or if you have any questions please contact me at (804) 771-6145 or amanda.m.mayhew@dominionenergy .com. Dominion Energy appreciates your assistance with this project review and looks forward to any additional information you may have to provide.

Sincerely,

Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 20, 2017

Mr. Fred Selden, Director
Herrity Building
12055 Government Center Parkway
Suite 730
Fairfax, VA 22035

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Mr. Selden,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

Dominion Energy has been researching overhead and underground routes as required by the Virginia State Corporation Commission (SCC). Currently, the company is reviewing six underground routes and one overhead route in greater detail. At present, the company is considering an underground option as the proposed solution. The final decision on the route, however, ultimately will be determined by the SCC.

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Amanda Mayhew
Sr. Siting and Permitting Specialist

Attachment: Project Overview Map

Dominion Energy Virginia
701 East Cary Street, Richmond, VA 23219
DominionEnergy.com

Dominion Energy®

October 20, 2017

Ms. Martha Little
Virginia Outdoors Foundation
600 East Main Street, Suite 402
Richmond, Virginia 23219

Reference: Dominion Energy Proposed Idylwood to Tysons 230 kV Electric Transmission Line, Fairfax County, Virginia

Dear Ms. Little,

Dominion Energy is proposing to build a new 230 kV electric transmission line to connect its Idylwood Substation, located off Shreve Road, to its Tysons Substation, located off Tyco Road. The project will address future reliability concerns to remain consistent with North American Electric Reliability Corporation Reliability Standards in the Tysons and Mclean areas of Fairfax County.

Dominion Energy has been researching overhead and underground routes as required by the Virginia State Corporation Commission (SCC). Currently, the company is reviewing six underground routes and one overhead route in greater detail. At present, the company is considering an underground option as the proposed solution. The final decision on the route, however, ultimately will be determined by the SCC.

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Sincerely,

Amanda Mayhew
Sr. Siting and Permitting Specialist

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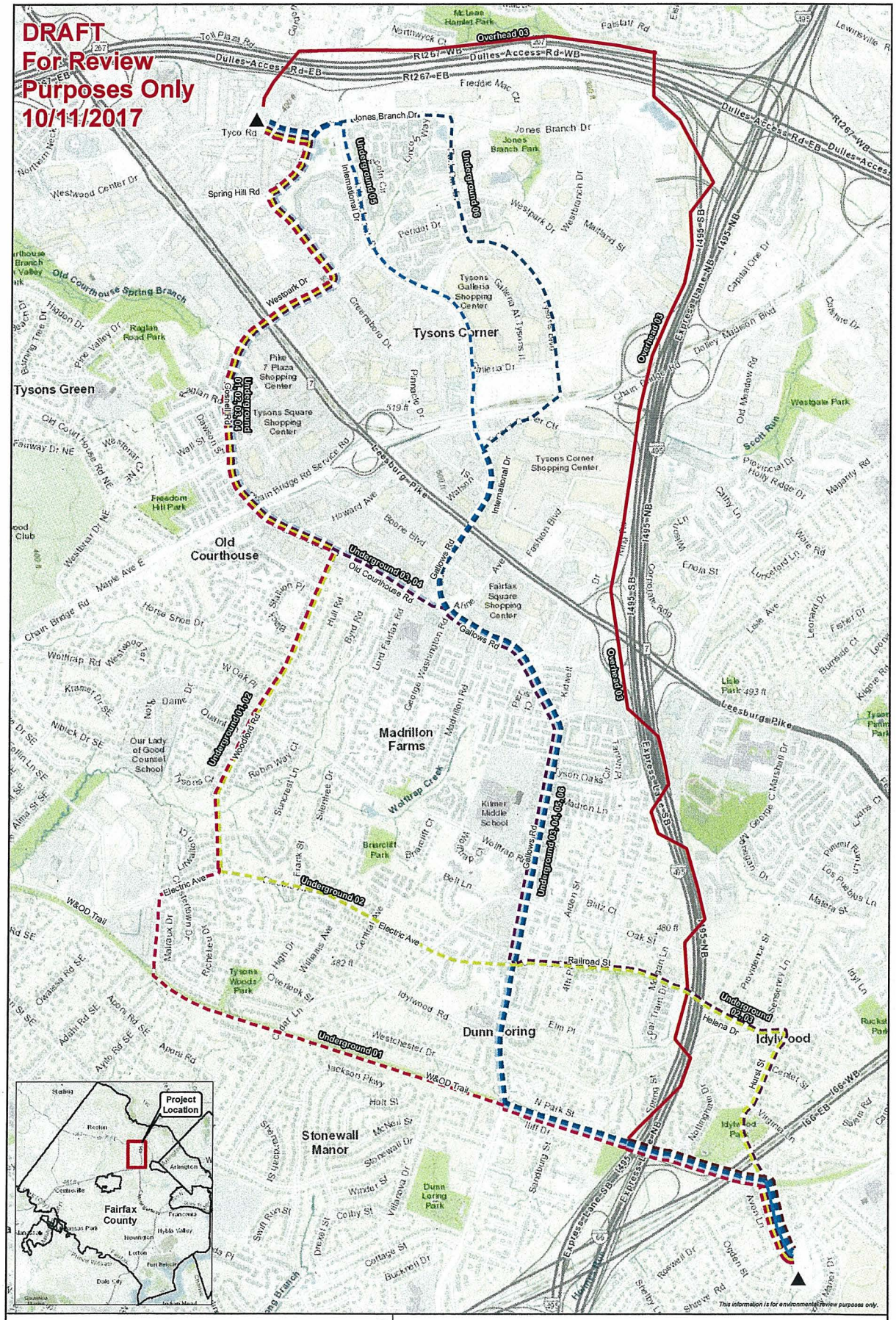

Detailed Route Overview Map
Idylwood to Tysons Project
Fairfax County, Virginia

ERM

Dominion Energy

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

C. Detail the nature, location, and ownership of all buildings which would have to be demolished or relocated if the project is built as proposed.

Response: Proposed Route (Underground Alternative 05)

No buildings would have to be demolished or relocated if the Project is built as proposed.

Underground Alternative 06

One privately-owned industrial/commercial building is located within the right-of-way of Underground Alternative 06 associated with the Tysons Corner Metro Station.

Underground Alternative 04

No buildings would have to be demolished or relocated if Underground Alternative 04 were to be constructed.

Underground Alternative 01

No buildings would have to be demolished or relocated if Underground Alternative 01 were to be constructed.

Underground Alternative 03

One privately-owned outbuilding is located within the right-of-way of Underground Alternative 03 which would either need to be relocated or removed if Underground Alternative 03 were to be constructed.

Underground Alternative 02

One privately-owned outbuilding is located within the right-of-way of Underground Alternative 02 which would either need to be relocated or removed if Underground Alternative 02 were to be constructed.

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

D. What existing physical facilities will the line parallel, if any, such as existing transmission lines, railroad tracks, highways, pipelines, etc.? Describe the current use and physical appearance and characteristics of the existing right-of-way that would be paralleled. How long has the right-of-way been in use?

Response: Proposed Route (Underground Alternative 05)

The Proposed Route would be collocated with various existing transmission lines and road rights-of-way for the entirety of the route's 4.3 miles. The first mile of the route is collocated with the Company's existing Clark-Idylwood 230 kV overhead line that was constructed in 1963 and placed into service in 1964. Within this first mile, the route is collocated with the NOVA Parks' W&OD Park for about 0.8 mile, including about 0.6 mile along the trail within the park. For the remaining 3.3 miles, the route is located within existing roadways including Gallows Road, International Drive, Spring Hill Road, and Tyco Road.

Underground Alternative 06

Underground Alternative 06 would be collocated with various existing transmission lines and road rights-of-way for the entirety of the route's 4.7 miles. The first mile of the route is collocated with the Company's existing Clark-Idylwood 230 kV overhead line that was constructed in 1963 and placed into service in 1964. Within this first mile, the route is collocated with the NOVA Parks' W&OD Park for about 0.8 mile, including about 0.6 mile along the trail within the W&OD Park. For the remaining 3.7 miles, the route is located within existing roadways including Gallows Road, International Drive, Tysons Center Court, Tysons Boulevard, Park Run Drive, Jones Branch Drive, and Tyco Road.

Underground Alternative 04

Underground Alternative 04 would be collocated with various existing transmission lines and road rights-of-way for the entirety of the route's 4.5 miles. The first mile of the route is collocated with the Company's existing Clark-Idylwood 230 kV overhead line that was constructed in 1963 and placed into service in 1964. Within this first mile, the route is collocated with the NOVA Parks' W&OD Park for about 0.8 mile, including about 0.6 mile along the trail within the W&OD Park. For the remaining 3.5 miles, the route is located within existing roadways including Gallows Road, Old Courthouse Road, Gosnell Road, Westpark Drive, Greensboro Drive, Spring Hill Road, and Tyco Road.

Underground Alternative 01

Underground Alternative 01 would be collocated with various existing transmission lines and road rights-of-way for 96 percent (4.8 miles) of the route. The first 2.0 miles of the route is collocated with the Company's existing Clark-Idylwood 230 kV overhead line that was constructed in 1963 and placed into service in 1964. Within this first 2.0 miles, the route is collocated with the NOVA Parks' W&OD Park for about 1.8 miles. After leaving the W&OD Park the route crosses 0.2 mile of non-collocated land. For the remaining 2.8 miles, the route is located within existing roadways including Electric Avenue, Woodford Road, Old Courthouse Road, Gosnell Road, Westpark Drive, Greensboro Drive, Spring Hill Road, and Tyco Road.

Underground Alternative 03

Underground Alternative 03 would be collocated with various existing transmission lines and road rights-of-way for 91 percent (4.2 miles) of the route. The first 0.2 mile of the route is collocated with the Company's existing Clark-Idylwood 230 kV overhead line that was constructed in 1963 and placed into service in 1964. The route is collocated with existing roadways for about 4.0 miles including Hurst Street, Idylwood Road, Helena Drive, Railroad Street, Electric Avenue, Gallows Road, Old Courthouse Road, Gosnell Road, Westpark Drive, Greensboro Drive, Spring Hill Road, and Tyco Road.

Underground Alternative 02

Underground Alternative 02 would be collocated with various existing transmission lines and road rights-of-way for 92 percent (4.6 miles) of the route. The first 0.2 mile of the route is collocated with the Company's existing Clark-Idylwood 230 kV overhead line that was constructed in 1963 and placed into service in 1964. The route is collocated with existing roadways for about 4.4 miles including Hurst Street, Idylwood Road, Helena Drive, Railroad Street, Electric Avenue, Woodford Road, Old Courthouse Road, Gosnell Road, Westpark Drive, Greensboro Drive, Spring Hill Road, and Tyco Road.

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

E. Has the Company investigated land use plans in the areas of the proposed route? How would the building of the proposed line effect future land use of the areas affected?

1. Has the Company determined from the governing bodies of each county, city and town in which the proposed facilities will be located whether those bodies have designated the important farmlands within their jurisdictions, as required by Virginia Code Section 3.2-205B?

2. If so, and if any portion of the proposed facilities will be located on any such important farmland, please:

a. Include maps and other evidence showing the nature and extent of the impact on such farmlands.

b. Describe what alternatives exist to locating the proposed facilities on the affected farmlands, and why those alternatives are not suitable.

c. Describe the applicant's proposals to minimize the impact of the facilities on the affected farmland.

Response: Proposed Route

The Proposed Route would cross land predominantly uncategorized, consisting of road right-of-ways. The Proposed Route would also cross 1.4 miles of land zoned as Residential, 0.2 mile zoned as Commercial, and less than 0.1 mile zoned as Industrial.

The Proposed Route crosses land predominantly zoned as Residential and uncategorized land associated with road rights-of-way. From the tie-in location, the route crosses Residential land for the first 1.0 mile. The route then heads north on Gallows Road and stays within uncategorized road rights-of-way for 1.1 miles. Continuing northwest, the route crosses 0.1 mile of Residential land and stays within road rights-of-way for another 0.7 mile. The route then crosses another 0.2 mile of Commercial land before continuing in road rights-of-way for an additional 0.7 mile. After crossing Westpark Drive, the route continues on Residential land for 0.3 mile before heading west and staying in uncategorized road rights-of-way for another 0.2 mile before heading northwest crossing less than 0.1 mile of Commercial land before ending on a parcel zoned as Industrial.

Based on the present Comprehensive Plans of Fairfax County, the construction of the Proposed Route should have no significant impacts of future land use

along the route and does not cross any planned developments.

Underground Alternative 06

Underground Alternative 06 would cross land predominantly zoned as Uncategorized/ Right-of-way (2.5 miles or 53 percent). The alternative would also cross land zoned as Residential (1.1 miles or 23 percent), Planned units (0.9 mile or 19 percent), Commercial (0.2 mile or 4 percent), and Industrial (less than 0.1 mile or 1 percent).

Underground Alternative 06 crosses land predominantly zoned as Residential and uncategorized land associated with road rights-of-way. From Idylwood Substation, the route crosses Residential land for the first 1.0 mile. The route then heads north on Gallows Road and stays within uncategorized road rights-of-way for 1.1 miles. Continuing northwest, the route crosses 0.1 mile of Residential land and stays within road rights-of-way for another 0.7 mile. The route then crosses another 0.1 mile of Commercial land before turning to the northeast and crossing 0.1 mile of land zoned as Planned Units. The route then crosses 0.1 mile of uncategorized land associated with Chain Bridge Road right-of-way before continuing in a northerly direction across 0.7 mile of Planned Units zoned land. After crossing Westpark Drive, the route continues on Commercial land for 0.1 mile and then within road rights-of-way for another 0.6 mile. The route then heads northwest into Tysons Substation crossing less than 0.1 mile of Commercial land before ending on a parcel zoned as Industrial.

Based on the present Comprehensive Plans of Fairfax County, the construction of Underground Alternative 06 should have no significant impacts of future land use along the route. The alternative crosses two planned developments for a total of about 0.8 mile.

Underground Alternative 04

Underground Alternative 04 would cross land predominantly zoned as Uncategorized/ Right-of-way (3.2 miles or 71 percent). The alternative would also cross land zoned as Residential (1.1 miles or 24 percent), Commercial (0.2 mile or 4 percent), and Industrial (less than 0.1 mile or 1 percent).

Underground Alternative 04 crosses land predominantly zoned as Residential and uncategorized land associated with road rights-of-way. From Idylwood Substation, the route crosses Residential land for the first 1.0 mile. The route then heads north on Gallows Road and stays within uncategorized road rights-of-way for 1.1 miles. Continuing northwest, the route crosses 0.1 mile of Residential land and stays within road rights-of-way for another 1.4 miles. Continuing northeast, the route crosses 0.1 mile of Commercial land, 0.1 mile of uncategorized land associated with Leesburg Pike and Westpark Drive, and another 0.1 mile of Commercial land. The route then turns onto Greensboro Drive and stays within uncategorized road rights-of-way for the next 0.3 mile.

Continuing north, the route crosses about 0.2 mile of uncategorized road rights-of-way before crossing Tyco Road and continuing northwest into the Tysons Substation on less than 0.1 mile of Commercial land before ending on a parcel zoned as Industrial. Underground Alternative 05 crosses land predominantly zoned as Residential and uncategorized land associated with road rights-of-way. From Idylwood Substation, the route crosses Residential land for the first 1.0 mile. The route then heads north on Gallows Road and stays within uncategorized road rights-of-way for 1.1 miles. Continuing northwest, the route crosses 0.1 mile of Residential land and stays within road rights-of-way for another 0.8 mile. The route then crosses another 0.2 mile of Commercial land before continuing in road rights-of-way for an additional 0.7 mile. After crossing Westpark Drive, the route continues on Residential land for 0.3 mile before heading west and staying in uncategorized road rights-of-way for another 0.2 mile. The route then heads northwest into Tysons Substation, crossing less than 0.1 mile of Commercial land before ending on a parcel zoned as Industrial.

Based on the present Comprehensive Plans of Fairfax County, the construction of Underground Alternative 04 should have no significant impacts of future land use along the route and does not cross any planned developments.

Underground Alternative 01

Underground Alternative 01 would cross land predominantly zoned as Residential (2.8 miles or 56 percent). The alternative would also cross land zoned as Uncategorized/ Right-of-way (1.8 miles or 36 percent), Commercial (0.2 mile or 4 percent), and Industrial (0.2 mile or 4 percent).

Underground Alternative 01 crosses land predominantly zoned as Residential and uncategorized land associated with road rights-of-way. From Idylwood Substation, the route crosses Residential land for the first 2.0 miles. The route then heads north off the W&OD Park trail and crosses Industrial land for the next 0.2 mile before continuing east along 0.2 mile of Residential land and 0.1 mile of uncategorized land associated with Electric Avenue. Heading north, the route crosses another 0.6 mile of Residential land before entering uncategorized road rights-of-way for the next 1.0 mile. Continuing northeast, the route crosses 0.1 mile of Commercial land, 0.1 mile of uncategorized land associated with Leesburg Pike and Westpark Drive, and another 0.1 mile of Commercial land. The route then turns onto Greensboro Drive and stays within uncategorized road rights-of-way for the next 0.3 mile. Continuing north, the route crosses about 0.2 mile of uncategorized road rights-of-way before crossing Tyco Road and continuing west into the Tysons Substation on less than 0.1 mile of Commercial land before ending on a parcel zoned as Industrial.

Based on the present Comprehensive Plans of Fairfax County, the construction of Underground Alternative 01 should have no significant impacts of future land use along the route and does not cross any planned developments.

Underground Alternative 03

Underground Alternative 03 would cross land predominantly zoned as Uncategorized/ Right-of-way (3.0 miles or 65 percent). The alternative would also cross land zoned as Residential (1.4 miles or 30 percent), Commercial (0.2 mile or 4 percent), and Industrial (less than 0.1 mile or 1 percent).

Underground Alternative 03 crosses land predominantly zoned as Residential and uncategorized land associated with road rights-of-way. From Idylwood Substation, the route crosses Residential land for the first 0.7 mile. The route then crosses Idylwood Road for 0.1 mile of uncategorized road right-of-way and continues on Residential land for another 0.2 mile. The route then crosses uncategorized I-495 road right-of-way for 0.1 mile. Heading west, the route continues on Residential land for another 0.5 mile. The route then heads north onto Gallows Road staying within uncategorized road rights-of-way for about 0.7 mile. Continuing northwest, the route crosses 0.1 mile of Residential land and stays within road rights-of-way for another 1.4 miles. Continuing northeast, the route crosses 0.1 mile of Commercial land, 0.1 mile of uncategorized land associated with Leesburg Pike and Westpark Drive, and another 0.1 mile of Commercial land. The route then turns onto Greensboro Drive and stays within uncategorized road rights-of-way for the next 0.3 mile. Continuing north, the route crosses about 0.2 mile of uncategorized road rights-of-way before crossing Tyco Road and continuing northwest into the Tysons Substation on less than 0.1 mile of Commercial land before ending on a parcel zoned as Industrial.

Based on the present Comprehensive Plans of Fairfax County, the construction of Underground Alternative 03 should have no significant impacts of future land use along the route and does not cross any planned developments.

Underground Alternative 02

Underground Alternative 02 would cross land predominantly zoned as Uncategorized/ Right-of-way (2.8 miles or 55 percent). The alternative would also cross land zoned as Residential (2 miles or 40 percent), Commercial (0.2 mile or 4 percent), and Industrial (less than 0.1 mile or 1 percent).

Underground Alternative 02 crosses land predominantly zoned as Residential and uncategorized land associated with road rights-of-way. From Idylwood Substation, the route crosses Residential land for the first 0.7 mile. The route then crosses Idylwood Road for 0.1 mile of uncategorized road right-of-way and continues on Residential land for another 0.2 mile. The route then crosses uncategorized I-495 road right-of-way for 0.1 mile and continues west on Residential land for another 0.5 mile. The route then crosses Gallows Road and follows uncategorized road rights-of-way for 0.9 mile. Heading north, the route crosses another 0.6 mile of Residential land before entering uncategorized road rights-of-way for the next 1.0 mile. Continuing northeast, the route crosses 0.1

mile of Commercial land, 0.1 mile of uncategorized land associated with Leesburg Pike and Westpark Drive, and another 0.1 mile of Commercial land. The route then turns onto Greensboro Drive and stays within uncategorized road rights-of-way for the next 0.3 mile. Continuing north, the route crosses about 0.2 mile of uncategorized road rights-of-way before crossing Tyco Road and continuing northwest into the Tysons Substation on less than 0.1 mile of Commercial land before ending on a parcel zoned as Industrial.

Based on the present Comprehensive Plans of Fairfax County, the construction of Underground Alternative 02 should have no significant impacts of future land use along the route and does not cross any planned developments.

1. Fairfax County has designated important farmland within their jurisdiction through the implementation of AFDs. The Virginia Agricultural and Forestal Districts Act provides for the creation of conservation districts. These districts are designed to conserve, protect, and encourage the development and improvement of a locality's agricultural and forested lands for the production of food and other products, while also conserving and protecting land as valued natural and ecological resources. These districts are voluntary agreements between landowners and the locality, and offer benefits to landowners when they agree to keep their land in its current use for between four and 10 years. AFDs are established under the guidelines set forth by the Code of Virginia, § 15.2-4300; a district must contain at least 200 acres. Conservation efforts, such as AFDs, are informed by the soils surveys and classifications under the Virginia Agricultural Model, which is used to determine the agricultural value of lands crossed by the proposed routes. The Virginia Agricultural Model was developed to quantify the relative suitability of lands for agricultural activity across the state and is assessed primarily based on inherent soil suitability, but also accounts for current land cover as well as travel time between agricultural producers and consumers. The model ranks land into five classes based on the suitability determination (Class I being low suitability and Class V being high suitability).

   No AFDs would be crossed by the Proposed Route or any of the alternatives. The Proposed Route and all the alternatives are located entirely within land classified as low suitability within the Virginia Agricultural Model. Additionally, less than 0.1 mile of land classified as prime farmland by the U.S. Department of Agriculture Natural Resources Conservation Service would be crossed by the Proposed Route. This land is not being used for agricultural purposes, therefore no impacts to important farmlands would occur from construction of the Proposed Route. Underground Alternatives 01, 02, 03, 04, and 06 cross 0.4 mile, 02 mile, 02 mile, 0.1 mile, and less than 0.1 mile, respectively, of land classified as prime farmland. This land is not being used for agricultural purposes, therefore no impacts to important farmlands would occur from the construction of any of the alternatives.

2. a. Not Applicable

b. Not Applicable

c. Not Applicable

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

F. Identify the following that lie within or adjacent to the proposed right-of-way:

1. Any district, site, building, structure, or other object included in the National Register of Historic Places maintained by the U.S. Secretary of the Interior;

2. Any historic landmark, site, building, structure, district or object included in the Virginia Landmarks Register maintained by the Virginia Board of Historic Resources;

3. Any historic district designated by the governing body of any city or county;

4. Any state archaeological site or zone designated by the Director of the Virginia Department of Historic Resources, or his predecessor, and any site designated by a local archaeological commission, or similar body;

5. Any underwater historic property designated by the Virginia Department of Historic Resources, or predecessor agency or board;

6. Any National Natural Landmark designated by the U.S. Secretary of the Interior;

7. Any area or feature included in the Virginia Registry of Natural Areas maintained by the Virginia Department of Conservation and Recreation;

8. Any area accepted by the Director of the Virginia Department of Conservation and Recreation for the Virginia Natural Area Preserves System;

9. Any conservation easement qualifying under Sections 10.1-1009 to -1016 of the Code of Virginia, or prior provision of law;

10. Any state scenic river;

11. Any federal state, or local park, forest, game or wildlife preserve, recreational area, or similar facility; Features, sites, and the like listed in 1 through 10 above need not be identified again.

Response: 1. There are no NRHP-listed resources in the right-of-way of or adjacent to the Proposed Route or any of the Underground Alternatives.

2. There are no Virginia Landmarks Register properties in the right-of-way of or adjacent to the Proposed Route or any of the Underground Alternatives.

3. While there is one proposed historic district determined eligible for the NRHP by the Virginia Department of Historic Resources ("DHR") that is intersected by the Proposed Route and all the Underground Alternatives, there are no locally designated historic districts crossed. The district intersected by the Proposed Route is the W&OD Railroad Historic District, currently maintained as W&OD Park (053-0276).

4. There are no archaeological sites in the right-of-way of the Proposed Route.

   There is one site in the right-of-way of Underground Alternative 01: 44FX0043, the eighteenth-century Fairfax County Courthouse site, which also has multiple prehistoric components. In the right-of-way of Underground Alternative 02, there is 44FX0043, as well as 44FX0045, a site with historic-period components dating to the eighteenth through twentieth centuries. In the right-of-way of Underground Alternative 03, in addition to 44FX0043 and 44FX0043, there is 44FX2364, the remains of an early twentieth century streetcar line. Underground Alternative 04 has 44FX0043 reported in its right-of-way while Underground Alternative 06 has 44FX0540, a prehistoric site, within its right-of-way.

5. There are no underwater historic properties designated by the Virginia DHR crossed or adjacent to the Proposed Route or any of the Underground Alternatives.

6. There are no National Natural Landmarks crossed by or in the vicinity of the Proposed Route or any of the Underground Alternatives.

7. There are no Virginia Registry of Natural Areas crossed by or in the vicinity of the Proposed Route or any of the Underground Alternatives.

8. There are no areas accepted by the Director of the Virginia Department of Conservation and Recreation for the Virginia Natural Area Preserve System crossed by the Proposed Route or any of the Underground Alternatives.

9. Neither the Proposed Route nor any of the Underground Alternatives would cross any conservation easements qualifying under Sections 10.1-1009 to 1016 of the Code of Virginia.

10. There are no state scenic rivers crossed by or in the vicinity of the Proposed Route or any of the Underground Alternatives.

11. Proposed Route (Underground 05)

The Proposed Route crosses and is collocated with the Washington and Old Dominion Railroad Regional Park and W&OD Park trail for about 0.8 mile. The W&OD Park is located along the former roadbed of the Washington & Old Dominion Railroad. The park runs 45 miles from Shirlington to Purcellville. This is a paved trail designed for walking, hiking, and biking, but it is also lined with playgrounds that are open to the public. A gravel equestrian trail runs adjacent to the paved trail for about 32 miles. The Proposed Route is located within the park boundary from MPs 0.2 to 1.0. The trail would be crossed using the HDD crossing method and no closures are anticipated to the trail during construction. The Proposed Route crosses the Great Falls Loop of the Virginia Birding and Wildlife Trail (I-495); however, since the line would be installed underground, no impacts to the trail would occur. No other recreational areas are crossed by the Proposed Route.

Underground Alternative 06

Underground Alternative 06 is also located within the Old Dominion Railroad Regional Park boundary from MPs 0.2 to 1.0. As discussed above for the Proposed Route, the first portion of the trail would be crossed using the HDD crossing method and no closures are anticipated to the trail during construction. The alternative crosses the Great Falls Loop of the Virginia Birding and Wildlife Trail (I-495); however, since the line would be installed underground, no impacts to the trail would occur. No other recreational areas are crossed by Underground Alternative 06.

Underground Alternative 04

Underground Alternative 04 is also located within the Old Dominion Railroad Regional Park boundary from MPs 0.2 to 1.0. As discussed above for the Proposed Route, the first portion of the trail would be crossed using the HDD crossing method and no closures are anticipated to the trail during construction. The alternative crosses the Great Falls Loop of the Virginia Birding and Wildlife Trail (I-495); however, since the line would be installed underground, no impacts to the trail would occur. No other recreational areas are crossed by Underground Alternative 04.

Underground Alternative 01

Underground Alternative 01 is also located within the Old Dominion Railroad Regional Park and W&OD Park trail for about 1.8 miles. As discussed above for the Proposed Route, the first portion of the trail would be crossed using the HDD crossing method. The additional 1.1-

mile stretch would be crossed using traditional trenching construction methods and it is anticipated that this stretch of the trail would need to be temporarily closed and re-routed during construction. No permanent impacts to the park or trail are anticipated from the construction of this alternative. The alternative crosses the Great Falls Loop of the Virginia Birding and Wildlife Trail (I-495); however, since the line would be installed underground, no impacts to the trail would occur.

Underground Alternative 03

Underground Alternative 03 crosses the W&OD Park but would not be located within the trail and no impacts are anticipated. The alternative also crosses Idylwood Park along the eastern portion of the park within the soccer field. The majority of the park crossing would be completing using the HDD crossing construction method to minimize impacts to recreational users. Two additional temporary workspaces ("ATWS") would be required to complete this crossing, one of which would be located within the parking lot of Idylwood Park. South Railroad Street Park is located adjacent to one of the ATWS required for the HDD crossing of Railroad Street. It is anticipated that temporary closures to portions of these parks may be required during construction. Additional temporary impacts to recreational users would include noise and dust from construction. No permanent impacts to the park are anticipated.

An ATWS for another HDD crossing for Underground Alternative 03 is located within the South Railroad Street Park. It is anticipated that temporary closures to portions of the park may be required during construction. Additional temporary impacts to recreational users would include noise and dust from construction. No permanent impacts to the park are anticipated.

The alternative crosses the Great Falls Loop of the Virginia Birding and Wildlife Trail (I-495); however, since the line would be installed underground, no impacts to the trail would occur.

Underground Alternative 02

Underground Alternative 02 crosses the W&OD Park but would not be located within the trail and no impacts are anticipated. The alternative also crosses Idylwood Park along the eastern portion of the park within the soccer field. The majority of the park crossing would be completing using the HDD crossing construction method to minimize impacts to recreational users. Two ATWS would be required to complete this crossing, one of which would be located within the parking lot of Idylwood Park. South Railroad Street Park is located adjacent to one of the ATWS required for the HDD crossing of Railroad Street. It is anticipated that temporary closures to portions of these parks may be

required during construction. Additional temporary impacts to recreational users would include noise and dust from construction. No permanent impacts to the park are anticipated.

An ATWS for another HDD crossing for Underground Alternative 02 is located within the South Railroad Street Park. It is anticipated that temporary closures to portions of the park may be required during construction. Additional temporary impacts to recreational users would include noise and dust from construction. No permanent impacts to the park are anticipated.

The alternative crosses the Great Falls Loop of the Virginia Birding and Wildlife Trail (I-495); however, since the line would be installed underground, no impacts to the trail would occur.

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

G. List any airports where the proposed route would place a structure or conductor within the glide path of the airport. Advise of contacts and results of contacts made with appropriate officials regarding the effect on the airport's operations.

Response: The Federal Aviation Administration ("FAA") is responsible for overseeing air transportation in the United States. The FAA manages air traffic in the United States and evaluates physical objects that may affect the safety of aeronautical operations through an obstruction evaluation. The prime objective of the FAA in conducting an obstruction evaluation is to ensure the safety of air navigation and the efficient utilization of navigable airspace by aircraft. The nearest heliport is the private Pentagon Army Heliport located about 7.2 miles from the Proposed Route. The nearest public airport is the Ronald Reagan Washington National Airport located about 8.6 miles from the Proposed Route. Since the Proposed Route and all of the alternatives are underground, they would not have any impacts on aviation.

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

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

Response: Neither the Proposed Route nor any of the Underground Alternatives cross any scenic byways. The nearest scenic byway is the Old Georgetown Pike (SR 193) about 2.0 miles north of the Proposed Route.

IV. HEALTH ASPECTS OF EMF

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

Response: In an underground cable, the electric field is contained entirely within the cable insulation. Therefore, there is no electric field at any point external to the cables.

The calculated peak magnetic field strength for the proposed underground facilities operating at maximum loading capability (i.e., 950 MVA) is 81.00 milligauss (mG), at one meter above ground, directly above the duct bank. This calculation is based on those segments of the underground line installed through means of open trenching at a depth of approximately 3.0 feet from the top of the duct bank to the surface of the ground. The HDD segments of the underground line will be installed at greater depths, ranging from 5-50 feet from the top of the borehole to the surface of the ground. The increased burial depth in these segments will result in a lower magnetic field strength in the HDD and liner plate tunnel portions of this line.

IV. HEALTH ASPECTS OF EMF

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

Response: The foundation of the Company's opinion is the conclusions of expert panels formed by national and international scientific agencies; each of these panels has evaluated the scientific research related to health and power-frequency EMF and provided conclusions that form the basis of guidance to governments and industries. The Company regularly monitors the recommendations of these expert panels to guide their approach to EMF.

Major reviews on this topic, in order of their most recent publication, include those published by the European Health Risk Assessment Network on Electromagnetic Fields Exposure (EFHRAN),[17] the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), the World Health Organization (WHO), and the International Committee on Electromagnetic Safety (ICES) (EFHRAN, 2010; ICNIRP, 2003, 2010; SCENIHR 2007, 2009; WHO, 2007; ICES, 2002).

Research on this topic varies widely in its approach. Some studies evaluate the effects of high EMF exposures not typically found in day-to-day life, while others evaluate the effects of common EMF exposures. The studies evaluate long-term effects (e.g., cancer, neurodegenerative diseases, and reproductive effects) and short-term biological responses. This research includes hundreds of epidemiology studies of people in their natural environment and laboratory studies of animals (*in vivo*) and isolated cells and tissues (*in vitro*). Standard scientific procedures are used by the expert panels to identify, review, and summarize this large and diverse research area.

The general scientific consensus of the health agencies reviewing this research is that at levels associated with the operation of the proposed transmission lines, or other common sources of EMF in the environment, the research does not support the conclusion that EMF causes any long-term, adverse health effects.

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

[17] EFHRAN is funded by the European Commission's Executive Agency for Health and Consumers.

IV. HEALTH ASPECTS OF EMF

C. Describe any research studies the Company is aware of that meet the following criteria:

1. Became available for consideration since the completion of the Virginia Department of Health's most recent review of studies on EMF and its subsequent report to the Virginia General Assembly in compliance with 1985 Senate Joint Resolution No. 126;

2. Include findings regarding EMF that have not previously been reported and/or provide substantial additional insight into previous findings; and

3. Have been subjected to peer review.

Response: The Virginia Department of Health (VDH) conducted its most recent review and issued its report on the scientific evidence on potential health effects of extremely low frequency (ELF) electric and magnetic fields (EMF) in 2000. They concluded that "... *the Virginia Department of Health is of the opinion that there is no conclusive and convincing evidence that exposure to extremely low frequency EMF emanated from nearby high voltage transmission lines is causally associated with an increased incidence of cancer or other detrimental health effects in humans.*"[18]

The continuing scientific research on EMF exposure and health has resulted in a number of peer-reviewed publications since 2000. The accumulating research results have been regularly and repeatedly reviewed and evaluated by national and international health, scientific, and government agencies. One of the most comprehensive and detailed reviews of the relevant scientific peer-reviewed literature was published by the World Health Organization (WHO) in 2007. The conclusion of the WHO, as currently expressed on its website, is consistent with the earlier VDH conclusions: "*Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields.*"[19]

Research published in the peer-reviewed literature subsequent to the WHO report has been reviewed by several scientific organizations, including most notably:

- The Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), a committee of the European Commission, that

[18] http://www.vdh.virginia.gov/content/uploads/sites/12/2016/02/highfinal.pdf.

[19] http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html.

published its assessments in 2009 and 2015;

- The Swedish Radiation Safety Authority (SSM), formerly the Swedish Radiation Protection Authority (SSI), that has published annual reviews of the relevant peer-reviewed scientific literature since 2003, with its most recent review published in 2016; and,

- The European Health Risk Assessment Network on EMF Exposure (EFHRAN) that published its reviews in 2010 and 2012.

The above reviews provide detailed analyses and summaries of relevant recent peer-reviewed scientific publications. The conclusions of these reviews that the evidence overall does not confirm the existence of any adverse health effects due to exposure to EMF are consistent with the conclusions of the VDH and the WHO reports. With respect to the statistical association observed in some of the childhood leukemia epidemiologic studies, the most recent comprehensive review of the literature by SCENIHR, published in 2015, concluded that "*no mechanisms have been identified and no support is existing [sic] from experimental studies that could explain these findings, which, together with shortcomings of the epidemiological studies prevent a causal interpretation*" (SCENIHR, 2015, p. 16).

While research is continuing on various aspects of EMF exposure and health, many of the recent publications have focused on an epidemiologic assessment of EMF exposure and childhood leukemia and neurodegenerative diseases. Of these, the following recent publications provided additional evidence and contributed to clarification of previous findings. Overall, new research results have not provided evidence to alter the previous conclusions of scientific and health organizations.

Recent epidemiologic studies of EMF and childhood leukemia:

- Sermage-Faure et al. (2013) used geocoded information on residential addresses and power line locations in France to evaluate distance of residence to high-voltage power lines and the risk of childhood leukemia. The study included 2,779 cases of childhood leukemia diagnosed between 2002 and 2007, and 30,000 control children. Overall, no statistically significant associations were reported between childhood leukemia risk and residential distance to high-voltage power lines.

- Bunch et al. (2014) included over 53,000 childhood cancer cases, diagnosed between 1962 and 2008, and over 66,000 healthy children as controls, in their case-control epidemiologic study in the United Kingdom. The study provided an update and extension of an earlier study (Draper et al., 2005). The update extended the study period by 13 years, included Scotland in addition to England and Wales, and included 132-kilovolt (kV) transmission lines in addition to 275-kV and 400-kV transmission lines.

Unlike the earlier study (Draper et al., 2005) that relied on a smaller sample, the updated study by Bunch et al. (2014) reported no overall association between residential proximity to power lines and childhood cancer development. Data were also analyzed from the same case-control study in the United Kingdom to assess the potential association between residential proximity to high-voltage underground cables and childhood cancer development (Bunch et al., 2015). No statistically significant associations or trends were reported with either distance to underground cables or calculated magnetic fields from underground cables for any type of childhood cancers.

- Pedersen et al. (2014, 2015) published two case-control studies that investigated the potential association between residential proximity to power lines and childhood cancer in Denmark. One of the studies included 1,698 childhood leukemia cases and twice as many controls; no statistical association with residential distance to power lines was reported (Pedersen et al., 2014). The other study included all cases of leukemia (n=1,536), central nervous system tumor, and malignant lymphoma (n=417) diagnosed before the age of 15 between 1968 and 2003 in Denmark, along with 9,129 healthy control children matched on sex and year of birth (Pedersen et al., 2015). Considering the entire study period, no statistically significant increases were reported for any of the childhood cancer types.

- Salvan et al. (2015) compared measured magnetic-field levels in the bedroom for 412 cases of childhood leukemia under the age of 10 and 587 healthy control children in Italy. Although the statistical power of the study was limited because of the small number of highly exposed subjects, no consistent statistical associations or trends were reported between measured magnetic-field levels and the occurrence of leukemia among children in the study.

- Crespi et al. (2016) conducted a case-control epidemiologic study of childhood cancers and residential proximity to high-voltage power lines (60 kV to 500 kV) in California. Childhood cancer cases, including 5,788 cases of leukemia and 3,308 cases of brain tumor, diagnosed under the age of 16 between 1986 and 2008, were identified from the California Cancer Registry. Controls, matched on age and sex, were selected from the California Birth Registry. Overall, no consistent statistically significant associations were reported for leukemia or brain tumor with residential distance to power lines.

Recent epidemiologic studies of EMF and neurodegenerative diseases:

- Seelen et al. (2014) conducted a population-based case-control study in the Netherlands and included 1,139 cases diagnosed with amyotrophic lateral sclerosis (ALS) between 2006 and 2013 and 2,864 frequency-matched controls. The shortest distance from the cases' and controls' residence to

the nearest high-voltage power line (50 kV to 380 kV) was determined by geocoding. No statistically significant associations between residential proximity to power lines with voltages of either 50 to 150 kV or 220 to 380 kV and ALS were reported.

- Sorahan and Mohammed (2014) analyzed mortality from neurodegenerative diseases in a cohort of approximately 73,000 electricity supply workers in the United Kingdom. Cumulative occupational exposure to magnetic-fields was calculated for each worker in the cohort based on their job titles and job locations. Death certificates were used to identify deaths from neurodegenerative diseases. No associations or trends for any of the included neurodegenerative diseases (Alzheimer's disease, Parkinson's disease, and ALS) were observed with various measures of calculated magnetic fields.

- Koeman et al. (2015, 2017) analyzed data from the Netherlands Cohort Study of approximately 120,000 men and women who were enrolled in the cohort in 1986 and followed up until 2003. Lifetime occupational history, obtained through questionnaires, and job-exposure matrices on ELF magnetic fields and other occupational exposures were used to assign exposure to study subjects. Based on 1,552 deaths from vascular dementia, the researchers reported a statistically not significant association of vascular dementia with estimated exposure to metals, chlorinated solvents, and ELF magnetic fields. However, because no exposure-response relationship for cumulative exposure was observed and because magnetic fields and solvent exposures were highly correlated with exposure to metals, the authors attributed the association with ELF magnetic fields and solvents to confounding by exposure to metals (Koeman et al., 2015). Based on a total of 136 deaths from ALS among the cohort members, the authors reported a statistically significant, approximately two-fold association with ELF magnetic fields in the highest exposure category. This association, however, was no longer statistically significant when adjusted for exposure to insecticides (Koeman et al., 2017).

- Fischer et al. (2015) conducted a population-based case-control study that included 4,709 cases of ALS diagnosed between 1990 and 2010 in Sweden and 23,335 controls matched to cases on year of birth and sex. The study subjects' occupational exposures to ELF magnetic fields and electric shocks were classified based on their occupations, as recorded in the censuses and corresponding job-exposure matrices. Overall, neither magnetic fields nor electric shocks were related to ALS.

- Vergara et al. (2015) conducted a mortality case-control study of occupational exposure to electric shock and magnetic fields and ALS. They analyzed data on 5,886 deaths due to ALS and over 58,000 deaths from other causes in the United States between 1991 and 1999. Information on occupation was obtained from death certificates and job exposure matrices

were used to categorize exposure to electric shocks and magnetic fields. Occupations classified as "electric occupations" were moderately associated with ALS. The authors reported no consistent associations for ALS, however, with either electric shocks or magnetic fields, and they concluded that their findings did not support the hypothesis that exposure to either electric shocks or magnetic fields explained the observed association of ALS with "electric occupations."

- Pedersen et al. (2017) investigated the occurrence of central nervous system diseases among approximately 32,000 male Danish electric power company workers. Cases were identified through the national patient registry between 1982 and 2010. Exposure to ELF magnetic fields was determined for each worker based on their job titles and area of work. A statistically significant increase was reported for dementia in the high exposure category when compared to the general population, but no exposure-response pattern was identified, and no similar increase was reported in the internal comparisons among the workers. No other statistically significant increases among workers were reported for the incidence of Alzheimer's disease, Parkinson's disease, motor neuron disease, multiple sclerosis, or epilepsy, when compared to the general population, or when incidence among workers was analyzed across estimated exposure levels.

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V. NOTICE

A. Furnish a proposed route description to be used for public notice purposes. Provide a map of suitable scale showing the route of the proposed project.

Response: A map showing the Proposed Route and Underground Alternatives for the Project is provided as Attachment V.A. A written description of the routes is as follows:

Proposed Route of Project (Underground Alternative 05)

Underground Alternative 05 is approximately 4.3 miles long. With the exception of the first mile, the route would be constructed primarily within the roadbed of existing roads. The route follows Dominion Energy Virginia's existing Line #2035 out of the Idylwood Substation for about 0.2 mile heading north across Shreve Road. At the W&OD Park, the route turns west to follow Line #202 parallel with the park for about 0.1 mile, crossing under I-66 and the WMATA Orange Line, and then parallel with the W&OD Park trail for about 0.6 mile, crossing I-495, Nottingham Drive, and Sandburg Street. The route then continues for about 1.9 miles, turning north and following Gallows Road, crossing Idylwood Road, Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive (2 crossings), Science Applications Court, Gallows Branch Road Road/Aline, and Boone Boulevard. The route crosses Leesburg Pike and continues in a northeast direction along International Drive for about 1.3 miles, crossing Fletcher Street, Tysons Corner Center, Chain Bridge Road, the WMATA Silver Line, Galleria Drive, Greensboro Drive, Tysons Boulevard, Westpark Drive, Lincoln Circle (2 crossings), and Lincoln Lane. Just prior to reaching Jones Branch Drive, the route turns west and southwest following Spring Hill Road for 0.1 mile. The route then turns west to follow Tyco Road for about 0.1 mile before entering the Tysons Substation.

Underground Alternative 06

Underground Alternative 06 is approximately 4.7 miles long. With the exception of the first mile, the route would be constructed primarily within the roadbed of existing roads. The route would follow Dominion Energy Virginia's existing Line #2035 out of the Idylwood Substation for about 0.2 mile, heading north across Shreve Road. At the W&OD Park, the route turns west to follow Line #202 parallel with the park for about 0.1 mile, crossing under I-66 and the WMATA Orange Line, and then parallel with the W&OD Park trail for about 0.6 mile, crossing I-495, Nottingham Drive, and Sandburg Street. The route continues for 1.9 miles, turning north to follow Gallows Road, crossing Idylwood Road, Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive (2 crossings), Science Applications Court, Gallows Branch Road Road/Aline Avenue, and Boone Boulevard. The route crosses Leesburg Pike and continues in a northeast direction along

International Drive for about 0.2 mile, crossing Fletcher Street. The route veers northeast and east along Tysons Corner Center for about 0.2 mile, after which it diverges from the road heading northeast crossing Chain Bridge Road and the WMATA Silver Line before veering north then northwest, following Tysons Boulevard for 0.7 mile crossing Galleria Drive, and Westbranch Drive. The route turns north along Park Run Drive for about 0.3 mile, crossing Westpark Drive and Crestwood Heights Drive before turning west on Jones Branch Drive for about 0.3 mile, crossing Lincoln Way (2 crossings), Lincoln Center Court, International Drive, then continues west and southwest on Spring Hill Road for 0.1 mile. The route turns west to follow Tyco Road for about 0.1 mile before entering the Tysons Substation.

Underground Alternative 04

Underground Alternative 04 is approximately 4.5 miles long. With the exception of the first mile, the route would be constructed primarily within the roadbed of existing roads. The route would follow Dominion Energy Virginia's existing Line #2035 out of the Idylwood Substation for about 0.2 mile, heading north across Shreve Road. At the W&OD Park, the route turns west to follow Line #202 parallel with the park for about 0.1 mile, crossing under I-66 and the WMATA Orange Line, and then parallel with the W&OD Park trail for about 0.6 mile, crossing I-495, Nottingham Drive, and Sandburg Street. The route continues for 1.6 miles, turning north to follow Gallows Road, crossing Idylwood Road, Elm Place, Electric Avenue, Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive (2 crossings), Science Applications Court, and Gallows Branch Road. The route then veers west to follow Old Courthouse Road for about 0.8 mile, crossing Lord Fairfax Road, Byrd Road, Hull Road, Woodford Road and Chain Bridge Road. Where Old Courthouse Road turns west, the route continues north along Gosnell Road for about 0.4 mile crossing Wall Street, Raglan Road, Tyspring Street, Leesburg Pike and the WMATA Silver Line. After crossing the rail line, the route continues onto West Park Drive for about 0.2 mile before turning northwest onto Greensboro Drive for about 0.3 mile. At Spring Hill Road, the route veers northeast following Spring Hill Road for about 0.2 mile. At Tyco Road, the route turns west to follow Tyco Road for about 0.1 mile before entering Tysons Substation.

Underground Alternative 01

Underground Alternative 01 is approximately 5.0 miles long. With the exception of the first 2.0 miles, the route would be constructed primarily within the roadbed of existing roads. The route would follow Dominion Energy Virginia's existing Line #2035 out of the Idylwood Substation for about 0.2 mile, heading north across Shreve Road. At the W&OD Park, the route turns west to follow Line #202 parallel with the park for about 0.1 mile, crossing under I-66 and the WMATA Orange Line. The route then follows the W&OD Park trail for about 1.7 miles, crossing Interstate 495 (I-495), Nottingham

Drive, Sandburg Street, Gallows Road, and Cedar Lane. About 0.4 mile west of the Cedar Lane crossing, the route heads north behind residences on the west side of Malraux Road for about 0.2 mile. At Electric Avenue, the route turns northeast and follows Electric Avenue for about 0.2 mile until it reaches Woodford Road. The route heads north following Woodford Road for about 1.0 mile, crossing Connierae Lane, Falcone Pointe Way, Wolftrap Creek, Tysons Court, Bethany Court, Quaint Lane, Wolftrap Road, Woodford Court, Rainbow Road, Black Stallion Place (2 crossings), and Old Courthouse Road. After the crossing under Old Courthouse Road, the route veers northwest to follow Old Courthouse Road for about 0.4 mile, crossing Howard Avenue and Chain Bridge Road. Where Old Courthouse Road turns west, the route continues north along Gosnell Road for about 0.4 mile, crossing Wall Street, Raglan Road, Tyspring Street, Leesburg Pike, and the WMATA Silver Line. After crossing the rail line, the route continues onto West Park Drive for about 0.2 mile before turning northwest onto Greensboro Drive for about 0.3 mile. At Spring Hill Road, the route veers northeast following Spring Hill Road for about 0.2 mile. At Tyco Road, the route turns west to follow Tyco Road for about 0.1 mile before entering Tysons Substation.

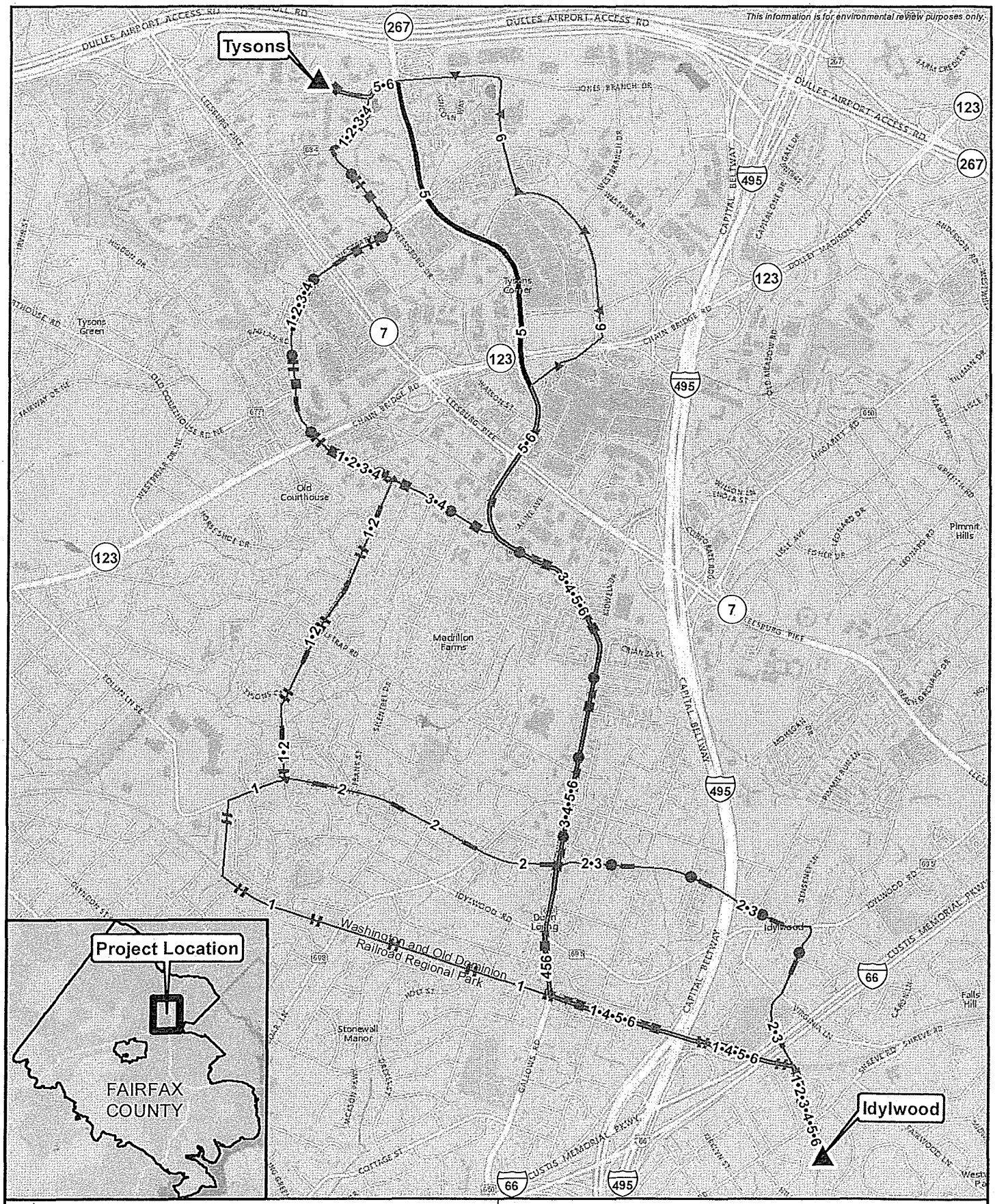
Underground Alternative 03

Underground Alternative 03 is approximately 4.6 miles long. With the exception of about 0.8 mile, the route would be constructed primarily within the roadbed of existing roads. The route would follow Dominion Energy Virginia's existing Line #2035 for about 0.2 mile out of the Idylwood Substation, heading north across Shreve Road. The route would diverge from Line #2035 and over a length of approximately 0.2 mile, crosses W&OD Park and veers northwest to cross under I-66 and the WMATA Orange Line and enter Idylwood Park. The route turns northeast before leaving the park and crossing Virginia Lane, to follow Hurst Street for about 0.3 mile before turning west on Idylwood Road and crossing Senseney Lane. The route veers northwest onto Helena Drive for about 0.2 mile, crossing Providence Street. The route crosses I-495 (about 0.1 mile) and then extends onto Railroad Street, crossing Coal Train Drive and Morgan Lane while turning west. The route crosses about 0.3 mile of unpaved Fairfax County right-of-way before rejoining Railroad Street. The route continues along Railroad Street crossing 4th Place, Arden Street, and Journey Drive for about 0.2 mile. The route turns to follow Gallows Road north and northwest for about 1.1 miles, crossing Cedar Lane/Oak Street, Wolftrap Road, Madron Lane, Tyson Oaks Drive (2 crossings), Science Applications Court, and Gallows Branch Road. The route then veers west to follow Old Courthouse Road for about 0.8 mile, crossing Lord Fairfax Road, Byrd Road, Hull Road, Woodford Road and Chain Bridge Road. Where Old Courthouse Road turns west, the route continues north along Gosnell Road for about 0.4 mile crossing Wall Street, Raglan Road, Tyspring Street, Leesburg Pike and the WMATA Silver Line. After crossing the rail line, the route continues onto West Park Drive for about 0.2 mile before turning northwest

onto Greensboro Drive for about 0.3 mile. At Spring Hill Road, the route veers northeast following Spring Hill Road for about 0.2 mile. At Tyco Road, the route turns west to follow Tyco Road for about 0.1 mile before entering Tysons Substation.

Underground Alternative 02

Underground Alternative 02 is approximately 5.0 miles long. With the exception of about 0.8 mile, the route would be constructed primarily within the roadbed of existing roads. The route would follow Dominion Energy Virginia's existing Line #2035 for about 0.2 mile out of the Idylwood Substation, heading north across Shreve Road. The route would diverge from Line #2035 and over a length of approximately 0.2 mile, crosses W&OD Park and veers northwest to cross under I-66 and the WMATA Orange Line and enter Idylwood Park.. The route turns northeast before leaving the park and crossing Virginia Lane, to follow Hurst Street for about 0.3 mile before turning west on Idylwood Road and crossing Senseney Lane. The route veers northwest onto Helena Drive for about 0.2 mile, crossing Providence Street. The route crosses I-495 (about 0.1 mile) and then extends onto Railroad Street, crossing Coal Train Drive and Morgan Lane while turning west. The route crosses about 0.3 mile of unpaved Fairfax County right-of-way before rejoining Railroad Street. The route continues along Railroad Street crossing 4th Place, Arden Street, and Journey Drive for about 0.2 mile. After crossing Gallows Road, the route continues west onto Electric Avenue for about 0.9 mile, crossing McGregor Court, Wheystone Court (2 crossings), Cedar Lane, Central Avenue, Williams Avenue, and Frank Street. At Woodford Road the route heads north following Woodford Road for about 1.0 mile, crossing Connierae Lane, Falcone Pointe Way, Wolftrap Creek, Tysons Court, Bethany Court, Quaint Lane, Wolftrap Road, Woodford Court, Rainbow Road, Black Stallion Place (2 crossings), and Old Courthouse Road. After the crossing under Old Courthouse Road, the route veers northwest to follow Old Courthouse Road for about 0.4 mile, crossing Howard Avenue, and Chain Bridge Road. Where Old Courthouse Road turns west, the route continues north along Gosnell Road for about 0.4 mile, crossing Wall Street, Raglan Road, Tyspring Street, Leesburg Pike and the WMATA Silver Line. After crossing the rail line, the route continues onto West Park Drive for about 0.2 mile before turning northwest onto Greensboro Drive for about 0.3 mile. At Spring Hill Road, the route veers northeast following Spring Hill Road for about 0.2 mile. At Tyco Road, the route turns west to follow Tyco Road for about 0.1 mile before entering Tysons Substation.


This information is for environmental review purposes only.
Tysons
Idylwood
Project Location
FAIRFAX COUNTY
Washington and Old Dominion Railroad Regional Park
Proposed Route (Underground 05)
Underground Alternative 01
Underground Alternative 02
Underground Alternative 03
Underground Alternative 04
Underground Alternative 06
Existing Substation
1:25,000
0 0.25 0.5 Miles
N
Notice Map
Idylwood to Tysons Project
Fairfax County, Virginia

V. NOTICE

B. List Company offices at which members of the public may inspect the application.

Response: The application is available at the following locations:

Virginia Electric and Power Company
OJRP 12th Floor
701 E. Cary Street
Richmond, Virginia 23219
Attn: Ms. Amanda Mayhew

Fairfax County
Department of Planning and Zoning Divisions
Planning Division
12055 Government Center Parkway
7th Floor, Suite 730
Fairfax, Virginia 22035
Attn: Mr. Fred Selden

Dranesville District
McLean Governmental Center
1437 Balls Hill Road
McLean, VA 22101
Attn: Mr. John Foust

Hunter Mill District
1801 Cameron Glen Drive
Reston, VA 20190
Attn: Ms. Cathy Hudgins

Providence District
Providence Community Center
3001 Vaden Drive (2nd Floor)
Fairfax, VA 22031
Attn: Ms. Linda Smyth

Virginia Electric and Power Company
Lincoln Park Office
3072 Centerville Road
Herndon, Virginia 20171
Attn: Ms. Deborah Johnson

V. NOTICE

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

Response:

Ms. Bettina Sullivan, Manager, Environmental Impact Review
and Long Range Priorities Program
c/o Ms. Valerie Fulcher, Executive Secretary Senior (2 electronic copies)
Office of Environmental Impact Review
Department of Environmental Quality
629 East Main Street
Richmond, Virginia 23219

Mr. Keith Fowler
Virginia Department of Environmental Quality
Valley Regional Office
4411 Early Road
Harrisonburg, Virginia 22801

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

Ms. Amy Ewing, Biologist (1 electronic copy)
Virginia Department of Game and Inland Fisheries
7870 Villa Park Drive, Suite 400
Henrico, VA 23228

Mr. Roger W. Kirchen, Director (1 electronic copy)
Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

Ms. S. Rene Hypes (1 electronic copy)
Virginia Department of Conservation and Recreation
Division of Natural Heritage- Project Review Coordinator
600 East Main St, 24th FloorRichmond, VA 23219

Ms. Theresita Crockett-Augustine
U.S. Army Corps of Engineers-Norfolk District
Northern Virginia Field Office
18139 Triangle Plaza, Suite 213
Dumfries, VA 22026

Mr. Troy Anderson
U.S. Fish and Wildlife Services
Ecological Services Virginia Field Offices
6669 Short Lane Gloucester, VA 23061

Ms. Robbie Rhur (1 electronic copy)
Virginia Department of Conservation and Recreation
Planning Bureau
600 East Main Street, 24th Floor
Richmond, Virginia 23219

Ms. Martha Little
Virginia Outdoors Foundation
600 East Main Street, Suite 402
Richmond, Virginia 23219

Mr. Greg Evans (1 electronic copy)
Virginia Department of Forestry
Assistant Director for Forestland Conservation office
900 Natural Resources Drive, Suite 800
Charlottesville, Virginia 22903

Mr. Abraham Lerner
Associate Manager of Special Project Development
VDOT-NOVA District
4975 Alliance Drive
Fairfax, Virginia 22030

Mr. Tony Watkinson
Virginia Marine Resources Commission
Habitat Management Division
2600 Washington Avenue, 3rd Floor
Newport News, Virginia 23607

Mr. Sunil Rabindranath
Project Manager, Engineering Division
Metropolitan Washington Airports Authority
P.O. Box 17045, MA-224
Washington, DC 20041-0045

Mr. John Foust
Dranesville District
McLean Governmental Center
1437 Balls Hill Road
McLean, VA 22101

Ms. Cathy Hudgins
Hunter Mill District
1801 Cameron Glen Drive
Reston, VA 20190

Ms. Linda Smyth
Providence District
Providence Community Center
3001 Vaden Drive (2nd Floor)
Fairfax, VA 22031

Mr. Fred Selden
Fairfax County
Department of Planning and Zoning Divisions
Planning Division
12055 Government Center Parkway
7th Floor, Suite 730
Fairfax, Virginia 22035

Direct Testimony

COMMONWEALTH OF VIRGINIA

STATE CORPORATION COMMISSION

APPLICATION OF	)	
	)	
VIRGINIA ELECTRIC AND POWER COMPANY	)	
	)	
	)	Case No. PUR-2017-00143
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.*	)	

IDENTIFICATION AND SUMMARIES OF DIRECT WITNESSES OF VIRGINIA ELECTRIC AND POWER COMPANY

Mark R. Gill

Witness Direct Testimony Summary and Portions of Appendix Adopted and Supported
Appendix A: Background and Qualifications

Matthew E. Rudd

Witness Direct Testimony Summary and Portions of Appendix Adopted and Supported
Appendix A: Background and Qualifications

Peter L. Tirinzoni

Witness Direct Testimony Summary and Portions of Appendix Adopted and Supported
Appendix A: Background and Qualifications

Elizabeth K. Gatlin

Witness Direct Testimony Summary and Portions of Appendix Adopted and Supported
Appendix A: Background and Qualifications

W. Chase Bland

Witness Direct Testimony Summary and Portions of Appendix Adopted and Supported
Appendix A: Background and Qualifications

Amanda M. Mayhew

Witness Direct Testimony Summary and Portions of Appendix and DEQ Supplement Adopted and Supported
Appendix A: Background and Qualifications

Jon M. Berkin

Witness Direct Testimony Summary and DEQ Supplement and Environmental Routing Study Adopted and Supported
Appendix A: Background and Qualifications

Witness Direct Testimony Summary

Witness: Mark R. Gill

Title: Consulting Engineer – Electric Transmission Planning

Summary:

Company Witness Mark R. Gill will adopt and sponsor those portions of the Appendix describing the Company's transmission system and the need for, and benefits of, the proposed project, as follows:

- Section I.A (co-sponsored with Company Witnesses Matthew E. Rudd, Elizabeth K. Gatlin, and W. Chase Bland): This section details the engineering justifications for the proposed project.

- Section I.B: This section describes the present system and details how the proposed project will effectively satisfy present and future demand requirements.

- Section I.C (co-sponsored with Company Witnesses Matthew E. Rudd, Elizabeth K. Gatlin, and W. Chase Bland): This section explains that the proposed project is the only feasible option to meet the identified need.

- Section I.E: This section provides a map showing the location and voltage of the Company's existing transmission lines, substations, generating facilities, associated with the proposed project, and a map of the transmission system with the addition of the proposed project.

- Section I.F: This section provides the desired in-service date of the proposed project and the estimated construction time.

- Section I.H: Although not applicable to the proposed project, this section, when applicable, contains information for transmission lines interconnecting a Non Utility Generator.

- Section I.I: This section describes the new and existing generating sources, distribution circuits or load centers planned to be served by all new substations, switching stations and other ground facilities associated with the proposed project.

- Section II.C (co-sponsored with Company Witnesses Elizabeth K. Gatlin and W. Chase Bland): This section describes and furnishes plan drawings of the substation, switching station, and other ground facilities associated with the proposed project.

A statement of Mr. Gill's background and qualifications is attached to this summary as Appendix A.

DIRECT TESTIMONY
OF
MARK R. GILL
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2017-00143

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Mark R. Gill, and I am a Consulting Engineer in the Electric Transmission Planning Department for Dominion Energy Virginia. My office is located at 701 East Cary Street, Richmond, Virginia 23219. A statement of my qualifications and background is provided as Appendix A.

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

A. I have responsibility for planning the Company's electric transmission system in the northern Virginia area for voltages of 69 kV through 500 kV.

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

A. In order to resolve a potential criteria violation of the mandatory NERC Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area, Dominion Energy Virginia proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS") equipment to accommodate a six-breaker 230 kV ring bus within the existing property

boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

The purpose of my testimony is to describe the Company's transmission system and the need for, and benefits of, the proposed Project. I am sponsoring Sections I.B, I.E, I.F, I.H, and I.I of the Appendix. Additionally, I am co-sponsoring Sections I.A and I.C of the Appendix with Company Witnesses Matthew E. Rudd, Elizabeth K. Gatlin, and W. Chase Bland, and Section II.C with Company Witnesses Elizabeth K. Gatlin and W. Chase Bland.

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

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF MARK R. GILL

Mark R. Gill received a Bachelor of Science degree in Electrical Engineering from the University of Virginia in 1989. He has been licensed as a Professional Engineer in the Commonwealth of Virginia since 1994. He has been employed by the Company for 29 years. Mr. Gill's experience with the Company includes Customer Service (1988-1992), Circuit Calculations/System Protection (1992-1999), Distribution Planning (1999-2007) and Transmission Planning (2007-Present).

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

Witness Direct Testimony Summary

Witness: Matthew E. Rudd

Title: Project Engineer – Electric Transmission Engineering

Summary:

Company Witness Matthew E. Rudd adopts and co-sponsors those portions of the Appendix providing an overview of the design of the underground transmission line components of the proposed electric transmission facilities from a transmission line engineering perspective, as follows:

- Section I.A (co-sponsored with Company Witnesses Mark R. Gill, Elizabeth K. Gatlin, and W. Chase Bland): This section details the engineering justifications for the proposed project.

- Section I.C (co-sponsored with Company Witnesses Mark R. Gill, Elizabeth K. Gatlin, and W. Chase Bland): This section explains that the proposed project is the only feasible option to meet the identified need.

- Section I.D: This section describes any lines or facilities that will be removed, replaced, or taken out of service upon completion of the proposed project.

- Section I.G (co-sponsored with Company Witnesses Elizabeth K. Gatlin and W. Chase Bland): This section provides the estimated cost of the proposed project.

- Section II.A.3: This section provides drawings of the right-of-way cross section showing existing and proposed transmission line structure placements referenced to the edge of the right-of-way.

- Section II.B: This section provides the line design and operational features of the proposed project.

- Sections IV.B and IV.C: These sections provide the health aspects of electric and magnetic field levels.

A statement of Mr. Rudd's background and qualifications is attached to this summary as Appendix A.

DIRECT TESTIMONY
OF
MATTHEW E. RUDD
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2017-00143

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Matthew E. Rudd, and I am a Project Engineer – Electric Transmission Engineering for Dominion Energy Services, Inc. My business address is 701 E. Cary Street, Richmond, VA 23219.

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

A. I have responsibility for the Company's electric underground transmission system including new construction projects, daily operations and maintenance, and material requisitions. This includes 69kV-230kV solid dielectric, high-pressure fluid-filled and self-contained fluid-filled cable systems.

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

A. In order to resolve a projected criteria violation of the mandatory NERC Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area, Dominion Energy Virginia proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS")

equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

The purpose of my testimony is to describe the design characteristics of the transmission facilities for the proposed Project, and also to discuss electric and magnetic field ("EMF") levels. I am sponsoring Sections I.D, II.A.3, II.B, IV.B, and IV.C of the Appendix. I am also co-sponsoring Sections I.A and I.C of the Appendix with Company Witnesses Mark R. Gill, Elizabeth K. Gatlin, and W. Chase Bland, and Section I.G of the Appendix with Company Witnesses Elizabeth K. Gatlin and W. Chase Bland.

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

A. Yes, it does.

BACKGROUND AND QUALIFICATIONS OF MATTHEW E. RUDD

Matthew E. Rudd earned his Bachelor's degree in Mechanical Engineering from The Virginia Commonwealth University School of Engineering in 2011. He has been employed by the Company for 10 years. Mr. Rudd's experience with the Company includes GIS Services (2007-2011), Commercial & Industrial Distribution Design (2011-2014), Transmission Engineering (2014-Present).

Witness Direct Testimony Summary

Witness: Peter L. Tirinzoni

Title: Senior Engineer, Power Consultants, Inc.

Summary:

Company Witness Peter L. Tirinzoni will adopts and sponsors the following portion of the Appendix:

- Section IV.A: This section provides the calculations of electric and magnetic field levels.

A statement of Mr. Tirinzoni's background and qualifications is attached to this summary as Appendix A.

DIRECT TESTIMONY
OF
PETER L. TIRINZONI
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2017-00143

Q. Please state your name, business address.

A. My name is Peter L. Tirinzoni, and I am a Senior Engineer with Power Delivery Consultants, Inc. ("PDC"). My business address is 12 Plains Road, Suite 308, Essex, Connecticut, 06426. A statement of my background and qualifications is attached as Appendix A.

Q. What is PDC's professional experience in calculating electric and magnetic field values?

A. The engineers at PDC have been performing EMF calculations for its clients since it was founded 25 years ago. PDC engineers have also prepared several reports concerning magnetic fields for the Electric Power Research Institute ("EPRI"), including a report on methods to reduce magnetic fields resulting from electric power cables. A PDC engineer was also the principal author on the chapters on magnetic fields in the 1992 and 2006 EPRI Underground Transmission Systems Reference Book.

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

A. In order to resolve a projected criteria violation of the mandatory NERC Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area, Dominion Energy Virginia proposes to (i) construct a new single circuit 230 kV

underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS") equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

The purpose of my testimony is to discuss electric and magnetic field ("EMF") levels. I am sponsoring Section IV.A of the Appendix.

Q. Have you made calculations of the EMF for the proposed lines?

A. Yes, and they are shown in Section IV.A of the Appendix. In an underground cable, the electric field is contained entirely within the cable insulation. Therefore, there is no electric field at any point external to the cables. The calculated peak magnetic field strength for the proposed underground facilities operating at maximum loading capability (i.e., 950 MVA) is 81 milligauss (mG), at one meter above ground, directly above the duct bank.

Q. The information you have provided in Section IV.A of the Appendix shows the calculated maximum EMF at the edge of the rights-of-way. How do the strengths of the expected maximum magnetic fields at the edge of the right-of-way compare to magnetic fields found elsewhere?

A. The field strengths shown in Appendix Section IV.A can be compared to those created by

other electrical sources. For example, a hair dryer produces 300 mG or more, a copy machine can produce 90 mG or more, and an electric power saw can produce 40 mG or more, depending on the circumstances and operation of these devices. The strength of the field received by the person operating these devices would, of course, depend on the distance between the device and the person operating it. Magnetic field strength diminishes rapidly as distance from the source increases.

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

A. Yes, it does.

BACKGROUND AND QUALIFICATIONS OF PETER L. TIRINZONI

Peter L. Tirinzoni received a Bachelor of Science degree in Mechanical Engineering from the University of Connecticut in 1982, a Master of Science degree in Mechanical Engineering from Rensselaer Polytechnic Institute in 1988, and a Master of Science degree in Electrical and Computer Engineering from Worcester Polytechnic Institute in 2011.

After qualifying on two submarine propulsion systems at General Electric, Mr. Tirinzoni joined Northeast Utilities (NU) in 1985 as an engineer in their Nuclear Engineering and Design Division. During his 15 years in the Nuclear Department, he performed many analyses, design modifications, and major upgrades to critical plant systems. Additionally, he was responsible for the procurement, installation, and commissioning of the world's largest fuel cell farm for use as the primary power supply to a juvenile detention facility in Connecticut.

In 2003, Mr. Tirinzoni joined the utility's Transmission Department where he performed engineering assignments related to the design, specification, construction, operation and maintenance of underground and subsea transmission cable projects. He has extensive experience witnessing sample, production and type testing and has been involved in several cable failure analyses and repairs. He developed many underground transmission standards, addressing material, design, and construction, and conducted technical and economic studies of alternate underground systems and route analyses.

Mr. Tirinzoni was responsible for several significant cable projects in Southwest Connecticut, including overseeing the final cable and duct bank system design, manufacturing, factory testing, installation and commissioning of the world's longest (24-mile, double circuit) 345-kV extruded cable project. He was also the technical lead for the design, specification, duct

bank construction, cable installation, and commissioning of a 9-mile, double circuit 115-kV XLPE cable system and the replacement of seven, 12-mile, 138-kV single-core Self Contained Fluid Filled (SCFF) cables under the Long Island Sound with three 3-core XLPE submarine cables.

Mr. Tirinzoni was the technical lead for the design of the underground HVDC cable system to bring clean hydroelectric power to central New England, with responsibilities for vendor prequalification, cable system specification and RFP development, and bid evaluations and negotiations.

Mr. Tirinzoni is a senior member of the IEEE, its Power & Energy Society, and Standards Association. He is actively involved in the IEEE PES Insulated Conductors Committee ("ICC") and serves as chair of its Educational Committee. While at NU, he was a member and chair of the Association of Edison Illuminating Companies ("AEIC") Cable Engineering Committee, as well as chair of the Task Group performing a major update to AEIC CS9, "Specification for Extruded Insulation Power Cables and Their Accessories Rated above 46 kV Through 345 kV."

Mr. Tirinzoni is a past member of CEATI and the EPRI Underground Transmission Task Force ("UTTF"). He is also a past chair of the UTTF and served as a utility advisor on several EPRI and CEATI projects.

Mr. Tirinzoni has taught courses with Power Delivery Consultants, Inc. for several years, and joined the firm in 2015 where he continues to specialize in underground and subsea transmission cable systems.

Mr. Tirinzoni is a registered Professional Engineer in the state of Connecticut.

Witness Direct Testimony Summary

Witness: Elizabeth K. Gatlin

Title: Transmission Line Engineer III

Summary:

Company Witness Elizabeth K. Gatlin adopts and co-sponsors the following portions of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Mark R. Gill, Matt E. Rudd, and W. Chase Bland): This section details the engineering justifications for the proposed project.
- Section I.C (co-sponsored with Company Witnesses Mark R. Gill, Matthew E. Rudd, and W. Chase Bland): This section explains that the proposed project is the only feasible option to meet the identified need.
- Section I.G (co-sponsored with Company Witnesses Matt E. Rudd and W. Chase Bland): This section provides the estimated cost of the proposed project.
- Section II.A.7 (co-sponsored with Company Witness Amanda M. Mayhew): This section describes the Company's route selection process.
- Section II.C (co-sponsored with Company Witnesses Mark R. Gill and W. Chase Bland): This section describes and furnishes plan drawings of the substation, switching station, and other ground facilities associated with the proposed project.

A statement of Elizabeth K. Gatlin's background and qualifications is attached to this summary as Appendix A.

DIRECT TESTIMONY
OF
ELIZABETH K. GATLIN
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2017-00143

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Elizabeth K. Gatlin, and I am a Transmission Line Engineer III in the Electric Transmission Line Engineering Department for Dominion Energy Virginia. My office is located at 701 East Cary Street, Richmond, Virginia 23219. A statement of my qualifications and background is provided as Appendix A.

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

A. I am responsible for the conceptual design, scope development, and cost estimating for high voltage transmission line projects from 69 kV to 500 kV.

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

A. In order to resolve a projected criteria violation of the mandatory NERC Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area, Dominion Energy Virginia proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS") equipment to accommodate a six-breaker 230 kV ring bus within the existing property

boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

The purpose of my testimony is to describe costs associated with the overhead routes and rejection of those routes. I am co-sponsoring Section I.A of the Appendix as it pertains to the "Replacement Tower Proposal" and cost with Company Witnesses Mark R. Gill, Matthew E. Rudd, and W. Chase Bland. I am also co-sponsoring Section I.C with Company Witnesses Mark. R. Gill, Matthew E. Rudd, and W. Chase Bland; Section I.G with Company Witnesses W. Chase Bland and Matthew E. Rudd; Section II.A.7 with Company Witness Amanda M. Mayhew; and Section II.C with Company Witnesses Mark R. Gill and W. Chase Bland, as those sections pertain to cost and rejection of the overhead routing alternatives.

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

A. Yes, it does.

APPENDIX A

BACKGROUND AND QUALIFICATIONS OF ELIZABETH K. GATLIN

Elizabeth K. Gatlin graduated with a Bachelor of Science degree in Engineering Science and Mechanics from Virginia Polytechnic Institute and State University in 2003. From December 2003 – November 2009, she held various engineering titles at CHA Inc. (Formerly Clough Harbour and Associates, LLP). From June 2010 – Present, she has held various engineering titles with the Company in the Electric Transmission Engineering department.

Witness Direct Testimony Summary

Witness: W. Chase Bland

Title: Conceptual Engineer – Substation Engineering

Summary:

Company Witness W. Chase Bland adopts and co-sponsors the following portions of the Appendix:

- Section I.A (co-sponsored with Company Witnesses Mark R. Gill, Matt E. Rudd, and Elizabeth K. Gatlin): This section details the engineering justifications for the proposed project.

- Section I.C (co-sponsored with Company Witnesses Mark R. Gill, Matthew E. Rudd, and Elizabeth K. Gatlin): This section explains that the proposed project is the only feasible option to meet the identified need.

- Section I.G (co-sponsored with Company Witnesses Matt E. Rudd and Elizabeth K. Gatlin): This section provides the estimated cost of the proposed project.

- Section II.C (co-sponsored with Company Witnesses Mark R. Gill and Elizabeth K. Gatlin): This section describes and furnishes plan drawings of the substation, switching station, and other ground facilities associated with the proposed project.

A statement of W. Chase Bland's background and qualifications is attached to this summary as Appendix A.

DIRECT TESTIMONY
OF
W. CHASE BLAND
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2017-00143

Q. Please state your name and position with Virginia Electric and Power Company ("Dominion Virginia Power" or the "Company").

A. My name is W. Chase Bland, and I am a Conceptual Engineer in the Substation Engineering section of the Electric Transmission group of the Company. My business address is 2400 Grayland Avenue, Richmond, Virginia 23220.

Q. What are your responsibilities as a Conceptual Engineer?

A. I am responsible for conceptual design, scope development, and cost estimating for all new high voltage transmission switching stations, transmission substations and distribution substations.

Q. What is the purpose of your direct testimony?

A. In order to resolve a projected criteria violation of the mandatory NERC Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area, Dominion Energy Virginia proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS")

equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

The purpose of my testimony is to describe the work to be performed as part of the proposed Project at the Company's existing Idylwood Substation and Tysons Substation. As it pertains to station work, I am co-sponsoring Sections I.A and I.C of the Appendix with Company Witnesses Mark R. Gill, Matthew E. Rudd, and Elizabeth K. Gatlin; Section I.G with Company Witnesses Matthew E. Rudd and Elizabeth K. Gatlin, and Section II.C with Company Witnesses Mark R. Gill and Elizabeth K. Gatlin.

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

A. Yes, it does.

BACKGROUND AND QUALIFICATIONS OF W. CHASE BLAND

W. Chase Bland graduated in 2008 with a Bachelor's Degree in Mechanical Engineering and Minor in Mathematics and Physics from the Virginia Commonwealth University. He is a registered as an Engineer in Training in the state of Virginia as of 2013. From 2008 to 2010, he worked in the Substation Engineering (Physical Design) Department where he held the position of Engineer I for substation upgrade construction projects. In 2010, he was promoted to Engineer II in the Substation Engineering (Physical Design) Department where he expanded the scope of projects to include substation build-outs, upgrades and new substations. In 2014, he was promoted to Engineer III in the Substation Engineering (Physical Design) Department and began working on more complex, higher level projects. His responsibilities in all three positions included working closely with construction crews to communicate detail drawings clearly to execute a project successfully as well as ensuring that the crews had all physical material correctly specified and on site on time. In 2015, Mr. Bland became a Conceptual Engineer (Engineer III) in the Conceptual Engineering Department. His responsibilities include conceptual design, scope development, and cost estimating for all substation construction for the Company.

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

Witness Direct Testimony Summary

Witness: Amanda M. Mayhew

Title: Senior Siting and Permitting Specialist – Electric Transmission Right-of-Way

Summary:

Company Witness Amanda M. Mayhew will adopt and sponsor those portions of the Appendix providing an overview of the design of the route for the proposed project, as follows:

- Section II.A.1: This section provides the relevant lengths of each transmission line with relocated structures associated with the proposed project.
- Section II.A.2: This section provides a map showing the route of the proposed project.
- Sections II.A.4-9 (Section II.A.7 co-sponsored with Company Witness Elizabeth K. Gatlin): These sections provide detail regarding the right-of-way for the proposed project.
- Section III: This section details the impact of the proposed project on scenic, environmental, and historic features.
- Section V: This section provides information related to public notice of the proposed project.

Additionally, Company Witness Mayhew adopts and co-sponsors with Company Witness Jon M. Berkin the DEQ Supplement provided as part of the Company's Application.

A statement of Ms. Mayhew's background and qualifications is attached to this summary as Appendix A.

DIRECT TESTIMONY
OF
AMANDA M. MAYHEW
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2017-00143

Q. Please state your name, business address and position with Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company").

A. My name is Amanda M. Mayhew, and I am a Senior Siting and Permitting Specialist for the Company. My office is located at One James River Plaza, 701 East Cary Street, Richmond, Virginia 23219. A statement of my qualifications and background is provided as Appendix A.

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

A. My responsibilities include identification of appropriate routes for transmission lines and obtaining necessary federal, state, and local approvals, and environmental permits for those facilities.

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

A. In order to resolve a projected criteria violation of the mandatory NERC Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area, Dominion Energy Virginia proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS")

equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

The purpose of my testimony is to provide an overview of design of the route for and environmental impacts of the proposed Rebuild Project. I am sponsoring Appendix Sections II.A.1, II.A.2, II.A.4-9, III, and V of the Appendix, and co-sponsoring Section II.A.7 with Company Witness Elizabeth K. Gatlin. Additionally, I adopt and co-sponsor with Company Witness Jon M. Berkin the DEQ Supplement provided as part of the Company's Application.

Q. What activities have been or will be undertaken to reasonably minimize the environmental impact of the proposed Rebuild Project, and describe the environmental permitting process that will follow the State Corporation Commission (the "Commission") approval of the Rebuild Project?

A. DEQ will conduct an environmental and permitting review of the Company's Application, including the solicitation of comments from relevant agencies. The Company developed the DEQ Supplement attached to the Application based on previous Company coordination with the DEQ. The DEQ Supplement contains, in addition to a brief description of the Project, information on impacts and the status of agency review with respect to the following: air quality; water withdrawals and discharges; wetlands; solid and hazardous waste; natural heritage and threatened and endangered species; erosion and sediment control; archeological, historic, scenic, cultural, and architectural resources; use of pesticides and herbicides; geology and mineral resources; wildlife

resources; recreational, agricultural, and forestal resources; and transportation infrastructure. The proposed route for the Project is 4.3 miles long and utilizes an existing 230 kV transmission line easement along the Washington & Old Dominion Park trail for approximately 0.6 mile, and will be predominantly located within road right-of-way belonging to the Virginia Department of Transportation. The appropriate environmental studies will be made of these areas before construction begins. The DEQ Supplement also discusses the permits that will be required and comment letters and other materials the Company has obtained regarding the Project from relevant agencies as a result of its own efforts.

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

A. Yes, it does.

BACKGROUND AND QUALIFICATIONS OF AMANDA M. MAYHEW

Amanda M. Mayhew graduated from the University of Connecticut in 2003 with a Bachelor of Science in Environmental Science. She also obtained a Master of Business Administration from Quinnipiac University in 2013. Ms. Mayhew joined the Company's Transmission Right-of-Way group in May 2014 as a Senior Siting and Permitting Specialist, the position she presently holds.

Prior to working for the Company, Ms. Mayhew worked as an environmental scientist for the Northeast Utilities Service Company in Connecticut. She worked in the Transmission Siting and Permitting group from 2003 to 2014, obtaining environmental permits and assisting in siting proceedings with the Connecticut Siting Council.

Ms. Mayhew has previously testified before the Virginia State Corporation Commission.

Witness Direct Testimony Summary

Witness: Jon M. Berkin

Title: Principal Environmental Consultant, Environmental Resource Management

Summary:

Company Witness Jon M. Berkin adopts and sponsors the Environmental Routing Study provided as part of the Company's Application. Mr. Berkin also adopts and co-sponsors with Company Witness Amanda M. Mayhew the DEQ Supplement provided as part of the Company's Application.

A statement of Mr. Berkin's background and qualifications is attached to this summary as Appendix A.

DIRECT TESTIMONY
OF
JON M. BERKIN
ON BEHALF OF
VIRGINIA ELECTRIC AND POWER COMPANY
BEFORE THE
STATE CORPORATION COMMISSION OF VIRGINIA
CASE NO. PUR-2017-00143

Q. Please state your name, position and place of employment and business address.

A. My name is Jon M. Berkin. I am employed as a Partner with Environmental Resource Management ("ERM"). My business address is 1000 IDS Center, 80 South Eighth Street, Minneapolis, Minnesota 55402.

Q. What professional experience does ERM have with the routing of linear energy transportation facilities?

A. ERM has extensive experience in the routing, feasibility assessments, and permitting of energy infrastructure projects. It has assisted its clients in the identification, evaluation and development of linear energy facilities for the past 25 years. During this time it has developed a consistent approach for linear facility routing and route selection based on the identification, mapping and comparative evaluation of routing constraints and opportunities within defined study areas. ERM uses data-intensive Geographic Information System spatial and dimensional analysis and the most current and refined data layers and aerial photography resources available for the identification, evaluation and selection of transmission line routes. In addition to Dominion Virginia Power, its clients include some of the largest energy companies in the United States, Canada and the world, including ExxonMobil, TransCanada, Shell, NVEnergy, Niagara Mohawk, Kinder Morgan, British Petroleum, Enbridge Energy and others. ERM also routinely assists the staff of the Federal Energy Regulatory Commission and the U.S. Forest Service in the

identification and/or evaluation of linear energy routes to support federal National Environmental Policy Act evaluations. ERM works on both small and large energy projects and has assisted in or conducted the routing and route evaluation of some of the largest electric transmission line and pipeline facilities in North America.

In Virginia, we served as routing consultant to Virginia Electric and Power Company ("Dominion Energy Virginia" or the "Company") for its Cannon Branch-Cloverhill 230 kV transmission line project in the City of Manassas and Prince William County, approved by the Commission in Case No. PUE-2011-00011. We similarly served as the routing consultant for the Company's Dahlgren 230 kV double circuit transmission line project in King George County, approved by the Commission in Case No. PUE-2011-00113. ERM also served as the routing consultant for the Company's Surry-Skiffes Creek-Whealton 500 and 230 kV transmission lines in Case No. PUE-2012-00029; for the Company's Remington CT-Warrenton 230 kV Double Circuit transmission line, approved by the Commission in Case No. PUE-2014-00025; for the Haymarket 230kV Line and Substation Project pending in Case No. PUE-2015-00107; for the Remington-Gordonsville Electric Transmission Project, approved by the Commission in Case No. PUE-2015-00117; and most recently for the Company's Norris Bridge project pending in Case No. PUE-2016-00021.

ERM's role as routing consultant for each of these transmission line projects included preparation of an Environmental Routing Study for the project and submission of testimony sponsoring it.

Q. What were you asked to do in connection with this case?

A. In order to resolve a projected criteria violation of the mandatory NERC Reliability Standards for the 230 kV lines feeding the substations serving the Tysons and McLean areas of Fairfax County and to maintain reliable service to the overall growth in the area, Dominion Energy Virginia proposes to (i) construct a new single circuit 230 kV underground transmission line, designated 230 kV Idylwood-Tysons Line #2175, to run approximately 4.3 miles from the Company's existing Idylwood Substation to the Company's existing Tysons Substation, with the project located entirely in Fairfax County; (ii) rebuild the Tysons Substation using Gas Insulated Substation ("GIS") equipment to accommodate a six-breaker 230 kV ring bus within the existing property boundaries; (iii) install new Gas Insulated Line ("GIL") terminal equipment at Idylwood Substation for the new Line #2175 installation; and (iv) perform relay work at Reston Substation (collectively, the "Project").

ERM was engaged on behalf of the Company to assist it in the identification and evaluation of route alternatives to resolve the identified electrical need that would meet the applicable criteria of Virginia law and the Company's operating needs.

The purpose of my testimony is to introduce and sponsor the Environmental Routing Study, which is included as part of the Application materials filed by the Company in this proceeding. I am also co-sponsoring, with Company Witness Amanda Mayhew, the DEQ Supplement.

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

A. Yes, it does.

BACKGROUND AND QUALIFICATIONS OF JON M. BERKIN

Jon M. Berkin earned a Bachelor of Arts degree from Boston University and a Master of Arts and a Doctoral degree from Bryn Mawr College. He has 24 years of experience working in the energy-related consulting field specializing in the siting and regulatory permitting of major linear energy facilities, including both interstate and intrastate electric transmission lines and gas and oil pipelines throughout the United States. During this time he was employed for 5 years with R. Christopher Goodwin and Associates, Inc. and 19 years with ERM, a privately-owned consulting company specializing in the siting, licensing and environmental construction compliance of large, multi-state energy transportation facilities.

Mr. Berkin's professional experience related to electric transmission line projects includes the direct management of field studies, impact assessments and agency consultations associated with the routing and licensing of multiple transmission line projects in the mid-Atlantic region, including the management and/or supervision of the routing and permitting. Work on these projects included studies to identify and delineate routing constraints and options; identification and evaluation of route alternatives; and the direction of field studies to inventory wetlands, stream crossings, cultural resources and sensitive habitats and land uses. Within the last several years he has managed or directed the identification and evaluation of over 100 miles of 230 and 500 kV transmission line route alternatives in the Commonwealth for Virginia Electric and Power Company.

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